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Addis Ababa University
College of Business and Economics School of Commerce
Department of Project Management

**Assessment of the Impact of Project Scope Management on Project
Performance of construction Projects: the case of 40/60 saving house
condominium project Bole Ayat 2 sites**

**A Thesis Submitted to the Department of Project Management in
Partial Fulfillment of Requirements for the Degree of Master of
Project Management**

By
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Addis Ababa, Ethiopia

Addis Ababa University
College of Business and Economics
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project performance of construction**

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By: Kalkidan Kebede

**Submitted in Partial Fulfillment of the Requirements for the Award of
Masters of Arts Degree in Project Management.**

Approved by Board of Examiners

Advisor _____ **Signature** _____ **Date** _____

Internal Examiner _____ **Signature** _____ **Date** _____

External Examiner _____ **Signature** _____ **Date** _____

DECLARATION

I declare that this research paper entitled **Assessment of the Impact of Project Scope Management on Project Performance of Construction Projects (the case of 40/60 Saving House Condominium Project Bole Ayat 2 sites)** is my original work. This research has not been presented for any other university and is not concurrently submitted in candidature of any other degree. To the best of my knowledge and belief this thesis contains no materials previously published or written by another person except where due reference is made.

Candidate:

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ABSTRACT

The general objective of this study was to investigate factors influencing project scope performance at Bole Ayat 2 site 40/60 condominium projects. The specific objectives for the study included: To determine how the processes and procedures in scope management influence project performance at projects; to examine how scope change influenced project performance at projects; to investigate the use of work breakdown structure in determining project scope performance of the projects and to examine how stakeholder management influences project scope performance at projects. The study adopted a descriptive research design to collect quantitative data. The target population was drawn from a population frame provided by the project and consisted of project supervisors; project managers; staff and other stakeholders. The study took the initiative to describe and analyze the scope in relation to the project performance parameters (cost, quality and time)of the projects. The target population for the study was 84 of which a sample of 46 respondents responded to the send out questionnaires. A questionnaire was the instrument used for data collection. Reliability results showed that all the variables had exceeded the acceptable limit of 0.85. The researcher used SPSS Statistics 23 to analyze quantitative data. In conclusion The absence of an Expertise judgment with specialized education, knowledge, skill, experience ,the fact that There is no system of Organizing workshops and interview with the stakeholders to ensure thorough stakeholder involvement, and improve the collection of requirements, the Lack of complete definition of project scope and its impact on critical factors, Under estimating activity duration and cost estimation and activity sequencing and the fact that there is No clear agreement between the client and the contractor concerning how to verify the activities with what is stated in the contract on regular basis and the awareness that at Change in project activities results to change in Project schedule/time cost and quality are the major challenges related to project scope management processes In this research, problems and challenges were identified with the aim to improve the process of scope management by providing solutions for these challenges.

Key terms: Scope Definition, Change Management, control Scope, Stakeholder Management, Work

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Construction industry makes significant contributions to the socio-economic development process of a country. Globally, the construction industry hugely influences the economy, the environment & the society and the sector accounts for about six percent of the world GDP (World Economic Forum, 2016).

Ethiopia is a fast growing economy in Africa and the construction industry has important contributions to the Ethiopian economy (EEA, 2011). The construction industry in Ethiopia is a sector that opens the door for the growth of many additional industries. Building works require high input. For instance, they require different metal products, clay works, and cement and cement products, etc. As such, the growth of these industries will surely follow the growth of the construction industry

Achieving the right results is the primary test of effective performance in project management; and this is observed through fulfilling the scope. It takes precedence over the constraints of deadlines and budgets. The failure to manage and control this aspect of the project could be a principal reason why construction projects fail. Harrington & McNellis, (2006). Inadequate pre-project planning and poor scope definition continue to emerge as major causes of expensive changes, delays, rework, cost overruns and schedule overruns, and they often lead to project failure (Mirza, Pourzolfaghar & Shahnazari 2013; Lordsleem Jr & Melhado 2014).

When projects are hardly ever completed without introducing changes to their original baseline plan, a major challenge is to accurately estimate the project delivery time, while understanding the effects of other factors that create the discrepancy between estimated and actual project completion times. (Moshe Ayal 2012).

The project scope is throughout the project so that it can be used as an appropriate way to achieve project deliverables. The project scope draws a line in which project manager and stakeholders will follow to know the direction to take or not to take towards achieving the

critical success factors of the project. Because Changes in scope can impact the cost, schedule, risk and even the quality of the project. Karl (2014) adds that a well-defined scope sets expectations among the project stakeholders .

Alsehaimi, Koskela and Tzortzopoulos (2013) investigated a number of studies on delay in construction projects in developing countries their study cited poor project management as one of the main causes of delay. They reported that poor planning and control is, specifically, the factor that had been identified in most studies. And one of the very major aspects of planning is to define the parameters of the project which is referred to as the scope of the project. In Ethiopia, the public construction projects are the highest consumer of government annual capital budget in terms of government infrastructure development (Ministry of Construction, 2016).The construction sector's contribution is greater in the case of Ethiopia and the industry has been playing a crucial role in sustaining country's rapid and equitable socio-economic development and changing the livelihood of millions of peoples and the sector had a 9.5 percent share from Ethiopia's total Gross Domestic Product (Ministry of Construction, 2016).

Addis Ababa is largely characterized by low provision of infrastructure, poverty, limited housing development, high illiteracy and high unemployment. A large percentage of the urban population is living in overcrowded housing that lacks basic services such as potable water, electricity and sanitation. Many inhabitants live in conditions, which do not meet minimum standards of living, (UN-HABITAT

2011a).Housing is one of the major challenges of the city of Addis Ababa due to the increase population and high rate of urbanization. It is an acute problem especially for low-income households that account for over 80 percent of the city's population.

The recently emerging strategy in Addis Ababa city is provision of readymade collective dwelling units (condominium housing units) which aimed to be affordable for low and middle income groups. The major objective of condominium housing project is minimizing disparities by viewing governments concern and commitment to improve the main slum settlement, ensuring access to decent and affordable housing for the poor urban dwellers, which are

homeless or inadequately sheltered .However, to what extent the affordability and adequately of the housing units to the urban poor is still questionable (UN-Habitat, 2011)

The Addis Ababa city government took the initiative to reverse the situation and committed itself to new and innovative approaches through the integrated housing development program in 2004 for the low- and middle income families. The housing development program is also considered by the founder (Addis Ababa city administration as the major development task to reduce urban poverty and improve the lives of slum dwellers and to bring sustainable socio-economic transformation. (UNHABITAT,2011).Having a better project outcome in terms of cost time and quality is significant in construction projects because construction is one of the most important sectors in many economies and a significant contributor to the gross domestic product (GDP) of most countries. Fageha, M.K &Aibinu, A.A. (2014).

This research shows the general ideas and the relevance of the study in terms of planning and the scope management on the Case Study Which includes Background of the study, Statement of the Problem, Research objectives Research Questions significance and scope of the study as well as the organization of the study.

1.2 Statement of the Problem

In many poor and developing countries like Ethiopia the lack of access to financing excessive complex documents failure to ensure fair procurement practices the high costs of importing equipment's is a time bound ,high value and special construction mission of creating a construction service with the predetermined performance objectives defined in terms of quality specification, completion time, budgeted cost and others specified constraints (Chitkara, 2011).The purpose of project scope definition is to provide adequate information that is needed to identify the work to be performed in order to avoid major changes that may negatively affect project performance, adequate project planning with clear project scope can alleviate the potential for cost overrun and delays .the level of scope definition is a typical project success factors so that project stakeholders can determine whether to move a project forward into detailed design and construction.

The problems lies on the construction projects of Bole Ayat(40/60) Condominium Housing Projects in relation to their scope assessment and its impact on the project performance.

since scope is the preliminary and front phase of every construction project It is important to pin down the scope early in a project's life cycle as it can greatly impact the schedule or cost of the project down the track and hence that was not given enough attentions and causes a lot of problems such as inadequate project planning and poor scope definition can lead to expensive changes, delays, rework, cost overruns, schedule overruns, and project failure. This is the reason why the purpose of this study was to investigate if proper scope management leads to better project outcome in terms of project being completed within set budget and time; project delivered at agreed quality levels and project deliverables to satisfaction of all stakeholders.

1.3 Research Questions

1. How well is the project scope planning considered in relation to project performance factors on the construction works of 40/60 saving house condominium Bole Ayat 2 sites?
2. How well is the project stakeholder management considered in relation to project performance factors on the construction projects?
3. What is the role of work break down structure in relation to project performance factors on the construction projects?
4. How well is the project scope verified and controlled in relation to project performance factors on the construction projects?
5. What are the major setbacks encountered on the processes of project scope management?

1.4 Objectives of the Study

The general objective of this study is to assess the impact of project scope management on project performance of construction Projects (the case of 40/60 saving house condominium project Bole Ayat 2 sites).

The major objective of this research is to contribute to an improved scope management process by identifying the challenges that affect this process and provide solutions for these bottlenecks, by comparing literature findings with practical experiences.

1.4.1 Specific objectives of the study are:

1. To identify scope planning on project performance of the project.
2. To identify the impact of Stakeholder participation on project performance of the project.
3. To investigate the influence impact of a well prepared of work breakdown structure on the project.
4. To identify the impact of validation and scope control on project performance of the project.
5. To identify the challenges associated with project scope management processes on the construction project.

1.5 Significance of the Study

The research intends to show the impact of a proper scoping to diminish the gap that are seen in the building construction industry in Ethiopia especially in terms of cost over run and project delays and quality compromises and give recommendations on ways to improve on implementation of a proper scope management and meet the dead line of projects completion with in the specified quality and budget. This research has also provided the recommendations of project scope management for making a project successful. The finding of this work would orient the project managers to take the analysis in the project scope process based on the challenges faced and what they consider as factors which affect positively the project successfully.

The study will be supportive for building construction projects in Addis Ababa and all over Ethiopia in the future. The findings of this study can be used as a reference for future researches on the same topic and related issues and can also help students planning to undertake their research.

1.6 Scope of the Study

The study was conducted study was conducted in Addis Ababa city around Bole Ayat 49 Round about and the project is the construction of B+G+10 typology saving houses civil works construction projects. The case was chosen by the researcher because of accessibility for data

collection. The scope of this study is to identify the project scope management and its relation to its impacts on project performance regarding cost, schedule and quality.

1.7 Organization of the Study

Following the proposal this research will be logically organized into five chapters and references. Chapter one deals with the introduction, which talks about the general idea and relevance of the study. It defines the background, the problem statement, the objectives, the scope as well as the organization of the research. Chapter two comprises of literature review, and quotes the various related works done in this area of study. Chapter three attempts to describe in detail the methodology of the project followed in this research study. Chapter four contains data presentation, analysis of the information gathered through the data survey, summary of findings, discussion and limitation of the study. Chapter five provides conclusions and recommendations of the study.

1.8 Limitation of the Study

The following factors were the limitations of the study:

- Respondents' involuntary act to fill the questionnaires not to publicize the company's internal affair.
- Due to the time constraint of the research the focus has been laid on client, consultant and contractor. It is not taken into account what happens if several stakeholders work together to produce the outcome of the project

CHAPTER TWO

LITERATURE REVIEW

2.1. Overview

A project scope is the most essential part of any project especially in the construction industry, having a better project outcome is significant because construction is one of the most important sectors in many economies and a significant contributor to the gross domestic product (GDP) of most countries. Construction projects face failures due to inadequate scope definition & cost overruns, and delays. The following literature review goes in to details about project scope management theories and concepts gathered from different books journals and articles. (Sarde. R. 2016).

International studies were conducted and published in the subject area Assessment of the impact of project scope management on project performance of construction Projects (the case of 40/60 saving house condominium project Bole Ayat 2 site) even though where developing countries are suffering more& developing countries should give more attention to the performance of the public building construction projects (Almaktari et al., 2017).

2.2. Theoretical Literature Review

2.2.1. Definition of Project

The Project Management Institute (PMI) defines a project as “A temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end”. The end is reached when the project’s objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. Thus, a project is any endeavor that serves a specific purpose, objective, or goal under the constraint of time, resources, quality objectives, and defined scope to create a service or a capability to perform a service. (PMBOK, 2013).

2.2.2. Definition of Project Management

Project Management The Project Management Institute (PMI) also defines project management as “the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements” (PMBOK, 2013).

Managing a project typically includes, but is not limited to:-

- Identifying requirements;
- Addressing the various needs, concerns, and expectations of the stakeholders in planning and executing the project;
- Setting up, maintaining, and carrying out communications among stakeholders that are active, effective, and collaborative in nature
- Managing stakeholders towards meeting project requirements and creating project deliverables;
- Balancing the competing project constraints, which include, but are not limited to project Scope, Quality, Schedule, Budget, Resources, and Risks. (PMBOK, 2013).

Project management is a set of management activities performed in and on an organization, under the leadership of a designated person, to move from a given current state to a defined target state. Generally accepted project management activities are scope (which includes, by the definition of scope, integrative activities), communication, cost, human resources (HR), procurement, quality, risk, stakeholder, and time management activities.

2.2.3. Definition of Project Scope Management

Project scope management includes all those practices that are necessary to ensure that the project is streamlined to only the required necessary work in order to achieve a necessary product, service or result. Scope means what is needed to be done and scope management is the managing of what needs to be done (Wysocki, 2009).it covers processes required to ensure the project includes all the work and only the work that is required to complete the project successfully, (Horine, 2013).

A clear project scope can alleviate the potential for cost overrun, inadequate project planning and poor scope definition can lead to expensive changes, delays, rework, cost overruns, schedule overruns, and project failure. Failure to consider and clarify stakeholders' expectations and concerns at early stage in the project can result in extraordinary risks being ignored and may lead to difficulties in running the project, and hence poor performance (Atkinson et al., 2006).

The PMI (2004, p. 103) defines scope management as the sum of processes needed to ensure a project containing: all the work required, and only the work required, to complete the project successfully." The PMI further states: "Project scope management is primarily concerned with defining and controlling what is and what is not included in the project."

Webber and Webber (2007, p. 2.9): "Scope management, which ensures that all changes to the project scope are made in a controlled manner and that unofficial 'side agreements' between team members and end users are never permitted".

What is a Project scope?

According to the Project Management Body of Knowledge (2013) a Project scope involves managing the work that must be done to deliver a product with specified features and functions which can be visualized by creating a Work Breakdown Structure (WBS).

According to Turner (2009) scope is an initial, high-level description of the way in which the goal of a project will be reached. Which is called statement of scope should include the work required to solve the problem and achieve benefits, the work that falls outside the project and also interface with other projects. A well-defined project scope is important for effective allocation of resources, plan expenditures, save time and energy by eliminating and or reducing features that have little value to project objectives.

Project scope is a process whereby the work that is needed for the project are identified and described in sufficient detail to facilitate project execution. It gives the project team an understanding of what needs to be done while at the same time helping the team in setting up management control systems that can be applied during project execution; and could impact on project outcomes(Fageha, &, A.A. 2014,).

Project Scope Management Processes: - Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project. (PMBOK, 2013).in accordance with the project management body of knowledge an overview of the Project Scope Management processes includes:

Plan Scope Management: Plan Scope Management is the process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled. The key benefit of this process is that it provides guidance and direction on how scope will be managed throughout the project. (PMBOK, 2013). Scope Planning Begins with a project concept that reflects a business need and ends with a decision whether to proceed and start the execution of the project by developing the detailed design (Gibson, Kaczmarowski& Lore 1995).

Collect Requirements: Collect Requirements is the process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives. The key benefit of this process is that it provides the basis for defining and managing the project scope. The project's success is directly influenced by active stakeholder involvement in the discovery and decomposition of needs into requirements and by the care taken in determining, documenting, and managing the requirements of the product, service, or result of the project. Requirements include the quantified and documented needs and expectations of the sponsor, customer, and other stakeholders. (PMBOK, 2013). Collection of requirements is the practice whereby the customers and stakeholder's expectation of the project is recorded. The captured information must be elicited and analyzed in concrete detail. Requirement becomes the foundation of the work to be done and serves as a guide to the cost, schedule, and the quality and customer satisfaction baseline of the project. (Mulcahy, 2009).

Define Scope: Define Scope is the process of developing a detailed description of the project . The key benefit of this process is that it describes the project, service, or result boundaries by defining which of the requirements collected will be included in and excluded from the project scope. The preparation of a detailed project scope statement is critical to project success and builds upon the major deliverables, assumptions, and constraints that are documented during project initiation. (PMBOK, 2013).Whereas Karl (2014) adds that a well-defined scope sets expectations among the project stakeholders. It identifies the external

interfaces between the system and the rest of the activities. The scope definition helps the project manager assess the resources needed to implement the project and make realistic commitments. The purpose of project scope definition is to generate adequate information that is needed to identify and describe the work to be performed, in order to avoid major changes that may negatively affect project outcome (Gibson et al. 2006).

Define scope is the practice of implementing a detailed documentation and description of the project and product. The product scope describes the features and characteristics of the product, result or service of the project while project scope describes the project work required to create the project deliverables (Heldman,

2009). Project scope definition is primarily concerned with what is and is not included in the project to be implemented and qualifies major deliverables assumptions and initial constraints documented during the project initiation stage or phase.

Create WBS: A Work Breakdown Structure is the process of subdividing project deliverables and project work into smaller, more manageable components. The key benefit of this process is that it provides a structured vision of what has to be delivered, The WBS is a hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables (PMBOK.2013).The goal of creating a WBS is to create work packages that decrease the complexity of a project. These smaller work packages are easier to manage and to execute. Work packages are defined as deliverable or project work components at the lowest level of each branch of the WBS that include the activities required to complete the work package deliverable. Each work package contains the activities that must be executed along with the requirements, information and identified risks. (de Boer, Bruinsma, Elich, van Luling, &Wemeijer, 2009). WBS (work breakdown structure) of a project is the breakdown of the total scope of what must be done to completely satisfy the objectives and produce the required (expected) deliverables. The definition also tells us that this breakdown of the project is not done in a random, chaotic fashion, but rather the breakdown is performed in an ordered way so that, when completed, the broken-down parts are arranged in a hierarchical structure The WBS of a project depicts, describes, displays, illustrates, maps, models, pictures, portrays, projects, represents, or shows all the elements that make up the

total scope, and consequently only the total scope, in a top-down ordered structure. Sokowski (2015).

(PMI 2008) states that the deliverable oriented WBS provides the following benefits of the project Better communication to project sponsor, stakeholder and team member's Accurate estimation of tasks risks timelines and costs. WBS perform a very important role on any project, acting among other things as a linking mechanism between the elicited and documented project requirements and the detailed estimation activities that belong to the project time and project cost management domains. (Moustafaev.2015).

Validate Scope: Validate Scope is the process of formalizing acceptance of the completed project deliverables. The key benefit of this process is that it brings objectivity to the acceptance process and increases the chance of final product, service, or result acceptance by validating each deliverable. The Validate Scope process differs from the Control Quality process in that the former is primarily concerned with acceptance of the deliverables, while quality control is primarily concerned with correctness of the deliverables and meeting the quality requirements specified for the deliverables. (Moustafaev.2015).

Key project stakeholders, such as the customer and sponsor for the project, inspect and then formally accept the deliverables during this process. if the deliverables are not acceptable, the customer or sponsor usually requests changes The main outputs of this process, therefore, are accepted deliverables and change requests. A continuous feedback loop provides verification of the scope of all the work done within the project. It involves checking the design and engineering deliverables required as part of the scope planning and definition phase of a construction project. Schwalbe (2010).

Several documents may be used to achieve this process including project management plan, requirements documentation and validated deliverables. (PMBOK.2013.) validating the scope of the project produces outputs that are key items on the way to successful completion of the projects: the deliverables accepted by the stakeholders with the authority to declare acceptance. This is different from declaring deliverables to be the "correct" deliverables from the specification point of view and declaring that the deliverables meet the quality standards specified for these deliverables. Sokowski (2015).

Control Scope: Control Scope is the process of monitoring the status of the project and product scope and managing changes to the scope baseline. The key benefit of this process is that it allows the scope baseline to be maintained throughout the project. Control Scope is also used to manage the actual changes when they occur and is integrated with the other control processes. (PMBOK.2013.)

The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources is referred to as scope creep. Control is used to monitor the actual changes as they occur and integrated into the change control process. A reliable system must be in place to track, monitor, manage, and review change to project scope. Controlling scope changes must focus on; determining if a scope change is required; facilitating scope changes to ensure that changes are agreed upon; and managing the changes if they happen. (PMBOK.2013).

A scope change is defined as an alteration or a modification to the defined conditions, assumptions or requirements as stated in the beginning of a project, which lead to a change in activities (Gokulkarthi & Gowrishankar, 2015; Nahod, 2012).

Two categories of scope change are defined; rework and change orders (Huang, Kong, Guo, Baldwin, & Li,2007; Hao, Shen, & Neelamkavil, 2008; Sidney, 2006).

Rework refers to re-doing a process or activity because of quality defects, variance, poor design or on-site management. The baseline requirements are still satisfied by the new alternative. The process of rework is relatively simple, but the costs can be very high since it is most of the time accompanied by the demolition of what has already been built (Hao, Shen, & Neelamkavil, 2008).

A change order refers to a change generated by an unanticipated cause that cannot easily be replaced by an alternative. It has to be negotiated case by case and requires a common agreement on paper between all involved actors. Dealing with these changes includes coordinating all aspects relating to the change orders such as documentation, drawings, processes, information, costs, schedule and personnel (Hao, Shen, & Neelamkavil, 2008).

The PMI states that uncontrolled changes are often referred as “scope creep”. Scope creep is the undesired byproduct of a badly managed project scope, often leading to major difficulties in projects or being a reason for project failure. Scope creep occurs when the requirements, design, or development dictates or implements a feature that does not meet the objectives or the needs of the solution being produced. Scope creep is extraneous and unnecessary. If, however, scope is changed as a result of the requirements, design, or development processes in order to meet the objectives and business needs, it is a valid evolution or fluctuation in scope. (PMI.2004).

2.2.4. Phases of a Construction Project

Project, in its broadest sense, is any task which has to be accomplished within a scheduled time and within a defined budget. This implies that every project has its stated objectives and there are always three that are basic: the completed facility, complying with the appropriate specifications, the budgeted or target cost and the time required to completion. (Kharbada ,1985). The life cycle of a construction project can be thought of as consisting of five distinct, phases namely: -

The conceptual phase: - this is the first Phase of any project's life cycle. In this phase a tangible form is given to an abstract idea usually conceived by the owner. In this phase preliminary studies are done which determine the technical and financial feasibility of the proposed project. Based on these feasibility studies the decision is taken by the owner whether to proceed with or abandon the project. This is the phase when the owner conceives the basic idea. The basic architectural drawings are prepared in this phase presenting the various alternatives. If an option is selected then other basic project initiation activities, which include selection/initiation of various other players. Conceptual and definition indicate this is the time when the concept of the project is evolved and the scope of the project defined or stated. The overall scope is based on the needed functionality, but in the end it is function of how much money is available for the project the owner has only an abstract idea which he conveys usually verbally to the designer which is an architect. (Nayyar.1994).

The construction industry of Ethiopia The consultant is appointed by the client and takes care of the client’s interests according to the general condition of construction. The contributions of

each consultant in the design process can be summarized as follows: a Brief Stage Client provides the design brief that consists of the requirements and constraints to the design team and a Sketch Design Stage Architect prepares a preliminary sketch to satisfy the design brief and possibly provides alternative proposal. Quantity surveyor prepares preliminary cost estimates based on the Architect's design sketch. Quantity surveyor provides the initial cost plan that forms the basis of cost control and budgeting. Client approves sketch and cost estimates. Scheme Design Stage Architect designs to a greater detail to meet the submission requirements of the local authority. Quantity surveyor undertakes various costs, checks and ensures that the budget is not exceeded. Architect provides scheme designs to the civil (structural), mechanical and electrical engineers for the engineering design of the project. Architect submits scheme design for approval to the local authority. Tefera(2013).

The Engineering phase: - In this phase engineering tasks that define the type and general size of the facility portions, starting from the basic units to the overall scope are determined. These tasks include the preparation of detailed architectural drawings. This phase is begun after it is determined that a proposed project is feasible. Engineering phase includes preliminary engineering tasks that define the type and general size of basic units of which the facility is comprised. During this phase time schedules and cost estimates are developed for the detailed engineering and the subsequent phases. (Nayyar.1994).

The engineering phase includes Design ideas are usually the start of possible projects, and alternatives are investigated before estimating costs and evaluating whether to proceed any further. The main design stage of deciding how to use materials to realize a project usually follows an evaluation and selection of those materials. The decisions made at the design stage almost entirely determine the quality and cost, and therefore the success, of a project. Scale and specialization increase rapidly as the design proceeds. (J smith .2002).

After the scope of the project is defined, the project enters the details planning phase (Westland, 2006). This phase typically begins when a single contractor is awarded the contract and may continue with early phases of the construction process. Pre-construction planning may involve the planning phase, the design phase, and the tendering and award phase. Once a contract has been signed, the planning stage is traditionally completed at no more than one month before mobilization and no more than two additional months beyond mobilization.

Planning deliverables include a detailed schedule, baseline milestone schedule, risk management process, project operations plan, and a clear scope (Lines et al., 2015). Architects proceed to detail design the elements and components of various spaces and prepares specification for the project. Quantity surveyor prepares bills of quantities and final cost check. Engineers finalize their drawings and specifications. Tendering documents are important guide to the bidders and should therefore contain enough and unambiguous information regarding obligation of the parties involved.

Tendering document must contain:-Information on the kind and quality of materials, Information on the required quality of the finished work, Information on administration and legal matters usually the descriptions are referred to existing General documents as far as possible. In Ethiopia, some of the references are national or international standards, general conditions, Regulations laws and by laws. After all the above descriptions are stated in the specifications, the contractor submits his prices mainly depending on the estimated quantities of the Project. For variations further negotiations will be made between the client and the contractor. Tefera (2013).

The procurement phase: - In this phase the detailed drawings are made available or produced for all parts of the project, and purchasing of the material to construct the project is done. In this phase equipment and materials are procured and most of construction and vending contracts awarded. For this reason equipment and material specification and vendor information is made available according to already designated dates as per detailed engineering schedule. The required equipment and material items are delivered by dates designated on the construction schedule, and contractors mobilized to perform per start dates on the construction schedule. (Nayyar.1994).

The construction phase: - Construction Phase In this phase the facility is constructed according to work packages prepared during the detailed engineering phase using equipment and material obtained in the procurement phase. The sequencing of construction is initially planned to reflect the most logical and cost effective approach to meet startup dates. Most companies and public bodies who promote new capital expenditure projects employ contractors and sub-contractors from this stage on to supply equipment or carry out construction. For internal

projects within firms there is an equivalent internal process of placing orders to authorize expenditure on labor and materials. (Nayyar.1994).

2.2.5. Contract types and procedures of the housing projects

The MWUD are responsible for purchasing all construction materials, in bulk and therefore at low prices. the contract is a fixed contract price type of contract for items of work contained in the structural and major elements and framework of the project. For this specific research we are interested on fixed rate contract types. Contractors are engaged on fixed-cost contracts, which reduce the burden of soliciting for, receiving, and choosing tenders for each job. The material requirements for each condominium block are calculated and the exact material quantities are given to contractors. This centralized system minimizes wastage, helps to keep records for material supplies and distribution, and enables any surplus materials to be used on other sites. These mechanisms give greater certainty of the final cost of construction. the project completion time is fixed by the client. the contractor is responsible to furnish all the necessary material, labor and equipment with in the given time without any additional cost. Construction contractors are specifically hired to build the structure of each block. The task of fitting out the buildings, including the plumbing and electricity works and the application of finishes, is given to sub-contractors consisting of Micro and Small Enterprises (MSE). This sub-contraction of smaller tasks is done in an effort to enable the capacity and development of MSEs, to keep a tighter control on costs, and increase competition that aims to improve construction quality. Consultants are hired to oversee construction and maintain construction quality.

The HDPO acts as the project manager of each project. It allocates portions of each project to individual contractors. The selected contractors visit the HDPO to analyze the specifications and decide whether they will accept the fixed-cost for the job offered to them by the Government. Once the HDPO and the contractors come to an agreement on the fixed price of the project and a bill of quantities, the contractor's final step is to provide the HDPO with written confirmation of their agreement. Construction quality is affected by micro and small enterprises seeking to make additional profit by using cheaper substandard fixtures, such as doors and door handles, as well as the low levels of construction skills and capacity, which is somewhat understandable considering the vast numbers of recently employed inexperienced contractors and builders necessary for projects of this scale. Following quality issues with early

condominium projects, consultants have been hired to carry out quality supervision and monitoring. Quality checks on building materials have been implemented alongside monitoring of structural frame quality, crucially important in the earthquake-zoned city of Addis Ababa.

A central feature of the projects is the centrally sourced and distributed building materials. The client purchases all materials (cement, reinforcing bar, electricity and sanitation equipment, etc.) in bulk in an effort to reduce the cost and control quality. This means that there is less risk for contractors of material cost overruns. Construction quality is monitored by consultants, who conduct on-site checks. In order to be contracted for work on condominium projects, construction companies must register with the Ministry of Works and Urban Development.

Under the fixed-price mode, the owner should not request detailed contractor cost information except as required to validate periodic payments. If the contract is reimbursable, the contractor must share all schedule, cost, and work-hour information with the client. In fact, the owner may provide part of the staff for the project controls operation. On all contracts, the owner should receive summary cost and schedule information on the project for historical purposes. This can include work hour expenditures. On most contracts the owner will establish scheduling guidance. The simplest guidance is the required date for completion and required contractor mobilization date. More likely, additional guidance in the form of a summary schedule or listing of milestone dates will be provided to correspond with expected delivery dates of owner-furnished items, coordination points with other contractors or operations, or key dates in start-up sequences. The owner may maintain a staff on site to protect owner interests and to expedite any owner review or approval responsibilities. (Project control for construction, 1987).

On a certain construction project a technical scope document is what describes the project's physical characteristics, establishes the design basis, and provides input to civil-structural, architectural, plant design, mechanical, electrical, and control systems disciplines. single line diagrams, facility layout sketches, an equipment and instrument list, bulk take offs of mechanical/electrical quantity items, an engineering procurement, instrumentation and construction master schedule, a written controls philosophy, and repair standards expected. Minimum results expected from the production of a project scope statement include a broad description of what is to be covered in the works..(Nayyar .1994).

2.2.6. Contract Delivery System of the housing projects

Design Bid Build (DBB):-This is the most practiced type of delivery system in the Construction Industry of Ethiopia since the 1987. After project owners did prepare the Basic Planning that identifies construction project programs, they call upon the participation of Design and / or Supervision Consultants either by tender or by negotiated contracts. This consultant will carry out the design together with the necessary tender documents which will be the bases for tendering to select contractors. These process is called Design

- Bid - Build and hence the name for such delivery system. In this type of delivery system, projects are divided into different packages interfacing to each other. Though the design and supervision consultant will be the prime professional on behalf of the owner and largely the administrator of the construction contract; the employer takes the responsibility of coordinating the various project packages and their respecting interfaces. designers have not been required to guarantee results but rather methods. That is, they are held accountable on the basis of their superior knowledge and sufficient competency and ability to design with a reasonable degree of technical skills. As a result, contracts and courts focused on professional duty of care, not results or project goals. Contractors are also responsible to construct works with due care and diligence and complete them in accordance with the contract, but they are not held responsible for design deficiencies.

Some of the major setbacks frequently happening are:-

- Severe Adversarial relations between the design and contract administration consultant and the contractor.
- Fragmented contract for the project owner.
- Project owner responsibility for risks associated with the design and contract administration.
- Non - Impartiality of the Design and Contract Administration services.
- The inability of design and contract administration consultants to cope up with new construction technologies and constructability issues of their designs.
- Severe adversarial relationships between Urban Planners and Architects on the one hand; and Architects and Engineers on the other hand on building projects.

- The indirect contractual obligation assigned for the Design and Contract Administration consultants.

2.2.7. Project Scoping in relation to project performance

The purpose of project scope definition is to generate adequate information that is needed to identify and describe the work to be performed, in order to avoid major changes that may negatively affect project outcome (Gibson et al. 2006). This information is needed before making the decision whether or not to proceed with the project execution (Kähkönen 1999). Project scope definition influences the overall project performance. The level of efforts ensured during scope definition phase defines the success during the design and construction phase. Poor scope definition adversely affects the final costs of a project due to certain changes, lowers the productivity of work force and delays project completion time. As the project becomes better defined, the estimates are updated to reflect the new information. For a fixed-price project, good estimating is critical because the estimate establishes the costs of all direct work as well as the total contract price which incorporates all elements of direct cost plus field overhead, contingency, general overhead, and a reasonable profit. The estimate also provides all quantity, cost, and productivity targets to be used for detailed control. (Project control for construction, 1987).

Project success is more than having the right human factors in place. A balance of technical, management, and human factors is required for project success. These elements are interdependent, synergistic and congruent. To optimize success, all of the elements must be actively present. Other factors that will bear on team composition are the resources available for pre-project planning, the degree of participation desired of the membership, the degree of pre-project planning detail desired, and the project specific objectives. CII (1995). on the heavy dependency of scope and other key constraints of the project: time, money resources and/or in quality. Following the given statement, one understands that changing one of the elements changes all or one of the others. This conclusion is strongly supported by Dekkers and Forselius (2007, p. 387): "there are no scope changes without possible consequences to schedule [i.e. time], budget [i.e. money] and quality or risk level of the project. This is true vice versa as well. If the schedule or budget must be tightened, it may require changing the scope or quality requirements, or increase the project risk.

The Pre-Project Planning Research Team has established a clear link between teamwork and positive project performance. Business may have many different goals for a particular project, but the project objectives can be distinguished by the fact that they deal with time, cost, and quality. These characteristics of project objectives are dependent variables since each one has an effect on the others. The right balance must be established among them, and the team must have a clear understanding of the correct balance that fits within the business objectives. The owner will ultimately judge the success of the project on the basis of its having satisfied the acceptance criteria, which have been based upon the project objectives, which in turn will have been influenced by the elements of time, cost and quality. CII (1995).It is fundamental to understand how scope relates to the other key constraints or elements of the project. Project scope plays a key role in defining the failure/success outcome of some projects. But defining or managing the scope of the project cannot be an activity, which does not relate to other aspects of the project, like schedule and cost.

In terms of collection of requirements from stake holders on construction projects-In terms of stakeholders involvement In decision making Researchers found that in construction projects, people care not only about the outcome of decisions, but also about the procedures used to make those decisions (Aibinuet al., 2011). People feel more fairly treated if they are given the opportunity to participate in making decision relating to their concerns. Even if their input has little or no influence in the decision made, people still value the opportunity to express their views (Lind et al., 1990). Giving construction projects' stakeholders the opportunity to provide their opinions and concerns on scope definition decisions increases their feeling of having some kind of control over the process (Aibinu, 2006).

Work break down structure on construction projects - In terms of a work breakdown structure once a project is broken down into phases, the specific outcomes and goals of each phase can be determined. The amount of work and effort required can be determined, and various roles and responsibilities can be shared between the project team. Because the desired goals and objectives are recognized this will also greatly improve the motivation and moral within the team and when the desired objectives have been met, a sense of accomplishment will be felt and will improve cohesion between the members. (Howes.2009).

For a construction project management time planning is the foundation of planning, and thus the foundation for projects right after the work break downs structure is decomposed in to measurable work packages. If this is combined with cost estimates it also helps to facilitate cash flows and is a valuable tool for presentations and progress reports. There are many techniques available, and they help manage uncertainty and the influence that a large number of variables on a project.

The technique in planning wishes to employ should be flexible, in order to handle change and variations and thus not only to accommodate planning but also accommodate re planning to accommodate the changes. Some of the most common Planning Techniques practiced is: The Bar/Gantt Chart—Most common and most popular technique employed. It is in a simple format, easy to understand, well known, visual. The disadvantages are: Not suitable to predict or accommodate uncertainty, does not accommodate critical path or float for activities, no early/late start and is not suitable for complex projects. (Howes.2009).

Validate the scope of a construction project: - The work has to be in accordance with the regulations and design documents. To check the project's progress, the earned value technique can be used. This technique evaluates indices to measure cost and schedule progress. It compares the planned work against the actual performed work. During the project this process of verification should happen continuously, with the aim to check whether the executed activities meet the demands from the client (de Boer, Bruinsma, Elich, van Luling, &Wemeijer, 2009).

How to Control the scope of a project: -the idea is to isolate and control in detail those elements with the greatest potential impact on final cost, with only summary level control on the remaining elements. The greatest variable in the final cost of a construction project is usually the labor cost.

2.2.8. Challenges related to Project Scoping on project performance

The owner: - is the name given to the entity who initially or ultimately owns the project. The term owner is usually understood to refer to the entity who has the final say in the decision making process. An owner might range from a single entrepreneur to group of developers or an organization to a conglomerate of organizations or might even be a government or in rare cases multiple governments. (Nayyar.1994).

Some of the problems and challenges related to the owner of the project are

- Owner does not have engineering expertise to provide complete conceptual definition.
- If the initial order of magnitude (feasibility) estimate looks very favorable, there is no reason to spend additional funds in scope definition.
- Owner does not have engineering expertise to provide complete conceptual definition.
- If the initial order of magnitude (feasibility) estimate looks very favorable, there is no reason to spend additional funds in scope definition.
- As a matter of economy, owners want to limit the amount spent on feasibility and project authorization/budget studies.
- The shorter the time spent on preliminaries, the quicker the job can be completed and the lower the overhead.(Nayyar.1994)
- The Lack of, or less than full use of engineering capability within the owner organization to conceptually define a project.

Roles & responsibilities

- Lacking clarity about the responsible actor for each step in the scope management process
- No common understanding of the roles since they are not defined the roles within the project team are not linked to the WBS.
- The consultant is responsible for creating the design on paper, but in real life the client still designs what must be constructed
- In larger projects in terms of the scope, a general scope manager is missing.

Funding or Finances

Fund is the amount of money that the sponsor has or can afford on a current project. This amount of money in some cases determines the final functionality or in some cases the fate of the project the sponsor might ask for a supplementary feasibilities and reconsider the project, the amount and terms of financial commitment. The owner who acquires the money for the project on his personal or organizational responsibility whichever the case might be and therefore has the final say in the decision making process. (Nayyar.1994).

2.2.9. Scope changes

- The lead time of the formal scope change procedure is too long Expectations concerning scope change are not identified and managed correctly.
- There is a lot of discussion about the budget and schedule concerning scope change.
- There is no system for keeping track of changes to seek for patterns in these changes.

The project Designer's influence

Historical information's, past experiences, project procedures, contract type, and manpower experience of the project management in under-taking similar types of projects are critical to the scope definition process such experience is needed for proper definition of project control systems, prior to the undertaking of any major construction project.(Nayyar.1994.)

Design changes are another major cause for modifications to a project scope. Since multiple design disciplines are working, sometimes independent of each other, toward a fully integrated design, there is bound to be areas of confusion. These professionals must continually balance process design and structural engineering considerations with regulatory, maintainability, serviceability, and human factors considerations, and being human will occasionally overlook something. (Nayyar.1994).

Contractor Influence: - changes due to constructability and safety can also happen in other type of construction projects, because designs that have taken into account issues that affect how a project can be constructed more efficiently are reducing construction costs on every type of projects. Ideally constructability is taken into consideration during conceptual engineering phase so that this knowledge can be reflected in the first designs. Still, the need for some constructability changes may not be evident until later and these must be formally evaluated as potential scope changes. Unfortunately, these constructability issues are usually not addressed until the design efforts are well under way. As with design changes, constructability changes also cause numerous impacts on design plans as well as discontent among design professionals. (Nayyar.1994).

Change orders can be one of the most insidious factors influencing project scope performance. Many contractors fail to ask for additional time when they process the cost of the change, thinking that they can adjust the extra work into the existing schedule. (J.Jackson , 2002).

Incorrect sequencing of work: - Unfortunately, there are times when pressure from an owner or from the main office can cause a superintendent to schedule work out of sequence and before it is ready, just to appease some unrealistic demand for action. Schedules are used to keep tracking of the project as per the given time line and check if the project is making progress. (J.Jackson , 2002).

Frequent problems in the project scope management processes

- Information is lost between the process steps for project scope management.
- Decision-making within the steps takes too much time.
- There is a lack of information due to different composition of the team in project phases
- Knowledge shared among project team members of different project teams is not correctly documented.
- Stakeholder involvement is not done thoroughly in the beginning of the project.
- The stakeholders are not involved throughout the complete process.
- Team members do not see the importance of a tool to track scope state.
- There is no overview of possible risks that can result in scope change.
- Not everyone in the project team agrees with the process approach.

Poor definition of scope breakdown, or work packages. Inconsistent, incomplete or unclear definition of quality requirements. Inadequate scope control during implementation. A scope change request is used to request an addition or subtraction to the agreed upon scope of work agreed upon for a project. Scope change requests may be managed as part of a pre-defined scope change process outlined as part of the project plan. This process would determine what changes may be approved by the project team and the procedure as well as authority for approving other changes. (Assaf& Al-Hejji 2006).

Lack of Communication between Project Team and Customers

Lack of communication is a very broad problem domain that can include a multitude of factors. Sometimes it can be caused by the stakeholders who have initiated the project but are “too busy” to spend time with the requirements analysts to iron out all the details of the scope. In addition, in many cases, as mentioned several times earlier in this book, the stakeholders are simply not prepared to assess the sheer complexity of the projects they are initiating. Moustafaev.(2015).

Lack of Access to higher Authority

There is by itself nothing wrong when the project is initiated by a representative of the executive team, and hence, at least the initial high-level requirements are conceived in the heads of the senior management. Moustafaev.(2015).

Inability to See the Entire Project

Very frequently, the project stakeholders, including the project team, fail to see that the scope of the project they are about to start working on is, sometimes by orders-of-magnitude, larger than what they perceive it to be. This is especially true for large corporations undertaking large internal endeavors such as rebranding, regulatory, and technology projects, to name a few. And, yet after several months of running the project under that presumption, the stakeholders discover that the initiative in question has enormous impacts on the sales, marketing human resources, and finance, accounting, and operations departments. Moustafaev.(2015).

Absence of Requirements Prioritization

Very frequently, the features and requirements included in the project scope are not prioritized. What is the potential impact of not prioritizing the requirements or, something that many executives like to do, claiming than they are all equally important? Moustafaev.(2015).

Poorly Trained Requirements Professionals

this is one of the most widespread problems at many companies where the requirements gathering, analysis, and documentation is basically an ad hoc process, where the executives just simply assume that all the project features are obvious and self-evident. Moustafaev.(2015).

Technical Experts and Requirements Experts

Another very popular myth strongly tied is that any good technical expert be it an architect, a mechanical engineer, an accountant, or a software developer can automatically, without special training, become an effective requirements analyst. Unfortunately, nothing can be further from the truth. The technical experts have been trained, starting from universities and throughout their respective careers, to receive a complete set of unequivocal, clear, and measurable requirements and convert them into specific designs. The main problem of their existence is that they continue to be bombarded with incomplete and ambiguous features that they do not know how to “translate” into an acceptable format. Moustafaev.(2015).

Lack of Stakeholder Education

One of the major issues encountered by the project teams is that the project stakeholders usually do not appreciate the whole complexity of the requirement collection process. The inherent problem here is that our human psyche is trained to consider only normal or successful courses of events. Moustafaev.(2015).

Quick De-Scoping at the End of the Project

What happens sometimes closer to the end of many projects is that the senior stakeholders, typically executives or customers, realize that the project can't be delivered with all the current requirements and decide to cut the scope of the project. Unfortunately, the “quick” de-scoping of the project can represent a process way more painful than the initial addition of the features at the beginning of the venture. Moustafaev.(2015).

Undocumented Requirements

The project manager has his requirements recorded in different formats. Some of the information is contained in e-mails, certain facts make it to his notebook, yet others are prominently displayed on the yellow Post-it notes attached to his screen monitor. There is probably nothing wrong with having the requirements recorded in different forms at the very beginning of the requirements elicitation process. However, once the requirements process nears its end, the project stakeholders discover that many of the features mentioned by the customers have been lost and did not make it to the final documentation. Moustafaev.(2015).

Vague Scope and Lack of Measurability

This phenomenon is beyond the paradigm of bad or good. It is simply how they were trained to think and speak. Furthermore, it is very unlikely that anyone would be able to change this approach; the project managers, along with their team, should simply get used to the idea that the scope will be communicated to them in those terms. The only thing available to them is a multitude of questions to be directed at their customers in an attempt to better define what exactly those words mean in the context of their project. Moustafaev.(2015).

Knapp (2011) states that failing to clearly define and manage project scope are one of the most common reasons that can projects fail. He adds failing to manage stakeholders' expectations can lead to scope creep and ultimately beneficiaries' dissatisfaction. Scope creep describes unplanned changes to a project's scope.

Faulty Designs: The problem due to faulty engineering can be in size and type of an activity, wrong specification or non-specification of details. The reason for these faults is the lack experience of designers, knowledge, and the information available to them. The influence of external factors is more important in this phase. scope is being modified therefore the influence of designers has a greater effects engineering progresses the mistakes of incomplete scope definition and faulty scope definition are identified and the need arises for scope modifications. The lack of inter-communication between these designers and disciplines is also a cause of most of the problems. The engineering phase the process of scope modifications might also be influenced by the external influences of the public or regulatory bodies, and in very rare cases by the influence of constructors or vendors. (Nayyar.1994).

The Construction Industry Institute (CII) defined pre-project planning as “the process of developing sufficient strategic information with which owners can address risk and decide to commit resources to maximize the chance for a successful project” (CII 1994). Additionally, it is the process that combines all tasks between project initiation phases to the beginning of detailed design phase (Gibson et al. 2006). It begins with a project concept that reflects business need and ends with a decision whether to proceed and start the execution of the project by developing the detailed design (Gibson, Kaczmarowski& Lore 1995). Many experts and industry

practitioners believe that pre-project planning efforts in the project life cycle have significantly greater impact on the whole project life cycle, thus improving project final outcomes.

2.2.10. Mitigation measures to improve project success with better scope management

The reason for scope management is to ensure the project includes all only the work required, for completing the project successfully. In scope management the emphasis is on identifying and controlling what is or is not included in the project. Scope management must be applied throughout the life of the project.

Harrington & McNellis (2006) adds that project scope management ensures that a project focuses only on the work required for successfully completing a project. The process identifies and averts work that falls outside the scope and that contributes to delays and

The scope of work is defined very early in the project planning and estimation phases. Fageha & Aibinu, (2013) state that an incomplete scope definition in early stages of a project's life cycle is a common source of difficulty in project implementation process.

Relevance of the scope can be also investigated via inspecting the attributes of scope itself. Say one dimension of project scope is the size of it, i.e. what is included in scope contra what the organization executing the project is capable of accomplishing. Lieberman (2001).

Project reporting, change management, and project ending. Scope management is part of the project planning process as a function of time, cost, and performance, and the project baseline grounds scope management to the original goals of the project (Fayol, 1917).

Another one of the biggest challenges in construction project management is changing scope. Also known as scope creep, it can arise from a lack of defined goals. It can be a huge reason why projects end up delayed or over budget. A good project manager can communicate concerns to scope changes to the stakeholders. Thereby informing them of all the changes to schedule and budget it will cause.

A lack of communication or poor communication can be the death of a project. Project managers need to have updates on project status and feedback, since project managers are responsible for updating their teams as to the requirements of the stakeholders and upper management. The

project manager has to foster open communication or risk falling to the communication challenges in construction project management.

Sometimes stakeholders have unrealistic expectations. Whether it's from impossible deadlines or a lack of resources. Unrealistic expectations create challenges in construction project management because they can hurt morale and productivity. With impossible deadlines looming or a lack of resources, teams sometimes become less productive. In some cases they won't make the deadline regardless of their high productivity. As the project manager, it's important to advocate for workers and against unrealistic expectations and set realistic ones.

Stakeholder indifference can kill projects, and the lack of stakeholder participation is a common challenge in construction project management. When stakeholders are indifferent to the activity at the site, it can result in rework and delays. Project managers can communicate with the stakeholders and encourage feedback. Since it can be difficult to get participation, it's important to have contingency plans in case of issues.

Project reporting is important because the project leader must monitor the progress of the project as well as instigate changes to the scope in the middle of the project. The project ending is paramount for judging the overall success of the project (Fayol, 1917). The scope management strategy became an important part of the project management process through linkages to all of the five pillars of project management through the planning stage and the remaining stages through change management with constant reflection back to the original scope and improved understanding of scope management by project leaders (Fayol, 1917).

2.3. Empirical Framework

Detailing the development of a novel front-end planning tool designed for use on the most prevalent project type in the industrial construction sector and in-depth analysis of front-end planning practices for small and large industrial construction projects. Collins, Parrish, and Gibson, (2017).

The process of developing a project definition (i.e., scope definition) during the early stages of a construction project, known as pre project planning or front-end planning, has substantially more effect on project performance (related to cost, schedule, and change orders) than efforts

undertaken after detailed design and construction has begun (Gibson et al. 1993). Xia et al. (2015) found that with increased scope definition came improved project performance regarding cost, schedule, and quality through the development and testing of a structural equation model.

Hwang and Ho (2012) found that project size was the most influential factor regarding the implementation of sufficient front-end planning practices; as project size increased, companies were more likely to implement front-end planning. Small projects require thorough and dedicated procurement, organization, and management if they are to be efficient and cost-effective, yet the level of commitment needed to undertake small projects successfully is underestimated in many organizations (Griffith and Headley 1995).

Effective front-end planning practices can substantially improve project performance if implemented consistently and correctly. The PDRI tools developed by CII are meant to assess how well scope definition has been developed during front-end planning, providing guidance to project teams regarding specific elements that should be further addressed to improve project success. Collins, Parrish, and Gibson, (2017).

Fageha ,Ajibade A. Aibinu (2012).An incomplete scope definition in early stages of a project's life cycle is a common source of difficulty in construction project development process. Meanwhile, the developing of the project can effect positively or negatively a variety of interests. Construction projects in specific bring different degrees of changes on the surrounding environment and people, not only limited at the construction site. Therefore, project definitions boundaries may be redefined, or subjected to differing expectations and interpretation by different stakeholders.

Defining project scope using input from all stakeholders is a vital task that needs to be adequately carried out at the early stage. The purpose of project definition is to provide adequate information that is needed to identify the work to be performed in order to avoid major changes that may negatively affect project performance (Gibson et al., 2006).

While adequate front-end project planning with clear project scope definition can alleviate the potential for cost overrun, inadequate project planning and poor scope definition can lead to expensive changes, delays, rework, cost overruns, schedule overruns, and project failure. Changes often reflect the uncertainties that occur during the early stages of the project (Assaf&

Al-Hejji, 2006). Changes are requested as a result of the different perspectives that each stakeholder has on the project.

It is irrational to get stakeholders' opinions about the project outcome after the completion, when their involvement is limited. Incomplete project definition can occur when the input of one or more stakeholder is intentionally or unintentionally omitted (Sharma & Lutchman, 2006), while at the same time inputs from others dominate. Failure to consider and clarify stakeholders' expectations and concerns at early stage in the project can result in extraordinary risks being ignored and may lead to difficulties in running the project, and hence poor performance (Atkinson et al., 2006).

Project abandonments are symptoms of broken processes in early stages of the project; thus, it is clear that adequate project scope definition in the pre-project planning stage could remedy the problem if properly approached. Assaf and Al-Hejji (2006) suggested that some of major causes of projects delay in Saudi Arabia related to changes in the scope of work, rework and inappropriate involvement of parties, which all are symptoms of early project definition and stakeholder management problems.

In order to address the problem of poor project definition, a scoring tool called the Project Definition Rating Index (PDRI) has been developed by the Construction Industry Institute (CII) of America. The tool can be used to evaluate the definition completeness on projects. The philosophy of PDRI tool is to allow a project planning team to determine the level of definition needed for each of the elements in the project definition list. Project team, owner and/or contractor evaluate each of the list's elements. Overall score is then calculated for the whole project, the lower the score the better defined project (Cho & Gibson, 2001).

Olander and Landin (2005) stated that conflict and controversies about the implementation of a construction project can arise if stakeholders are inadequately engaged and their concerns and expectations are not managed well. To avoid this, project managers need to engage all stakeholders when making decisions on project definition. They need to acknowledge the concerns of all stakeholders and mitigate conflicting interests. Any negative perception by stakeholders on the project definition can have an impact on a project. A comprehensive approach of engaging stakeholders is still required in construction. In addition,

the stakeholders' expectations must be respected and reflected in the project, while varying their engagement according to their saliency. Researchers found that in construction projects, people care not only about the outcome of decisions, but also about the procedures used to make those decisions (Aibinu et al., 2011). People feel more fairly treated if they are given the opportunity to participate in making decision relating to their concerns. Even if their input has little or no influence in the decision made, people still value the opportunity to express their views (Lind et al., 1990). Giving construction projects' stakeholders the opportunity to provide their opinions and concerns on scope definition decisions increases their feeling of having some kind of control over the process (Aibinu, 2006).

Several organizations face challenges in implementing these projects to desire expectations and these challenges do stem from improper gathering, interpretation and documentation of requirements and defining the boundary (scope) needed to fulfill project objectives. Significant efforts have been made in the identification, application and management of procedures, practices, processes, standards and methodologies towards ensuring that project requirements and scope are properly analyzed and documented to aid project delivery and success (PMBOK, 2013).

An increase in project success was observed over the years and this was as a result of several factors such as methods, skills, costs, tools. Decisions, internal and external influences, team bonding, technology and paramount amongst these is the increased awareness and introduction of project management especially in the various stage of project implementation including project scope management practices needed for projects implementation (Heeks, 2002).

Scope definition is an iterative process. In this step, the beginning of the scope statement is made along with a set-up of the Work Breakdown Structure (WBS). According to Cho & Gibson (2001), a helpful tool in scope definition is the Project Definition Rating Index (PDRI) tool. This is a weighted checklist, developed by a research team from the Construction Industry Institute. It helps the project team determining which steps are necessary to follow in defining project scope. And besides, it can be used as a benchmarking tool for organizations to use in evaluating completion of scope definition versus the performance of previous projects (Cho & Gibson, 2001).

The goal of creating a WBS is to create work packages that decrease the complexity of a project. These smaller work packages are easier to manage and to execute (de Boer, Bruinsma, Elich, van Luling, & Wemeijer, 2009). Each work package contains the activities that must be executed along with the requirements, information and identified risks.

Planning has long been a subject of discussion in the building industry. Many guides have been developed and much knowledge resides with experienced practitioners (Griffin 1972; Pena 1987; Billings 1993; Preiser 1993; Haviland 1996; Cherry 1999; ASCE 2000). However, early planning in many cases is not performed well in the building industry. Consequently, the building sector suffers from poor or incomplete scope definition, frequently experiencing considerable changes that result in significant cost and schedule overruns (Gibson et al. 1997; Cho et al. 1999; Cho 2000).

Writing a scope statement Scope statements define both what a project will involve and what it will not involve. Getting typically into specifics about the project budget, timeframe, and deliverables is a scope statement. These parameters help you determine what tasks to include in your project. For example, you might consider: Deliverables: These are tangible products, services, or results that you'll produce during your project. Somewhere in your project should be tasks that reflect the delivery of each deliverable such as key dates, and project completion criteria's.

In the definition of scope management it already turned out that scope management is a process area in the project lifecycle. It strongly interacts with other project process areas (Dekkers & Forselius, 2007); (Association for Project Management, 2000) & (Project Management Institute (PMI), 2004). Dekkers and Forselius (2007) identify that scope management is overlapping and interacting with all other 8 knowledge areas of the PMI's PMBoK: integration management, time management, human resource management, risk management, cost management, procurement management, quality management and communication management.

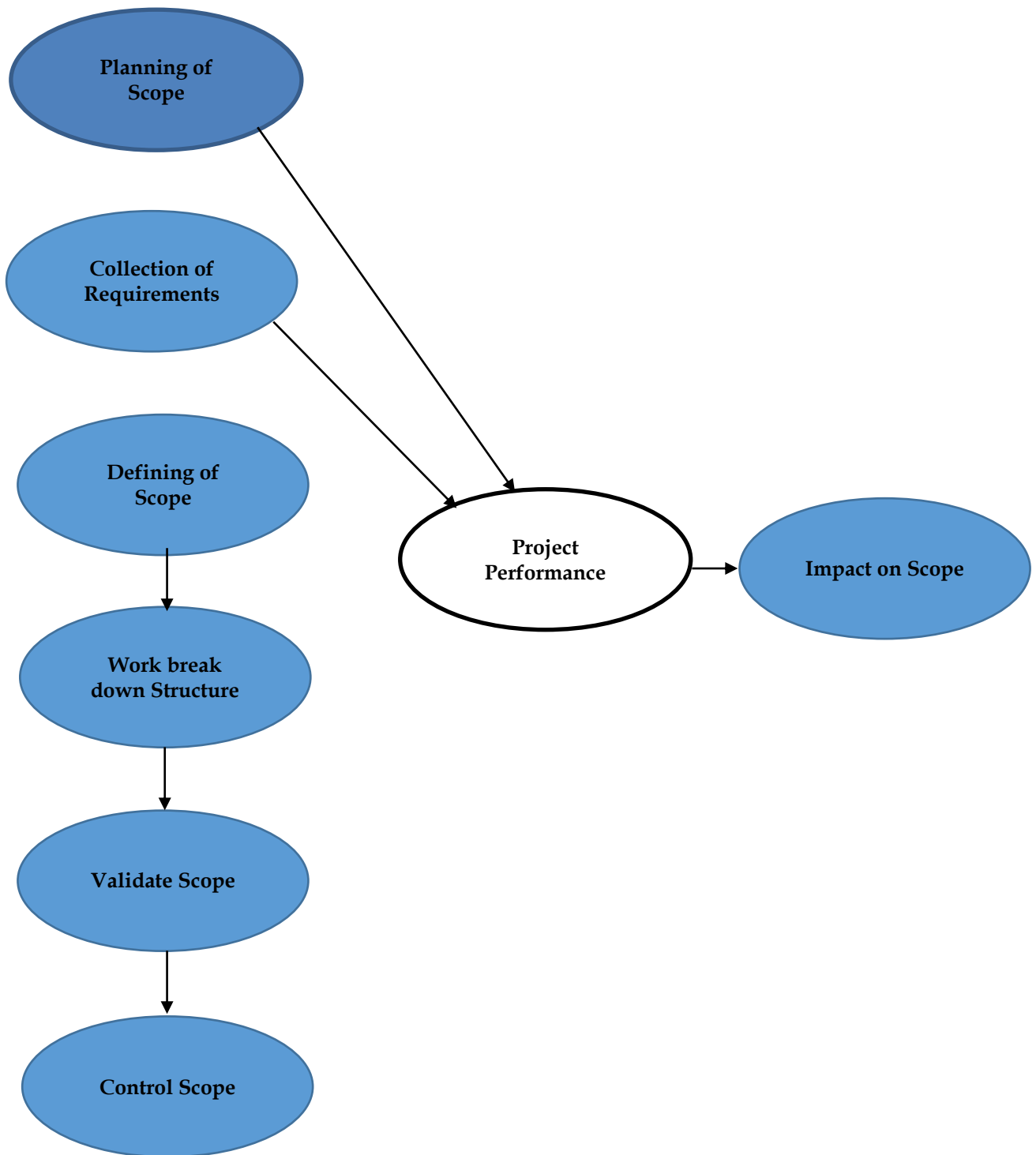
Lee-Kelley, Leong and Loong (2003) identify a finding from the literature (quoting mainly Turner and Dey) that instead of focusing on the three factors (or constraints) of time, cost and quality, project managers would do well by focusing mainly on project definition and scope.

This notion is further supported by Akinsola, Potts, Ndekugri & Harris (1997) in their finding that project organization, project definition and scope are the major influencing factors for delivering successful project objectives. Along the same lines, but also considering requirements and their estimation, are Kassab, Daneva and Ormandjueva (2007) claiming that only via making a realistic assessment on project scope can a project meet commitment and thus have the possibility for success.

The management plan is really a mechanism for monitoring and managing scope. In order to define this plan, it is important to understand the potential risks and issues, as well as the needs of the business and objectives of the project. It is these components that will enable the identification of potential changes to scope as the project progresses, and also provide anticipated means and limits for future changes. In other words, as the project progresses, this plan will provide a framework for making key decisions about requested changes to scope. Radford (2014).

The tactical elements of managing change, utilizing the governance framework, include managing and directing the meetings. Carefully planned and executed meetings include identifying and inviting the appropriate stakeholders, creating a detailed agenda, careful crafting of key messages, up-front identification of decisions to be made (as objectives of the meetings), and clearly stated action items. Radford (2014).

2.3.1. Conceptual frame work



source: own

CHAPTER THREE:

RESEARCH METHODOLOGY

This chapter presents and discusses the research design, the target population, sampling procedure and sample size. Besides this, the chapter presents the instruments of data collection, data analysis and presentation techniques which was used.

3.1. Research Design

According to Kumar (2011), research design is “a plan, structure and investigating strategy to obtain answers to research question”. There are two approaches for research design: quantitative and qualitative research. Quantitative study designs are specific, well structured, have been tested for their validity and reliability, and can be explicitly defined and recognized. In this study a combination of both qualitative and quantitative approaches are used. It is qualitative because it assesses the scope of the project by critical reviewing literatures in subject area. It is also quantitative because it uses numerical data to investigating facts by taking professionals opinions and view on public building construction projects through questionnaire survey. The purpose of this research is exploration of new facts based on existing facts of cause of scope related problems and measures observed in public building construction projects the case of bole ayat 2 (40/60) condominium projects.

3.2. Data Collection and Instrument

In this study both quantitative and qualitative research methods (mixed approach) were employed. According to Creswell (2014) mixed research is a method of inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks.

Data collection is simply how information is gathered; every researcher has two general approaches to data collection, namely primary and secondary data collection.

3.2.1. Primary data collection

Primary data are acquired directly from original sources whereas data collected indirectly from reports and publications are referred to as secondary (Chandran, 2004). To collect primary data two methods as questionnaire were used. The study employed primary data which were collected through questionnaire and from client, contractor and consultant of the given project to get perception on the scope assessment processes and impacts, questionnaire was used.

Hernon and Whitman (2001) state that, a questionnaire is a tool designed to ask the same set of questions to several people. A questionnaire was developed and distributed to staff of the project. The questionnaire was chosen taking into consideration its advantages. According to Kurnar (2005), the questionnaire is less expensive since it saves time as well as human and financial resources. It offers greater anonymity and in some situations where sensitive questions are asked, it helps to increase the likelihood of obtaining accurate information.

The fact that the questionnaire is easy to distribute to a large number of people and is relatively inexpensive to conduct makes it appropriate for this study. According to Biggam (2008), primary source of data is the information that the researcher finds out by himself regarding a specific topic using questionnaires. The primary data was gathered particularly by using likert scaled standard questionnaires.

The standard questionnaire used to collect the necessary information regarding the study was adopted from the work of Priscila and Luiz (2011). The Likert-type scale method uses a range of responses: 'strongly Disagree', 'Disagree', 'Neutral', 'Agree', and 'Strongly Agree', with a numeric value of 1-5, respectively. The usage of this particular scaling method ensured that the research study illustrate the ability to assess the responses and measure the responses quantifiably. So that, a pattern or trend may be produced in order to assess research problem of statement.

The researcher was distributed the questionnaire to those who are selected respondents. For the purpose of this study a quantitative methodology involving a close-ended questionnaire and open ended questionnaires are used as the measuring instrument.

3.2.2. Secondary data collection

Secondary data is the data that have been already collected by others people and readily available from other sources. Such data are cheaper and more quickly obtainable than the primary data and also may be available when primary data cannot be obtained at all. The study collects secondary data through documents included books, journals, reports, internal policy and procedure manual and other documents through libraries and internet based research produced justifiable results.

3.3. Population and Sample size

Population is a group of individuals, objects or items from which samples are taken (Kombo and Tromp, 2006). A population refers to an entire group of persons or elements that have at least one thing in common. Sample is defined as a set of individuals selected from a population, usually intended to represent the population in a research study (Gravetter and Wallnau, 2007). And sample size is “the number of individuals or objects in the sample” (Peck, Olsen & Devore, 2009,p.35). According to Hair et al. (2010), target population is said to be a specified group of people or object for which questions can be asked or observed made to develop required data structures and information. Therefore, for this study, the target populations were taken from the targeted populations selected for this research is to assess the Role of Project Scope Management in relation to project performance the Case of Construction works of 40/60 Saving House Project Bole Ayat2 Sites.

3.4. Target population

Defined target population of the study particularly were include city Bole Ayat Site 2 clients consultants and contractors who are in charge of building 40/60 condominium housings around Bole Ayat in Addis Ababa. Currently there are 3 sites –site 1,site 2 and site 3 in which there are B+G+10 houses under construction most of the houses are currently above 80% completed and provided for lottery in the year 2019. There are 30 contractors with one project manager each and 2 consulting offices with 30 technical resident engineers for each contractor that control the project related to the project and one client (Addis Ababa housing project office)with 30 supervisors for each site. There are

technical employees on site on quality control and supervision but it is in the best interest of this study to select the technical 1 people with better overall exposure of the projects. Of the target population 100% executors, contractors and consultants had more than average years of experience in this specific projects ,which leads as to the approximate target population of this research we are taking all the amiable technical personnel as a sample to respond to our questionnaires.

The researcher has used simple random sampling method to select respondents from the targeted population.

Alreck & Settle (2005) states that sample size is determined after considering statistical precision, practical issues and availability of resources. According to Lowler (1984) there is no a single precise way for the determinations of sample size hence there are a number of inadequacy for deciding on sample size.

Malhotra & Peterson(2006) stated that, the larger the sampling size of a research, the more accurate the data generated. Sample size for the study was determined by Yemane (1967) formula based o n a 95% desired confidence level and a 5% desired level of precision.

$$n = \frac{N}{1 + N e^2}$$

N = population size, N=90

Level of precision, e=0.05

Based on computation by the formula, sample size is determined to 84 respondents. Table 1 below presents the sample size determined based on the formula selected for the sample size determination.

Table 3.1 Sample Size Determination

Sites	Population				Sample Size			
	Contractors	Consultants	Client	Total	Contractors	Consultants	client	Total
Bole Ayat 2 Site	30	30	30	90	28	28	28	84
Total	30	30	30	90	28	28	28	84

Source: own

Then the respondents were proportionally computed from each category. Accordingly, the number of respondents are 20(44%) for the contractor 14(30%) for the consultant and 12 (26%) for the client.

Table 3.2 percentage of the respondents

No.	description	total population	sample size	No. of respondents	% of the respondents	Ranking
1	Contractor (PM)	30	28	20	44%	1
2	Consultant (RE)	30	28	14	30%	2
3	Client (SU)	30	28	12	26%	3
	total	90	84	46	100.00%	

In the targeted sites the respondents were stratified in contractors , consultants and contractors. In the case of contractors, project managers were purposively selected because they have better knowledge about the factors that affect the project scope and project performances and they directly involve in the performance indicators. On the side of the consultant the resident engineers that follow up the day to day activity of the project on behalf of the constant are selected. as for the client the site supervisors that are directly exposed to the sites are purposively selected for this study. After determining the sample size, respondents were randomly selected in

each site. Therefore, this study has used stratified, purposive and simple random sampling methods or multi stage sampling method to select respondents from the selected companies.

3.5. Methods of Data Analysis

The data collected through questionnaire was analyzed using quantitative data analysis techniques. The data collected from respondents was analyzed by using statistical package for social science (SPSS) version

23. For presenting the data different types of descriptive data analysis methods such as frequency, percentage, simple tabulation, cross tabulation, mean and standard deviation were used.

Project scoping Factors affecting performances of the project are identified by using factor analysis method through principal component analysis.

3.6. Validity test

Validity is defined as how much any measuring instrument measures what it is intended to measure. Bryman & Bell (2003) suggested that the important issue of measurement validity relates to whether measures of concepts really measure the concept. Validity refers to the issue of whether an indicator (or set of indicators) that is devised to gauge a concept really measures that concept. Several ways of establishing validity are: content validity; convergent validity concurrent; predictive validity; construct validity; and convergent validity (Bryman and Bell, 2003). This study addressed content validity through the review of literature and adapting instruments used in previous researches.

3.6.1. Reliability Test

The level of reliability of the instrument that is the consistency of the variables is checked by the Cronbach's alpha statistics. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct (Nunnaly, 1978). Cronbach's Alpha can only be measured for variables which have more than one measurement question. Nunnaly (1978) has stated that

0.5 is a sufficient value, while 0.7 is a more reasonable Cronbach's alpha. The results were passed and

Cronbach's Alpha values are more than 0.7 implying that constructs are consistent to measure the variables.

Reliability Statistics

Cronbach's	N of Items
.85	30

3.7. Ethical Consideration

In this research, issues related to ethics were given more weight; mainly the two ethical considerations were consent and confidentiality. Firstly, every respondent participated in the survey were asked for their consent and all respondents were ensured that data obtained for the purpose of this study solely used for academic purpose & were kept confidential.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This part of the research deals with the analysis and discussion of the data gathered from document review in each office and questionnaire survey. As clearly specified on the methodology part, the procedures used in analyzing questionnaires survey result was aimed to identify main causes, establish the significance level and impact of each factors on the scope in the studied area.

From each office document review, all the documents of each housing scheme such the approved contract amount, contract time during signing of the contract, actual cost at completion, actual completion time at completion of the project, project site, each housing block, rising floor and housing type were thoroughly investigated. These help to understand the reasons behind the impact of scope .

4.1. Review of Questionnaires Survey

4.1.1. Demographics of the Respondents

The number of distributed questionnaires and available respondents are listed below:

No.		Frequency	%age	Cumulative %age
1	Gender type			
	• Male	32	69.57%	70
	• Female	14	30.43%	30
2	Types of Respondents			
	• Clients	12	26.09%	26
	• Contractors	14	30.43%	30
	Total	46	100	100
4	Academic qualification	25	54.35%	54
	• BSC degree holder	21		46
	• MBA/MSc master holder		45.65%	100
	• PhD holder	---	---	100
	Total			

5	Work experience	21	45.65%	46
	- 4years	13	28.26%	28
	- 5 years	8	17.39%	17
	- 6 years	4	8.70%	9
	- 7 years			
	- 8 years			
	Total	46	100	100

Source; survey result

Table 4.1. attested that the some of the respondents 70% (32) participated in the survey were males and 30% (14) were female respectively.

Likewise, on table 4.1 declared that respondents of 26% (12), 30% (14) and 44% (20) participated in the survey were clients, consultants and contractors respectively, meanwhile, all respondents involved in the survey were selected from 40/60 housing schemes.

In general, on the above table 4.1. conformed that, 54% (25) respondents participated in the survey were degree holder and the rest had obtained MBA/MSc degree in construction engineering, and similarly, the majority of respondents 52% (13) &24%(6) involved in the survey had 5 and 4 work experience in housing construction projects.

4.2. Stakeholder of the project to cause the Project Scope related problems

Project scope related problems can be caused by the client consultant contractor or other external stake holders. The respondents were primarily requested to rank which stakeholder causes scope related

Problems and challenges as shown here under:-

No.	description	frequencies	% age	ranking
1	client-related factors	26	57%	1
2	Contractor-related factors	7	15%	3
3	Consultant-related factors	13	28%	2
	total	46	100%	

Table 4.2.Source; survey result

From the above data for the purpose of this study 57%(26) of the respondents have agreed that most of the scope related problems are caused due to client related problems while 28% (13) of the respondents have said most of the problems of the project scope are due to the consultant and the rest 15% (7) have agreed that the problems are related to the contractors.

Descriptive Analysis

This section presents results of descriptive analysis about the project scope management processes factors affecting project performance by using mean and standard deviation. Responses are sorted according to their mean values in descending order; higher mean value suggesting the higher practice of the factor.

As it has been discussed on the literature review there are six processes to a scope management.

4.3. Planning of a scope management

As it has been discussed planning of a scope management is the basis and the front line planning process to describe the boundaries of the project that will define validated and controlled though out the project execution.

Table 4. 3 Planning of scope management descriptive statistics

item		N	Mean	Std. Deviation
1	The absence of a document (a master plan) that compiles the needs, resources , assumptions, risks and constraints, to understand customers level of performance expectation.	46	3.8043	.71863
2	Organizational culture, structure, Geographic distribution of facilities and resources; Government standards, Infrastructure, human resources, Personnel administration, and Market conditions on planning are not considered.	46	3.0652	.92861
3	Due consideration not given to plans, processes, policies, procedures, and knowledge bases while planning the scope of the project.	46	2.9348	1.16241
4	The absence of Expertise judgment with specialized education, knowledge, skill, experience, not involved while project scope planning.	46	4.2391	.79400
5	Preparation of Meetings which include the stakeholders of a project on project scope plan preparation was no considered.	46	3.3478	1.19661
6	As a matter of economy the client wants to limit the amount spent on feasibility and project authorization/budget studies.	46	3.7391	.74341

Source: Own survey,

The planning of a scope management is to create a boundary of guidance to all the stakeholders included in the project the parameters stated in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument while planning the scope referring different literature reviews accordingly and the stakeholders were requested to state their level of agreement to the variables according to their impact on project performances. As it is presented in table 4.1 above, responses of the clients, contractors and consultants have the mean value of 4.239 indicating majority of the respondents agree that The absence of an Expertise judgment with specialized education, knowledge, skill, experience, not involved while project scope planning and a lack of expertise judgment with better educational background and management skills has a sequential effect on defining the cost of a project such as the project cost that material labor and machinery cost of the project as for the project completion time as well. the skills of the scope planning team needs to have the capacity for conceptual design and shall be an engineering expert with better solutions and better anticipation to forecast challenges while project inception phase. Not being able to define the project cost such as labor material and equipment cost of a project creates problems additional cost of rework and cost of variation works and the team needs a proper knowledge .

Most of the faults in the conceptual phase and the engineering phase take place and go on unnoticed due to lack of knowledge and experience of the team players. On the other hand expertise without a proper leading and coordinating skills might affect the overall planning aspect project. The second important factor among is as a matter of economy the client wants to limit the amount spent on feasibility and project authorization/budget studies has a mean value of 3.7391 which indicates the respondents have agreed while planning the scope of the project the client limits the amount of time and money spent of the feasibility study of the project

Whoever controls the flow of funds influences or has the final word on the consideration of the factors that affect the project feasibility study In most cases it is the owner/the client who acquires the money for the project on his personal or organizational responsibility whichever the case might be and therefore the client has the final say in the decision making process.

On this specific site the project has a major problem on material supply both the client and the contractor supply different materials to the site in which the client is responsible for the supply of major construction materials like cement and reinforcement bar in which mostly the materials

delay for months in which it has a great impact not to be able to execute the work in time. and when the client is unable to purchase the needed materials he orders the contractor to do so asking for a cost breakdown after doing the market analysis and hence the contractor after purchasing the needed materials and executing the work they have incurred a challenge of getting a refund from the client. because the client is unable to approve any market price above the budget that was initially stipulated for one lock of building construction work. which indicates that the initial time spent of allocating the budget to spend on one building block of the construction project was not efficiently done.

When the feasibility study is not properly done the project budget forecast and time of completion is also not properly stated. which intern affect all the stakeholders after they mobilize the project and the scope of the project is out of the stated parameters. Time delays and cost overrun are going to affect the project performances.

Some other factors mentioned on the questionnaire are the absence of a master plan that compiles the needs resources assumptions and risks and the level of customers' expectations all in one with a mean value of 3.804 could have potential impact since there isn't any document that compiles all those in to one and delivered to all th e stakeholders so that they have the same level of understanding. this factor is one of the inputs for scope planning referred as a project charter. organization culture with a mean value of 3.06 is also one other factor to affect the project this factor is referred to as environmental impacts.and organizational process asset which encompasses the considerations of plan polices regulations and proclamations and any updates regarding the matter while scope planning, historical data's and lessons learned will have to be reviewed regarding previous projects. the fact that there is no regular meeting between all the stakeholders will impact the planning phase because there is no level of understanding as to the stakeholders needs and expectations and information flow.

4.4. Collection of requirements

Table 4.4. collection of requirements descriptive statistics

Item		N	Mean	Std. Deviation
1	Inadequate definition of project complete requirements.	46	3.7826	.66376
2	The contractors are informed instead of involved on project scoping.	46	3.1304	.83290
3	Responsible actor for scope management not assigned or documented in the project documents.	46	2.9130	1.18932
4	There is no system of Organizing workshops and interview with the stakeholders to ensure thorough stakeholder involvement, and improve the collection of requirements.	46	4.2391	.79400
5	The absence of an organized listing and prioritizing all the requirements categorized by stakeholder.	46	3.5870	1.06617

Source: Own survey,

As it is indicated in table 4.2 above, among the collection of requirements of the project is the process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives. The key benefit of this process is that it provides the basis for defining and managing the project scope. the parameters stated in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument while collecting the requirements referring different literature reviews accordingly and the stakeholders were requested to state their level of agreement to the variables according to their impact on project performances. As it is presented in table 4.2 above, responses of the clients, contractors and consultants have the mean value of 4.239 indicating majority of the respondents agree that There is no system of Organizing workshops and interview with the stakeholders to ensure thorough stakeholder involvement, and improve the collection of requirements.one of the major tools to collect inputs from all the stakeholders while project scoping is to collect the needs of every stakeholder and plan the project accordingly.

the stake holders of the projects have to know their level of involvement on every aspect of the project and need to be on the same page with every other stakeholder the contractor is expected

to know the needs of the owner of the project to fulfill what he is expected and his level of involvement on decision making one of the major problem occurring on the site.

As one example to the delay of the condominium project Sub-contractors such as MSE (micro and small enterprises) are assigned by the client to the sites. But the assigned sub-contractors don't come on time to the site and have no initial communication with the contractor. Payments are made to the sub-contractors from the client and in most cases when their payment delays they will not be on site to execute their assigned tasks which contributes to the overall delay of the project.

As for the second most important variable that potentially affects the collection of requirements inadequate definition of project complete requirements has a mean value of 3.7826 when the scope is not defined with a complete set of requirements it has a major material and labor cost effect which has a potential effect on the project cash flow and even on escalation of material prices those effects contribute to time delay.

The client when collecting requirements from all the stakeholders has to defined how materials would be supplied which potentially informs the delivery dates of the materials needed when they are needed to be delivered to the site. the most challenging problem on the site was related to material supply.

the contractor involvement on project scope planning and collection of requirements has a huge impact since the contractor of the project might have better insights on constructability and may be able to generate cost minimizing options and even this actually might reduce designing errors and designs not matching with actual work. a responsible personnel in charge of managing the scope of the project is not assigned which affects possibility of working according to the scope baseline and the project faces delays and cost overrun.

The absence of an organized listing and prioritizing all the requirements categorized by stakeholder with a mean value of 3.58 could also create a gap between stakeholder communications to each other since every stakeholder is expected to list his or her requirements especially so that everyone knows the what is expected of them its is one of the major out puts if the process referred to as requirements documentation.

4.5. Defining of scope

Table 4.5. Scope definition descriptive statistics

Item		N	Mean	Std. Deviation
1	Lack of complete definition of project scope and its impact on critical factors of the project.	46	3.7826	0.78636
2	Scope management tasks associated with scope are well not documented and not accessible to everyone within the project team.	46	3.0652	1.04141
3	Expertise judgment provided was not give due attention while project scope definition of the project.	46	3.3478	0.92418
4	There is no approach to distinguish the exact content of activities within the scope and explain this to team members.	46	3.7609	1.03676
5	The contractor is not consulted for input on design and constructability issues.	46	3.7174	.77926

table 4.3 above, states the parameters in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument while defining the scope of the project referring different literature reviews accordingly and the stakeholders were requested to state their level of agreement to the variables according to their impact on project performances. As it responses of the clients, contractors and consultants have agreed that the Lack of complete definition of project scope and its impact on critical factors of the project.3.7826 which is to say that the definition of the scope should indicate the impact of time cost and other project performance criteria's. On the initial phase of the construction process all the stake holders must be aware of the consequences if the project deviates for the scope base line.ans this helps to keep the project stakeholders focused on the processes rather than on the output. Scope Management tasks associated with scope will have to be documented and accessible to everyone within the project team. this is referred to as a scope management plan which is used as an input for defining the scope causes problems on stakeholders awareness of consequences when deviation from the scope baseline.

the second most important factor affecting the definition of scope is the approach to There is no approach to distinguish the exact content of activities within the scope and explain this to

team members with a mean value of 3.7609 which refers This is part of project scope statement one of the major outputs for output scope definition causing problems on communication between stakeholders and possibility of completion delays. the existence of a Vague Scope and Lack of Measurability of parameters. which is highly related to the clarity of the scope to every stakeholder and its measurability standards defined at the earliest stage of the project.

Table 4. 7. Work breakdown structure descriptive statistics

Item		N	Mean	Std. Deviation
1	The absence of a proper document that provides detailed activities, and scheduling information about each component of the work .	46	3.3478	1.01582
2	The contractor is not involved when dividing the work package in to activities and elements.	46	3.8261	0.82474
3	No consideration of historical information related design information, available from past projects relevant to the current project.	46	3.3478	1.01582
4	Under estimating activity duration and cost estimation and activity sequencing	46	3.956522	0.697823
5	No awareness about possible information loss between stakeholders of the project.	46	3.8043	1.10794

4.6. The work break down structure

As it is indicated in table 4.4 above, the work breakdown structure is a hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables the parameters stated in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument while collecting the requirements referring different literature reviews accordingly and the stakeholders

were requested to state their level of agreement to the variables according to their impact on project performances.

the respondents have agreed that the mean value of 3.9565 which stated one of the factors is Under estimating activity duration and cost estimation and activity sequencing. this is one of the main challenges that occur on the site it has a major impact on the overall project cost of a project when every little detail of the labor cost with efficient consideration of their productivity the material price considering the current market price and the machinery costs considering their productivity is not given attention well. The initial schedule time line of the project to be completed is very unrealistic due to this most of the sites signed a contract agreement on May 2014 for casting the projects to be completed within 455 calendar days on august 2015. The contract was amended due to a major delay on June 2015 expected to be completed on June 2016.in which the construction projects are currently still under construction and most of the project reached above 90%o of completion on the year 2019.

this shows how the schedule was very unrealistic according to the current status of the project. The second important factor contributing to the project performances under the work break down structure is The contractor is not involved when dividing the work package in to activities and elements. there might be a chance of constructability issue to occur on the site If a portion of design is such that it can not be constructed then it can cause a scope problem. designs that have taken into account issues that affect how a project can be constructed more efficiently are reducing construction costs on every type of projects.

same goes to the work decomposition which helps the contractor create a strategy to finish one time and within the budget of the project. some of the other factors to be consider to affect the scope of the project are the absence of a proper document that provides detailed activities, and scheduling information about each component of the work and no consideration of historical information related design information, available from past projects relevant to the current project the document that is provided to the contractor on the award of a contract is the contract document which includes the contract agreement the general and special conditions of the contract the formats for advance an performance securities and attached relevant drawings the document does not clearly state the scope of the project in a detailed sense as per the discussion made so far regarding the scope of the project. Some gaps are also created regarding consideration of earlier similar design and construction projects during the feasibility study.

documentation of problems and challenges and lesson learned is not practicable on construction projects in public build projects.

4.7. Validate scope

Table 4. 5. validate scope descriptive statistics

Item		N	Mean	Std. Deviation
1	Inspections of qualities such as measuring and examining whether deliverables meet requirements and performance criteria are not considered.	46	3.3913	.93043
2	Updates on work performance information that define the projects report status on the project completion are not duly communicated and documented.	46	3.7174	0.83435
3	No clear agreements between the client and the contractor concerning how to verify the activities with what is stated in the contract on regular basis.	46	3.7826	1.11381
4	Regular meetings are not held between the client and the contractor to ensure that both actors are up to date about the state of the project.	46	3.6739	.89578

Scope validation has a lot to do with formalizing the acceptance of the project deliverables. table 4.5 above, states the parameters in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument to verify the scope different literature reviews accordingly and the stakeholders were requested to state their level of agreement to the variables according to their impact on project performances. As it responses of the clients, contractors and consultants have agreed that the most important factor that could potentially impact is the one that has a mean value of 3.7826 stating the fact that there is No clear agreement between the client and the contractor concerning how to verify the activities with what is stated in the contract on regular basis. Scope verification has a lot to do with Reviews are made with the customer concerning deliverables and the sponsor to ensure that the scope is in line with the initial goals of the sponsor .there has to be a system for this stakeholders to be up to date about the state of the project and the contractor does not define how each activity will be verified during execution in a document prior to execution of the project.

The second important factor that potentially affects the scope verification process is Updates on work performance information that define the projects report status on the project completion are not duly communicated and documented it has a mean value of 3.7174The client is not informed about the state of the contractor’s activities which provides the input to validate of the scope. A system of regular budget updates and schedule updates are not applicable of the stakeholders are not on the same level of understanding regarding the status of the project.

Some other factors include regular meetings not being held between the client and the contractor to ensure that both actors are up to date about the state of the project and Inspections of qualities such as measuring and examining whether deliverables meet requirements and performance criteria are not considered. Although tests are held on some items as per the need of the project the tests were not appropriately held as per the needed quality which creates a problem of many defective materials delivered on site especially the ones provided by the client. Even on the materials provided by the contractor the tests held were no that tangible and the materials easily be destroyed which increases wastage and loss of huge extent since materials are purchased in bulk amount.

4.8. Control scope

Table 4. 8. control scope descriptive statistics

Item		N	Mean	Std. Deviation
1	The absence of a system to Monitoring the scope creep and change requests within the defined boundaries considering the delay and cost incurred.	46	3.5652	.86029
2	The absence of Project performance measurements to assess the magnitude of variation interims of cost and time frame from the original scope baseline.	46	3.7174	1.22317
3	A system for keeping track of scope changes to seek for patterns is not used yet.	46	3.5870	.95629
4	no formal agreement to a discussion between that involves The contractor on scope changes.	46	3.6739	1.05524
5	no proper awareness that Change in project activities results to change in Project schedule/time cost and quality.	46	3.8478	.89362

Table 4.8 above, states the parameters in the questionnaire above are the major inputs tools and techniques and out puts that are used as an instrument on the control of scope different literature reviews accordingly and the stakeholders were requested to state their level of agreement to the

variables according to their impact on project performances. As it responses of the clients, contractors and consultants have agreed that the most important factor that could potentially impact is the awareness th at Change in project activities results to change in Project schedule/time cost and quality with a mean value of 3.8478 ,scope changes reflect cost of rework cost of variation orders and also affects the cash flow of the project. when the scope change is not initially anticipated it affects all the stakeholders of the project on cost overrun and delays. Scope changes occur as a result of faulty scope definitions faulty scope definition with wrong specification of size or type of an activity and when the feasibility study is not properly done. and mostly Scope change does not come with extra capacity of finance and resources which makes processing scope change difficult. And usually a reactive scope change management (without initially anticipating changes) style is applied.

The second most important factor to affect the control of scope on project performances is The absence of Project performance measurements to assess the magnitude of variation in terms of cost and time frame from the original scope baseline.it is clearly stated in the contract that the contractor has to submit an updated project schedule with all the necessary resources every 2 months although the consultant does not request it until the project had been delayed and they are expected to generate a crush schedule .which keeps the other stakeholders outdated on the actual progress of the project. The stakeholders agreed as an important factor as to when there has to be a check and balance system to the cost time and other important factors stated on the scope baseline of the project which helps us to do a variance analysis,

A Variance analysis is a technique for determining the cause and degree of difference between the baseline and actual performance of the project to determine the cause and degree of variance relative to the scope baseline and deciding whether corrective or preventive action is required.

Some other factors include the absence of a system to Monitoring the scope creep and change requests within the defined boundaries considering the delay and cost incurred, A system for keeping track of scope changes to seek for patterns is not used yet and no formal agreement to a discussion between that involves The contractor on scope changes –the contractor not being involved on scope of the project including while monitoring and control creates cost and time gaps on the project. This are also some of the relevant things to be considered on control of the scope of the project.

CHAPTER FIVE

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of major findings and conclusions

Some of the major findings of this study are concluded here under as per the steps of procedures of the scope management processes.

Planning Scope

The highest mean value of 4.239 indicating majority of the respondents agree that The absence of an Expertise judgment with specialized education, knowledge, skill, experience, not involved The absence of Expertise judgment with specialized education, knowledge, skill, experience, not involved while project scope planning. (tools and techniques)-Not being able to define the project cost with a proper knowledge such as labor material and equipment cost of a project creates problems additional cost of rework and cost of variation works and longer completion time and the team needs a proper knowledge of estimation

Collection of requirement

the highest mean value of 4.239 indicating majority of the respondents agree that There is no system of Organizing workshops and interview with the stakeholders to ensure thorough stakeholder involvement, and improve the collection of requirements, the stake holders of the projects do not know their level of involvement on every aspect of the project and need to be on the same page with every other stakeholder .

Define scope

the Lack of complete definition of project scope and its impact on critical factors of the project.3.7826 which is to say that the definition of the scope should indicate the impact of time cost and other project performance criteria's. this is referred to as a scope management plan which is used as an input for defining the scope causes problems on stakeholders awareness of consequences when deviation from the scope baseline

Create WBS

The most important factor with a mean value of 3.9565 which stated one of the factors is Under estimating activity duration and cost estimation and activity sequencing. it has a major impact on the overall project cost of a project when every little detail of the labor cost with efficient consideration of their productivity the material price considering the current market price and the machinery costs considering their productivity is not given attention well.

Validate the scope

that the most important factor that could potentially impact is the one that has a mean value of 3.7826 stating the fact that there is No clear agreement between the client and the contractor concerning how to verify the activities with what is stated in the contract on regular basis.

Control scope

the most important factor that could potentially impact is the awareness that at Change in project activities results to change in Project schedule/time cost and quality with a mean value of 3.8478 ,scope changes reflect cost of rework cost of variation orders and also affects the cash flow of the project.

5.2. RECOMMENDATION

- It is advised to emphasize on the need for regular communication and meetings with the other stakeholders along the way the client, the contractor and other stakeholders. This improves the communication and thereby prevents information loss between the processes.
- A proper mix of experience and knowledge and other management skills is necessary for participating as successful player in the construction process. Special trainings shall be given to give exposures of project scope management and other project management principles for every stakeholder.
- The design bid build project delivery system of the project with needs to be adjusted and updated to avoid the length process that takes the three stakeholders to reach in to decision making process at the same time and the contractor gets closer to the conceptual and designing phases on the project.

- Responsible person for scope management shall assigned or documented in the project documents. a professional working independently for either the client or the contractor.
- Assigning existing professionals for a specific project scope management tasks is recommended such as Resident engineers or supervisors contribute to scope management by managing the requirements during the project. Contract managers or project managers are essential when managing scope. The contract managers must be able to define a guide line to ensure the steps are defined in the contract and the roles and responsibilities are linked to the steps.
- It is advised to apply a proactive management style to prevent challenges and scope change from happening. Proactive management means that experiences from projects are documented, with the aim to improve future projects. Not only when managing scope change, but especially in monitoring scope.
- Using a project management software increases the chances of better work organization, management, and completion. The Advantages are project planning, scheduling, time management, resource allocation, better communication, documentation.

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Appendixes

Questionnaire for Data Collection

Dear respondents,

I am studying Master's degree program of Project Management which is conducted by Addis Ababa

University School of Commerce.

The main purpose of this questionnaire survey is to collect information on **Assessment of the Impact of Project Scope Management on Project Performance of Construction Projects (the case of 40/60 saving house condominium project Bole Ayat 2 sites)**. You are requested to answer the questions in the questionnaire based on your personal knowledge and experience. The questionnaire has four sections. The first section (Section I) consists of questions aimed at collecting General information about the respondent. The second section (Section II) is aimed at finding out the processes of scope management and its impact on project performance. The third section (Section III) is focused on how to mitigate the problem.

Hence, I kindly request you to fill up the questionnaire which will have an immense help for my study. I assure you that, this study is solely intended for academic purposes and confidentiality of your response is guaranteed. Please provide the information as soon as you can.

Finally, I would like say thank you in advance for your kind cooperation

The main Objective of this questionnaire is to:-

To asses and analyze a proper scoping on the specified construction project for success In terms of **Planning the Scope of the Project, Collection Requirements from different stakeholders, the Proper definition of Scope, a Proper Work break down Structure preparation to the smallest manageable extent, Validation and Control of Scope and change requests** to achieve all the success criteria's of a given project especially items of cost and time overrun.

Part one –general information about the participants

Part two-asks questions about the assessment of project scope management on the project

Part three-possible solutions to the problems and challenges related to the project

Part 1: General Information

All answers will be treated in strict confidence

1, Name (optional).....

2. Discipline.....

3. Please circle the figure that represents your years of experience in Ethiopia

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16+ (Graduate)

(Intermediate) (Advanced) (Expert)

4. What is your highest qualification?

Bachelor’s Degree) (Master’s Degree)

Phd) (other)

5. Professional Membership

Yes (.....) No

6. What is your position on the project?

Client Contractor Sub-Contractor Consultant other

7. Please rank the stakeholders of the project to cause the Project Scope related problems on the project. Scale(1 = least cause and 3 = major cause)

Owner-related factors Contractor-related factors Consultant-related factors External factors

Part 2: Project Scope Management Assessment on the Construction of Bole Ayat 2 40/60 site

Condominium Construction Project

Regarding this aspect of the study respondents are required from the statements below indicate your level of agreement or disagreement. There are no correct or wrong answers. Please use the scale indicated below the statements below indicate your level of agreement or disagreement.

Please use the scale indicated below: 1=strongly disagree 2=Disagree
 3=Neutral
 4=Agree 5=Strongly Agree

Table 1: Frequency of major problems affecting the Project Scope Management of the Bole Ayat site
 40/60 Condominium Housing Construction Project

no.	Parameters	5	4	3	2	1
	Planning the scope of the project					
1	The absence of a document (a master plan) that compiles the needs, resources, assumptions, risks and constraints, to understand customers level of performance expectation.					
2	Organizational culture, structure, Geographic distribution of facilities and resources; Government standards, Infrastructure, human resources, Personnel administration, and Market conditions on planning are not considered.					
3	Due consideration not given to plans, processes, policies, procedures, and knowledge bases while planning the scope of the project.					
4	The absence of Expertise judgment with specialized education, knowledge, skill, experience, not involved while project scope planning.					
5	Preparation of Meetings which include the stakeholders of a project on project scope plan preparation was no considered.					
6	As a matter of economy the client wants to limit the amount spent on feasibility and project authorization/budget studies.					

no	Collection of requirements from stakeholders	5	4	3	2	1
1	Inadequate definition of project complete requirements.					
2	The contractors are informed instead of involved on project scoping.					
3	Responsible actor for scope management not assigned or documented in the project documents.					
4	There is no system of Organizing workshops and interview with the stakeholders to ensure thorough stakeholder involvement, and improve the collection of requirements.					
5	The absence of an organized listing and prioritizing all the requirements categorized by stakeholder.					

no	Define Project Scope	5	4	3	2	1
1	Lack of complete definition of project scope and its impact on critical factors of the project.					
2	Scope management tasks associated with scope are well not documented and not accessible to everyone within the project team.					
3	Expertise judgment provided was not give due attention while project scope definition of the project.					
4	There is no approach to distinguish the exact content of activities within the scope and explain this to team members.					
5	The contractor is not consulted for input on design and constructability issues.					

no	Create Work Breakdown Structure	5	4	3	2	1
1	The absence of a proper document that provides detailed Activities, and scheduling information about each component of the work .					

2	The contractor is not involved when dividing the work Package in to activities and elements.					
3	No consideration of historical information related Design information, available from past projects relevant to the current project.					
4	Under estimating activity duration and cost estimation and activity sequencing					
5	No awareness about possible information loss between stakeholders of the project.					

no	Validate Scope	5	4	3	2	1
1	Inspections of qualities such as measuring and Examining whether deliverables meet requirements and performance criteria are not considered.					
2	Updates on work performance information that define the projects report status on the project completion are not duly communicated and documented.					
3	No clear agreements between the client and the contractor Concerning how to verify the activities with what is stated in the contract on regular basis.					
4	Regular meetings are not held between the client and the Contractor to ensure that both actors are up to date about the state of the project.					

no	Control Scope	5	4	3	2	1
1	The absence of a system to Monitoring the scope creep and Change requests within the defined boundaries considering the delay and cost incurred.					
2	The absence of Project performance measurements to Assess the magnitude of variation interims of cost and time frame from the original scope baseline.					
3	A system for keeping track of scope changes to seek for Patterns is not considered.					
4	The absence formal agreement to a discussion between that Involves The contractor on scope changes.					

Part three-possible solutions to Project Scoping related problems and challenges of project

3.1. in your opinion what are the main challenges of construction project scope management in governmental construction projects

.....

3.2.in your opinion what is the best way to overcome this challenges: Further Research and

Development

Increase awareness at all levels regarding project scope management on the Construction industry

Others Please Specify

.....

*thank you for your participation