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Assessment of Project Monitoring and Controlling Practice: The case of Elevation Diplomatic Residence Building Project.

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Statement of Declaration

I, Robel Demissie Tiba, declare that this project work entitled “Assessment of Project Monitoring and Controlling Practice: The case of Elevation Diplomatic Residence Building Project.” is outcome of my own effort and that all source of materials used for the study have been duly acknowledged. I have produced it independently except the guidance and suggestion of the research advisor. This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters of Art in Project Management.

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Date: _____

Statement of Certification

This is to certify that Robel Demissie Tiba has carried out this project work entitled ‘‘Assessment of Project Monitoring and Controlling Practice: The case of Elevation Diplomatic Residence Building Project”**.** The work is original in nature and is suitable for submission for the reward of the MA degree in Project Management.

By: **Dr. Wubshet Bekalu**

Signature: _____

Date: _____

Acknowledgment

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Abstract

*The implementation of a standard monitoring and controlling practice which includes a good planning and methods of implementation has an essential factor on keeping a project execution on track/plan and it enables to make a corrective action for the performance variance as earlier as possible. In many construction projects, the lead consulting firm commences the monitoring and controlling activity based on their company culture and individuals experience instead of following the international and scientific methods. The intention of this research is to assess the practice of monitoring and controlling process during the construction of diplomatic resident apartment building called "**Elevation Diplomatic Residences"** in Addis Ababa, Ethiopia. The research proposed to illustration the monitoring and controlling plan, methods of implementation, best practices and strategies implemented during the construction phase and associate the practice with the international standards and scientific method. The research has used a quantitative research approach and uses a descriptive design to define the study population, character and responses. The primary data were gathered through a questioner. 25 target population were selected from the project management team, contractors, consultant and developer's representative depending on their involvement on the monitoring and controlling process. SPSS v.27 is used to simplify long statistical computations. The overall findings indicate that the project had implemented a standard and scientific monitoring and controlling practices. However, the project lacks a clear variance threshold for schedule, cost, performance and scope creep. In addition, the project did not have a risk management plan. The research has a recommendation for the consultant and project management office to emphasize on the risk management and variance threshold plan. Finally, it is recommended to do further study on the area of evaluation and relationship to the project success.*

Keyword: *Construction Project Management, Project Monitoring and Controlling Practice*

Table of Contents

I. Chapter One: Introduction 1

1.1. Background of the Study 1

1.2. Background of the Organization 3

1.3. Statements of the Problem 4

1.4. Research Questions 5

1.5. Research Objectives 6

1.5.1. General Objectives 6

1.5.2. Specific Objectives 6

1.6. Significance of the Research 6

1.7. Scope of the Research 7

1.8. Limitation of the Research 7

1.9. Operational Definition of Key Term 7

1.10. Organization of the Research Document 8

II. Chapter Two: Literature Review 9

2.1. Project Concept 9

2.2. Project Management Concept 9

2.3. Construction Project Management 10

2.4. Construction Project Management Processes 12

2.4.1. Project Initiation 12

2.4.2. Planning Phase 12

2.4.3. Execution Phase 13

2.4.4. Closing Phase 13

2.5. Monitoring and Controlling Process 13

2.6. Methods of Implementing Monitoring and controlling 15

2.6.1. Project schedule Monitoring and Controlling 15

2.6.2. Project Cost Monitoring and Controlling 17

2.6.3. Project Scope Monitoring and Controlling 20

2.7. Importance of Project Monitoring and Controlling Practice 21

2.8. Components of Good Monitoring and Controlling Practice 22

2.9. Empirical Review 23

2.10. Summary of literature review 24

2.11. Conceptual Model Diagram 25

III. Chapter Three: Research Methodology 26
3.1. Introduction 26
3.2. Research Approach 26
3.3. Research Design 27
3.4. Population and Sampling 27
3.5. Data Collection 28
3.6. Data Validity and Reliability 29
3.6.1. Validity 29
3.6.2. Reliability 30
3.7. Data Analysis 31
3.8. Ethical Consideration 31
IV. Chapter Four: Data Analysis, Presentation and Interpretation 33
4.1. Demographic Features 33
4.2. Assessment of Project monitoring and control process 34
4.2.1. Project monitoring and control plan 34
4.2.2. Implementation of monitoring and control plan 35
4.2.3. Best practice of monitoring and control process 37
4.2.4. Monitoring and control technique 38
4.2.5. Monitoring and control strategy 40
V. Chapter Five: Summary, Conclusion and Recommendation 41
5.1. Summary of Findings 41
5.2. Conclusion 42
5.3. Recommendation 43
5.4. Recommendation for future study 44
Reference 45
From Book / Articles 45
From Websites 48
Research Questionaries 49

List of Figure, Table and Chart

List of Figure

Figure 1 Construction Project Structure.....11
Figure 2 Cost monitoring and control cycle.....20
Figure 3 Conceptual frame work.....25

List of Table

Table 1Reliability Analysis 31
Table 2 Demographic Feature Summary 33
Table 3 Project monitoring and control plan Descriptive Statistic 35
Table 4 Implementation of Monitoring and Control Plan Descriptive Statistic 37
Table 5 Best Practice of Monitoring and Control Process Descriptive Analysis 38
Table 6 Monitoring and Control Technique Descriptive Analysis 39
Table 7 Monitoring and Control Strategy Descriptive Analysis 40

List of Charts

Chart 1 Monitoring and Control Plan 34
Chart 2 Implementation of Monitoring and Control Plan.....36
Chart 3 Best Practice of Monitoring and Control Process.....37
Chart 4 Monitoring and Control Technique 39
Chart 5 Monitoring and Control Strategy.....40

I. Chapter One: Introduction

This chapter gives an overall view of the research document. It defines the background of the study and the organization, statement of the problem, research question, research objectives, significance of the research, Scope of the study, limitation of the research, definition of keywords and organization of the research document.

1.1. Background of the Study

The (PMI, 2020) Pulse of the Profession report identified the following factors as the causes of the project failure: poor communication (19%), senior management's lack of communication (18%), employee resistance (14%), and insufficient funding (9%). The report also noted that the lack of clearly defined and/or achievable milestones and objectives to measure progress accounted for 37% of the failures. Clear targets and benchmarks are used in the monitoring and controlling process to gauge progress. Monitoring and controlling all project activity to make sure it is progressing as planned is one of the main duties of a project manager. To accomplish the performance targets specified in the project management plan, this process entails monitoring, evaluating, and reporting overall progress.

In (PMBOK, 2013) 6th edition, a project monitoring and controlling practice defined as a process that consist of required to track, review, regulate the progress and performance of the project, identify areas in which changes to the plan is required and initiate the corresponding changes.

According to (Abdullah Oguz, 2022) Monitoring and controlling project activity enables stakeholders to gain insight into the future project status with cost and schedule estimates, recognize the measures taken to resolve any performance issues, and comprehend the current condition of the project.

A project's progress is periodically evaluated as part of the monitoring and controlling process to ensure that goals are being met and that it is still serving organizational demands. It entails figuring out what remedial action has to be taken, when it needs to happen, and who needs to do it. An efficient system that enables the project team to reliably and efficiently collect performance data is necessary for effective monitoring. The project budget and schedule status

are two pieces of information that are frequently gathered. It is particularly interesting to know what has already been done, what needs to be done, and how likely it is that the project will be finished on schedule and on budget. Additionally, it's critical to recognize the dangers and problems that demand attention. Information technology should be used whenever possible to gather, analyses, and share the data. An "end-to-end" approach to progress reporting is required from Project Management Office, which entails their involvement from data gathering to report distribution. Progress monitoring is influenced by who performs it (from a formal perspective) and how (from an informal one) by organizational policies and organizational culture.

Team meetings are one of the often-employed strategies for tracking progress. Meetings with the team are very collaborative and have a variety of uses, such as knowledge exchange and team building. These sessions may only be used to share updates on tasks that are currently in progress, depending on the nature of the project. Additionally, status conversations may result in team planning.

Typically, project teams produce different reports for various stakeholders. High-influencing and high-interested stakeholders will get more information very frequently. The frequency of the reporting might be daily, weekly, monthly, or quarterly, depending on the importance and length of the project. Among different types of reports status reports, progress report and forecast reports are the common.

According to Global Data, the size of Ethiopia’s construction market reached $41 billion in 2021. Its average annual growth rate is expected to increase by more than 8% over 2023-2026, indicating a promising future for the industry.

In most building construction projects, the monitoring and controlling process undertakes by the Project Management and Consulting firms. They basically focused on examining the project performance, keeping on the schedule, staying on the budget, avoiding scope creep and managing risks.

The general purpose of this project study is to assess the practice of monitoring and controlling process during the construction of 2B, G+7 high end diplomatic resident apartment called Elevation Diplomatic Residences.

1.2. Background of the Organization

Elevation Diplomatic Residences is a 2B, G+7 residential tower with 112-unit diplomatic residential apartments tower on the third largest hub of diplomats in the world-Addis Ababa, Ethiopia by DH One Real Estate PLC ("DH One"), a joint venture between Africa Property Development Specialist, Gateway Real Estate Africa ("GREA") and Verdant Ventures ("Verdant"), a property developer from the US with an Africa focus (Capital Magazine).

DH ONE REAL ESTATE PROJECT is high-end and high-tech project with a total development and construction cost of 54Million USD and 36Million USD respectively. The project has site works, softscapes, and hardscapes; it is situated on 1.63 Acres (6,600 m^2) land and has a built-up area of 30,494 sq. Ft (2,833 m^2); the apartments have an average unit size of 1295 sq. Ft (120 m^2) and each apartment is furnished with appliances and intended to give world class amenities. The building is equipped with full-fledged active & passive firefighting systems, stair pressurization, state-of-the-art ICT infrastructures, centralized high security features, swimming pool, potable water treatment, borehole water, sewage treatment plant, and two standby generator system.

The project completed and inaugurated in a year 2021, this 7-storey development will be the only security, seismic and international standard compliant housing development for consular staff in Ethiopia in a country distinguished as the third largest diplomatic community in the world after Washington DC and Brussels with over 130 diplomatic missions.

The project was undertaken by a local Project Management Consultant (SYMBIO Project Management), one Lead Consultant (BIGAR Builders & Developers), five other Specialist Consultants, two Main Contractors, and ten Specialist Subcontractors.

1.3. Statements of the Problem

(Tigbu A., 2022) Ethiopia committed ETB183.5 billion, or 33%, of the anticipated ETB561.67 billion yearly budget (2021–2022) for capital expenditures only, which are primarily distributed through projects. Given the significant and continuous infrastructure development, it is reasonable to say that project management is now and will remain a crucial part of the nation's economy for some time to come. The Ethiopian economy gives project management very little attention, despite the fact that it has an obvious potential to be a crucial tool for the economy.

However, Ethiopian customary practice falls well short of what project management methods and principles require. Projects are typically started from the top down and completed without going through a thorough process and stakeholder or technical, financial, institutional, commercial, delivery, or sustainability review.

Relationships are prioritized over project management knowledge and skill because they are seen as being more beneficial to people than to organizations or society as a whole. Even worse, poor project status disclosure to the public creates a Pandora's box of potential assumptions.

It is essential to implement a standard metric (value capturing systems), carry out deeper analyses across all project dimensions, and effectively communicate rather than relying on individual employees' subjective perspectives in order to truly capture the value from projects. While leaders are present to provide guidance and set the tone, the actual project work should be carried out using a scientific method rather than just following orders.

(Sinesilassie et al., 2017), reinforcing the above statement on his literature by saying that Ethiopian public construction project management, issues of people's competency based on project management knowledge are given less attention. Despite the current construction boom, no serious research on construction project timetable performance has been undertaken in Ethiopia.

(Hailemeskel T., 2020) Even though Ethiopia's construction sector is flourishing, it is still difficult to deliver projects efficiently in terms of time, money, and quality. Application of knowledge-based, vitally important aspects is the key to successful construction projects. The

degree to which each organization has incorporated project management expertise determines the effectiveness of the sector.

It is a common situation these days, construction projects end by causing extra money, time and very stretched scope of work. Many project managers agreed that a poor practices of monitoring and controlling process is the major reason for a project failure. The less availability of a well design and systematic method, incompetency of PM team and lack of technical knowledge on the area makes the monitor and control process very tough.

The monitoring and control process of a project allows managers to establish effective project timelines including scope, budget and schedule. This information can then be used to monitor the progress of the project throughout its lifecycle. Gathering timely data allows managers to make informed decisions and take advantage of opportunities and any changes that need to be can be made beforehand, reducing significant time waste.

In many local building construction projects, the Project Management and Consulting firm practices the controlling and monitoring process based on their organizational culture and individuals experience instead of following a proper standards and scientific method of doing it.

The intent of this research is to assess the monitoring and controlling practice during the construction 2B, G+7 building and tries to give insight on the gaps.

1.4. Research Questions

- What are the components of monitoring and controlling plan?
- How well the monitoring and controlling plan was implemented?
- What methods or techniques has been used for monitoring and controlling practice?
- What best practice of monitoring and controlling process implemented according to the international standards?
- What strategy has been used for project monitoring and controlling plan implementation?

1.5. Research Objectives

The research objectives define the goals of the research endeavor. They should direct every phase of the research process, including data collection, argument development, and conclusion development. (Eoghan, 2022)

1.5.1. General Objectives

The general objective of this study is to assess the overall monitoring and controlling practice during the construction of **Elevation Diplomatic Residence** Project.

1.5.2. Specific Objectives

- ✓ Asses the project monitoring and controlling plan
- ✓ Asses the implementation process of monitoring and controlling plan
- ✓ Asses methods used to perform the monitoring and controlling process
- ✓ Classify the components of best monitoring and controlling practices according to international accepted standards
- ✓ Identify the strategies used for monitoring and controlling practice

1.6. Significance of the Research

The findings of this study can be used by construction project management and consulting offices to develop a standard monitoring and control handbook for construction projects.

Those participating in project management responsibilities will be able to recognize the strengths and flaws of the practice through the research conclusions, which will be used as a lesson for future projects.

Finally, the findings of this study can be used as a starting point for future study on project management practice evaluation and its relationship to project success.

1.7. Scope of the Research

The scope of the research is limited to the project monitoring and controlling practice on the project budget, schedule, performance, and scope management during the construction of a 2B, G+7 diplomatic residential apartment from February 2019 to December 2021.

1.8. Limitation of the Research

The major data gathering method used in the study was just questioners, which provides a one-way answer and may limit the respondent's explanation. There is also the potential that the concept of the questioner is misunderstood. To address these constraints, the researcher attempted to create clear, standard, and straightforward questions for the respondents.

1.9. Operational Definition of Key Term

APM Body of Knowledge 7th edition defines the key operational terminologies as follows:

Acceptance criteria: Is a set of pre requirements, standard and essential conditions that have to be achieved before a deliverable is accepted.

Baseline: is reference levels used for project monitoring and controlling purpose.

Change: A variation to a project's baseline scope, cost, time or quality objectives.

Change control: a procedure by which all requests to alter the baseline that has been approved for a project, program, or portfolio are gathered, assessed, and either approved, denied, or deferred.

Client: Is an individual or institution who has a legal ownership right of a project.

Constraints: Restrictions that will directly affect a project performance. Time, money, standards, scope, environmental factors, etc.

Contractor: A company or institution who is legally registered, accountable and capable of doing a specific job and delivery according to the agreed contract agreement on a specified time, budget and standard to the client.

Designer: An individual or a firm who is legally registered, accountable and capable of designing a specific work item according to the client requirement and local authority standards on the specific time and budget.

Investor: Is a full or partial financial source for the execution of a project.

Project manager: An individual who is assigned on a project to lead and manage all the project team and make all the necessary decision to guarantee the success of a project.

Stakeholder: an individual or a group of people who has a different level of involvement on a specific project execution in having a common interest, understanding and thrives to succeed the project objectives together.

1.10. Organization of the Research Document

This research document has five chapters. The first chapter is an Introductory section that provides an overview of the research document, the study's and organization's background, a statement of the problem, general and particular objectives, the importance of the study, the scope of the research, and limitations. The second chapter is a Literature Review part that raises many supporting literatures on the topic of project monitoring and controlling plan, methods of implementation, best practice, and importance of the practice. The third chapter contains a section on Research Methodology, which discusses the implemented research design and approach, population and sample size, data gathering and analysis methods, data reliability and validity check, and finally the ethical considerations made during data collection. The fourth chapter is about data analysis, interpretation and presentation. The last chapter gives summary of the findings, conclusion and recommendation.

II. Chapter Two: Literature Review

2.1. Project Concept

According to (Project Management Institute, 2003) Project is an activity which has a defined starting and ending timeframe commenced to produce a unique output / product / service within a specific budget, schedule and expected values.

(William 2023) A project is a collection of actions that must be performed within a certain time frame in order to achieve a specific set of goals. These duties are carried out by a group of people known as the project team, which is managed by a project manager who oversees project planning, scheduling, tracking, and completion. Aside from the project team, resources such as labor, materials, and equipment are required. Projects with a wide range of aims are managed by organizations and individuals. These can range from building a structure to preparing an event to executing a certain duty.

2.2. Project Management Concept

According to (PMBOK, 2008) definition **p**roject management is a profession that applies a combination of processes, methods, skills, knowledge, and experience to achieve a specific project objective with in the project acceptance criteria, timeframe and budget.

The other definition given by (Project Management Institute, 2003) is a project management is a system as software that can help strategize, organize, and manage resource streams and develop resource approximations.

Also, (Peng et al., 2007) define project management as a profession that involves an activity of planning, execution, and monitoring of project activities to meet project objectives. Effective implementation of controlling and monitoring the constraints of scope, schedule, and budget can guaranteed the success of a project.

Largely, project management is a wide range task that is executed from the stage of project idea initiation to the project completion or closure. Sometimes it goes beyond from the closure phase and involves on the project impact evaluation process. As it stated in the above, the primer goal

of project management practice is to execute the client interest in a very professional and accountable manner complying with the government policies, rules and social values.

A project management process requires strategic method of doing things, soft and hard skills, knowledge, and experience with the help of software to make a strategy, organize, and manage resource streams and develop resource approximations.

2.3. Construction Project Management

Construction project management, unlike managing a single company, varies in its extensive coverage to coordinate and regulate all project processes important to the effective completion of the projects. There are no two projects that are exactly same. Construction project managers are mandated to deliver his obligation while working with organizations other than his own (Sears et al., 2015).

Construction projects are uncertain and complex due to the high level of asset specificity, and there are numerous requirements that must be met both throughout the design and construction processes, according to (Awuzie and McDermott, 2013).

The procedures required to properly execute a building project are referred to as construction project management. It deals with organizing, carrying out, and planning a building project. Construction project managers make ensuring that, throughout the project's lifecycle, every component is supported and carried out effectively, (Diana, 2015)

A very known construction management software developer called “Letsbuild” define construction project management as a direction, regulation, and supervision of a project from early development to completion stage of construction. The end result of construction project management is to completely satisfy the client's desire for a project that is worthwhile in terms of both functionality and cost. There are many different kinds of construction projects, including heavy civil, commercial, residential, and industrial. The building construction project management procedure will be the focus of this study.

A construction project manager is responsible for planning, coordinating project team, set a project budget and get approval by the client, evaluate and hire qualified project team, control

and monitor project execution, set bench mark goals, deliver a project on time, stay on budget and schedule, constantly communicate client's and project stakeholders, manage disputes, develop contract documents, plan risk management, prepare project closure document and get approval by the client.

Proper communication and engagement with stakeholders are the basic factor for an efficiently operated construction project.

The construction project manager chooses the contractor of the project as soon as the design is completed. In some cases, this can happen even when the project is still in development. The selection is based on an auction process with various contractors. There are three prevailing methods based on which a contractor is picked: low-bid selection, best-value selection, and qualification-based selection. Contractors should be able to deal with deadlines, budget issues, public safety, decision making, quality management, working drawings, human resources, and mathematics.

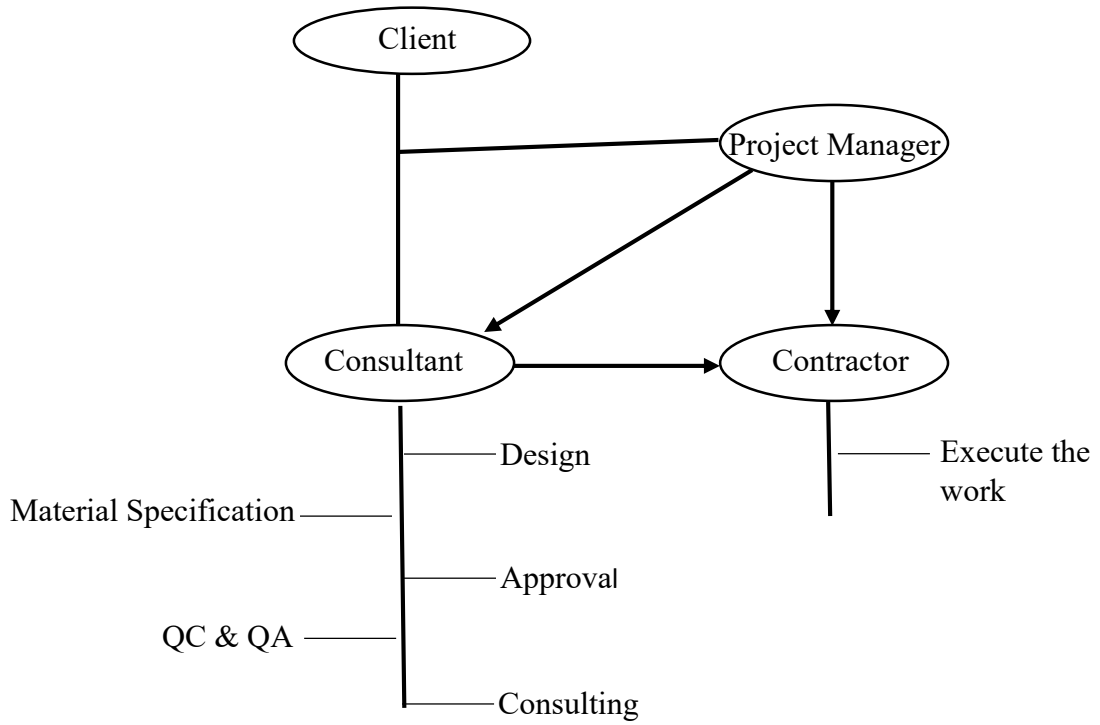

Figure 1 *Construction Project Structure*

2.4. Construction Project Management Processes

Construction management starts with the design phase when the bid and selection process is complete, followed by pre-construction and procurement. The team then finishes off construction and commissioning. The project is finished once the owner assumes possession and confirms the building complies with specifications.

According to (PMBOK, 2013) cited by (Haseena V., 2015) there are four basic construction project management phases which outlined below.

2.4.1. Project Initiation

Before the beginning of the project, the objective and feasibility of the project needs to be determined by the project manager. Feasibility studies will be conducted and based on its result a recommended solution/plan is issued.

If the project feasibility is decided, a project initiation document (PID) will be created. The project initiation document provides the basis for the construction plan and is one of the most vital pieces in project management process.

2.4.2. Planning Phase

The team separates out all the work that has to be done during the project planning phase. It is a continuous process that is virtually complete. Priorities during the planning stage include budgeting, resource allocation, and scheduling. The team is creating the required strategy based on these needs. It's referred to as scope management.

Another important document that is going to be prepared on the planning phase is a **Work Breakdown Structure (WBS)**. It is a list of detailed divides all the necessary work into smaller more functional categories and sequential order. It is a very essential document for scheduling purpose and resource allocation.

As soon as the budget, schedule, and work have been defined, the project is almost ready to begin. The next step will be developing a **Risk Management Plan**. It is a document states unknown potential project threats or benefits depending on the previously recorded project or

individual experience and define how to respond for it. According to the extent of damage the risk causes and the frequency of occurrence, responses to the risks could be avoiding, controlling, accepting or transferring.

Finally, a **Communication Plan** will be developed. It outlines all aspects of communication, such as defining the purpose of communication, methods of communication, tools for communication and defines when and with whom to communicate. The communication plan creates a common framework to be used effortlessly and avoid misunderstandings or conflict and it will establish an efficient information flow among the project stakeholders.

2.4.3. Execution Phase

The construction project management strategy is implemented during the execution phase. Typically, there are two key operations in this phase: the Executing and the Monitoring and Controlling. The project team monitors the completion of the necessary tasks. Progress is tracked concurrently, and adjustments are made as necessary.

The concept, method of application, purpose and the components of best practices of a project monitoring and controlling process will be discussed on the next chapter.

2.4.4. Closing Phase

An official completion and project handover will mark the end of the construction project. The project manager is taking stock of what went well and mentioning any potential pitfalls. The team then conducts a project report, determines the overall budget, and provides details on any tasks that are still outstanding.

The project report in combination with the analysis of the potential failures will be valuable feedback for future construction projects and lesson learn.

2.5. Monitoring and Controlling Process

Monitoring, according to (Crawford and Bryce, 2003), is an ongoing internal process that incorporates data gathering and analysis with the aim of enforcing the project activity's competence. The ability to effectively transform inputs into outputs while adhering to the budget, deadline, and resource allocation techniques is defined by the authors as competency. It

highlights the operational concept of monitoring and admits that monitoring plays a significant role in project control. According to the operational definition of monitoring, project control decisions, such as corrective action and decision-making related to projects, are generally made by the project manager using monitoring.

However, controlling uses data findings from the monitoring process and make changes. By using this data, project managers can actively adjust the project performance in order to maintain alignment with the original plan. This can help ensure a project remains on track and stays true to the original objectives and goals set. Project management monitoring and controlling means actively reviewing the status of project as it proceeds, evaluating potential obstacles, and implementing necessary changes.

According to (PMBOK, 2013), ongoing monitoring is required to ensure project performance under proper management. Continuous monitoring entails evaluating and documenting a range of project-related actions on a frequent basis in terms of time, cost, and quality. Every day, every week, every month, or every year, these recurrent periods could take place. The daily reports provide information on the real labor force, equipment, material deliveries, and work completed on a given day. Include details on the Schedule Performance Index (SPI) and Cost Performance Index (CPI), a comparison of actual and anticipated activity, any threats, and the strategic choices that the client or senior management must make in the weekly reports. Biweekly and monthly meetings should also be attended by the client, consultant, and contractor to discuss the project's development in depth.

Nearly every building endeavor encounter constraint at some point throughout their development. Schedule, budget, and scope are the three most typical. The triangle shape is frequently used to symbolize these three significant variables, also known as "the triple constraint." These three constraints were the main focus of the monitoring and controlling procedure in relation to the quality or customer expectation standard.

2.6. Methods of Implementing Monitoring and controlling

2.6.1. Project schedule Monitoring and Controlling

Mismanagement frequently leads to schedule delays, which can be considered as a risk for construction projects. If this risk were to be detected, examined, and managed systematically across all phases of the project life cycle, it could be managed, minimized, and mitigated T. (Umar, 2018)

The author states that project schedule is a document that details when a certain activity will begin to be carried out, how long it will take to finish, and what happens next in the context of the resources provided and the anticipated output. Risks that could occur during a building project could be reduced with a well-prepared schedule. Scheduling is mostly used to optimize the distribution of supplies and resources within a project. By doing so, any potential delays can be prevented and improved communication between all the stakeholders can be guaranteed.

According to Australian Institute of Project Management blog there are seven popular project scheduling tools and techniques.

A. **Task list**: which is a simple list of activities, responsible person and task ending day. It is recommended for small scale projects.
B. **Work Breakdown Structure**: It shows every required step to complete the project shown in graphically and hierarchically order. It's an excellent starting step in segmenting the project scope into more manageable pieces. It provides a foundation for resource planning, cost estimation, and more intricate scheduling methods.
C. **Gantt Chart**: It is a graphical representation of activities task's start and end dates, dependencies, scheduling, and deadlines, as well as the percentage of the task that has been completed in each stage against the plan and the task owner.
D. **Simulation**: By creating many schedules that accommodate various eventualities, it's possible to simulate. It works well for estimating project duration when there are risks, ambiguities, and the need to account for unknowns. It's adjustable and fluid, enabling users to make a timeline that may be changed as the project progresses and certain details become more certain.

E. Mathematical Method

a. **Critical Path Method**: It sum up the duration for all activities to get the earliest project completion date. This method will be more effective for the projects where the peak hours of activity are known.

b. **Program Evaluation and Review Techniques**: This method gets an estimate of activities shortest time, the longest time, and the most likely time to complete each task. The weighted average of these three will be the time estimate used in the schedule. It's great for complex projects like research or IT where activity times are unknown.

F. Schedule Compression Method: This is a method to manage lagged schedule to the baseline. Fast tracking and crushing method can be used.

G. Resource Levelling: Resource levelling is a technique for flattening resource demand by making adjustments to the tasks, schedule, or resource distribution. For effective resource allocation, the project manager may allocate resources to projects that are more important or divide the work among the available resources.

Project managers must continually keep track of the numerous moving pieces that make up each project. Understanding whether a project is on or off schedule is a core duty of project management. The Project Management Institute (2013) defines control schedule as the method for comparing schedule progress to the baseline.

To summarize the above ideas, there are a few basic steps that a project manager needs to follow while monitoring and controlling a project schedule.

- ✓ Review the schedule and schedule baseline frequently.
- ✓ Identify changes and take corrective action immediately.
- ✓ Continuously monitor the progress of the project and make necessary adjustments if it is not aligned with the original plan.
- ✓ Communicate the project status with all stakeholders frequently.
- ✓ Keep the project on track and ensure its successful completion.

2.6.2. Project Cost Monitoring and Controlling

APM's Planning, Scheduling, Monitoring and Control (2015) The technique of cost control involves gathering actual costs and organizing them so that they can be compared to project budgets. Cost control is required to maintain a record of money spent in order to, among other things, decrease costs when feasible and identify areas of cost overspending.

Client always wants the project to be finished as quickly and for the less costly as feasible. To track cost performance, a performance standard must be adopted or created by the project manager (Larry, 2002)

According to (Harold, 2009), poor planning, scheduling, estimating, and cost control contributed significantly to the quantitative failure of projects in the 1980s.

On research conducted by (Nega, 2008) in Ethiopia the predominant factors for cost overrun in public building construction projects are poor planning, inflation and client change orders are the most reason.

APM Body of Knowledge 6th edition define as one of the most crucial aspects to take into account when planning a construction project, and effective implementation of this aspect is by far one of the most crucial elements for the success of a project. It makes it possible for project managers to plan their expenses, distribute resources appropriately, and manage overall cashflows.

(Jennifer, 2022) classified project cost management processes in four basic phases.

1. **Resource planning**: it is a process of identifying the type, amount and quality of resource required for a specific task at a specific time. Resources can be a material, equipment or labor. A project scop statement, work breakdown structure (WBS), companies' capacity and previously recorded data can be used as an input for resource planning.

2. **Cost estimation**: it is a process of estimating the amount of money required for a specific task. Data from the previously executed similar task or experience could be a raw data for estimation.
3. **Budgeting:** it is a process of assigning or allocating an estimated and approved cost for a specific task. It helps to develop a cost baseline.
4. **Cost monitoring and controlling:** is a process of measuring the project cost performance and ensuring it will be executed according to the planned budget.

There are a few tools that helps project managers to track and control the project cost expenses.

i. S-curve (time- cost analysis)

The S-curve is a graphic representation of cumulative costs, labor hours, percentages of work, or other quantities plotted against time, according to the Project Management Body of Knowledge.

(J.R. San Cristóbal, 2017) S-curve helps to monitor a project cost by plotting a graph as a function of the cumulative costs on y-direction against timeframe on x-direction. In this method first the baseline cost against the time frame will be drawn. Then the actual cost expenditure against the actual time taken will be drawn. If the actual S-curve fall under the baseline, it means the project is performed under the budget. If the actual S-curve fall above the baseline S-curve, it indicates the project is consuming more budget than the intended plan and needs a correction action.

ii. Earned Value Method (EVM):

(Michael, 2021) EVM is a method for project performance management that takes risk, cost, and schedule into account. It is used to track progress in comparison to a baseline, detect problems, gauge the effectiveness of deliverables, and estimate the cost and time needed to complete the project. Here are the basic procedures used to track the earned value:

Step 1: Analyze and quantify the amount or volume of completed work at a specific time in the form of a percentile.

Step 2: Fix Planned Value (PV). This is a process of determining budget to complete the scheduled work at the beginning of the project.

Step 3: Compute Earned Value (EV) by multiplying the percentile completion with PV. This allows to understand the expected amount of the actual executed work in cash according to the planned value.

Step 4: Get the Actual Cost (AC) of work performed. This is the amount of money that has been spent for the executed work. This will be the summation of all expenses incurred during the project execution. Data can be gathered from project cost records.

Step 5: Calculate Cost Variance (CV) by subtracting earned value from the actual cost (CV = EV – AC). The result from this represents the cost status of the project. A negative CV indicates the project is over budget and needs a serious attention to be made.

Step 6: Compile and analyze all the findings and report to the project stakeholders for the decision purpose.

The project cost monitoring and controlling process is a continuous and cyclic activity performed throughout the project life time.

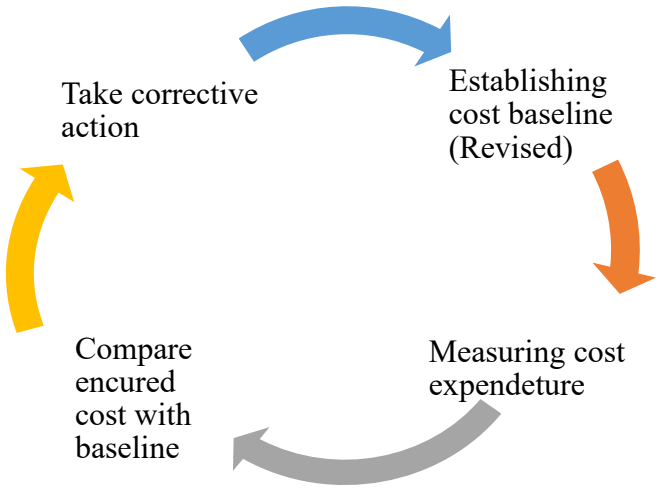

Figure 2 *Cost monitoring and control cycle*

2.6.3. Project Scope Monitoring and Controlling

Control scope refers to the process of keeping track of the project and product scope's progress and controlling modifications to the baseline scope. The control scope is a procedure that enables the scope baseline to be preserved during the course of the project's life cycle. (Lucy B., 2022)

Project management is the primary emphasis of scope control, which is part of the Monitor & Controlling Process Group. The Project Management Body of Knowledge (2013) has recognized it as an approach for managing project modifications.

(Mulder, P., 2017) Scope Control needs to manage every project scope change to prevent budget overruns or serious time overruns. The author suggested the following techniques to use as project scope monitoring and control methods.

- ✓ Review all requested changes
- ✓ Identify and evaluate impact of change
- ✓ Install a procedure that allows a decision-maker to accept or reject changes.
- ✓ Communicate change to concerned parties

- ✓ Get final approval in writing by the client's agent and senior management
- ✓ Amend master plan and contract document to reflect changes
- ✓ Re-planning and project scope statement
- ✓ Ensure changes implemented properly
- ✓ Prepare reports that summarize changes made to date and their impact

2.7. Importance of Project Monitoring and Controlling Practice

As (Kate E., 2022) states on her article, the main goal of monitoring and control in project management is to spot issues early on and make corrections. These adjustments can need reevaluating and revising the project plan.

Project monitoring and control, according to the (PMBOK Guide, 2008), entails a series of procedures intended to monitor, evaluate, and manage the project's progress and performance, spot areas where changes to the plan are necessary, and start the necessary modifications. The project team can identify any areas that may need further attention through continuous monitoring and control, such as project cost, schedule, quality, risk, scope, procurement, and communication management. In order to accomplish the initial project objectives, timely project monitoring and management can assist reduce deviations from intended baselines.

The monitoring and controlling phase are crucial because it is employed to guarantee that a project remains on course and satisfies all specifications laid down in the planning phase. (Travis, 2022)

With the help of management and monitoring, projects stay on track. The timely completion of projects can be significantly impacted by the appropriate controls. The information gathered allows project managers to make informed decisions. They have the ability to take advantage of opportunities, implement changes, and avoid crisis management issues.

Several publications that have been published have emphasized the importance of project control in accomplishing project objectives and asserted that projects perform much better when they receive more attention Avison et al, (2001); (Rozenes et al., 2006)

A project control best practice study found that good project control practices result in better schedule and cost results because they reduce the execution schedule by 15% and increase cost-effectiveness by about 2%.

2.8. Components of Good Monitoring and Controlling Practice

PMBOK Guide (2008), classified monitoring and controlling tools as one dimensional and multi-dimensional. One-dimensional project control tools are simple to implement; however, control is focused on one specific dimension (cost) rather than on the entire set of project objectives. Multi-dimensional project control tools integrate several dimensions within one control system, such as the earned value approach, which was designed to assess cost and time simultaneously.

(Kate E., 2022) mentions that best practices for project monitoring and control necessitate ongoing attention to detail. Project managers and teams can be equipped with these best practices to balance time, cost, and budget. The author also remarks the following parameter as a component of best monitoring and controlling practices.

- ✓ Define project management team roles**,** expectations and the timelines to meet.
- ✓ Identify point of contact dedicated for tracking, documenting and monitoring purpose
- ✓ Set a time and frequency for KPI reporting
- ✓ Define percentage of change is acceptable and the variance threshold figure that requires change for schedule, budget and scope.
- ✓ Determine if the variance cause is common or unique
- ✓ With the project team, review the written change requests and decide whether to accept or reject them.
- ✓ Minimize scope expansion to maintain project parameters and acknowledge that project change may have an influence on results.
- ✓ Conduct rigorous approval process at completion and make sure to document and file all approvals appropriately.

In addition to the above listed methods, the implementation of suitable templates, and tools and a well-defined work break down structure will make very easier and operative monitor and controlling process. Companies' management structure, culture, capacity, human resource, skill, experience and internal check and balance methods has a huge factor on the effective implementation of project monitoring and controlling process.

2.9. Empirical Review

A study made by Hailemeskel T. in 2020 with a title called "Management Control of Projects in Construction Industry in Ethiopia Context." States on his research that there is a lack of project monitoring and controlling practice, and the research respondents emphasize the importance of project control on the six variables namely budget, cash flow, material, time, quality, and workmanship, indicating that the Ethiopian construction industry lacks project monitor and control management practice. The building businesses of today are not interested in specialized professionals. This could be due to knowledge gaps that existed as a result of a lack of exposure to large-scale projects. This has a substantial impact on the quality of project deliverables, project cost and time management, and overall performance.

Research made by Seblewengel N. in 2020 called "The Effect of Project Monitoring and Controlling Practice on Project Success: A Case Study of Projects in Information Network Security Agency" attempted to demonstrate the relationship between project progress monitoring, reporting, change control, and documentation practices and project success. The finding suggests that the project's progress tracking practice was successfully implemented, and it has a positive significant effect on the project. Furthermore, the agency used effective project progress reporting practices, which had a substantial beneficial impact on project success. The final analysis shows that the agency implemented a successful project documentation practice, and multiple linear regression analysis revealed that project documentation has a positive substantial effect on project success.

The other research made by Henok in 2018, with a title called "Assessing the Effect of Project Monitoring and Controlling Practice on Project Success: In the Case of Ethiopian Airlines Digital Project Management Office Concerning project progress follow-up and progress," shows that the respondent was asked to rate their level of agreement with the nine-project

progress report indicator statements presented. The assertions are primarily concerned with regular project performance assessment, actual project status comparison with planned, project status meeting at acceptable intervals, timely and accurate project report, updated data availability, and reporting system effectiveness. The respondents moderately agreed with the project progress report metrics.

According to the response, authority and accountability for project scope change requests are clearly defined. However, the levels of agreement among respondents on the other project change control method are below the average. For example, project change control procedures are not well defined at the start of the project, there is 41 poor practice to assess the effect of project change in terms of project timescales, costs, and quality before the change is approved, risk and impact analysis for project changes is not well conducted, and failure to follow formulated procedures for review and approval of project changes. The outcome implies that there is poor project change management practice, which has a detrimental impact on project success

2.10. Summary of literature review

To summaries the above-mentioned literatures, the project monitor and control process is the most important component for keeping project performance on track and ensuring project objectives are met. The most important components of a strong monitoring and control process are a sound monitoring and control strategy, continuous and proper execution of the plan, and the use of standard tools and techniques.

However, the researcher believes that there is a gap in the literature to illustrate the local context of what the monitoring and controlling process of a construction project should look like, monitoring and controlling tools and techniques to be used for actual construction projects, in addition to the theoretical pictures and components to be called the best monitoring and control practice in a construction project.

To fill this gap, the research evaluated the process of monitoring and controlling practices in such an international and high-quality building project, leading to the conclusion and advice to create a standard monitoring and controlling guidebook for construction projects.

2.11. Conceptual Model Diagram

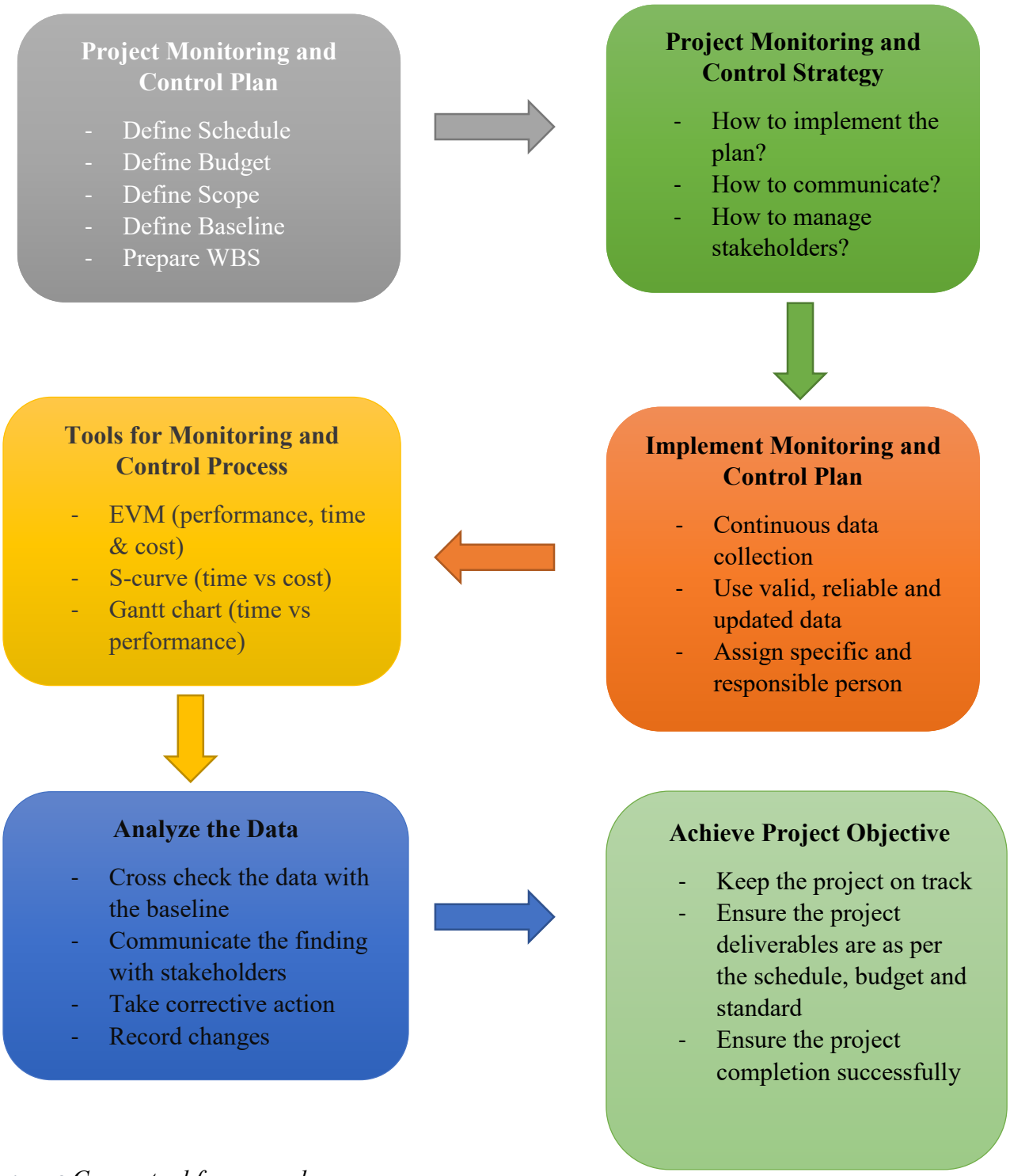

Figure 3 *Conceptual frame work*

III. Chapter Three: Research Methodology

3.1. Introduction

This chapter defines the methodology used for the research approach and design, the total population and sampling size, methods of data collection and analyses, validity and reliability of data and the ethical consideration while data collection.

According to (Leedy, 2010), research is the methodical process of gathering and analyzing data in order to gain a better knowledge of the subject under investigation.

(Brynard, 1997) state that research technique or data collection procedures include a reflection on the research design, organization, and execution in order to meet the demands of truth, objectivity, and validity.

3.2. Research Approach

According to (Yin, 2014), researchers conduct studies in three approaches: **Quantitative**, which utilizes numerical data; **Qualitative**, which uses nonnumeric data; **Mixed** method, which includes both of the aforementioned approaches.

Quantitative approaches emphasize objective measurements and statistical, mathematical, or numerical analysis of data gathered through polls, questionnaires, and surveys, as well as through modifying pre-existing statistical data using computational tools. Quantitative research is concerned with collecting numerical data and generalizing it across groups of individuals or explaining a specific occurrence. (Babbie, 2010)

Due to the nature of the research question, the objectives of the study, and the availability of pertinent information the study used a quantitative research approach. It is a formal, systematic method for describing the participants response. It focuses on measurements, statistical and numerical analysis of the surveyed data.

3.3. Research Design

Plans and procedures for conducting research are known as research designs, and they cover anything from general hypotheses to specific techniques for gathering and analyzing data. Descriptive study methodology allows for the collection of detailed information about the population being investigated, including descriptions of its behavior, attitude, traits, and values (Cresswell, 2009).

(Cooper and Schindler, 2003) summaries the essentials of research design as an activity and time-based plan; always based on the research question; guides the selection of sources and types of information; a framework for specifying the relationship among the study variables; and outlines the procedures for each research activity.

As it stated on the introduction section earlier, the general objective of this research is to assess the project monitoring and controlling process during the construction of 2B, G+7 diplomatic residence building and relate the process with the international standard practices. Due to this, the study implemented a descriptive research design.

3.4. Population and Sampling

(McMillan and Schumacher, 2001) define population as "a group of elements or cases, whether individuals, objects, or events, that conform to specific criteria and to which we intend to generalize the research results."

The target population of the research focused on the total **28** project participants from Client or Developer, Contractor, Consultant and Project Management Office who were directly involved on the project monitoring and controlling process.

The total selected sample size was **25** individuals. The selection criteria were made based on their level of involvement to the process and current availability

- 10 individuals from both shell and core and outfit contractors worked as Project Manager, Construction Manager, Quality Control and Assurance, Quantity surveyor, Office engineer and Site engineer.
- 9 individuals from the lead consultant team worked as Project Lead Architect, Team Coordinator, Senior and Junior Resident Engineers.

- 1 individual from developer's representatives worked as a Quality and Performance Control
- 5 individuals from project management team worked as Project Manager, Construction Manager, Data Controller and Contract Administrator.

Among 25 sampled population, **22** of them (88%) are able to respond for the questionaries.

3.5. Data Collection

Primary and secondary sources of data can be used to collect information. Primary data, according to (Hollensen, 2007), is "information that is collected first-hand, generated by original research tailored to answer specific current research questions." Secondary data, on the other hand, is defined as "information that has already been collected for other purposes and is thus readily available."

There are several methods of collecting primary data, particularly in surveys and descriptive researches. Important ones are: observation, interview, questionnaires, depth interviews, and content analysis (Kothari, 2004). Secondary data include both quantitative and qualitative data. Secondary data are usually collected from journals, existing reports, books, and statistics by government agencies and authorities (Saunders, et al., 2009).

This study uses questionaries as a primary data collection method. The questioner has two sections. The first part of the questionary is the demographic inquires which gives the general characteristic information of the respondent such as gender, educational background, work experience, and representing stakeholder.

The second part has five questionary sections which helps to understand the respondent's feedback regarding to the implementation of project monitoring and control process.

The questionnaire was created utilizing a five-scale scoring system known as the Linkert scale, in which 1 symbolizes strongly disagree, 2 Disagree, 3 Neutral, 4 Agree, and 5 Strongly Agree.

The concept of questionaries is developed from the article wrote by (Kate E, 2022).

> **Project monitoring and control plan**: It is a document that has a set of defined project cost, schedule, benchmark, client/ functionality standards and quality

Implementation of monitoring and control plan: it consists of monitor project parameters, monitor stakeholder involvement, monitor risk, monitor project performance, take corrective action to control progress, monitor and manage data documentation.

Best practice of monitoring and control process: it entails a defined project management team role, assignee qualified and responsible personnel, frequency of KPI reporting, monitor and control scope creep, conduct a rigorous approval process at completion.

Monitoring and control technique: basically, this area focuses on a project plan, cost and status monitoring.

Monitoring and control strategy: it emphasizes on how to implement a good monitoring and control approach that looks at quality, risk, and stakeholder engagement levels and communicates all project outcomes.

The questionaries are presented in soft copy excel format and delivered to the respondents through email. This helps to minimize the paper work cost, transportation cost and time to distribute, collect and filling of questionaries.

3.6. Data Validity and Reliability

3.6.1. Validity

Validity is concerned with whether the study is credible and true, and whether it is evaluating what it is supposed to evaluate. (Creswell, 2014) emphasizes that "validity is an essential criterion for evaluating the quality and acceptability of research." In general, researchers collect data using a variety of equipment. As a result, the quality of these instruments is crucial since "the conclusions researchers draw are based on the information they obtain using these instruments"

(Roberta H., 2015) The amount to which a concept is accurately measured in a quantitative investigation is characterized as validity. There are three types of validity. The first is content validity, which examines whether the instrument adequately covers all of the content that should

be covered in relation to the variable. The second is construct validity, which refers to whether or not it is possible to make conclusions about test scores based on the concept being investigated. The final one is criterion validity, which refers to the instrument's connection with variables.

Content validity is a sort of validity in which various aspects, skills, and behaviors are measured sufficiently and efficiently. To that aim, professionals in the field of research may assess the study instruments and data. The vague and cryptic questions can be updated, and the difficult elements can be reworded, based on the reviewer's remarks. In addition, ineffective and nonfunctional queries can be eliminated entirely.

As Kothari, 2004 states, the most important validity is criterion, which reveals how well an instrument measures what it is designed to assess.

To assure the validity of the research questioners, it has been examined and evaluated by subject matter experts and the research advisor Dr. Wubshet Bekalu before being given to the respondents.

3.6.2. Reliability

According to (Mohamed, 2013), one of the most important needs of any research process is the consistency of the data and findings. In general, reliability is concerned with the consistency, dependability, and replicability of "research results."

Cronbach's Alpha, which assesses internal consistency, was used to assess the questionnaire's reliability. The Alpha examines internal consistency by determining whether or not a certain item measures the same construct. Cronbach's Alpha was calculated for each objective to see if each scale (objective) would provide consistent findings if the research was repeated later.

The constancy of a measurement is referred to as its reliability. Someone who is performing the research using the same questioner or instrument should have got the same replies each time the exam is done. The research questioner has been tested on 5 subject related participants before it distributed to the actual participants. Cronbach's alpha has been utilized to assess the questioner's internal consistency. Cronbach's alpha is a value between 0 and 1, and the acceptable reliability has a positive value in between 1 and 0.7.

Questioner	Cronbach's Alpha	N of item
Project monitoring and control plan	0.789	5
Implementation of monitoring and control plan	0.873	6
Best practice of monitoring and control process	0.701	7
Monitoring and control technique	0.864	4
Monitoring and control strategy	0.783	5

Table 1Reliability Analysis

According to the results of the study, all five objectives were reliable since their reliability values exceeded the stipulated threshold of 0.7.

3.7. Data Analysis

To make the analysis process simpler, a systematic data preparation process (checking, editing, and coding) and data entry into SPSS version 27 were carried out after collecting the questionnaires from the respondents. The primary instrument for analyzing the quantitative data was the Statistical Package for Social Scientists (SPSS). Mean, frequency, percentage and standard deviation is are used to analyze the data and the findings are presented on tabular and bar charts

3.8. Ethical Consideration

According to (Creswell, 2014), in addition to conceptualizing the proposal writing process, researchers must foresee ethical difficulties that may occur during their research. Research entails gathering information about individuals from people. Maintaining strong ethical standards is vital and a priority throughout the project. Respect for privacy and confidentiality is essential for establishing trust with participants. All information provided by participants would be kept private and confidential.

While dispensing the study questioners, the objective of the study has been made clear to the respondents right away in order to increase their level of confidence and enable them to provide timely, suitable, and thorough responses. The researcher will keep the respondent's identity and their opinion unanimously based on their consent to meet the ethical obligations of the research.

In addition, the researcher emphasizes that the finding from the questionary will be used for academic purposes only.

IV. Chapter Four: Data Analysis, Presentation and Interpretation

The data analysis and discussion of the research findings are presented in this chapter. The data was analyzed using the Statistical Package for Social Science (SPSS) version 27. The study targeted 25 participant and 22 of them were able to respond.

4.1. Demographic Features

The table below summarizes the demographic characteristics of the participants based on their gender, years of work experience, educational level, study background, and stakeholder status.

Category	Frequency	Percentage
Gender		
Male	16	72.7
Female	6	27.3
Work Experience		
5-10 years	14	63.6
10-20 years	7	31.8
Over 20 years	1	4.5
Level of Education		
B.Sc. Degree	13	59.1
Master's Degree	9	40.9
Educational Background		
Architecture	5	22.7
Civil Engineering	11	50.0
Construction and Technology Management	6	27.3
Representing Stakeholder		
Client	1	4.5
Project Manager	5	22.7
Consultant	9	40.9
Contractor	7	31.8

Table 2 Demographic Feature Summary

As indicated on the above table majority 73% of the research participants are male. It also shows that more than half percent of the study participants had 5-10 years of working experience, 32% had 10-20 years of experience and 4% had over 20 years of working experience. 60% and 40% of this study participants had a B.Sc. and Master's Degree consecutively. Among them 50% of them are Civil Engineers, 27% are Construction and Technology Management graduates and 23% are Architects by profession. This implies that a lot of young and qualified engineers were involved on the project.

Finally, under the category of representing stakeholder, 41% of the participants are representing the lead consultant team (Design and Supervision work), 32% represent the Contractor (Both structure and finishing contractors), 23% represent the Project Management team and 4% from the Client representative. This indicates legitimacy of the collected data.

4.2. Assessment of Project monitoring and control process

4.2.1. Project monitoring and control plan

As (Kate, 2022) implies a project monitoring and control plan considers success, scope, schedule, resources, risk, and costs. The plan is created at the planning phase of the project's lifecycle. Create a project outline. Establish baselines for scope, schedule, and money for benchmarking in accordance with the project plan.

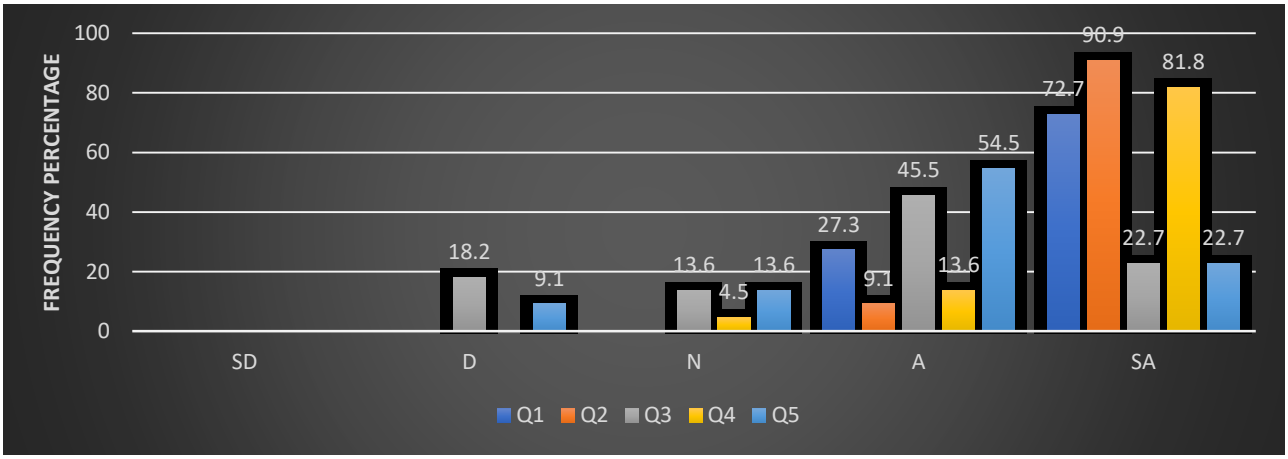

Chart 1 Monitoring and Control Plan

Under the category of project monitoring and control plan the above chart shows that all participants agreed that the project had a well-defined project scope of work and schedule to

achieve the project objective and 68% agree that the project has defined budget baseline. Moreover, 94.5% of participant condemn that the project has a work breakdown structure that helps project managers to track and simplify performance and deliverables and 77% believes that the project set a benchmark, baseline and standard for schedule, budget and quality monitoring and control purpose.

Summarizing the above findings and relate with the international standard, it can be concluded that the project had implemented a well defined and prepared project monitoring and controlling plan.

Questioner	Mean	Variance	Standard Dev.
The project has defined scope of work?	4.73	0.208	0.456
The project has a defined schedule to achieve the project objective?	4.91	0.087	0.294
The project has defined budget baseline?	3.73	1.065	1.032
Do you think that the project has a work breakdown structure that helps project managers to track and simplify performance and deliverables?	4.77	0.279	0.528
Does the project set a benchmark, baseline and standard for schedule, budget and quality?	3.91	0.753	0.868

Table 3 Project monitoring and control plan Descriptive Statistic

4.2.2. Implementation of monitoring and control plan

To keep the project on track, project managers use various key performance indicators to present monitoring data and create objectives. Project Monitor Parameters, for example, show the scope of the project and success metrics. KPIs are used by project managers to track schedule, effort, and cost and verify they are in line with the project plan. (Kate, 2022)

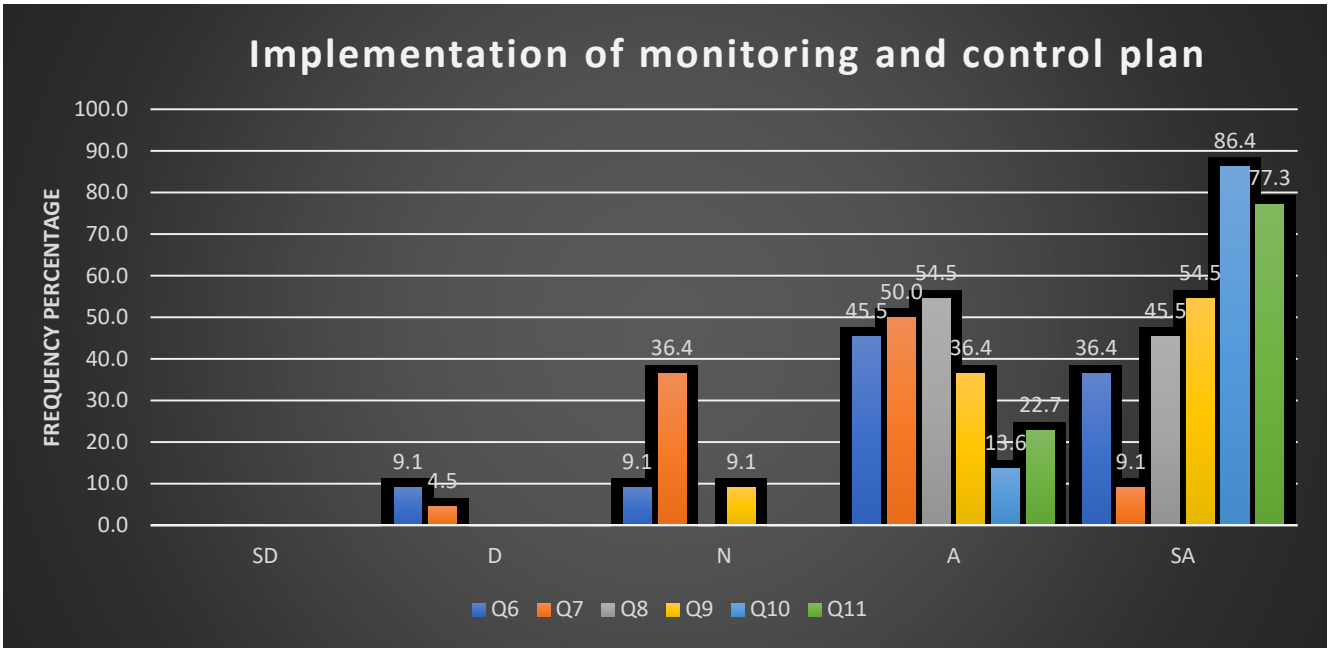

Chart 2 Implementation of Monitoring and Control Plan.

Six queries were given to this section of questionary in order to show what the actual implementation of monitoring and control plan looks like on the ground. 81% of the participant agree that schedule, budget, quality and performance monitoring and control tools/methods were implemented and 59% of participant agree that there was an implementation of project risk registration and assessment document. However, all participant agree that the PM frequently monitor the project performance against the baseline and due to this 90% agree that the PM have full authority and take corrective action to control the project performance on time. All participant agree that PM engages and communicate the project team, management and client regarding the project performance, corrective action and future plan on time and record performance reports and change made.

Questioner	Mean	Variance	Standard Dev.
Does the project apply tools / method while monitoring the schedule, cost, quality and work volume?	4.09	0.848	0.921
Does the project implement risk registration and assessment document?	3.64	0.528	0.727
Does the PM frequently monitor the project performance against the baseline?	4.45	0.26	0.51

Does the PM have full authority and take corrective action to control the project performance on time?	4.45	0.45	0.671
Does the PM engage and communicate the project team, management and client regarding the project performance, corrective action and future plan on time?	4.86	0.123	0.351
Does the PM record performance reports and change make?	4.77	0.184	0.429

Table 4 Implementation of Monitoring and Control Plan Descriptive Statistic

4.2.3. Best practice of monitoring and control process

Best practices for project monitoring and management necessitate ongoing attention to detail. These best practices can equip project managers and teams with the ability to balance time, cost, and budget. Defining Project Management Team Roles is one component. Determine a point of contact for recording, documenting, and monitoring any issues that arise. Determine the frequency with which KPIs are reported. Scope Monitoring and Control Creep must be mitigated in order to preserve project parameters and to recognize that project changes may have an impact on outcomes, as well as to execute a rigorous Approval Process at Completion: Make careful to properly document and file all approvals. (Kate, 2022)

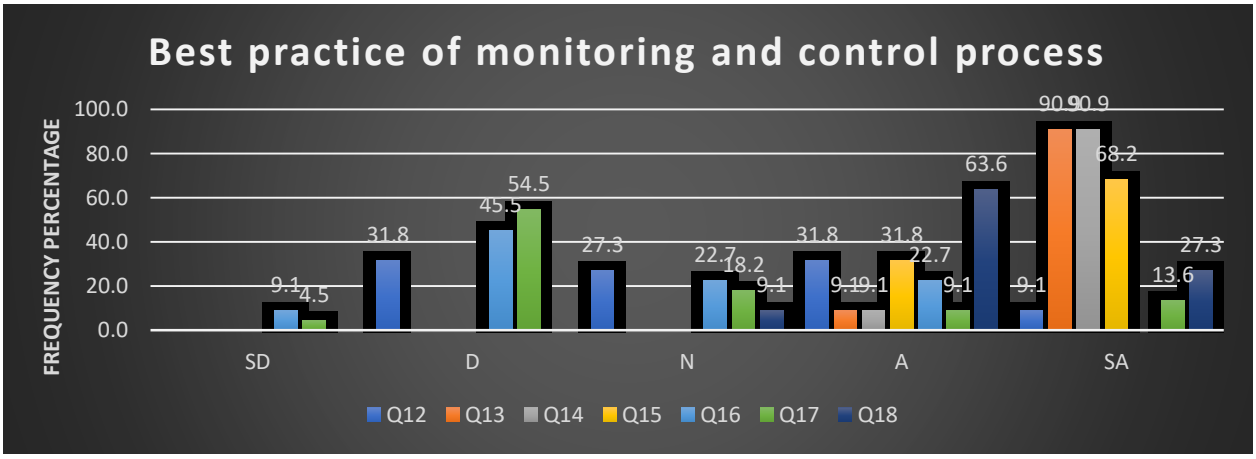

Chart 3 Best Practice of Monitoring and Control Process

In this section there are seven given queries to demonstrate the best practice of the project monitoring and control process. According to the respondents' answer, 41% agree that the project team member have a common understanding of project expectations and timeline to meet and 32% did not agree with this idea. On the other hand, all participant agrees that there

were dedicate and responsible person assigned for tracking, monitoring and documentation process, data used for monitoring were up to date and there were a specific period and frequency for performance monitoring reports.

Nevertheless, 46% and 55% of participant disagree that there were no clearly defined variance thresholds for schedule, cost and performance and mitigation plan to manage scope creep consecutively.

Questioner	Mean	Variance	Standard Dev.
Does the project team member have a common understanding of project expectations and timeline to meet?	3.18	1.013	1
Was there a dedicate and responsible person assigned for tracking, monitoring and documentation process?	4.91	0.087	0.294
Was there a specific period and frequency for performance monitoring report?	4.91	0.087	0.294
Data used for monitoring were up to date?	4.68	0.227	0.477
Was there a clearly defined variance thresholds for schedule, cost and performance?	2.59	0.92	0.959
Was there a mitigation plan to manage scope creep which could impact the project outcome badly?	2.73	1.351	1.162
Was there attentive change approval and documentation process?	4.18	0.346	0.588

Table 5 Best Practice of Monitoring and Control Process Descriptive Analysis

4.2.4. Monitoring and control technique

Monitoring and control are used by project managers to track, review, and report on project performance. This phase is essential for making informed decisions, avoiding crises, and maximizing performance and possibilities. Techniques for project monitoring and control cover three aspects of project management: Monitoring of the project plan, project budget, and project status. (Kate, 2022)

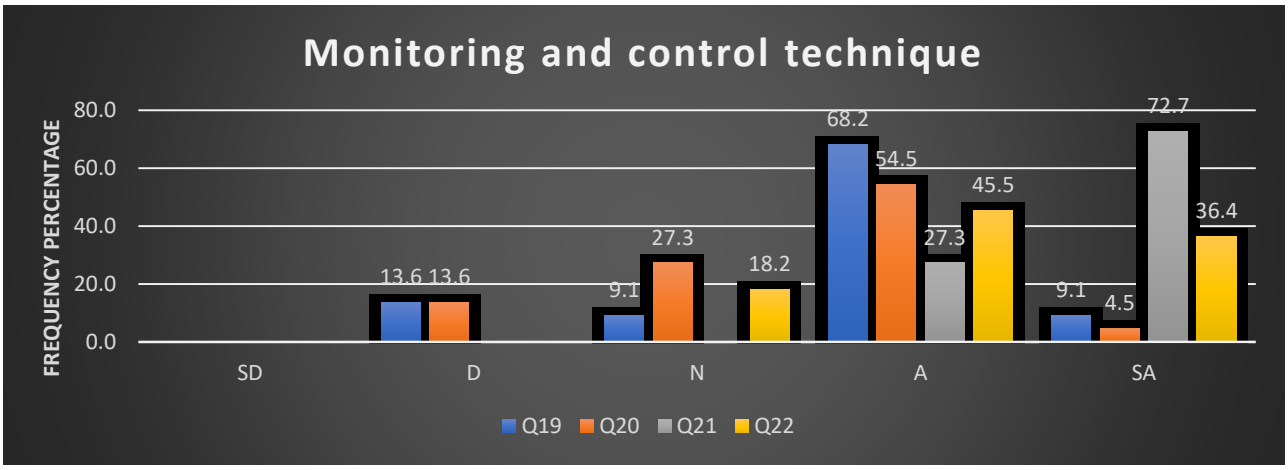

Chart 4 Monitoring and Control Technique

On this section there are four queries that helps to demonstrate the methods or techniques that were used while monitoring and controlling the project. 80% of the participant agrees that the project set a milestone to keep the deliverables on schedule. Also 59% of participant agrees that the project applies budget monitoring technique to asses project tasks according to their cost. Regarding to the project status and performances, all participant agrees that there was an implementation of project status monitoring technique to identify completed tasks, key takeaways, risks, and real-time progress. In related to this, 82% of participant agrees that standard monitoring and control techniques (among Earned Value Method, Critical Path Method, Key Performance Indicator or other) were implemented while the project execution.

Questioner	Mean	Variance	Standard Dev.
Does the project apply project schedule monitoring technique to identify essential project milestones and keep deliverables on schedule?	3.73	0.684	0.827
Does the project apply project budget monitoring technique to asses project tasks according to their cost?	3.5	0.643	0.802
Does the project apply project status monitoring technique to identify completed tasks, key takeaways, risks, and real-time progress?	4.73	0.208	0.456
Does the project apply standard monitoring and control techniques such as Earned Value Method, Critical Path Method, Key Performance Indicator or other?	4.18	0.537	0.733

Table 6 Monitoring and Control Technique Descriptive Analysis

4.2.5. Monitoring and control strategy

Successful initiatives necessitate zealous monitoring and control, so having the proper plan can make all the difference. A strong monitoring and control strategy considers quality, risk, and stakeholder engagement levels, as well as communicating all project outcomes. (Kate, 2022)

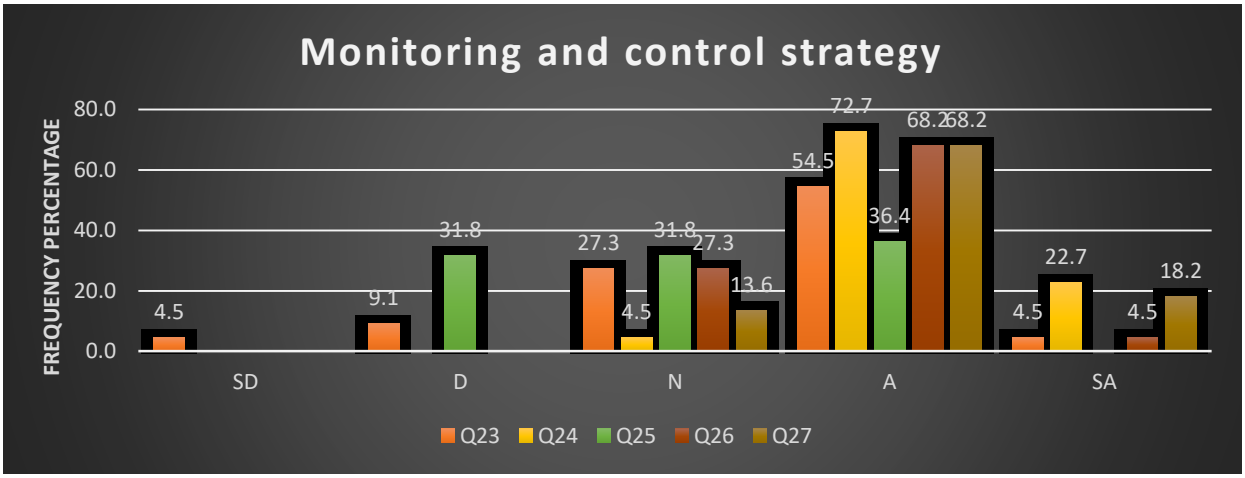

Chart 5 Monitoring and Control Strategy

The above chart is last section of the questionary and has five basic and summarized queries about the project monitoring and control strategy.

According to the respondents reply 59% and 95% of them agrees that the project had clear and specific project monitoring and control plan and clear communication plan consecutively. Whereas 36 % agrees that the project had a risk management plan but 32% did not agree with this. At last, 73% and 86% of participant agrees that the project had a change management and stakeholders management plan consecutively.

Questioner	Mean	Variance	Standard Dev.
Does the project have clear and specific project monitoring and control strategy?	3.45	0.831	0.912
Does the project have clear communication plan?	4.18	0.251	0.501
Does the project have a risk management plan?	3.05	0.712	0.844
Does the project have a change management plan?	3.77	0.279	0.528
Does the project have stakeholders' management plan?	4.05	0.331	0.575

Table 7 Monitoring and Control Strategy Descriptive Analysis

V. Chapter Five: Summary, Conclusion and Recommendation

5.1. Summary of Findings

The demographic outcome of the questionary shows that half of the participants are Civil Engineers by profession and have a minimum five years of work experience on the construction field. Most of the participants are from the lead designing and consultant team which will make result more validate. As a downside, a smaller number of female participants would be mentioned.

The first section of the questionary was intended to show the components of the project monitoring and control plan in related with schedule, budget, scope management and baseline. Majority of respondents agrees that the project had implemented a proper and well-defined schedule, budget and scope management plan. They also agreed that the application of work breakdown structure helps the project managers to track and simplify performance and deliverables. The overall mean value for the 1st section questionary is 4.4.

The second part of the questionary intended to show the implementation process of monitoring and control plan. The survey result indicates that the overall mean value for this section is 4.38 which indicates majority of the respondent believes monitoring and controlling implemented according to the plan.

The third section intended to demonstration good practices of the monitoring and controlling process. Among the given parameters to indicate the good practices, majority of the respondent highly agreed that the project dedicates responsible person who is assigned for tracking, monitoring and documentation purpose and data used for monitoring was up to date. However, many think that the project did not have a clearly defined variance thresholds for schedule, cost, performance and scope creep. The overall mean value of the third section is 3.88.

The fourth section of the questionary emphasize on techniques or tools used for data collection, analysis and reporting while monitoring the project execution. Among all, most participant agree that a strong project status monitoring technique has implemented. The overall mean value of the fourth section is 4.03.

The final section of the questionary is about the inclusive strategy for project monitoring and control plan. According to survey result the overall mean value for this section is 3.53 which indicates that most of the respondent have a neutral stand. Majority of respondent think that there was a clear communication plan. Whereas most of them do not think the project have a clear risk management plan.

5.2. Conclusion

According to the findings from the survey data, the project had a clear and well-prepared project monitoring and controlling plan for the schedule, budget, performance and scope management. In addition to this, the implementation of clear and detailed work breakdown structure helps the project managers to track and simplify performance and deliverables. The research assessed that the project had a defined scope of work, schedule management plan, cost management plan, defined performance and quality benchmark and cost baseline as the major components of monitoring and controlling plan.

During the implementation of monitoring and control plan, the Project Manager had a big role on a continues monitoring of the project performance against the baseline and take a corrective action to control the project performance. Also, the Project Manager engages and communicate the project team, management and client regarding the project performance, corrective action and future plan on time. While doing so, every change made were recorded. However, there was a shortcoming on implementing risk registration and assessment practice.

While assessing the best practices of monitoring and controlling process, the findings shows that the project had assigned a responsible person for continues and updated data collection, tracking, documentation and reporting purpose. The project had also applied project status monitoring technique to identify completed tasks, key takeaways, risks, and real-time progress. Updated data were used for monitoring reports and it presented on a specific period of time to the client.

On the assessment of methods/techniques used for monitoring and controlling process, the project had applied standard project schedule, budget and performance monitoring techniques to identify essential project milestones and keep deliverables on schedule, cost and real time

progress. Earned Value Method, Critical Path Method and Key Performance Indicator were the most applied methods.

While identifying the project monitoring and controlling strategy, the project had a strategy for implementing change management plan, stakeholders' management plan and communication plan. The communication plan defines the type of information to be transferred, to whom to be shared, when and how to be shared. Status and performance reports are presented at a specific period of time and frequency for all concerned project stakeholders. This allows the client, managers and project team to understand the project status and changes made on the project.

Nevertheless, the project lacks clearly defined variance thresholds for schedule, cost, performance and scope creep. In addition, the project did not have a risk management plan. (Befekadu, 2017) On Ethiopian Real Estate projects, Project risk management practiced are at a lower standard deviation than the average in project management knowledge areas.

A good risk management strategy helps the construction company to identify and evaluate hazards, as well as to think about risk containment and risk reduction measures. Construction firms that manage risk effectively and efficiently benefit from financial savings, increased productivity, higher project success rates, and better decision making. Nerjia B. (2012)

5.3. Recommendation

Based on the aforementioned finding, the researcher makes the following recommendations to the project management and consulting office in order to strengthen future monitoring and controlling practices.

The first research recommendation is for project managers and consultants to have the components of a monitoring and controlling plan, as well as the project's best practices, and to develop standard guidance of monitoring and controlling practice out of it for construction projects.

According to the research findings, the project lacks and needs a serious attention on developing risk management plan. As (William, 2022) stated risk management is the process of evaluating and applying methods to limit the impact of hazards in building projects. This risk management approach entails extensive planning to establish a risk management plan that helps project

managers to identify, monitor, and reduce risks as they arise. Risk monitoring and control are required to keep a strict check on the implementation of risk identification, risk assessment, and risk response. It monitors the trigger conditions for contingencies and the probability of new impending risks during project execution, in addition to assuring the execution of risk plans. The monitoring authority goes over team meetings and each individual checklist established during the initial stage, and remedial actions are done as needed. Monitoring and control are carried out throughout the project's lifespan.

Another important element that should be highlighted is the definition of schedule, budget, performance, and scope variation thresholds, as well as methods of plan adjustment. Research made by (Anduwalem E. 2014) on “Assessing the Impact of Variation Order on Public Building Projects” The principal implications of variation orders on public building projects, according to the findings of the desk study, interview, and questionnaires, were completion schedule delay, rise in project cost, additional payments for the contractor, effect on progress, and increase in overhead expenses.

Beside from the findings, from personal observation of the researcher the research recommends that young project team members participate in trainings and experience sharing sessions to build standard project monitoring and controlling practices. Strengthening organizational and individual project implementation performance capability of contractors and consultants is needed to build the competitive construction industry.

5.4. Recommendation for future study

This research only looked at the process of project monitoring and controlling activity. The researcher suggests conducting additional research on the performance evaluation area and its relevance to project success.

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Research Questionaries

6/9/2023

This is **Robel Demissie**, a student in Addis Ababa University School of Commerce pursuing my Masters of Arts Degree in Project Management. This questionnaire is prepared for the fulfillment of conducting a final year research paper on the title '***Assessment of Project Monitoring and Controlling Practice: The case of Elevation Diplomatic ResidenceBuilding Project***'. The information acquired through this questionnaire will be kept confidential and it will be used solely for academic purposes.

I appreciate your effort to fill the questionnaire accurately and exhaustively.

Demographic		
Gender:	Female	☐
	Male	☐
Level of education:	Diploma	☐
	B.Sc. Degree	☐
	Master's Degree	☐
	PhD Degree	☐
Educational background:	Architecture	☐
	Civil Engineering	☐
	Construction and Technology Management	☐
	Other Engineering	☐
	Other	☐
Year of experience:	0-5 years	☐
	5-10 years	☐
	10-20 years	☐
	Over 20	☐
Represent:	Client	☐
	Project Manager	☐
	Consultant	☐
	Contractor	☐

#1	**Project monitoring and control plan**					
No	**Statement**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1	The project has defined scope of work?	☐	☐	☐	☐	☐
2	The project has a defined schedule to achieve the project objective?	☐	☐	☐	☐	☐
3	The project has defined budget baseline?	☐	☐	☐	☐	☐
4	Do you think that the project has a work breakdown structure that helps project managers to track and simplify performance and deliverables?	☐	☐	☐	☐	☐
5	Does the project set a benchmark, baseline and standard for schedule, budget and quality?	☐	☐	☐	☐	☐

#2	Implementation of monitoring and control plan					
No	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6	Does the project apply tools / method while monitoring the schedule, cost, quality and work volume?	☐	☐	☐	☐	☐
7	Does the project implement risk registration and assessment document?	☐	☐	☐	☐	☐
8	Does the PM frequently monitor the project performance against the baseline?	☐	☐	☐	☐	☐
9	Does the PM have full authority and take corrective action to control the project performance on time?	☐	☐	☐	☐	☐
10	Does the PM engage and communicate the project team, management and client regarding the project performance, corrective action and future plan on time?	☐	☐	☐	☐	☐
11	Does the PM record performance reports and change make?	☐	☐	☐	☐	☐
#3	Best practice of monitoring and control process					
No	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12	Does the project team member have a common understanding of project expectations and timeline to meet?	☐	☐	☐	☐	☐
13	Was there a dedicate and responsible person assigned for tracking, monitoring and documentation process?	☐	☐	☐	☐	☐
14	Was there a specific period and frequency for performance monitoring report?	☐	☐	☐	☐	☐
15	Data used for monitoring were up to date?	☐	☐	☐	☐	☐
16	Was there a clearly defined variance thresholds for schedule, cost and performance?	☐	☐	☐	☐	☐
17	Was there a mitigation plan to manage scope creep which could impact the project outcome badly?	☐	☐	☐	☐	☐
18	Was there attentive change approval and documentation process?	☐	☐	☐	☐	☐

#4	Monitoring and control technique					
No	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19	Does the project apply project schedule monitoring technique to identify essential project milestones and keep deliverables on schedule?	☐	☐	☐	☐	☐
20	Does the project apply project budget monitoring technique to asses project tasks according to their cost?	☐	☐	☐	☐	☐
21	Does the project apply project status monitoring technique to identify completed tasks, key takeaways, risks, and real-time progress?	☐	☐	☐	☐	☐
22	Does the project apply standard monitoring and control techniques such as Earned Value Method, Critical Path Method, Key Performance Indicator or other?	☐	☐	☐	☐	☐
#5	Monitoring and control strategy					
No	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
23	Does the project have clear and specific project monitoring and control plan?	☐	☐	☐	☐	☐
24	Does the project have clear communication plan?	☐	☐	☐	☐	☐
25	Does the project have a risk management plan?	☐	☐	☐	☐	☐
26	Does the project have a change management plan?	☐	☐	☐	☐	☐
27	Does the project have stakeholders' management plan?	☐	☐	☐	☐	☐
	Thank you very much !!!					