



ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**ASSESSMENT ON THE PLANNING AND IMPLEMENTATION OF
PROJECT SCHEDULE IN THE CONSTRUCTION OF REAL ESTATE
PROJECTS, A CASE STUDY ON GRAND VIEW ADDIS REAL ESTATE**

BY

NARDOS TEKLEHANA

DECEMBER 2021
ADDIS ABABA, ETHIOPIA

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SGS/0554/2012A

**A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF
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DECLARATION

I, the undersigned, declare that this thesis is my original work; prepared under the guidance of Dr. Maru Shete (Assoc. Prof). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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St. Mary's University, Addis Ababa

December, 2021

ENDORSEMENT

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

Dr. Maru Shete (Assoc. Prof)

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St. Mary's University, Addis Ababa

December, 2021

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ABBREVIATIONS

PMBOK Project Management Body of Knowledge

PMI Project Management Institute

PM Project Management

PMDO Project Management For Development Organizations

CCM Critical Chain Method

CPM Critical Path Method

PERT Program Evaluation and Review Technique

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ABSTRACT

Construction projects require the coordinated efforts of all participating teams to effectively manage project timelines. In Ethiopia, most construction projects fail to be completed within the contractual deadlines. As a result, expected services are unduly delayed to meet their intended goals. This practice needs to be improved for effective and efficient project management. Thus, this research focuses on the assessment of construction project schedule planning and implementation practices. The objectives of this study were to identify the current practices regarding project schedule planning and implementation on grand view Addis project, to identify the major factors to the problems of schedule planning and implementation and to examine the measures that has to be taken to improve project schedule planning and implementation. To achieve that Grand view Addis real estate project in Addis Ababa were studied. The study was carried out through desk study and questionnaires. Average/ mean value and measures of dispersion (standard deviation) then to determine the ranks of all factors listed in the questionnaire Relative Importance Index (RII) method were adopted for data analysis. All the 68 questionnaires distributed were collected. Regarding schedule planning and implementation practice the result shows that the project is behind schedule. Due to low practices in established procedures, not using the scope of work and the develop WBS to its full potential, reasonable activity durations are not set out and at last adequate resources are not allocating on time for this project. Factors that mainly affect schedule planning are unrealistic estimates for effort and duration, poor project schedule practices and design changes. In addition, required improvement parameters suggested are creating a well-planned scheduling by a competent expert, improve project activities that were interrupt the project schedule (slow decision making, delayed approvals, delayed payments, change orders) establishing schedule monitoring and supervision procedures, improving the communication between all parties, providing timely training on schedule planning and implementation to all personnel involved in the project.

Key Words: Schedule Planning, Schedule Implementation, Improvement, Grand View Addis Real Estate

Chapter One: Introduction

1.1 Background of the study

The concept of 'scheduling' is not new, the pyramids, the Great Wall of China and aqueducts of the Romans are over 2000 years old. None of these activities could have been accomplished without some form of schedule; i.e., the understanding of activities and sequencing. In 1896 Karol Adamiecki a Polish economist, engineer and management researcher, developed a methodology for 'work harmonization' that was based on graphical analysis. The charts used in this method have become known as Harmonograms/Harmonygraph. The tabulation of each activity's predecessors and successors in the Harmonygraph ('from' and 'to') makes it a distinct predecessor to the CPM and PERT systems developed some 60 years later (Weaver, 2011)

A project schedule is the contractual network diagram of the project's planned activities, their sequence determined by job logic, the contractual time in working days required for completion (activity duration), and the conditions necessary for their completion (contract specifications). It is also a contract document linking the lender, developer, prime contractor, and subcontractors (Hutchings, 2004). A schedule is a listing of a project's milestones, activities, and deliverables, usually with intended start and finish dates. Those items are often estimated in terms of resource allocation, budget and duration, linked by dependencies and scheduled events (Ssempebwa, 2013). According to, Austine, et al., (2018) Project scheduling can be referred to as the heartbeat of construction industry because it is the main tool that can be manipulated to increase profit without compromising quality.

Effective scheduling allows us to perform what-if exercises, develop contingency plans, determine the risks in the schedule, perform trade-offs, and minimize paperwork (Kerzner, 2017). An effective schedule management plan consists of outlining the work breakdown structure, identification of interdependencies amongst activities, sequencing them, estimating task duration, identification of risks involved and finally development of project schedule management plan (Sivakumar, et al., 2019).

Project schedule is useful as it helps project managers to summarize the start and finish times for every separate duty which forms a part of a project, thereby giving a graphical

illustration of how protracted the project is probable to last for (Carcano, 2015). Thus, the goal of defining the schedule is for the project team to have a complete understanding of all the work that needs they must accomplish, by defining the schedule the project also develops an understanding of the constraints, dependencies and sequence of the activities (PMDO,2015).

Africa's urban population has been growing at a very high rate i.e., from about 27% in 1950 to 40% in 2015 and projected to reach 60% by 2050 (Teye, 2018). Ethiopia, the second most populated country in Africa after Nigeria, is also the least urbanized, with urbanization at only 19%, significantly below the sub-Saharan average of 37%. The urban population has grown at an average 3.8% per annum since 2005 and is expected to triple from 15.2 million in 2012 to 42.3 million by 2037 ((African Economic Outlook, 2016)).

Currently, there are around 630 real estate investments across the country with a total investment capital of 3.5 billion birr. According to data from Ethiopian Investment Commission, since 2015, close to 117 companies took an investment license to invest on 56 different real estate projects. The primary destination of the real estate industry in Ethiopia, of course, is Addis Ababa. Out of the existing 56 real estate projects to date, 43 are located in Addis Ababa (Endeshaw, 2017).

1.2 Statement of the problem

Urbanization in Ethiopia is failing to meet the demands of growing number of urban residents in access to housing (Alemayehu, 2019). In recent years, private investors have participated in housing developments, mostly in the more developed cities like Addis Ababa. On the other hand, this has not helped as a way out to address the problems to the high number of Ethiopians who do not own a household. Privately owned real estate projects play a pivotal role in the growth of the country's economy. But these projects had a record of delays or not being completed within the contracted period which is resulted from various reasons. The most common reasons are improper management of project schedule and cost.

In Ethiopian construction practice, it is very rare that construction projects are completed on the time specified or agreed upon. According to, Ismeal (1996) delays are endemic to construction projects in Ethiopian. His study shows, most of the projects experience delay

from 100% to 460% of the original contract time. This shows how important it is to investigate and study on delay causing factors in construction projects of Ethiopia and find solutions to reduce the effect.

Construction project schedule is considered as a measurable indicator of performance criteria for successful project completion. Project scheduling problems ensues in all sectors and all over the country, the reason we are studying only the construction industry is because it holds a primary row that faces this problem. This issue not only affect the investors or stakeholders but rather it affects the whole country's economy. So, solving the different bottlenecks that hold this industry from growing will help so much in the country's development.

This study aims to intensively see the project schedule planning and implementation practices in grand view Addis project. When the project started in 2018 G.C it is hoped that it would be complete in two years, but the project will mark its fourth year soon and only 65% of the project is finished. The one and main reason for this delay is project scheduling.

Schedule planning and implementation it's not an easy task but applying it makes a project more achievable. The experience of project team members counts toward effectiveness of this issue. A project management (client, consultants and constructors) team that has too many inexperienced staffers risks experiencing issues of delays in task completions. The other basic and common problem with project scheduling is estimating the duration of each project task. Most people underestimate how long something will take them to do, resulting in a schedule that reflects only a best-case scenario. Most project schedules are based on the assumption that the right resource will be available exactly when needed. But unless we have a good method for allocating resources to projects, that may not happen. Turing the schedule into action to reach the desire outcome by itself is vital to a project success. Without an effective implementation process even, the best laid plans may not come to fruition.

In addition to the above problems, the followings major points have been raised by stakeholders in project progress documents

- ❖ Contractors does not submit their monthly plans and schedules on due time to the client and consultants. Due to late schedule updating (rescheduling) the projects monitoring and control are affected so that delay was obvious.
- ❖ Contractors raise claim that consultants are delayed on making comments and work measurements to the works executed.
- ❖ Most of the construction materials are supplied by the client. In this process major tools of planning and also advanced supply chain system not applied this contribute to the project delay
- ❖ The evaluation of the work progress is not made based on the merits of the physical work progress; rather it is conducted in financial status basis.

Though many studies were conducted to solve the above-mentioned problems and many more, but little or no attention given to schedule management. Those who studied schedule management concentrated on the causes of schedule delays, the level of usage of scheduling tools and techniques, the effectiveness of schedule implementation, and some related issues. So, by focusing on the detail development of a work schedule and the continuous evaluation strategy that it requires, this research stands out by focusing on the core concept of schedule.

1.3 Research Objective

1.3.1 General Objective

The overall objective of this study is to assess and analyze planning and implementation of project schedule in the construction of real estate projects, a case study on grand view Addis real estate and to see the overall impact in the succession of the project then to give recommendations in accordance with the outcome of the paper.

1.3.2 Specific Objectives

- To assesses the current practices of the project schedule planning and implementation on selected real estate project
- To assess the main factors affecting project schedule preparation and implementation

1.3.3 Research questions

As problems discussed above, the study is going to be guided by the following research questions:

- What are the current practices regarding project schedule planning and implementation on grand view adiss project?
- What are the major factors to the problems of schedule planning and implementation?
- How can project schedule planning and implementation be improved?

1.4 Significance of the research

Ethiopia has one of the fastest growing economies in the world. To achieve this different sector, play their parts. Real estate developments include in this list. To help this sector and improve the performances it's necessary to do researches to get empirical answers for all problems that face this industry. Thus, assessing the current approach is important so we can come up with the best way of practice to solve problems.

The biggest problem of real estate development is not delivering the project on time. To minimize this problem this study will have a valuable benefit to guide all parties that will involve in the real estate construction. The researcher strongly believes that this study will serve as practical input for the improvement of the project performance by showing better ways and methods.

1.5 Scope and limitations of the research

1.5.1 Scope of the research

This study was mainly initiated to assess planning and implementation of project schedule in real estate construction projects a case study on Grand View Addis real estate and to suggest possible recommendations destined to improve the current practices. The target respondents were Client, Consultants, Contractors and Site managers who work at the head office and on site that are involving on the construction of the real estate project.

1.5.2 Limitations of the research

Like any other study, this study also suffered limitations, Due to time and resource constraint the research was only be conducted on the mentioned project. In the data collection phase, we faced a hard time to get project information from contractors and consultants who have completed or terminated from the construction project that has no contact information currently. This minimized the potential number of participants. However, the findings of this study were not disrupted by this, instead it defiantly offered new, potentially useful information for the construction industry.

1.6 Organization of the thesis

The first chapter provided a background to the researched topic of the study. The section explained about the problem statement, objective of the study, significance and limitation of the study. The second chapter of the study reviewed related literatures regarding the topic area and provided exhaustive information about the main subjects of the study by reviewing the works of different authors. The third chapter explained about the methodology implemented in order to come up with the findings of the study. Specifically, the chapter explained about the research approach and design, and samples; and data collection methods used to find out the needed data. The fourth chapter explained about the results after analyzing the collected data. The section organized and discussed about the findings of the study which were collected. Finally, in the last chapter of the study, the key findings were summarized and after that the chapter concluded the study and gave recommendations based on the findings.

Chapter Two: Review of Related Literature

2.1 Conceptual Review

2.1.1 Project and Project Management

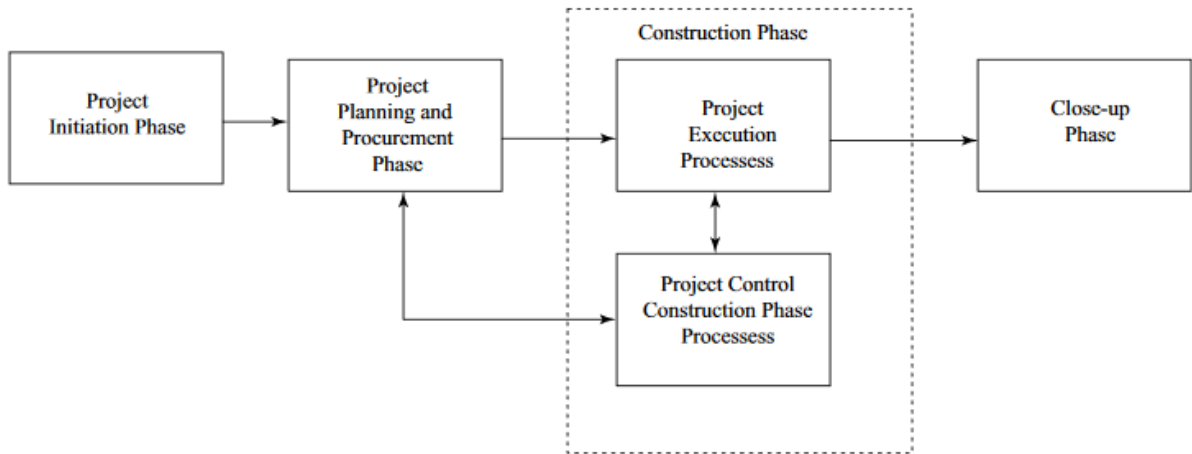
According to (PMI,2008) every project creates a unique product, service, or results. Although repetitive elements may be present in some project deliverables, thus repetition doesn't change the fundamental uniqueness of the project work. Project is defined as a planned undertaking of related activities to reach an objective that has a beginning and an end (Maserang, 2002). Furthermore, Heagney (2012) said, a project should have definite starting and ending points (time), a budget (cost), a clearly defined scope or magnitude of work to be done, and specific performance requirements that must be met.

Project management deals with the coordination of all initiating, planning, decision, execution, monitoring, control, and closing processes in the course of a project. In other words, it is the application of knowledge, skills, tools, and techniques to project tasks to meet all project interests (Schwindt et al, 2015).

2.1.2 Construction Project Management

According to Bennett (2003) the construction industry is a big business! The industry's significant impact on the world economy can be demonstrated by reviewing construction's proportion of the total value of goods and services, as well as the number of people employed in construction as a proportion of the total workforce and the number of construction firms compared with the total businesses in all industries. Construction project management applies to a given project at the various phases of which are usually accomplished by different organization, its coordinating and regulating all of the elements needed to a complete a job on hand (Clough, et al, 2000)

Figure 2-1 Construction Project Management Phases



Source: - Chitkara ,2014

2.1.3 Project Schedule Management

Project schedule management includes the processes required to ensure timely completion of the project. But before a project schedule is created, a project manager should typically have a work breakdown structure (WBS), an effort estimate for each task, and a resource list with availability for each resource (PMDO, 2015). Suresh et al. (2019) said that schedule management is a process of controlling, scheduling, and monitoring the entire working process of an organization. Managing the project schedule includes all of the steps required to ensure the timely completion of the project. It involves determining the delivery dates and milestones whilst taking all of the known constraints into account (Newton,2015). Additionally, Brown (2021) explains schedule management as a procedure that requires the establishment of policies and documentation for maintaining, developing, managing, and controlling the schedules for time and resources for the completion of the project. The strategic benefit of the schedule management process is, it will monitor and manage the schedule throughout the project.

2.2 Theoretical Review

2.2.1 Construction Project Work Schedule Concept

Scheduling is the determination of the timing and sequence of operations in the project and their assembly to give the overall completion time (Mubarak, 2015). A schedule or a timetable, as a basic time-management tool, consists of a list of times at which possible tasks, events, or actions are intended to take place, or of a sequence of events in the chronological order in which such things are intended to take place (Ssempebwa, 2013).

Project scheduling involves charting the resources requirements or anticipated progress in completing component activities over the project's time horizon. Scheduling is an inevitable part of life and essential part of every plan. Without scheduling, managers cannot be certain that they are actually processing towards their goals. It could be said that scheduling put the plan on calendar basis. Therefore, a time schedule outlines the project work program; hence, it is a time table of work planned. Development of accurate work schedules is a challenge to managers due incompetence into consideration the factors that affect work scheduling. Construction project with effective work schedule is a recipe for progress monitoring and control as it depicts the activities to be executed on a time scale (Moneke, 2012).

Without scheduling of work activities, it could be difficult to monitor activity progress and take corrective and control actions on the control milestone. It will also provide platform for measurement of the actual work progress and comparing it with the schedule work progress, determine if there is any deviation for corrective action. Project control puts the project plan on course again after determination of activities variance (Moneke, 2012).

2.2.2 Construction Project Work Schedule Practices

2.2.2.1 Plan Schedule Management

A thorough schedule management plan is essential for project progress and success. According to PMI, (2013), the purpose of this process is to provide guidance and direction on how the project schedule will be managed throughout the project. In addition, schedule preparation guideline is an important at early step in the creation of a full

schedule, and provides the framework, structure, and direction for the schedule development. This includes purpose and use of the schedule, organization of the schedule, the required reports to be generated from the schedule, level of details, weather planning methodology, cost loading and reporting requirements, risk analysis, change management process, and scheduling software to be used (CMAA, 2012).

2.2.2.2 Define Activities

Define activities is the process of identifying the specific action to be performed to produce the project deliverables, the key benefit of this type of process is that it defines the logical sequence of work to obtain the greatest efficiency given all project constraints. (PMI-Guide,2008). The first piece of information needed for this step comes from the WBS that has all the activities identified for the project. As Project Work Breakdown Structure (WBS) is the basic tool that is used to identify activities. WBS methodology facilitates the splitting of the work scope of project into hierarchy of breakdown levels of sub-projects (end products or deliverables), tasks, work packages, and activities. The goal of defining the schedule is for the project team to have a complete understanding of all the work that needs they must accomplish, by defining the schedule the project also develops an understanding of the constraints, dependencies and sequence of the activities. (PMDO, 2015)

2.2.2.3 Sequence Activities

Sequence Activities is the process of identifying and documenting relationships among the project activities (PMI-Guide,2008). According to (PMDO, 2015) The act of identifying which activity comes before or after another is the process of identifying dependency relationships between the activities. There are three types of activity dependencies. Technical or mandatory dependency is defined by the type of work or activity. The next one is Discretionary dependencies are selected by the project manager to accommodate organizational or resource constraints, these are also based on educate guesses the project makes in order to circumvent other constraints. The last dependency come from external factors imposed to the project. The end result is a list of activities in a sequence that will allow the development of relationships.

The next step is to determine the type of relationship among all activities; there are four types of relationships:

- **Finish to Start:** -in this relationship the successor activity cannot begin until the predecessor task has completed, this is the most common type of relationship.
- **Start to Start:** -in this relationship the successor activity depends on the start of the predecessor activity, used for starting activities in parallel but a delay of the first activity delays the successor activity.
- **Finish to Finish:** - this relationship has the finish of the successor activity dependent on the finish of the predecessor.
- **Start to Finish:** - the finish of the successor activity is dependent on the start of its predecessor; it is seldom used.

2.2.2.4 Estimate Activity Resources

Estimate activity resources is the process of estimating the type and quantities of material, people, equipment, or supplies required to perform each activity (PMI-Guide, 2008). In addition, Newton (2015) said that, the estimation of the amount and the types of resources required for activities is done in this step. The project management team will need a clear understanding of resource availability and capability.

2.2.2.5 Estimate Activity Durations

Estimate Activity Durations is the process of approximating the number of work period needed to complete individual activities with estimated resource developed schedule (PMI-Guide,2008). Duration of an activity is defined as the expected economical transaction time that is required to perform an activity according to the specified execution method and also the duration of an activity depends on the volume and the nature of resources earmarked for execution. The resources, such as men, machinery and materials are required for the execution of each activity (Chitkara, 2014).

(PMDO, 2015) Explains the three-activity duration constrains that govern when an activity starts or finish; The first one includes that an activity must be completed by no earlier than

a specific date, this means that an activity may occur at any time after a specified date but no earlier than the given date, this constraint is oriented to meet a deadline. Another constraint defines that an activity must be completed no later than a given date. The last type of is a constraint that imposes that an activity must be complete on a given date, no earlier or later.

According to, Levy (2006) The success of the construction project process hinges on the ability to determine activity duration time since this is the system's basic building block.

2.2.2.6 Develop Schedule

Develop schedule is the process of analyzing activity sequence, duration, resources requirements and schedule constraints to create the project schedules. Project schedule development uses the outputs from the processes to define activities, sequence activities, estimate activity resources, and estimate activity durations in combination with the scheduling tool to produce the schedule model (PMI-Guide,2008).

2.2.3 Construction Project Schedule Method

- **Program Evaluation and Review Technique (PERT)**

PERT was originally developed in 1958 and 1959 to meet the needs of the “age of massive engineering (Kerzner, 2017). PERT (Program Evaluation Review Technique) is a scheduling system that uses inside and outside figures to make a best-guess estimate on each activity duration. These “guesstimates” are then strung together by the prevailing job logic (Hutchings, 2004). Two special features of PERT distinguish it from the other network analysis techniques. These are emphasis upon events rather than activities and the use of three times estimate for activity duration (Chitkara, 2014)

- **Critical Path Method (CPM)**

The critical path method (CPM) is a procedure that was developed especially for the time management of construction projects. CPM involves the analysis of the sequence and time characteristics of projects by the use of networks. It is a widely used procedure for construction time control, and contractors are now frequently required by contract to apply network methods to the planning and scheduling of their fieldwork (Clough, et al 2000).

The Critical Path is the longest total duration. Activities on the critical path cannot be delayed or the whole project will be delayed, unless the loss of time can be offset somewhere else later on the critical path (PMDO, 2015).

- **Critical Chain Method (CCM)**

In 1997, Dr. Eliyahu Goldratt introduced the first significant new approach to project management in over thirty years with the publication of his bestselling business novel, *Critical Chain* (Retief, 2002). Leach (2000) further more explains it as follows, the critical chain differs from the critical path by:

- a) Including resource dependencies, and
- b) Never changing.

CCPM emphasizes the time of project completion. It also reduces project changes and the major source of project cost over-runs by improving schedule performance. It accomplishes these results by changing the project plan, the project measurement and control system, and certain behaviors by the project team and supporting personnel.

2.2.4 Construction Project Schedule Tools and Techniques

- **Gantt or bar charts**

According to, Saleh Mubarak (2015) the bar chart was originally developed by Henry L. Gantt, an American mechanical engineer, in 1917 and is alternatively called a Gantt chart. A bar chart (Gantt chart) is a graphical representation of project activities that are shown in time. They offer the advantage of being cheap and simple to prepare, they are easy to read and update, and they are readily understood by anyone with a basic knowledge of the construction business. They are still in wide use today (Hutchings, 2004).

- **Network diagrams**

A network is a logical and chronological, graphic representation of the activities (and events) composing a project. Network diagrams are basically of two types: arrow networks and node networks. Arrow networks were more popular in the 1960s and 1970s, and then precedence diagrams (an advanced form of node diagrams) became the choice for network

scheduling (Saleh Mubarak, 2015). The two best-known techniques for network analysis are Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM).

- **Milestone charts**

Milestone chart is an improvement over the bar chart (Gantt chart) by introducing the concept of milestone. The milestone, represented by a circle over a task in the bar chart indicates completion of a specific phase of the task. The charts also show the sequential relationship among the milestones or events within the same task but not the relationship among milestones contained in different tasks (PM – Study material).

2.2.5 Scheduling Selection

(Jonathan F. Hutchings, 2004) To be cost-effective, the selection must consider the following criteria:

- Size and complexity of project
- Scope of services required
- Sophistication of users (owner, project team, field personnel, subcontractors, etc.)
- Available scheduling systems
- Owner preference
- CPM scheduling costs versus savings
- Contract schedule specifications

2.2.6 Schedule Implementation

After we develop an entire project schedule, we have to make sure of its implementation. If the schedules not implemented correctly, it will cause project delay which then leads to cost overrun. Proper implementation of schedules can be achieved by a proper schedule monitoring system. Monitoring involves measuring the time progress activity-wise, updating progress on schedule charts, and analyzing the implication of variations. Time monitoring starts with measuring of time and status of balance activities in the project's completed or finished, in-progress and non-starter states. The baseline for monitoring time is the Project Master Schedule.

On PMDO (2015) it said that monitoring the project schedule is mainly focused on determining the current status of the project, the project manager, based on the information then will determine what factors have influenced the changes in the schedule and these may be internal or external factors. This can be achieved by performance report from responsible personnel. According to, Chitkara (2014) performance report is generally a written document that shows the up-to-date performance status of a task entrusted to a responsibility accounting center. Performance reports transmit the performance data covering the actual achievements and deviations from standards, and highlight the reasons for such deviations in a standard format at a predetermined frequency to the specified monitoring center.

Regular project update is also one of project schedule implementation monitoring process which will help to identify unplanned works that have the influence to disturb the schedule. McBride (2016) said, tracking any unplanned work that gets added into the workflow throughout execution is mandatory because as change requests are approved and unexpected work gets added, it's important to incorporate those tasks into the schedule so that you have a realistic projected completion date.

The schedule for progress monitoring and reporting should be set up at the start of the construction work and then adhered to throughout the construction period, unless otherwise agreed by all concerned (Baldwin, et al, 2014).

2.3 Schedule Planning Problems

Successful construction projects rely on a sound schedule that integrates cost, time, and other technical data to help a project manager make efficient and effective decisions during construction execution. But most construction projects encounter these problems because of improper planning. This problem is further compounded by poor schedules and lack of implementation of an adequate scheduling technique.

Factors that affect project scheduling which consequently affect the preparation of project schedule include the type of project which is undertaken, the nature of the project, project intricacy, task dependencies, resource availability, the climatic condition at size, financial

strength of the company, technology advancement, procurement strategy adopted and contractual agreement (Schatteman, et al., 2008).

According to Kerzner (2007), scheduling problems that can impact all scheduling techniques include:

- Using unrealistic estimates for effort and duration
- Inability to handle employee workload imbalances
- Deciding / having to share critical resources across several projects
- Overcommitted resources
- Continuous readjustments to the WBS primarily from scope changes
- Unforeseen bottlenecks (such as incomplete design)

As we know project schedule used as execution plan of a contractor in performing a scope of work for an owner over a definite period of time. Therefore, in order this to work, it must accurately reflect the scope of work, have a sufficient detail to monitor progress, and has also contain activity delays. It is the completion date forecasting and delay monitoring capability of a properly prepared project schedule that makes it such a valuable tool, allowing management insight in to the effect of delays. Management can then make timely decisions to address and mitigate the delays.

How to improve schedule planning problems

Project scheduling requires skilled professionals and decision makers' participation in the project implementation strategy to guide the project team. Setting up a construction schedule initially requires creating a schedule management process. According to Babu et al, (2015), improvement of project-work program management can be achieved by Creating a well-planned project schedule which helps the project manager and the stakeholders to take the right decisions and act towards the project success, and preparing a detailed specification of the individual action steps required for project implementation. improving construction project-time scheduling and management requires the project manager, to achieve upfront planning “plan the work and work the plan”, to fully understand what the stakeholders need, to have the ability to implement time schedule management methodologies correctly to manage, track, and report progress as well as to balance changes and fluctuations in project scope (Ray, 2014).

2.4 Schedule Implementation Problems

Different factors affect the timely completion of construction projects. These factors caused by the numerous parties involved in the construction project (contractors, consultants, clients). Debabrata, et al. (2007) said that the fundamental reasons for failure of most construction projects related to scheduling are

- Planning – Many construction projects are inadequately defined in the beginning.
- Change – Projects on Civil Engineering change in the course of implementation upsetting the time schedule.
- Project Manager: Poor management by the project manager
- Management Support: Lack of top management involvement and support
- Funding: The cash flow should be smooth as per project needs.
- Resources: Optimum resources must be allocated and deployed for project success.
- Information Management: Lack of quality feedback in time and poor coordination
- Incentives: Human resources management and motivation of the workmen are major aspects for project success.

According to Choong, et al. (1999) Five key determinants for project schedule performance have been identified, namely (in descending order of significance): amount of time project managers devotes to the project, frequency of meetings project managers holds with other project personnel, monetary incentive to designer, implementation of constructability program, and project manager experience with projects of similar size and duration.

How to improve schedule implementation problems

Projects can achieve timely completion when the planning and controlling processes are implemented. Earned value measure and updating or monitoring schedules show the time effect of the remaining planned activities and the progress of activities achieved to date (Solis et al., 2015). Thus, it is very important to develop a proper time management system and adopt various possible improvement methods to prevailing conditions (Chin, et al, 2015).

Accordingly, the improvement methods identified by (Memon, et al, 2014) are presented in Table 2.1 below.

Table 2- 1 Improvement Methods for Time Performance

	Performance Improvement Method	Authors and References
1	Proper planning work	Danso and Antwi 2012, Tumi et. al. 2009, Rahman et. al. 2012
2	Committed leadership and management	Memon et. al. 2012
3	Close monitoring	Danso and Antwi 2012, Enshassi et. al. 2009, Memon et. al. 2013, Memon et. al. 2012
4	Send clear and complete message to worker to ensure effective communication	Aziz 2013, Kaliba et. al. 2009, Rahman et. al. 2012
5	Hire skilled workers to achieve good progress, avoid poor quality of work, more rectification and double handling	Aziz 2013, Gunduz 2013, Rahman et. al. 2012
6	Focus on the quality, cost and delivery of the project	Enshassi et. al. 2009, Kaliba et. al. 2009, Pai and Bharat 2013, Rahman et. al. 2012
7	Training and development of all participant to support delivery process	Fugar and Agyakwah-Baah 2010, Kamaruzzama and Ali 2010, Rahman et. al. 2012
8	Fully utilize the construction team	Rahman et. al. 2012
9	Use new construction technologies (IBS- Industrialize Building System)	Rahman et. al. 2012
10	Focus on client's need	Rahman et. al. 2012
11	Provide knowledge/training to unskilled workers based on their scope of work.	Enshassi et. al. 2009, Fugar and Agyakwah-Baah 2010, Lee-Hoai et. al. 2008
12	Adoption of tools and techniques i.e. Value Management, Lean Thinking, Total Quality Management	Al-Tabatabai 2002, Rahman et. al. 2012
13	Measure performance against other projects	Rahman et. al. 2012

2.5 Empirical Review

A study with the title of “Appraisal of project scheduling in Nigeria construction industry”, A case study of Ibadan, Nigeria was carried out by (Michael, et al., 2018). The main objective of the research was to examine the factors affecting project scheduling and also establish the severity of these factors. The study has been conducted by means of structured questionnaire to get empirical data from the professionals (Architects, Engineers, Quantity surveyors and Builders). The research revealed that the type, complexity and the materials requirement for the work are the most important factors that determine project scheduling; Poor managerial decision on critical activity, lack of expertise in scheduling and inaccurate estimate of human resources required are the top factors hindering the performance of project scheduling.

A study title “Time Management Practices in Large Construction Projects” conducted in Malaysia by (Memon, et al, 2014). Data was gathered through survey technique amongst the practitioners involved in handling large construction projects. Relative Importance Index calculation was employed to assess the level of effectiveness for time management techniques and software packages adopted in the construction project. The results highlighted that most common and effective time management technique and software package are CPM and Microsoft Project respectively. Although, this technique and software package in almost every project is applied, but still the industry practitioners fail in achieving effective time. In the grand view Addis construction projects, CPM is among the tools used to the minimum level while Microsoft project software application has better usage level compared to CPM.

Kermanshachi, et al, (2019) conducted a study under the title “Sensitivity Analysis of Construction Schedule Performance Due to Increased Change Orders and Decreased Labor Productivity”. In this study, a sensitivity analysis was performed to analyze the levels of impact of the variables that affect project performance and duration. The analysis was performed for a typical project plan, to understand how the plan changed with deviations in the variables. The results showed that project duration was the most sensitive variable to project schedule performance. This effect, however, was only seen after a certain reduction in the project deadline.

Dessalegn, (2017) studied the assessment of construction project schedule preparation and controlling practices. Thirteen Public building projects in Addis Ababa were studied to find out the current practices by adopting the processes of project time management as a study model as well as assessing the factors affecting and improvement parameters based on researchers' suggestion. The study was carried out through desk study, questionnaires and interviews. Mean Value Analysis and TOPSIS for Multi Criteria Decision Making analysis methods were adopted for data analysis. The results indicate that more than 70% of the projects are behind schedule, due to low practices in establishing procedures to schedule preparation and control, and limited Project Management software application for performance analysis. Factors that mainly affect schedule performance are unrealistic estimates for effort and duration, limited knowledge in performance evaluation and design changes. In addition, required improvement parameters suggested by the respondents are creating a well-planned scheduling process, establishing schedule management procedures, applying appropriate scheduling software, adopting schedule management methodologies and continuous monitoring procedures.

The other study was research conducted by Solis, et al. (2015) titled "Project Time Management and Schedule Performance in Mexican Construction Projects". The study aimed at assessing the use of processes related to Project Time Management and its relation with project schedule performance (i.e., timely completion). The study included the assessment of fourteen school construction projects executed by a public agency in the Yucatan Peninsula, Mexico. These projects were monitored during the construction phase in order to measure two different variables: the degree of use of processes related to Project Time Management (PTM) that is schedule planning and controlling processes and the project performance regarding timely completion. For each of these projects a Use Index was obtained for assessing the first variable, while the Schedule Performance Index and the Schedule Variance were computed to assess the second one. The results demonstrated there is statistical dependence between these two variables. Most of the projects that attained timely completion also made a greater use of the Project Time Management (PTM) processes.

Srinath, et al. (2016) conducted a study under the title "Factors Affecting Quality of Construction Project Schedules". This study aims to find the factors affecting quality of

construction project schedules. Existing schedule quality assessment methods are reviewed and DCMA (Defense Contract Management Authority) assessment method is selected to quantitatively assess the schedule quality. Ten construction project schedules across India are accessed with the DCMA metrics using the schedule analyzer software package. The mean and standard deviation of the results are calculated to find the significant and factor affecting the quality of a schedule. The results indicate that factors (in the following order) significantly affect the schedule quality- Finish to start relationships, unreasonable float values, High number of lags, missing successors, presence of leads, number of missing predecessors and critical path. More number of lags was found to vary the most and the number of missing predecessors was found to vary the least among the projects. The study also notes that resource loaded and updated with actual dates is not done in most of the project schedules.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this section the researcher described the action that was taken to investigate the research problem which is schedule planning and implementation by applying a specific procedure to identify, select and analyze the problem then come up with a conclusion.

3.2 Description of the study Organization

This research attends to do an assessment on the planning and implementation of project schedule in the construction of real estate projects specifically on Grand View Addis Real Estate project, Addis Ababa. The project is located at Bole sub-city around Rwanda Embassy with a total plot area of 7200m². It has three luxury residential buildings that will accommodate 185 households and also one commercial center. So, in this study, we examined the scheduling method that the project is using currently and factors affecting this process so that we come up with a conclusion that the project is not on perfect track with the seated time and budget.

3.3 Research Design and Approach

To fulfil the objective of this research, quantitative research approach was selected. Quantitative research is a means for testing objective theories by examining the relationship among variables (Caswell, 2009). So, by using this approach we examined the proper planning and implementation of schedule.

As a research design, descriptive design was selected based on the research questions. According to, Naoum (2007), descriptive research is used to describe a specific population or a phenomenon and to answer the “what” question. As it is stated earlier, the objectives of this study are mainly to assess the planning and implementation of project schedule in the mentioned project and to identify its overall impact in the succession of the project.

3.4 Sampling size and sampling design

As mention in chapter one scope of the research section the main aim of this research is to assess the planning and implementation of a project schedule in real estate construction projects a case study on Grand View Addis real estate. Data were collected using questioner and source files. The target populations were employees at Client office, Consultants, Contractors and Site mangers who work at the head office and on site that are involved on the construction of the real estate project.

The following formula is used to determine the desired sample size which is n:

Source: - (Select Statistical Services Limited)

$$n = \frac{N}{(1 + Ne^2)} \dots\dots\dots (3.1)$$

$$n = 82 / (1 + 82(0.05)^2)$$

$$n = 68.04$$

Where,

n = sample size

N= known population size

e = error level (in this case it is 5% with a confidential interval of 95%)

Therefore, by using the formula our desired sample size was 68

3.5 Data source and data collection tools

The research was conducted using primary and secondary data sources. So that were achieved the aim of the research.

3.5.1 Primary Data

Primary data were collected from all parties participating in Grand View Addis Real Estate project which are Client, Consultant and Contractors, this helped us to get data that is exact and unbiased. This were done by distributing questioners survey to assess the current

design of the scheduling system and its implementation and also problems raised in current methods.

3.5.2 Secondary Data

Secondary data were gathered from the organization's documents which are contract, plans and reports this information were help us to get data that are missed in the primary data. In addition, books, articles and journals also used as secondary data to get more information for the research.

3.5.3 Data collection tools

I. Questionnaire

A questionnaire is the most widely used method in survey strategy. As the authors suggested, it is because the respondents were asked to respond to the same questions which will provide an effective way to collect responses from a large sample before making quantitative analysis (Saunders, et al., 2009). In order to obtain the required data, a structured questionnaire was used as a data collection tool resulting from the sample size and the quantitative approach of the study.

Questionnaire design

The questionnaire was used as a data collection tool to assess and analyze planning and implementation of project schedule and to see the overall impact in the succession of the project. The questions were prepared to be filled with professionals who are directly involved in the mentioned real estate construction. According to the objective of the study the questions were classified into five parts.

Part one: Personal data

In this section the questionnaire asked about respondent personal data. It includes the three questions which are; academic background, year of experience in the construction sector and participation in project planning and project management.

Part two: Company background information

In this section the questionnaire asked about company background information the research is based on. It included three questions which are; whom the respondent working for, current job title and contact address.

Part three: Projects schedule planning and implementation practices

This section is of the questionnaire tried to answer the first question of the research concerning schedule planning and implementation practices in grand view Addis real estate construction project and then the respondents are asked to identify the level of agreement on the identified processes.

Part Four: Factors Affecting Schedule Planning

This section is of the questionnaire tried to answer the second question of the research. About 11 causes were identified from different literature reviews and then the respondents were asked to identify the level of agreement on the identified factors affecting schedule planning.

Part Five: Factors Affecting Schedule Implementation

This section is of the questionnaire tried to answer the second question of the research. About 30 causes with three groups were identified from different literature reviews and then the respondents are asked to identify the level of agreement on the identified factors affecting schedule implementation.

3.5.4 Validity and Reliability Measures

“Validity refers to the extent to which a test measures what we actually wish to measure. Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. Validity can also be thought of as utility. In other words, validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested” (Kothari, 2004).

To test the content validity, the questionnaire was distributed by attaching it with the objective and research questions to ten experienced professionals who are currently

working on the construction industry and academic areas. After that, the questionnaire was modified based on the received comments and distributed to the targeted populations.

According to Kothari, (2004) reliability is the consistency of results provided by the measuring instrument.

This is done mainly to see the internal consistency with in the collected data. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient is to 0, the lesser the internal consistency of items in the scale and the closer to 1.0 Cronbach's alpha the greater the internal consistency of the items in the scale.

Based on this, as we can see from the SPSS result table 3.2, the Cronbach's alpha coefficient for each item was tested and the result shows there is high internal consistency.

Table 3.1. Reliability statistics

Statement	Cronbach's Alpha Coefficient
Projects schedule planning and implementation practices	0.78
Factors Affecting Schedule Planning	0.79
Factors Affecting Schedule Implementation	
• Client created	0.84
• Consultant Created	0.77
• Contractor created	0.87
All Questions	0.81

Source: own computation from survey data

3.6 Data Analysis

The data that were gathered through primary and secondary data collection methods were analyzed to meet the research objective which is descriptive statistics. The data that are collected in the course of the questionnaire were examined by both measures of average/mean value and measures of dispersion (standard deviation) then it is presented using Statistical Package for Social Scientists (SPSS) application. Relative Importance Index (RII) method were implemented to determine the ranks of all factors listed in the questionnaire. The score for each factor were calculated by summing up the scores given by the respondents. After calculating the RII value, we ranked the factors based on their respective values. The rank method that was used in this research is within various groups category (i.e., client, consultants, contractors) to rate the identified factors on a five-point scale (1, for the strongly disagree to and 5, for the strongly agree and also 1 never and 5 for Very high). At last, the collected data were presented in tables, charts and graphs. Based on the survey response, an RII was tabulated using the following equation:

$$RII = \frac{\sum P_i U_i}{N(n)} \dots \dots \dots (3.2)$$

($0 \leq RII \leq 1$) Where,

RII = Relative Importance Index

P_i = respondent's rating (From 1 to 5)

U_i = number of respondents placing identical weighting/rating on cause of rework

N = sample size

n = the highest attainable score (i.e., 5 in this case)

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

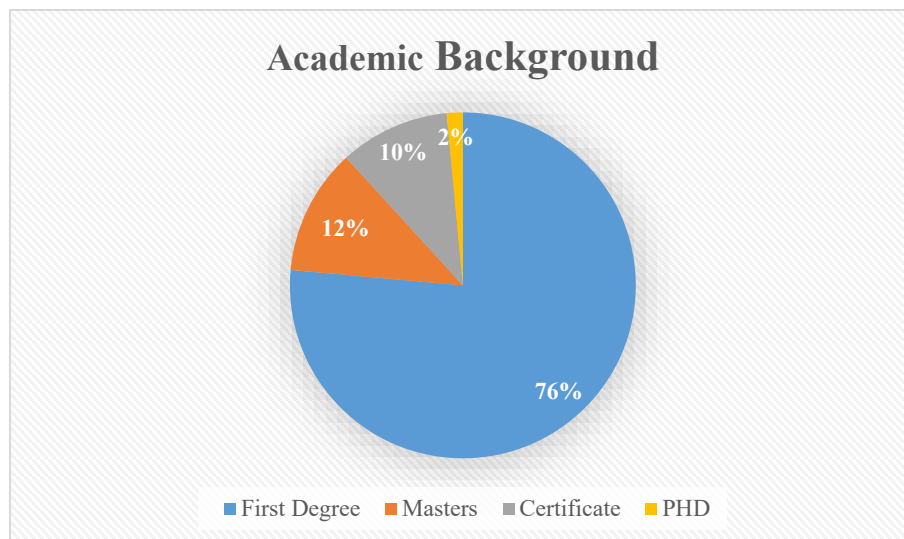
This chapter discusses the gathered data from Grand view Addis real estate project through structured questionnaires. The chapter is organized into two main parts. The first part is concerned with the demographic characteristics of respondents and the second part focused on analyzing, interpreting and presenting of the collected data. The data collection method was accomplished by distributing 68 structured questionnaires that were developed using a five-point Likert scale, and all the questionnaires were filled and returned. All the data gathered was organized, summarized, and analyzed using SPSS software to get intuitive results.

4.2 Background Information about Respondents

This section summarizes the first two parts of the questionnaire, which are personal data and experience. The main focus of this section is to show the relevance of the background information to our research.

4.2.1 Academic Background

Figure 4.1 Academic Background



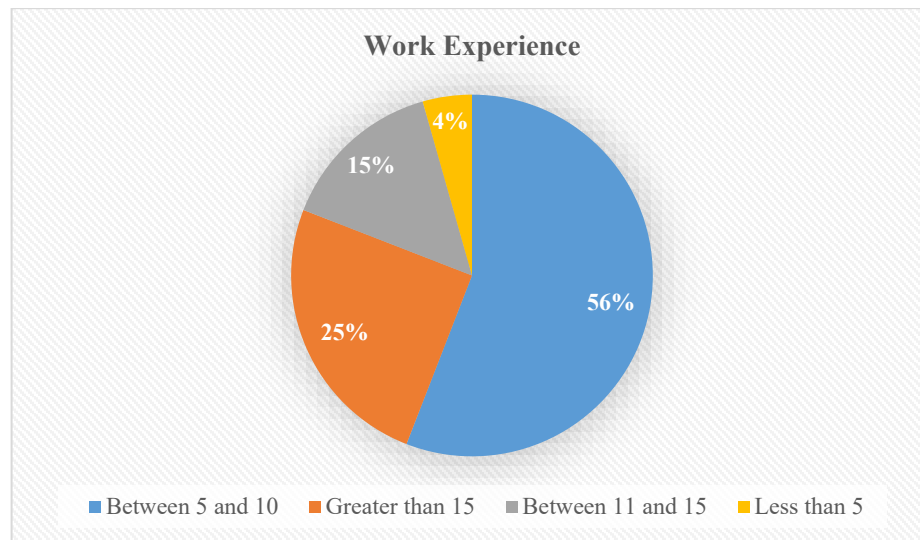
Source: own computation from survey data

As depicted in figure 4.1 above, respondents were asked to show their highest level of education achieved and indicated majority (76.5%) of them have first degree. 11.8% of the

respondents in the project have masters degree and 1.5% of the project staffs have Phd and the remaining 10.3 % of have certificate. This indicates majority of the project staffs have first degree and above level of education. This might imply that majority of our respondents are appropriate and capable of understanding the questionnaires and all about schedule planning and implementation practices.

4.2.2 Work Experience

Figure 4.2 Work experience

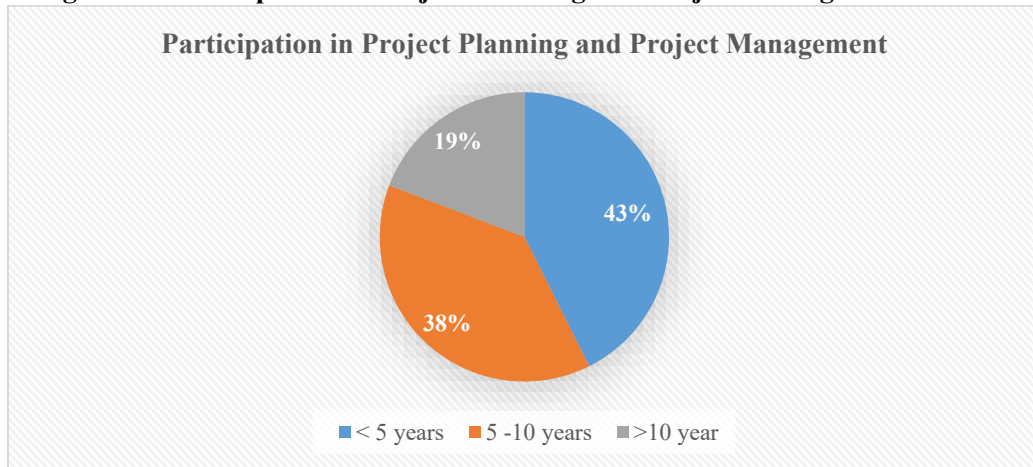


Source: own computation from survey data

As shown above in figure 4.2, respondents were asked to show their work experience in the construction sector and indicated majority (56%) of them have 5-10 years of work experience, 25% of the respondents have greater than 15 years of experience and 14.7% of the respondents have 11-15 years of work experience in the sector and the remaining 4.4% have less than 5 years working experience in the construction sector. This indicates majority of the staff assigned in the project have more than five years of work experience or can be said adequate number of senior staffs were assigned in the project and this might positively contribute for successful scheduling processes.

4.2.3 Participation in Project Planning and Project Management

Figure 4.3 Participation in Project Planning and Project Management

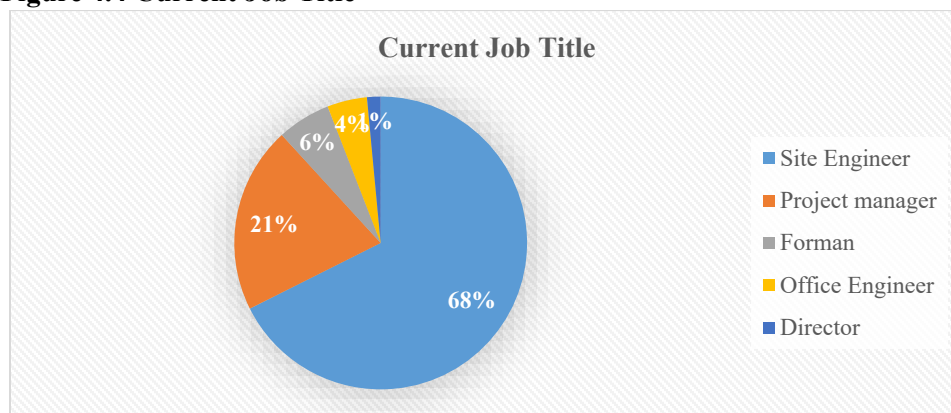


Source: own computation from survey data

Experience of participation in project planning and project management indicates for how long the respondents have been assigned and working in the project. Experience of participation in project planning and project management indicates for how long the respondents have been assigned and working in the project. As it got from literature review, project management is a core concept to apply all project tasks in order to achieve project success. Based on this, 42.6% of the respondents have experience for less than five years. 38.2% of the respondents in the project have an experience of 5-10 years while 19.2 % of the employees in the project have more than ten years of experience respectively. This may imply that majority of the respondents have adequate experience in project planning and project management and have enough understanding to consider and value their response equally in this research.

4.2.4 Current Job Title

Figure 4.4 Current Job Title



Source: own computation from survey data

Respondents were also asked to show their current job title in the organization and as depicted in Figure 4.4 above, majority of the respondents of the questionnaire (67.6%) are site engineers in their current position followed by second large in number 20.6 % are project managers and the remaining 11.2 % are foreman and office engineers. This implies that all the respondents are professional in their field of job assigned which is essential and helpful for this research because they are specialist in the planning, co-ordination and technical aspects of the project.

4.3 Projects schedule planning and implementation practices

In this section, respondents were asked to express their level of agreement on how schedule planning and implementation practices in grand view Addis real estate construction project. The responses were rated from 1 (strongly disagree) to 5 (strongly Agree) to all questions regarding planning practices and implementation.

Preparing a schedule plan right from the beginning is mandatory to bring satisfaction to all parties with the deliverables and avoid misunderstanding about the specific features of the deliverables. Construction work schedule practices were retrieved from literature review and the first one in the row is plan schedule management. As it mentioned on CMAA (2012) plan schedule management at early stage is important for better result of schedule development. Based up on that project staffs were asked whether a schedule plan was prepared at the planning phase. Majority of the employees (mean value of 2.91) schedule agree on the question. So, by this result we can say that the project schedule planning had a positive start.

As it also derived from literature review most important part of the planning phase is the development of the work breakdown structure. As it indicated by Chitkara (20014) WBS is a basic tool to identified activities and splitting of the work scope of project into hierarchy of breakdown levels. This implies, identifying project scope is mandatory to understanding of all the work that needs to be done to achieve the end product. In that matter, respondents were asked whether the scope of work was identified and WBS developed to avoid misunderstanding and majority of the employees (mean value of 2.82) believe that scope of the work was identified at high level. So, this result also shows that might have significant positive contribution for the success of schedule planning and also the overall

implementation. Along with that, the respondents also agree proper person designated, and as Hutchings, (2004) said that to be cost-effective, the schedule criteria selection must consider. Thus, the result show that proper scheduling criteria are considered and proper software were used by mean value 3.39, 2.6 and 3.86 respectively. As well, from the desk study the researcher finds out that, the project used Gantt chart project scheduling tool and technique to develop the schedule using Microsoft project software. This implies that it's a good start that the project uses one of the tools and technique that is stated as a standard procedure.

Table 4.1 Projects schedule planning and implementation practices

	No.		Mean	SD
Schedule Planning	1	A Schedule plan was prepared that serve as a road map for detail plan at the planning phase	2.91	1.43
	2	Scope of work was identified and WBS developed to avoid misunderstanding between the all parties	2.96	1.42
	3	Network diagram that shows activity dependency and sequence was developed	2.07	1.38
	4	Reasonable activity durations were set out to all activities	2.20	1.14
	5	High-level project schedule milestones were properly identified	2.76	1.43
	6	Project resources like budget and people were identified and allocated	2.22	1.39
	7	Proper scheduling selection criteria are considered	2.67	1.43
	8	Proper person designated to develop the schedule	3.23	1.53
	9	Proper Software is used to develop a schedule	3.85	1.01
Schedule Implementation	10	Project team meeting was conducted regularly to provide project status updates as per the baseline schedule	2.35	1.27
	11	Performance report was made for every activity as per the schedule	2.42	1.30
	12	The project schedule is updated regularly, incorporating unplanned work as needed	2.26	1.24

Source: own computation from survey data

Schedule practices that were derived from literature review, under construction project work schedule section was sequencing activities. Depending on that, respondents were asked whether a network diagram developed to sequence activities with the mean value 2.07, it showed that it's not practiced successfully in this project. And also, from the secondary data there is no evidence of using any scheduling methods that were mentioned in literature review (PERT, CPM and CCM). As it defined in the standard PMBok it has the benefit to obtain the greatest efficiency in the project. Also, from the Srinath et al. (2016) conducted research, the most factor affecting quality of a schedule as he concludes, it windup on inappropriate sequence of activities. Therefore, this issue should be managed by using the standard methods and by effective application of task relationships and lag and lead times, which will reflect realistic timing factors and allow for appropriate connection in the timing of tasks to make the best use of time, that will have a high impact on the project.

The other one under construction project work schedule practice section was estimating activity duration. In that matter, respondents asked reasonable activity duration was set out to all activities. From the mean value 2.2, we can understand most of the respondents disagreed with the idea. As Levy (2006), said in order to achieve a project success the ability to determine activity duration is a must. Therefore, it is necessary to focuses on this practice by considering all circumstances that are necessary to develop reasonable duration. As Chitkara (2014) said we considering the execution method and resources earmarked because activity duration highly depends on it, along with, all parties have to be involved to get the best result.

Likewise, they asked if project schedule milestones were properly identified mean value 2.38 respondent do not agree. Thus, improvement is needed in this regard. So that all teams view progress and judge priorities and also to monitor deadlines, identify important dates, and recognize potential bottlenecks within the project.

Regarding project resource, As stated in standard PM Book estimating activity resources is the process of estimating the type and quantities all the resource for each activity from this, we can understand that it's the main procedure for the project success. In the questionnaire it was asked if resource like budget and people were allocated the majority respondent do not agree with mean 2.22. Which indicate that this basic component of any

project plan isn't practiced in grand view addis project. Which might lead this project to not achieving its goals at the right time, interruptions of deadlines and then maximize the risk associated with the project and then cause budget overrun. Therefore, by avoiding poorly executed resource estimation, we can bypass, improper resource allocation, sub-optimal resource productivity that leads to compromised results and also, we can avoid project time and budget overruns.

The last points asked to respondents were schedule implementation practices the first one is kick-off meetings, as stated on PMDO (2015), monitoring the project schedule is mainly focused on determining the current status. team meetings are necessary to know a project status, to receive feedbacks about project performance, challenges, opportunities, risks etc. they can be held daily, weekly, monthly etc. as needed. To ensure that, respondents were asked their level of agreement on the idea of team meetings, if there were held properly, and most of them with mean value of 2.35 were disagreed that team meeting were held. Therefore, as it mentioned in literature review, schedule implementation can be achieved by continues monitoring, which involves measuring the progress and analyzing the variations with the baseline, which is master schedule.

On the other hand, with regard to performance report issue in the project, employees were asked if performance report was made for every activity and most of them disagreed with the statement and indicated performance report was not made for every activity with mean value of 2.42. As mentioned on PMDO (2015) monitoring is important to know the project status based on the schedule. In order to achieve that as Chitkara said performance report play a pivotal role. Therefore, in order to implement project schedule performance report is a mandatory, because it involves collecting and disseminating project information, communicating project progress, utilization of resources, and forecasting future progress and status to all parties, these all things are mandatory for schedule success.

Similarly, project staffs were also asked whether project schedule was updated regularly and only 2.26 mean value believe that it is updated regularly. The remaining majority do not agree with the statement or remain neutral and this might show that, there was a gap in regularly updating project schedules. According to McBride (2016), Tracking any unplanned work that gets added into the workflow throughout execution is mandatory, this could be achieved by regular schedule update. So, it is required to update schedule

regularly to always have a clear view of what has happened and what is due to happen on your project, which gives all the project team confidence that the project is actively managed the work towards a successful conclusion.

4.4 Factors Affecting Schedule Planning

Problems relating to schedule planning derived from the literature were included and distributed in the questionnaire and the respondents provided the level of occurrence (1 never and 5 for Very high) in the projects. The results are presented in Table 4.2

Factors that are considered as highly affecting schedule planning by majority of the respondents were ranked and the first one is use unrealistic estimates of workload and duration (M= 3.84 RII=0.78). According to Dessalegn (2017) research, the 70% studied projects are behind schedule. The main factors identified by him, that is put beforehand is unrealistic estimates for effort and duration. Srinath et al. (2016) also agrees with that. According to, Kermanshachi et al. (2019) study, they were performed a sensitivity analysis for a typical project and found that project duration highly affecting schedule planning. Therefore, from the respondents result and mentioned studies we can understand that to it is important to improve this issue foremost in order to improve schedule planning

Based on the responses, inadequate project schedule practices (M= 3.74 RII=0.77) comes in second. As it mentioned by Dessalegn (2017) this issue comes as a problem of current practice that resulted the projects to be behind schedule.

Inappropriate project organization structures and the problem of poor communication and coordination between all parties involved placed at the third with same mean and RII (M= 3.71 RII=0.76). It will not be expected to obtain a good communication output when there is inappropriate organizational structure is in place rather, poor communication and coordination between all parties is expected. As a result, these two factors are highly related to each other. In the 4th and 5th place low level of knowledge of project management (M= 3.60 RII=0.74) and poor understanding about construction works program (M= 3.57 RII=0.74) were placed. then the list will go on by ranking the least affecting factors of schedule planning.

Table 4.2 Factors Affecting Schedule Planning

No	Factors Affecting Schedule Planning	Mean	SD	RII	Rank
1	Absence of guidance and knowledge to develop a schedule	2.07	0.99	0.48	10 th
2	The problem of poor communication and coordination between all parties involved	3.71	1.29	0.76	3 rd
3	Inadequate project schedule practices	3.74	1.36	0.77	2 nd
4	Continuous WBS readjustments to incorporate strategy changes	3.24	1.46	0.68	7 th
5	Scop did not define properly initially	2.22	1.06	0.50	9 th
6	Use unrealistic estimates of workload and duration	3.84	1.11	0.78	1 st
7	The project organization structures are inappropriate	3.71	1.33	0.76	3 rd
8	Incomplete design information	3.50	1.52	0.73	6 th
9	Poor understanding about construction works program	3.57	1.32	0.74	5 th
10	Low level of knowledge of project management	3.60	1.30	0.74	4 th
11	Lack of Project management software application	2.32	1.45	0.55	8 th

Source: own computation from survey data

4.5 Factors Affecting Schedule Implementation

Factors that affect schedule implementation were identified from the project under study and assessed properly. These factors are attributed to the contractual stakeholders such as clients, consultants and contractors. Accordingly, these factors were evaluated for their degree of occurrence in the project. Thus, the mean values in Table 4.3 show factors that affect schedule implementation.

4.5.1 Client Created Factors

Table 4.3 Client Created Factors

No.	Factors Affecting Schedule Implementation	Mean	SD	RII	Rank
	Client created				
1	Delay of payment	3.44	1.39	0.71	3rd
2	project financing difficulties	3.01	1.39	0.64	7th
3	Slow decision-making process	3.74	1.22	0.76	1st
4	Information delay	3.13	1.44	0.66	6th
5	Changes in the initial design	3.50	1.26	0.72	2nd
6	Poor ability to understand technical terms	2.91	1.37	0.62	8th
7	Lack of communication between parties	3.34	1.36	0.69	4 th
8	Owner nominates subcontractors and suppliers	3.16	1.36	0.66	5 th

Source: own computation from survey data

Respondents ranked client - initiated factors are “Slow decision-making process” as the first factors affecting schedule implementation with the mean value of 3.74 and RII value of 0.76. When we see related studies regarding this, most of all the literatures regarding schedule implementation affecting factors do not see this problem as significant factor, that means it will not happen that often so this project needs a better improvement regarding this issue.

Based on the responses, “Changes in initial design” was ranked as the second affecting factor with mean value of 3.50 and RII value of 0.72. According to Debabrata et al. (2007), change in design is one of the fundamental reasons that affect schedule implementation. Dessalegn (2017) list this issue as one of the factors that mainly affect project performance. Therefore, the main measurement that has to be taken to improve this issue is communication and coordination of all parties in the design planning phase in that case, it possible to minimize change in execution phase.

In the third-place respondent ranked delay of payment with mean value of 3.44 and RII value of 0.71. According to Debabrata et al include this issue fundamental reasons that affect schedule implementation as funding. And explain it as the cash flow should be smooth as per project needs. Therefore, the client should take responsibility and avoid this issue since its affecting the project

4.5.2 Consultant Created Factors

Table 4.4 Consultant Created Factors

No.	Factors Affecting Schedule Implementation	Mean	SD	RII	Rank
	Consultant created				
1	Design change/ unqualified design /design error/improper drawing/bad design/incomplete design information	3.47	1.38	0.72	7 th
2	Delayed approval of construction drawings and samples	3.88	1.33	0.79	1 st
3	Inadequate supervision / project management / slow decision-making / insufficient experience	3.74	1.16	0.76	2 nd
4	Less coordination with contractors	3.71	1.30	0.76	3 rd
5	disagreements on the valuation of completed works	3.63	1.20	0.74	4 th
6	Late revising the specification	3.41	1.44	0.71	8 th
7	Unrealistic prescribed contract duration	3.50	1.33	0.72	6 th
8	Discrepancies in the contract document	3.21	1.39	0.67	9 th
9	It takes a long time to approve the test result and inspection	3.59	1.32	0.74	5 th
10	Bad project management / bad organizational structure	3.07	1.39	0.65	10 th

Source: own computation from survey data

When it comes to consultant created factors respondents ranked delay in approval of construction drawings and sample with mean value of 3.88 and RII value of 0.79 in first place. According to Debabrata et al addressee this issue as information management, as it said lack of quality feedback in time and poor coordination are the main reason for schedule implementation problem. Since the consultants are mediators between client and contractors, they have to solve problems not create one. but in all projects, they have their own portion in affecting the project succession, the same is true in this project so consultants should monitor the project regularly and approve all drawings and samples on time.

According to respondent's inadequate supervision / project management / slow decision-making / insufficient experience ranked in the second place with mean value of 3.74 and RII value of 0.76. in third place respondent ranked less coordination with contractors. According to Choong et al. (1999) the above-mentioned factors included in their five key determinants for project schedule.

4.5.3 Contractor created

Table 4.5 Contractor Created Factors

No.	Factors Affecting Schedule Implementation	Mean	SD	RII	Rank
	Contractor created				
1	Inadequate contractor experience	3.21	1.36	0.67	12 th
2	Insufficient planning for construction work / Insufficient definition of initial activity	3.66	1.21	0.74	5 th
3	Poor knowledge of project time management (limited knowledge of project schedule management,)	3.40	1.41	0.71	9 th
4	Unrealistic estimates of effort and duration	3.71	1.23	0.76	4 th
5	Inadequate project monitoring process	3.93	1.24	0.79	1 st
6	Lack of top management involvement and support	3.49	1.32	0.72	8 th
7	Inadequate site management / communication	3.25	1.36	0.68	11 th
8	Difficulty in financing the project	3.85	1.33	0.79	2 nd
9	Default in choosing subcontractors and designated suppliers	3.31	1.40	0.69	10 th
10	Inadequate resource management (human resources / materials / equipment / subcontractors)	3.78	1.34	0.77	3 rd
11	Poor site recording / communication / organization	3.56	1.39	0.74	6 th
12	Risks and uncertainties associated with the project	3.50	1.36	0.72	7 th

Source: own computation from survey data

According to the responses collected, "Inadequate project monitoring process" ranked first place as contractor-initiated factor from the category with mean value of 3.93 and RII value of 1.24. Dessalegn (2017) mentioned that as one of the factor's affecting schedule is limited knowledge in performance evaluation which implies to poor project monitoring process.

And also, Baldwin et al (2014) said, the schedule for progress monitoring and reporting should be set up at the start of the construction work. These indicates that, contractors should create awareness to all the staffs regarding project monitoring and also if project monitoring process have to starts at the beginning so that it will adhere throughout the life cycle of the project, then it can avoid poor project monitoring process because it will develop through time. Moreover, the survey from project documents indicated that the limited knowledge of professionals to utilize management software (MS Project and Primavera) have impacted the timely evaluation of project performance.

In second difficulty in “financing the project” placed with the mean value of 3.85 and RII 0.79. As Debabrata et al. (2007) said, the cash flow should be smooth as per project needs. So, the contractor has to allocate the proper estimated project cost so that it doesn't not cause any problem in schedule implementation.

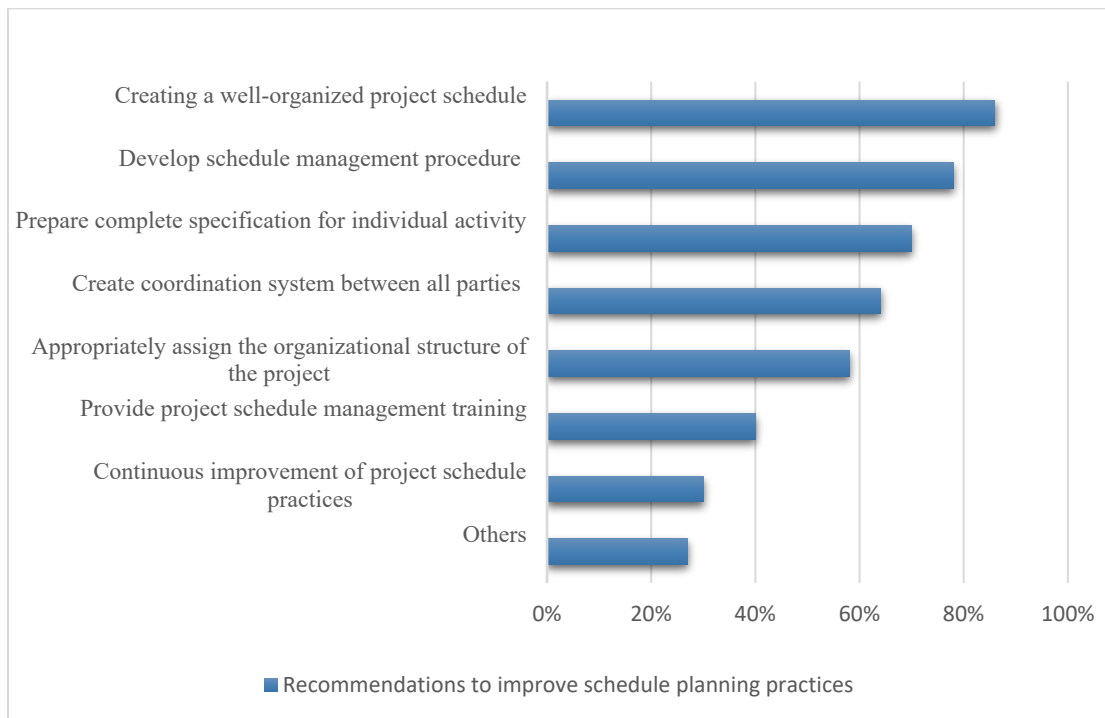
As a third factor respondents placed Inadequate resource management with mean value of 3.78 and RII 0.77. Resources management is a mandatory thing that has to be practiced in all parties specially contractors. Therefore, contractors have to have a better plan to avoid this problem foremost so as to avoid extra costs.

Furthermore, the above results indicates that failure in schedule implementation is created mainly from contractors' side. However, client and consultant created factors have also an impact on contractors' schedule performance

4.6 Responses of open-ended question

In this section of the questionnaire the respondents were asked to state any of their recommendations towards improving schedule planning and implementation. The following results were obtained by collecting all of the responses. According to the results, creating well organized project schedule, develop schedule management procedure and prepare complete specification for individual activity were the major improvement measures recommended by the respondents.

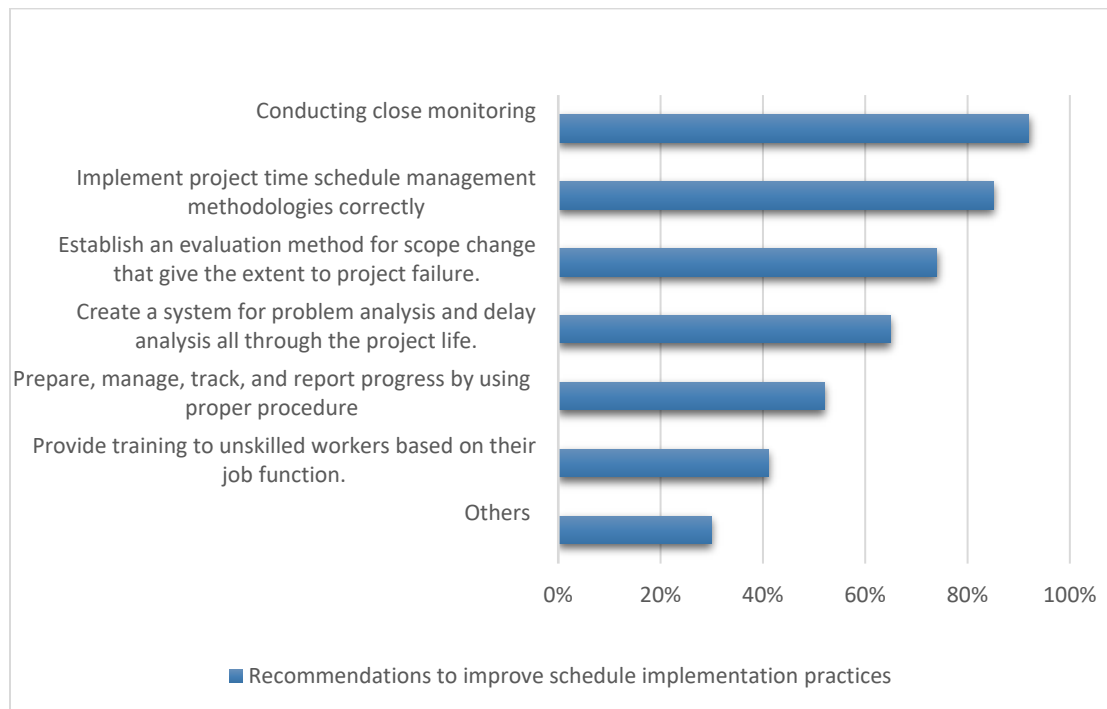
Figure 4.5 Responses of open-ended question (1)



Source: own computation from survey data

When we come to implementation, conducting close monitoring, implement project time schedule management methodologies correctly and establish an evaluation method for scope change that give the extent to project failure were the top three improvement measures recommended by the respondents.

Figure 4.6 Responses of open-ended question (2)



Source: own computation from survey data

CHAPTER FIVE:

SUMMARY, CONCLUSION and RECOMMENDATION

5.1 Introduction

This chapter is consisted of three sections. The first section presented summary of major findings of the study. The second section explained about the general conclusions reached depending on the findings and finally gave recommendations for concerned bodies who can contribute towards improvement of schedule planning and implementation.

5.2 Summary

In line with the major objective of the study, the significant findings obtained for schedule planning and implementation practices, different factors affecting schedule performances and the improvement parameters are indicated below.

Findings regarding schedule planning and implementation in grand view Addis project

- From the results we can say that majority of the respondents agree that schedule plan was created during the planning phase of the project. However, due to improper application, the project faces time overruns, cost overruns, and quality issues.
- Though project teams haven't gained the full benefits from the scope of work that was identified and the work breakdown structure (WBS) developed. Most of the respondents agreed that the scope of the work was identified and a WBS was developed for the grand view Addis project. However, current project status showed that they didn't use it for its progress. In other words, they did not use the practices to its full potential.
- The findings showed the least agreement to the sequence of activity was develop in network diagram to show activity dependence; this method resolves problems of construction projects schedule planning and implementation very effectively. The findings shows that the activities are not sequenced for all disciplines accordingly that results the project to add extra cost and time to correct mistakes that happen because of it.

- Reasonable activity duration is important for schedule management. results from the respondents show that less attention were given for this procedure, findings show that duration of the activity does not take into account the phenomena that can interrupt the activities like budget, resource shortage etc. In other words, schedule contingency is not added in the program schedule to mitigate the effects of risks or uncertainties identified or associated with specific elements of the project schedule.
- Project resources are necessary to finish the project on time, but from the findings, adequate resources in terms of human and materials are not allocating on time for this project. Respondents (in particular consultants and contractors) agree that it's one of the top reasons that disturb the schedule planning and implementation.
- Furthermore, in the issue of schedule planning respondents gives highest agreement in these issues, proper schedule selection criteria were taken into account, there was a designated person assigned to develop the schedule and proper software were used to develop the schedule.
- The findings of the evaluation reveal that the schedule is not implemented well. Respondent showed least agreement on the issue that make sure schedule implementation, which are regular team meetings to provide project statuses, preparing and delivering performance report, and updating project schedule regularly.

Findings regarding factors affecting schedule planning and implementation in grand view Addis project

- Among the identified factors affecting schedule planning, the top major affecting factors were unrealistic estimation of workloads, poor project schedule practices, inappropriate organizational structure, poor coordination/communication of project team members and low-level project management knowledge were at top of the lists.
- The major schedule implementation affecting factors that was caused by client wear slow decision making followed by change is design, delay payment and lack of communication.

- Among consultant caused factors, delayed approval, Inadequate supervision / project management / slow decision-making / insufficient experience and less coordination were identified as the major ones.
- In addition, contractor caused factors include inadequate project monitoring process, project financing difficulties and poor resource management.

Findings regarding improvement measures recommended for schedule planning and implementation in grand view Addis project

- From the schedule planning improvement measures, creating a well-planned scheduling process, establishing schedule management procedures, prepare a specification for all activities, creating coordination system, proper organizational structure, team training, continuous improvement on project schedule practices, recommendations were made.
- The main schedule implementation improvement parameters recommended are, conducting close monitoring, implement project time schedule management methodologies correctly, developing a project evaluation method, creating a system for problem and delay analysis, use proper procedures to prepare, manage, track, and report progress and the last one is provide training for unskilled workers.

5.3 Conclusion

This research has raised three major questions to be answered by analyzing all the required and gathered data. These questions were addressed by the study as below:

- To assess whether the construction project work schedule planning practices correctly applied, the study attempted to raise some basic issues or activities that are recommended by PMBOK-Guide that should be practiced to successfully planning and implementation of projects schedule. Based on this, most of the process that should be followed during schedule planning have not been followed. Even though a designated project management expert developed the schedule the activities are not sequenced properly and show no activity dependency at all. Duration of the activity was not correctly determined by taking account different phenomena and schedule contingency are not added. Regarding project resources, due to poor understanding of construction work, human resources are not properly allocated and also material resources are not allocated correctly due to failure to use correct supply chain and procurement system. Therefore, significant improvements are needed in all of the above.
- As well, schedule implementation was not achieved because of poor monitoring system. monitoring systems are regular team meeting for progress update, performance report of all disciplines as per schedule and schedule update as needed, in regards of the mentioned monitoring system this project is in need of improvement.
- This conclusion indicates that most of the current schedule planning and implantation practices do not follow standard practices. As a result, the project suffered time overruns, which led to cost overruns.
- The study identified the major schedule planning and implementation affecting factors that needs a serious intervention by all parties involved in the project.
- Identified factors affecting schedule planning are, unrealistic estimation of workloads, poor project schedule practices, inappropriate organizational structure, poor coordination/communication of project team members and low-level project management knowledge.

- Identified major factors affecting schedule implementation are, slow decision making, change is design, delay payment and lack of communication are client initiated. Delayed approval, Inadequate supervision / project management / slow decision-making / insufficient experience and less coordination are identified consultant initiated. inadequate project monitoring process, project financing difficulties and poor resource management are contractor initiated.
- So, the practical implication of this research is that proper schedule planning and implementation requires a practical knowledge of construction project management, schedule management and construction project work schedule practices. In addition, it is necessary to establish an appropriate organizational structure for the project, for better collaboration and sufficient communication between the 3 C's (client, consultant, and contractor). Also needs using a capable human resource and adequate budget from the start to the end of the project.

5.4 Recommendation

The purpose of the following recommendation is not to look deeply at areas for improvement. The intention is only to point out some major issues that need consideration to enhance the current project schedule management of grand view Addis real estate construction projects. Based on the analysis of the questionnaires and considering some standard practices, the following recommendations are aimed at improving this practice.

- The current schedule should be modified to take into account standard practices for incorporating the full specifications of individual activities. To this end, all parties have to participate and develop well organized schedule plan that will govern all activities. project schedule plan should be developed by competent project manager and be discussed by all stakeholders before final draft is completed and implemented, this will reduce the many change orders during construction phase.
- All construction management schedule practices should be implemented fully to fulfill their maximum potential in benefiting all parties in an all-round effectiveness on project time, project cost and project quality.
- All parties must agree on the developed schedule plan individual activity duration and make sure schedule contingency added.
- Responsible parties should allocate human, budget, and material resources on time at the project site to avoid interruption on the project schedule. Efficient allocation of resources means quality work delivered on time. This helps improve productivity and efficiency in all activities.
- Continuous improvement of project schedule practices should maintain and exercise, to achieve better results by avoiding project delay and cost overrun aspects.

Client Related Recommendations

- Clients should make their decisions in a timely manner. to make this process faster the project team compile information describing the project as it stands, the client assesses that information and either asks for changes or approves it and gives instructions to progress to the next stage. In this way, the timely completion of the project can be achieved.

- Clients must ensure that their demand in design changes during the construction period should have no adverse effects on the critical activities so as to avoid schedule delay.
- All change order demands must be evaluated to assess their impact on quality of work envisaged, scope and cost, possible claims and disruption to work so as to avoid unnecessary disputes and litigation.
- Clients should ensure that interim payment certificates are paid in time within the stipulated time-frame so as to facilitate the progress of works to ensure timely completion.

Consultant Related Recommendations

- The consultant should ensure appropriate approvals are done in timely manner and there is a competent representative on the site to make quick decisions that are binding and to ensure that works are done smoothly.
- The consultant must ensure timely, accurate and adequate communication between the contractors throughout the duration of the project.
- The consultant has to apply strong supervision mechanisms to assure the provision of all activities and of actors that are participating at different levels
- Contractors should apply effective site resources management system for all activities of the project so as to avoid material wastage and low labor productivity that will result time and cost overruns.

Improving the communication between all parties (Client, Consultant and Contractor)

- Standard reporting systems must be followed in reporting progress report
- Periodical meetings must be organized to facilitate the communication between all parties involved.
- Create awareness by providing timely training on schedule planning and implementation to all personnel involved in the project.

References

- African Economic Outlook. (2016).
- Alemayehu, A. (2019). Why should Ethiopian's care about urbanization? Jobs, infrastructure, and formal land and housing.
- Arditi, D., Akan, G. T., & Gurdamar, S. (n.d.). Reasons for delays in public projects in Turkey. *Construction Management and Economics*, 171–181.
- Baldwin , A., & Bordoli, D. (2014). *A Handbook for Construction Planning and Scheduling*. John Wiley and Sons, Ltd, Pondicherry, India.
- Babu, S. S., & Dr. Sudhakar. (n.d.). Critical Success Factors Influencing Performance of Construction Projects. *International Journal of Innovative Research in Science, Engineering and Technology*, IV (5)., 2015.
- Brown, L. (2021). *Project Schedule Management: How to Plan, Develop, Maintain and Control?*
- Chin, L. S., & Abdul Hamida, A. (2015). *The Practice of Time Management on Construction Project*. Johor, Malaysia: Elsevier Ltd.
- Chitkara K. K. (2014). *Construction Project Management Planning, Scheduling and Controlling (Third Edition ed.)*.
- Clough, R. H., Sears, G. A., & S. (2000). *Construction Project Management, Fourth Edition*.
- CMAA. (2012). *Time Management Guide Lines*. Ed. Virginia: Construction Management Association of America.
- Creswell , J. (2009). *Research design: qualitative, quantitative, and mixed methods*.
- Debabrata , K., Dr. Sudip , B., & Dr. Amartya, K. (2007). *Implementation of Construction Projects on Schedule*.
- Dessalegn, M. (2017). *Assessment on the practice of construction work schedule preparation and control of public building projects in Addis Ababa*, Research paper.

- Dr. Kog , Y. C., Dr. David , C., & Huat, M. (n.d.). 1999. Key determinants for construction schedule performance, Volume 17, Issue 6, 351-359.
- Endeshaw, D. (2017, 29 July). 'High-end, high in demand'. the reporter.
- Heagney, J. (2012). Fundamental of Project Management, (Fourth Edition ed.). American Management Association.
- Howley, P., Scott, M., & Redmond, D. (2009). Sustainability versus livability: an investigation of neighborhood satisfaction. Journal of Environmental Planning and Management, Volume 52, 847-864.
- Hutchings, F. J. (2004). Project Scheduling Handbook. Santa Cruze, California. USA.
- Ismael, I. (1996). Managing construction projects. Faculty of civil Engineering, Addis Ababa University, M.Sc. thesis.
- Kerzner, H. (2007). Project Management, A Systems Approach to Planning, Scheduling and Controlling. (10th Ed ed.). New York:: John Wiley and Sons, Inc.
- Kerzner, H. (2017). Project Management Case Studies.
- Kothari, C.R. (2004). Research Methodology: Methods and Techniques. (2nded). New Delhi: New Age International Limited Publishers.
- Leach, L. P. (2000). Critical Chain Project Management Improves Project Performance Advanced Project Institute.
- Levy, S. M. (2006). Project Management in Construction,. Third Edition.
- Maserang, S. (2002). Project Management: Tools and Techniques.
- McBride, M. (2016). Project management basics. How to manage your project with checklists.
- Memon, A. H., Roslan, N., & Yasmi, N. (2014). Improving Time Performance in Construction Projects: Perspective of Contractor. Journal of American Science, 46-50.
- Moneke, U. U. (2012). Evaluation of factors affecting work schedule effectiveness in the management of construction projects, Department of Project Management Technology Federal University of Technology, Owerri – Nigeria.

- Naoum, S. G. (2007). *Dissertation Research and Writing for construction students* (2nd ed., ed.). UK, Elsevier Ltd.
- Newton, P. (2015). *Managing the project schedule project skills*.
- Project Management For Development Organizations. (2015). *A methodology to manage development projects for international humanitarian assistance and relief organizations*. Management for development series.
- Project Management Institute. (2008). *A Guide to the Project Management Body of Knowledge (PMBOK Guide) (4th edition ed.)*. USA: Project Management Institute.
- Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*. USA: Project Management Institute.
- Ray , H. C. (2014). *Project Managers' Perceptions of the Primary Factors Contributing to Success or Failure of Projects. A Qualitative Phenomenological Study*. Proquest LLC.
- Retief , F. (2002.). *Overview of critical chain project management, Management Planning Systems*. Critical Chain Symposium. Johannesburg, South Africa.
- Saunders, M., Lewis , P., & Thornhill, A. (2009). *Research Methods for Business Students (5th ed ed.)*. British Library cataloguing.
- Schatteman, D., Herroelen, W., & Van de , S. (2008). *Methodology for integrated risk management and proactive scheduling of construction projects*. *Journal of Construction Engineering and Management* 134(11), 885-893.
- Sharareh, K. (2019). *Sensitivity Analysis of Construction Schedule Performance Due to Increased Change Orders and Decreased Labor Productivity*. University of Texas at Arlington, USA.
- Sivakumar, A., & Suresh, D. (2019). *Impact of Schedule Management Plan on Project Management Effectiveness*. *International Journal of Engineering and Advanced Technology (IJEAT)*.
- Solis-Carcano, R., Corona-Suarez, G., & Garcialbarra, A. J. (2015). *The Use of Project Time Management Processes and the Schedule Performance of Construction Projects in Mexico*. *Journal of Construction Engineering*.

- Srinath, P., & Varshese, K. (2016). Factors Affecting Quality of Construction Project Schedules, Doctoral Research Scholar,. Department of Civil Engineering. Indian Institute of Technology Madras, Chennai.
- Ssempebwa, R. K. (2013). Project Schedule management.
- Suresh , D., & Sivakumar , A. (2019). Impact of Schedule Management Plan on Project Management Effectiveness. International Journal of Engineering and Advanced Technology (IJEAT), Volume-9 Issue-1.
- Teye, J. (1-2 November, 2018). Urbanization and Migration in Africa. United Nations Headquarters in New York,,: Centre for Migration Studies University of Ghana Expert Group Meeting.
- UN-DESA . (2014). 2014 revision of the World Urbanization Prospects, New York.
- Weaver, P. (2011). The brief history of scheduling. Hatt Canberra.



ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
MASTER PROGRAM IN PROJECT MANAGEMENT
(QUESTIONNAIRE)

DEAR SIR/MADAM,

The purpose of this questionnaire is to collect data for the study entitled “**Assessment on the planning and implementation of project schedule in the construction of real estate projects, a case study on grand view addis real estate**” for partial fulfillment of M.A in Project Management. The genuine responses you forward will be used as input for the study and have great contribution to the success of the study. Your privacy will be kept anonymously and any information you provide in the questionnaire will be kept confidential and only used for the purpose of the study. Therefore, you are kindly requested to provide your genuine responses to the questions below.

Thank You in advance for your cooperation!

General Instruction: Please, tick “√” in the appropriate columns for your response for closed-ended questions among the provided alternatives but write your response in the space provided for open-ended questions.

Part one: personal data

1.1 Academic background

Certificate First Degree Other Specify _____
Masters PhD

1.2 Work experience in the construction sector (in years)

Less than 5 Between 11 and 15
Between 5 and 10 Greater than 15

1.3 Your participation in Project Planning & Project management:

< 5 years 5-10 years >10 year

Part two: Company background information

2.1 Organization you are working for

- i. MDM Developers (Client)
- ii. Contractor
- iii. Consultant

2.2 Current Job Title: _____

2.3 Contacts address (Optional): E-mail: _____ Tel: _____

Part three: Projects schedule planning and implementation practices

Kindly indicate how much you agree or disagree with the following statements concerning Schedule planning and implementation practices in grand view addis real estate construction project.

We Use the scale of (SD-Strongly Disagree D- Disagree N- Neutral A-Agree SA Strongly Agree)

	No.		SD	D	N	A	SA
Schedule Planning	1	A Schedule plan was prepared that serve as a road map for detail plan at the planning phase					
	2	Scope of work was identified and WBS developed to avoid misunderstanding between the all parties					
	3	Network diagram that shows activity dependency and sequence was developed					
	4	Reasonable activity durations were set out to all activities					
	5	High-level project schedule milestones were properly identified					
	6	Project resources like budget and people were identified and allocated					
	7	Proper scheduling selection criteria are considered					
	8	Proper person designated to develop the schedule					
	9	Proper Software is used to develop a schedule					
Schedule Implementation	10	Project kick-off meeting was conducted regularly to provide project status updates as per the baseline schedule					
	11	Performance report was made for every activity as per the schedule					
	12	The project schedule is updated regularly, incorporating unplanned work as needed					

Part Four: Factors Affecting Schedule Planning

No	Factors Affecting Schedule Planning	Occurrence rate				
		Very High	High	Medium	Low	Never
1	Absence of guidance and knowledge to develop a schedule					
2	The problem of poor communication and coordination between all parties involved					
3	Inadequate project schedule practices					
4	Continuous WBS readjustments to incorporate strategy changes					
5	Scop did not define properly initially					
6	Use unrealistic estimates of workload and duration					
7	The project organization structures are inappropriate					
8	Incomplete design information					
9	Poor understanding about construction works program					
10	Low level of knowledge of project management					
11	Lack of Project management software application					

Part Five: Factors Affecting Schedule Implementation

No	Factors Affecting Schedule Implementation	Occurrence rate				
		Very High	High	Medium	Low	Never
	Client created					
1	Delay of payment					
2	project financing difficulties					
3	Slow decision-making process					
4	Information delay					
5	Changes in the initial design					

		Very High	High	Medium	Low	Never
6	Poor ability to understand technical terms					
7	Lack of communication between parties					
8	Owner nominates subcontractors and suppliers					
	Consultant created					
1	Design change/ unqualified design /design error/improper drawing/bad design/incomplete design information					
2	Delayed approval of construction drawings and samples					
3	Inadequate supervision / project management / slow decision-making / insufficient experience					
4	Less coordination with contractors					
5	disagreements on the valuation of completed works					
6	Late revising the specification					
7	Unrealistic prescribed contract duration					
8	Discrepancies in the contract document					
9	It takes a long time to approve the test result and inspection					
10	Bad project management / bad organizational structure					
	Contractor created					
1	Inadequate contractor experience					
2	Insufficient planning for construction work / Insufficient definition of initial activity					
3	Poor knowledge of project time management (limited knowledge of project schedule management,)					
4	Unrealistic estimates of effort and duration					
5	Inadequate project monitoring process					

		Very High	High	Medium	Low	Never
6	Lack of top management involvement and support					
7	Inadequate site management / communication					
8	Difficulty in financing the project					
9	Default in choosing subcontractors and designated suppliers					
10	Inadequate resource management (human resources / materials / equipment / subcontractors)					
11	Poor site recording / communication / organization					
12	Risks and uncertainties associated with the project					

1. Do you have any recommendations to improve schedule planning practices in grand view addis real estate construction project?

2. Do you have any recommendations to improve schedule implementation practices in grand view addis real estate construction project?

APPENDIX B

Part one: Personal Data

Academic

No.	Academic background	Frequency	Percent
1	Certificate	7	10.3%
2	First Degree	52	76.5%
3	Masters	8	11.8%
4	PHD	1	1.5%
5	Total	68	100.0

Experience

No.	Work experience (In years)	Frequency	Percent
1	Less than 5	3	4.4%
2	Between 5 and 10	38	55.9%
3	Between 11 and 15	10	14.7%
4	Greater than 15	17	25%
5	Total	68	100.0

Participation

No.	Participation (In years)	Frequency	Percent
1	< 5 years	29	43%
2	5-10 years	26	37.3%
3	>10 year	13	18.7%
4	Total	68	100.0

Part two: Company background information Organization

No.	Current Job Title	Frequency	Percent
1	Director	1	1.5%
2	Forman	4	5.9%
3	Office Engineer	3	4.4%
4	Project manager	14	20.6%
5	Site Engineer	46	67.6%
6	Total	68	100.0

APPENDIX C

Part three: Projects schedule planning and implementation practices

	No		N	SD 1	D 2	N 3	A 4	SA 5	Mean	SD
Schedule Planning	1	A Schedule plan was prepared that serve as a road map for detail plan at the planning phase	68	17	13	5	25	8	2.91	1.43
	2	Scope of work was identified and WBS developed to avoid misunderstanding between the all parties	68	15	15	6	22	10	2.96	1.42
	3	Network diagram that shows activity dependency and sequence was developed	68	35	13	7	6	7	2.07	1.38
	4	Reasonable activity durations were set out to all activities	68	17	36	4	6	5	2.20	1.14
	5	High-level project schedule milestones were properly identified	68	24	21	4	11	8	2.76	1.43
	6	Project resources like budget and people were identified and allocated	68	29	23	2	8	6	2.22	1.39
	7	Proper scheduling selection criteria are considered	68	18	21	3	17	9	2.67	1.43
	8	Proper person designated to develop the schedule	68	13	14	5	16	20	3.23	1.53
	9	Proper Software is used to develop a schedule	68	-	11	7	31	19	3.85	1.01
Schedule Implementation	10	Project kick-off meeting was conducted regularly to provide project status updates as per the baseline schedule	68	20	26	4	14	4	2.35	1.27
	11	Performance report was made for every activity as per the schedule	68	19	26	3	15	5	2.42	1.30
	12	The project schedule is updated regularly, incorporating unplanned work as needed	68	18	34	3	6	7	2.26	1.24

APPENDIX D

Part Four: Factors Affecting Schedule Planning

No	Factors Affecting Schedule Planning	N	VL 1	L 2	M 3	H 4	VH 5	Mean	SD	RII	Rank
1	Absence of guidance and knowledge to develop a schedule	68	21	31	6	10		2.07	0.99	0.48	10 th
2	The problem of poor communication and coordination between all parties involved	68	8	6	3	32	19	3.71	1.29	0.76	3 rd
3	Inadequate project schedule practices	68	7	9	5	21	26	3.74	1.36	0.77	2 nd
4	Continuous WBS readjustments to incorporate strategy changes	68	12	15	1	25	15	3.24	1.46	0.68	7 th
5	Scop did not define properly initially	68	18	28	14	5	3	2.22	1.06	0.50	9 th
6	Use unrealistic estimates of workload and duration	68	3	7	9	28	21	3.84	1.11	0.78	1 st
7	The project organization structures are inappropriate	68	7	9	4	25	23	3.71	1.33	0.76	3 rd
8	Incomplete design information	68	10	13	4	15	26	3.50	1.52	0.73	6 th
9	Poor understanding about construction works program	68	7	11	6	26	18	3.57	1.32	0.74	5 th
10	Low level of knowledge of project management	68	8	8	4	31	17	3.60	1.30	0.74	4 th
11	Lack of Project management software application	68	29	15	4	13	7	2.32	1.45	0.55	8 th

APPENDIX E

Part Five: Factors Affecting Schedule Implementation

No	Factors Affecting Schedule Implementation	N	VL 1	L 2	M 3	H 4	VH 5	Mean	SD	RII	Rank
Client created											
1	Delay of payment	68	8	13	8	19	20	3.44	1.39	0.71	3rd
2	project financing difficulties	68	13	13	15	14	13	3.01	1.39	0.64	7th
3	Slow decision-making process	68	5	7	11	23	22	3.74	1.22	0.76	1st
4	Information delay	68	13	12	11	17	15	3.13	1.44	0.66	6th
5	Changes in the initial design	68	7	9	10	27	15	3.50	1.26	0.72	2nd
6	Poor ability to understand technical terms	68	14	14	15	14	11	2.91	1.37	0.62	8th
7	Lack of communication between parties	68	9	12	10	21	16	3.34	1.36	0.69	4th
8	Owner nominates subcontractors and suppliers	68	11	12	13	19	13	3.16	1.36	0.66	5th
Consultant created											
1	Design change/ unqualified design /design error/improper drawing/bad design/incomplete design information	68	8	11	11	17	21	3.47	1.38	0.72	7th
2	Delayed approval of construction drawings and samples	68	5	8	10	12	33	3.88	1.33	0.79	1st
3	Inadequate supervision / project management / slow decision-making / insufficient experience	68	3	9	12	23	21	3.74	1.16	0.76	2nd
4	Less coordination with contractors	68	5	9	13	15	26	3.71	1.30	0.76	3rd

5	disagreements on the valuation of completed works	68	4	11	9	26	18	3.63	1.20	0.74	4th
6	Late revising the specification	68	10	10	12	14	22	3.41	1.44	0.71	8th
7	Unrealistic prescribed contract duration	68	7	11	10	21	19	3.50	1.33	0.72	6th
8	Discrepancies in the contract document	68	11	12	12	18	15	3.21	1.39	0.67	9th
9	It takes a long time to approve the test result and inspection	68	6	11	10	19	22	3.59	1.32	0.74	5th
10	Bad project management / bad organizational structure	68	12	13	15	14	14	3.07	1.39	0.65	10th
	Contractor created										
1	Inadequate contractor experience	68	10	13	12	19	14	3.21	1.36	0.67	12th
2	Insufficient planning for construction work / Insufficient definition of initial activity	68	4	11	8	26	19	3.66	1.21	0.74	5th
3	Poor knowledge of project time management (limited knowledge of project schedule management,)	68	9	13	7	20	19	3.40	1.41	0.71	9th
4	Unrealistic estimates of effort and duration	68	5	8	10	24	21	3.71	1.23	0.76	4th
5	Inadequate project monitoring process	68	3	12	1	23	29	3.93	1.24	0.79	1st
6	Lack of top management involvement and support	68	7	10	13	19	19	3.49	1.32	0.72	8th
7	Inadequate site management / communication	68	10	12	11	21	14	3.25	1.36	0.68	11th
8	Difficulty in financing the project	68	5	10	5	18	30	3.85	1.33	0.79	2nd
9	Default in choosing subcontractors and designated suppliers	68	9	15	7	20	17	3.31	1.40	0.69	10th
10	Inadequate resource management (human resources / materials / equipment / subcontractors)	68	6	9	7	18	28	3.78	1.34	0.77	3rd
11	Poor site recording / communication / organization	68	8	10	9	18	23	3.56	1.39	0.74	6th
12	Risks and uncertainties associated with the project	68	7	12	10	18	21	3.50	1.36	0.72	7th