



**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE**

**Assessment of Scope Management Practices in
Information Technology Projects and the Projects
Performance: The case of Walia Technologies**

By- Geleta Kelbessa Kera

**Research Project Submitted to Addis Ababa University, School of
commerce in Partial Fulfillment of the Requirements for the award of
Masters of Art Degree in Project Management**

Advisor – Dr. Wubshet Bekalu

**June, 2022
Addis Ababa, Ethiopia**

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Declaration

I hereby declare that the research entitled ‘Assessment of Scope Management Practices in Information Technology Projects and the Projects Performance: the case of Walia Technologies’ is my original work, is of my own effort and study and has not been presented to any other Institution. It is presented in partial fulfillment of the requirements of the degree of Masters of Art in Project Management. No part of this research should be reproduced without the authors consent or that of Addis Ababa University.

Name: Geleta Kelbessa kera

Signature _____

Date _____

Certification

This is to certify that this project work entitled “Assessment of Scope Management Practices in Information Technology Projects and the Projects Performance: the case of Walia Technologies” undertaken by Geleta Kelbessa for the Partial fulfillment of the award of Master’s degree in Project Management at Addis Ababa University School of Commerce was carried out under my supervision. The study is an original work and is suitable for the submission for the reward of MA Degree in Project Management.

Advsisor: Dr. Wubshet Bekalu

Signature _____

Date _____

Approval

Addis Ababa University

School of Graduate Studies

This is to Certify that the project work prepared by **Geleta kelbessa**, entitled: Assessment of Scope Management Practices in Information Technology Projects and the Projects Performance: the case of Walia Technologies submitted in partial fulfillment of the requirements for the degree of Degree of Master of Arts (MA in Project Management) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by Board of Examiners

Dr. Wubshet Bekalu Signature _____ Date _____
Advisor

Dr. Mengistu B. Signature _____ Date _____
Internal Examiner

Dr. Tesfa N. Signature _____ Date _____
External Examiner

Abstract

The study attempted to assess scope management practices in Information Technology projects and the performance of the projects. The study is a case study focusing on Walia Technologies, an Addis Ababa based Technology Company. The study assessed the scope management practices of Walia Technologies by examining the activities and methods used to plan scope management, collect requirements, define scope, create work breakdown structure, validate scope and control scope. The study also assessed the scope change management practices of Walia Technologies and the performance of its projects. A descriptive research design was employed by the study. The study used census sampling techniques and data was collected from the entire population. A mix of both quantitative and qualitative approaches has been implemented. Primary data for the study was collected through questionnaires with project team members. The data collected from respondents was analyzed using data analytical software 'statistical packages for social sciences' (SPSS). The findings of the study indicate that Walia Technologies carries out the tasks and activities of project scope management's six processes as outlined by project management institute's 'A Guide to the Project Management Body of Knowledge' in a fairly good manner though there is still room for improvement and that its weaker application of scope change management tasks and activities have resulted in its projects performance level to be weak when the dimensions to assess a project's performance are time dimension and completion of the project within the budget.

Key Words: Project Scope Management, Scope Change, Scope Change Management, Walia Technologies

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Acronyms

IT – Information Technology

ICT – Information Communication Technology

LLC – Limited Liability Company

PC – Personal Computer

PMBOK - Project Management Body of Knowledge

PMI – Project Management Institute

SPSS - Statistical Packages for Social Sciences

USA – United States of America

WBS – Work Breakdown Structure

Chapter One – Introduction

This chapter consists of introduction of the study that include the background of the study, background of the organization under study, the statement of the problem, research question, objectives of the study, scope of the study, limitations, significance of the study and the organization of the study.

1.1. Background of the Study

A project is 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.

Examples of projects include, but are not limited to: developing a new product, service, or result; effecting a change in the structure, processes, staffing, or style of an organization; developing or acquiring a new or modified information system (hardware or software); constructing a building, industrial plant, or infrastructure; or implementing, improving, or enhancing existing business processes and procedures (PMI, 2017).

Projects have constraints or limitations. Typical constraints include time frames with predetermined milestones, financial limitations, and limitations regarding quality as identified in the specifications. Another typical constraint may be the tolerance for risk and the amount of risk that the project team or owner can accept. There may also be limitations on the quality and skill levels of the resources needed to accomplish the tasks (Kerzner & Belack, 2010).

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Developing and implementing a project requires several resources to be identified, mobilized and applied effectively to work tasks throughout the project life. Five basic project resource types can be readily identified: Manpower - Machinery – Materials – Methods – and Information. Project management is concerned with

dynamic commitment of above-mentioned resources to ensure completion of the project (Mishra & Soota, 2005).

Due to the potential for change, the development of the project management plan is an iterative activity and is progressively elaborated throughout the project's life cycle. Progressive elaboration involves continuously improving and detailing a plan as more detailed and specific information and more accurate estimates become available. Progressive elaboration allows a project management team to define work and manage it to a greater level of detail as the project evolves (PMI, 2017).

Ideally a project will be considered totally successful if it gets completed on time, within budget and performs exactly to the designer's specifications. But this is a tall order and many projects will not meet these requirements. Trade-offs have to be accepted between various performance parameters for effective management of a project. A project may be considered a total failure in the following cases: it's abandoned half way or kept in abeyance or completed with a changed concept; it does not produce as specified in terms of quality of produce; or it becomes sick soon after going into commercial production. So in real life a project cannot be considered either a total success or a total failure, it would fit somewhere in between. The investor, project manager and also the public who are watching the project are all very keen to know how the project is being managed, while in progress (Mishra & Soota, 2005).

Many good projects as well as project management structures have failed because the inability of the system to evaluate its performance. Performance of system as well as personnel is to be measured at regular intervals. This involves considering of factor such as technical judgment, work planning, communication, co-operation, initiative, quality, work habits, profit contribution, motivation level, etc. Modern method of performance analysis (also called Earned Value Analysis) provides an analytical framework for project control by estimating factors like cost variance, time variance, schedule variance, cost performance index, schedule performance index, estimated cost performance index etc (Mishra & Soota, 2005).

Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Scope means what is needed to be done and scope management is the managing of what needs to be

done (Wysocki, 2009). Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project. The processes used to manage project scope, as well as the supporting tools and techniques, can vary by project. The scope baseline for the project is the approved version of the project scope statement, work breakdown structure (WBS), and its associated WBS dictionary (PMI, 2017).

Defining a project scope is the first step in successfully managing a project. It is important to ensure that all the work required to achieve project objective are considered and well-articulated before project commencement. Scope definition is perhaps the most important part of the upfront process of defining a project as it helps to clearly describe the logical boundaries of the project. Where the deliverables and the boundaries of a project are not clearly defined, the chance of a project success is low (Avison and Torkzadeh, 2009).

Understanding of the business requirements, understanding of the business work processes, workflow, and dependencies, appropriate knowledge of the solution required with proper gap analysis conducted that will lead to a detailed work breakdown structure are all important elements to a successful and complete scope definition for an information technology project. The chance of failure (lack of client satisfaction) is significant when the project scope is not correctly defined at the start of the project (Nickolett, 2007).

In large scale IT projects, a high degree of coordination, organization and relationship building is required in order to ensure successful delivery of project expectations. There are usually a number of stakeholders who need to be heard, understood, and have their requirements met. Effective coordination and collaboration among the organization's essential units must be understood and handled. Functional heads, heads of IT infrastructure, administrative workers, customers, and consumers of the project's end products are among these categories.

Over the years, there has been an increase in the number of information technology projects implemented. However, these projects have a significant failure rate, which could be attributed to inadequate project scope, design, and management. To improve project success rates, project sponsors, project managers, and project team members must grasp the processes and methodologies involved in project management (United Nations, 2010).

Traditional organizations' changing business needs and demanding stakeholders make IT project management difficult. It is critical in today's workplace that technology is both useful

and dependable. In the IT area, efficient project scope management ensures that the appropriate technology is used to deliver a direct answer to the organization. It also guarantees that the implementation's management is well-planned, with proper attention paid to scope, timeline, resource allocation, and risk and quality management.

1.1.1. Background of the Organization

Walia Technologies PLC is an extension of HiSoft Solutions LLC, a Virginia USA based IT Solution Provider. Walia Technologies has more than 250 employees locally and internationally and has offices in Washington DC, Mauritius, Addis Ababa and Bahir Dar. HiSoft Solutions LLC was founded in 2010 and its major customers are US Department of State, US Defense, US Department of Transportation and other companies in the private sector.

Walia Technologies services include Network Implementation and System Administration, Cyber security, Mobility and Enterprise Solutions, Data warehouse and Business Intelligence, and building Data Centers. Walia Technologies provides innovative and cost effective IT solutions, professional service and unique support plans to its partners and customers.

The study will focus on six major projects undertaken by Walia Technologies since 2019. Details about the projects is listed below.

Table 1.1 Walia Technologies Projects (2019 – 2022)

No.	Project	Client	Timeline	Project Budget (ETB)
1	Network and Systems Optimization	Berhan Bank	Jan. 2019 - May. 2020	115,000,000
2	Network and Systems Optimization	Bahirdar University	Feb. 2019 - Jan.2020	30,000,000
3	Deploying an Information Technology Systems Management and Help Desk system	NIB Bank s.c	Oct.2019 - March. 2020	10,000,000
4	Building a new Learning Management System using Office-365	Addis Ababa Education Bureau	May.2020 - June. 2021	15,000,000
5	Deploying an Exchange System and a	Ababa Science	Aug.2020 -	40,000,000

	Cyber Security Solutions	and Technology Agency	April.2021	
6	Building a new Data Center and integrating it with the existing IT infrastructure	Godar University	Dec.2021 - July.2022	80,000,000

Sources: Own compilation, 2022

1.2. Statement of the Problem

In today's fast changing organizational and economic climate, meeting the demands of consumers, clients, and organizational needs is a perpetual struggle for existence. The development of information technology is becoming a key component of an organization's development, growth, and survival (Schumpeter, 1983). Thus, information technology is an extremely important aspect of every individual and organization in the world. Yet, developing countries struggle to incorporate technology in their policy and culture. The incapacity of developing a policy to integrate technology in their system is strongly considered to be a reason for the poor economy of those countries. Currently, technology with its advanced feature is used as the primary source to keep people connected around the world (Ahmed, 2013).

As a developing country, Ethiopia needs to be able to introduce new IT projects to its citizens so that the country can assimilate with and thrive in the current globalized world. When managing IT projects, many challenges occur. Delay in IT projects plays a major part in these challenges. IT projects have been considered tough to undertake and have defined characteristics that make them different from other engineering projects and increase the chances of their failure (Peffer, Gengler & Tuunanen, 2003; Salmeron & Herrero, 2005). IT projects are often poorly defined, codes of practice are frequently ignored, and, in some cases, not many lessons are learned from experience (AlAhmad et al, 2009).

As the world changes more and more every day, IT projects are becoming more complex, and technology is rapidly evolving. Researches show that more than half of all IT projects become faulty and exceed deadlines and budgets while also failing to deliver the expected result (Al-Ahmad et al, 2009). In fact, poor estimates in the planning phase (39%) and changes in scope mid-project (41%) are reported as the top two reasons for IT project failure

in the Global PPM survey by PwC. Thus, the success of an information technology project is a critical issue to an enterprise and the country in general.

Though there has been a number of research about finding critical success factors of information technology projects, scope management practices of information technology projects has received little attention in the literature, especially in a developing country context like that of Ethiopia. With this in mind, the study will attempt to fill this knowledge gap by assessing scope management practices in information technology projects and the projects performance.

Thus, the purpose of this research is to assess project scope management practices as defined by PMBOK (Project Management Body of Knowledge) and the performance of information technology projects undertaken by Walia Technologies, an Addis Ababa based Technology Company. The study will examine the way scope is defined, what the major sources of scope creep are, and what the problems with regards to scope management are. It will also try to explore challenges, strengths and weaknesses of the project office/team while managing the scope.

1.3. Research Questions

1. How is scope management practiced by Walia Technologies when managing IT projects?
2. What are the major sources of scope creep?
3. How does Walia Technologies manage scope change in its IT projects?
4. What are the major challenges faced by Walia Technologies project team in its project scope management practices?

1.4. Objectives of the Study

The general objective of this study is to assess scope management practices in Information Technology projects undertaken by Walia Technologies and the projects performance, with

the intention of contributing 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.

Based on the general objective, the study intends to address the following specific objectives:

- To assess the project scope management practices of Walia Technologies on its IT projects;
- To identify the major sources of scope creep;
- To examine the scope change management practices implemented by Walia Technologies; and
- To identify the major challenges faced by the project team in its project scope management practices.

1.5. Scope of the Study

The scope of the study is be limited to the project scope management practices employed by Walia Technologies when undertaking IT projects selected by the study in the past four years from 2019 to 2022.

1.6. Limitations of the Study

Lack of related studies in the context of Ethiopia is one of the limitations of the study. The other one is difficulty in access to all project documentation (secondary data) due to confidentiality of records.

1.7. Significance of the Study

The proposed outcome of this study is to provide the reader with a better understanding of the current scope management practices being implemented within IT projects. Moreover, the

study will attempt to indicate what can be done to improve the capacity of managing scope in IT projects.

Furthermore, this study can also be used by researchers or students as a reference or a guideline to do a research regarding this particular topic in the future. And this becomes even more important when one see's even though their exist a number of studies that work on this topic on the world arena, when you view the topic in the context of Ethiopia or even developing countries, it'll be an addition to a very limited number of studies done.

1.8. Organization of the Study

The study is structured as follows; chapter two deals with reviewing the existing literature available on the subject. This enables the study to engage with the issues related to project scope management. Chapter three deals with the methodology of the study and explains which data sources have been used, how they were collected and analyzed. Chapter four highlights and discusses the various collected data and possible outcomes, while the last chapter provides conclusion and recommendations.

Chapter Two - Literature review

2.1. Theoretical Literature

This section will provide the reader with the underlying theories and the necessary background information that the study will be based upon, enabling one to fully understand the following parts.

2.1.1. Definition and Concepts

Project

A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification (Wysocki, 2014).

A project is made up of a group of interrelated work activities that are limited by the project boundary (scope), available budget for the project and duration (schedule) within which the project is expected to be delivered, to deliver capital assets (project deliverables) needed to achieve the strategic goals of an organization. Projects are not defined as routine or repetitive work (Larson & Gray, 2014). For example, a T-shirt factory producing identical T-shirts will not be considered a project. This is because the same personnel produce an identical product and can, in theory, continue to do so indefinitely.

Projects are also considered to be multifunctional, which means that projects are integrated and cut across multiple functional areas and business entities. One of the primary roles of the project manager is to manage the integration of project activities. The larger the project, and the greater the number of boundaries to be crossed, the more complex the integration becomes (Kerzner & Belack, 2010). Projects close when they have fulfilled their purpose and achieved the objectives stated in the project scope and accomplished the deliverables in the work breakdown structure (Sokowski, 2015).

Project Constraints

Project constraints are anything that can either restrict the actions of project team or dictate their actions (Heldman, 2009). The project triple constraints are primarily scope, time and cost while the enhanced constraints include time, cost, risk, scope, quality, resources, customer satisfaction (Mulcahy, 2009). The triple constraints work in tandem with each other implying that a change in one directly affects the other two. Time constraint is usually presented in the form of enforced deadline from senior management within which the project is expected to be completed. Budget or cost constraint limits the project's ability to utilize funds on the project. It has a potential of restricting the project scope.

Scope elements define the deliverables and the boundary within which the project will be implemented. Quality constraints are restricted by the specifications of the product or service and also the expected standards required. Resource constraint deals with availability of resources (both internally to the project team and externally to other supports required for project execution) for project execution in terms of required skills, quantity, experience and so on (Heldman, 2009).

Project Management

Project management as a science seems to have evolved around second world war and got much importance due to various nuclear aerospace and other defense programs of USA in the 1950's and 1960's (Mishra & Soota, 2005). It is an attempt to improve efficiency and effectiveness in the use of resources by getting work to flow multidirectional through an organization.

A project is a collective term for work performed. Therefore, project management can, according to Sokowski (2015), be considered a summarizing term for all the managerial effort of work performed in planning, organizing and executing the project. Elaborating further on Sokowski's definition, project management, according to Kerzner (2017) and PMI (2017) is *"the application of knowledge, skills and tools necessary to achieve the project's requirements"*.

Project management is accomplished through the appropriate application and integration of the 47 logically grouped project management processes, which are categorized into five

Process Groups. These five Process Groups are: Initiating, Planning, Executing, Monitoring and Controlling, and Closing (PMI, 2017). 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: scope, quality, schedule, budget, resources, and risks.

Project Life Cycle

The project life cycle can be described as “*the series of phases that a project passes through from its start to its completion*” (PMI, 2017) and consists of five process groups, called phases. The phases serve as the building blocks of every project life cycle (Wysocki, 2011). The phases are generally sequential, and their names and numbers are determined by the management and control needs of the organization or organizations involved in the project, the nature of the project itself, and its area of application. The phases can be broken down by functional or partial objectives, intermediate results or deliverables, specific milestones within the overall scope of work, or financial availability. Phases are generally time bounded, with a start and ending or control point. A life cycle can be documented within a methodology.

The project life cycle can be determined or shaped by the unique aspects of the organization, industry, or technology employed. While every project has a definite start and a definite end, the specific deliverables and activities that take place in between will vary widely with the project. The life cycle provides the basic framework for managing the project, regardless of the specific work involved (Kerzner, 2017).

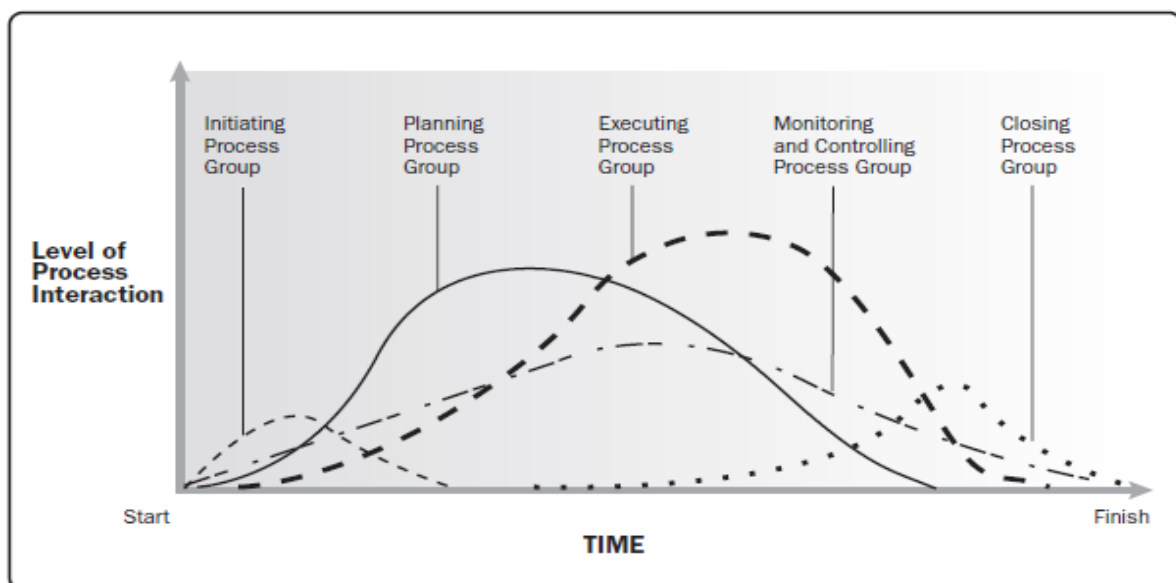
Project Management Process Groups

Project Management Process Groups are linked by the outputs they produce. The Process Groups are seldom either discrete or one-time events; they are overlapping activities that occur throughout the project. The output of one process generally becomes an input to

another process or is a deliverable of the project, subproject, or project phase. Deliverables at the subproject or project level may be called incremental deliverables.

The Planning Process Group provides the Executing Process Group with the project management plan and project documents, and, as the project progresses, it often creates updates to the project management plan and the project documents. The figure below illustrates how the Process Groups interact and shows the level of overlap at various times. If the project is divided into phases, the Process Groups interact within each phase (PMI, 2017).

Figure 2.1 Process Group Interactions in a project



Source: PMI, 2017

Project Management Knowledge Areas

A Knowledge Area represents a complete set of concepts, terms, and activities that make up a professional field, project management field, or area of specialization. The following ten Knowledge Areas are used on most projects most of the time. Project teams should utilize these ten Knowledge Areas and other Knowledge Areas, as appropriate, for their specific project.

The Knowledge Areas are: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk

Management, Project Procurement Management and Project Stakeholder Management (PMI, 2017).

Project Scope

In a project context, the term scope can refer to either the project scope or the product scope. The product is a separate system within the project or program system. Both project and product scope has different needs, goals, objectives, stakeholders, drivers, and interfaces. While the product will be driven by the project scope, there will be other drivers as well for the project scope. A project scope deals with the required work to create the project deliverables.

The scope of the project is specific to the work required to complete the project objectives. A product scope, on the other hand, is the attributes and characteristics of the deliverables in the project creation. The product scope is measured against requirements, while the project scope is measured against the project plan (Millhollan, 2008).

For all project management methods, the scope of the project or program is always the fundamental element. The scope defines all that is included within a project, excluding that which is not part of the project. It can be said that scope describes 100% of the deliverables (i.e. what the project is intended to perform). Thus, it can be reasoned out that the scope is the project, and thus the project must be the scope. Therefore, we cannot define a project without having defined scope (Helgason, 2010).

Previously, the project scope used to be perceived by project managers as a rigid and static target. The project scope is, instead, an evolving and naturally fluctuating target which lays the assumption that scope change is an inevitable occurrence (Davis & Radford, 2014). The precise definition of the project through the scope statement is one of the first and most important tasks when planning a project during the initiation and planning life cycle phases, as the absence of clear definitions of requirements in the project scope is a consistent hallmark of failed projects (Larson & Gray, 2014).

The processes used to manage project scope, as well as the supporting tools and techniques, can vary by project. The scope baseline for the project is the approved version of the project scope statement, work breakdown structure (WBS), and its associated WBS dictionary. A

baseline can be changed only through formal change control procedures and is used as a basis for comparison while performing Validate Scope and Control Scope processes as well as other controlling processes. Completion of the project scope is measured against the project management plan. Completion of the product scope is measured against the product requirements. The Project Scope Management processes need to be well integrated with the other Knowledge Area processes, so that the work of the project will result in delivery of the specified product scope (PMI, 2017).

Project Scope Management

PMI (2017) defines scope management as the processes required to guarantee the inclusion of all work required in order to complete the project successfully. Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project.

Kerzner (2017) expands the definition in more general terms as work that must be completed to finish the project. Put in even more simpler terms by Wysocki (2011), scope management must answer two questions: “*What will you do?*” and “*How will you know you did it?*”. As an amalgamation of the previous takes on scope management, Larson & Larson (2009) elaborate that scope management is the administering to ensure that all elements, objectives, and deliverables requested by stakeholders are satisfactorily taken care of.

The ability to define and then effectively control the scope of a project depends a lot on the goals and requirements of the project. For this reason, there is a need to gather the necessary information up front, before the project is started. By clearly understanding the needs of the stakeholders and the capabilities and constraints of resources, there is a higher chance to success (Jessie, 2010).

The main focus in the formulation of the project scope is the managerial identification and translation of client needs and requirements into documentation (Wysocki, 2011). The client requirements are recommended to be quantifiable, measurable and verifiable in order to make them more traceable for root-cause identification in case the project deviates from the initial scope requirements (Larson & Larson, 2009; Turk, 2010).

Mirza et al. (2013) suggest that the lack of proper knowledge, comprehension or defining a project scope at the beginning of a project leads to scope creep and is a significant contributor

to project failures. It is important to make all stakeholders understand project scope effectively for them to support project implementation. Properly implementing the process requires support from all members of the project team, special attention from the project manager, and the added support of the project sponsor and steering committee (Harrington & McNellis, 2006).

2.1.2. Project Scope Management Processes

I. 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.

The scope management plan is a component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and verified. The development of the scope management plan and the detailing of the project scope begin with the analysis of information contained in the project charter, the latest approved subsidiary plans of the project management plan, historical information contained in the organizational process assets, and any other relevant enterprise environmental factors. This plan helps reduce the risk of project scope creep (PMI, 2017).

Inputs

1. Project Management Plan - Approved subsidiary plans of the project management plan are used to create the scope management plan and influence the approach taken for planning scope and managing project scope.
2. Project Charter - The project charter is used to provide the project context needed to plan the scope management processes. It provides the high-level project description and product characteristics from the project statement of work.
3. Enterprise Environmental Factors - The enterprise environmental factors that can influence the Plan Scope Management process include, but are not limited to:

Organization's culture, Infrastructure, Personnel administration, and Marketplace conditions.

4. Organizational Process Assets - The organizational process assets that can influence the Plan Scope Management process include, but are not limited to: Policies and procedures, and Historical information and lessons learned knowledge base.

Tool and Techniques

1. Expert Judgment - Expert judgment refers to input received from knowledgeable and experienced parties. Expertise may be provided by any group or person with specialized education, knowledge, skill, experience, or training in developing scope management plans.
2. Meetings - Project teams may attend project meetings to develop the scope management plan. Attendees at these meetings may include the project manager, the project sponsor, selected project team members, selected stakeholders, anyone with responsibility for any of the scope management processes, and others as needed.

Outputs

1. Scope Management Plan – It's a component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and verified. It includes a process for preparing a detailed project scope statement; enables the creation of the WBS from the detailed project scope statement; establishes how the WBS will be maintained and approved; and controls how requests for changes to the detailed project scope statement will be processed. It is greatly integrated with other project management Processes like Requirements Management, Document Management, Communication Management, Deliverable Management, Quality Management, Change Control Management, and Time Management (Heldman & Mangano, 2009).
2. Requirements Management Plan – It's a component of the project management plan that describes how requirements will be analyzed, documented, and managed. It includes requirements prioritization process; how requirements activities will be planned, tracked, and reported; and product metrics that will be used and the rationale for using them.

II. 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 including product scope. Its primary purpose is to collect and document business and stakeholders' requirements of a project and develop a plan guiding how these requirements are going to be documented and managed all over the phases of the project (Heldman & Mangano, 2009).

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 conditions or capabilities that are to be met by the project or present in the product, service, or result to satisfy an agreement or other formally imposed specification.

Requirements also include the quantified and documented needs and expectations of the sponsor, customer, and other stakeholders. These requirements need to be elicited, analyzed, and recorded in enough detail to be included in the scope baseline and to be measured once project execution begins. Requirements become the foundation of the WBS. Cost, schedule, quality planning, and sometimes procurement are all based upon these requirements (PMI, 2017).

Inputs

1. Scope Management Plan - provides clarity as to how project teams will determine which type of requirements need to be collected for the project.
2. Requirements Management Plan – provides the processes that will be used throughout the Collect Requirements process to define and document the stakeholder needs.
3. Stakeholder Management Plan – used to understand stakeholder communication requirements and the level of stakeholder engagement in order to assess and adapt to the level of stakeholder participation in requirements activities.
4. Project Charter - used to provide the high-level description of the product, service, or result of the project so that detailed requirements can be developed.

5. Stakeholder Register - used to identify stakeholders who can provide information on the requirements.

Tool and Techniques

The tools and techniques used in collecting requirements include - interviews, focus groups, facilitated workshops, group creativity techniques, group decision-making techniques, questionnaires and surveys, observations, prototypes, benchmarking, context diagrams and document analysis.

Outputs

1. Requirements Documentation – It describes how individual requirements meet the business need for the project. The format of a requirements document may range from a simple document listing all the requirements categorized by stakeholder and priority, to more elaborate forms containing an executive summary, detailed descriptions, and attachments.
2. Requirements Traceability Matrix - It's a grid that links product requirements from their origin to the deliverables that satisfy them. The implementation of a requirements traceability matrix helps ensure that each requirement adds business value by linking it to the business and project objectives.

III. Define Scope

Define Scope is the process of developing a detailed description of the project and product. 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. Since all of the requirements identified in Collect Requirements may not be included in the project, the Define Scope process selects the final project requirements from the requirements documentation delivered during the Collect Requirements process.

It then develops a detailed description of the project and product, service, or result. An unambiguously defined scope definition shows the boundaries of the project while a poorly defined scope will lead to perpetual evaluation of what is included in the project and what is not included in the project (Jonasson, 2008).

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. During project planning, the project scope is defined and described with greater specificity as more information about the project is known. Existing risks, assumptions, and constraints are analyzed for completeness and added or updated as necessary (PMI, 2017).

Inputs

1. Scope Management Plan - It's a component of the project management plan that establishes the activities for developing, monitoring, and controlling the project scope.
2. Project Charter - It provides the high-level project description and product characteristics. It also contains project approval requirements.
3. Requirements Documentation - This documentation will be used to select the requirements that will be included in the project.
4. Organizational Process Assets - The organizational process assets that can influence how scope is defined include, but are not limited to: Policies and procedures, and project files from previous projects and lessons learned from previous projects.

Tool and Techniques

1. Expert Judgment - It's used to analyze the information needed to develop the project scope statement. Such judgment and expertise is applied to any technical detail. Such expertise is provided by any group or individual with specialized knowledge or training.
2. Product Analysis - For projects that have a product as a deliverable, as opposed to a service or result, product analysis can be an effective tool. Product analysis includes techniques such as product breakdown, systems analysis, requirements analysis, systems engineering, value engineering, and value analysis.
3. Alternatives Generation - It's a technique used to develop as many potential options as possible in order to identify different approaches to execute and perform the work of the project.
4. Facilitated Workshops - The participation of key players with a variety of expectations and/or fields of expertise in these intensive working sessions helps to reach a cross-functional and common understanding of the project objectives and its limits.

Outputs

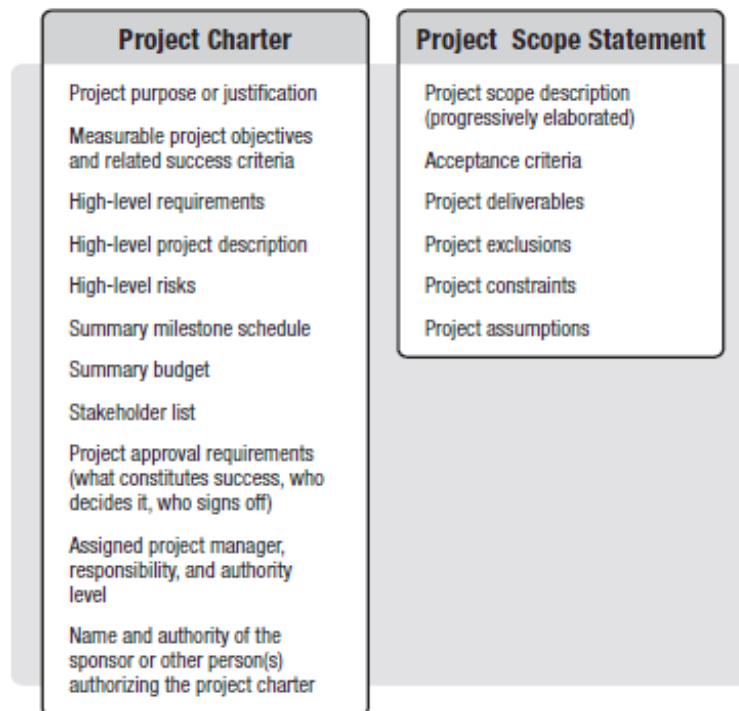
1. Project Scope Statement – The project scope statement is the description of the project scope, major deliverables, assumptions, and constraints. The project scope statement documents the entire scope, including project and product scope. It describes, in detail, the project's deliverables and the work required to create those deliverables. It confirms the project scope against the requirement of the stakeholder documented in the requirements document (Kerzner, 2017).

It also provides a common understanding of the project scope among project stakeholders. It may contain explicit scope exclusions that can assist in managing stakeholder expectations. It enables the project team to perform more detailed planning, guides the project team's work during execution, and provides the baseline for evaluating whether requests for changes or additional work are contained within or outside the project's boundaries. According to Martinelli (2016), the most basic and crucial aspect of a scope statement is making it as resistant to unforeseen future changes as possible.

The scope statement serves as the reference for future decision-making in case the scope has to be amended. Furthermore, the scope statement summarizes and clarifies the boundaries of the project such as time, cost and quality (Wysocki, 2011).

If the scope statement is inaccurate, subsequent alterations, statements, and estimates will propagate the original errors (Sokowski, 2015) and can lead to exponential scope creep. If a project manager fails to formulate a wholesome project scope statement, the project is likely to be beleaguered by scope creep (Burek, 2006).

Figure 2.2: Elements of the Project Charter and Project Scope Statement



Sources: PMI, 2013

2. Project Document Updates - Project documents that may be updated include, but are not limited to: stakeholder register, requirements documentation, and requirements traceability matrix.

IV. Create WBS

Create WBS 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 (PMI, 2017).

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. The WBS organizes and defines the total scope of the project, and represents the work specified in the current approved project scope statement. The planned work is contained within the lowest level of WBS components, which are called work packages. A work package can be used to group the activities where work is scheduled and estimated, monitored, and

controlled. In the context of the WBS, work refers to work products or deliverables that are the result of activity and not to the activity itself.

The different levels of WBS hierarchy have their own names. The level at the top is usually called a project and the lowest level of detail is called a work package. The work packages are natural subdivisions of cost accounts and tasks and is described merely as job assignments (Kerzner, 2017). The work packages are outlined in a separate document termed the work breakdown structure (WBS) (Greiman, 2013).

The levels in between these two levels are called subprojects, phases, tasks, work assignments, subtasks, and deliverables. Depending on the type of project and the types of team members who need to access it, several types of formats apply to work breakdown structure documents. They include: Chart Format, Hierarchical Structure, Outline Structure, Tabular View (Portny, 2010).

Inputs

1. Scope Management Plan – It specifies how to create the WBS from the detailed project scope statement and how the WBS will be maintained and approved.
2. Project Scope Statement – It describes the work that will be performed and the work that is excluded. It also lists and describes the specific internal or external restrictions or limitations that may affect the execution of the project.
3. Requirements Documentation – It's essential for understanding what needs to be produced as the result of the project and what needs to be done to deliver the project and its final products.
4. Enterprise Environmental Factors - Industry-specific WBS standards, relevant to the nature of the project, may serve as external reference sources for creation of the WBS.
5. Organizational Process Assets - The organizational process assets that can influence the Create WBS service include, but are not limited to: Policies and procedures, and project files from previous projects and lessons learned from previous projects.

Tool and Techniques

1. Decomposition - It's a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts. The work package is the work defined at the lowest level of the WBS for which cost and duration can be estimated and managed. The level of decomposition is often guided by the degree of control needed to effectively manage the project. The level of detail for work packages will vary with the size and complexity of the project.
2. Expert Judgment - It's often used to analyze the information needed to decompose the project deliverables down into smaller component parts in order to create an effective WBS. Such judgment and expertise is applied to technical details of the project's scope and used to reconcile differences in opinion on how to best break down the overall scope of the project. This level of expertise is provided by any group or individual with relevant training, knowledge, or experience with similar projects or business areas.

Expert judgment can also come in the form of predefined templates that provide guidance on how to effectively break down common deliverables. Such templates may be industry or discipline specific or may come from experience gained in similar projects. The project manager, in collaboration with the project team, then determines the final decomposition of the project scope into the discrete work packages that will be used to effectively manage the work of the project.

Outputs

1. Scope Baseline - The scope baseline is the approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary, that can be changed only through formal change control procedures and is used as a basis for comparison.
2. Project Document Updates - Project documents that may be updated include, but are not limited to: requirements documentation, which may need to be updated to include approved changes. If approved change requests result from the Create WBS process, then the requirements documentation may need to be updated to include approved changes.

V. 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 (PMI, 2017).

Inputs

The inputs used in the Validate Scope process include; the project management plan, requirements documentation, requirements traceability matrix, verified deliverables and work performance data.

Tool and Techniques

1. Inspection - Includes activities such as measuring, examining, and validating to determine whether work and deliverables meet requirements and product acceptance criteria. Inspections are sometimes called reviews, product reviews, audits, and walkthroughs. In some application areas, these different terms have unique and specific meanings.
2. Group Decision-Making Techniques - These techniques are used to reach a conclusion when the validation is performed by the project team and other stakeholders.

Outputs

1. Accepted Deliverables - Deliverables that meet the acceptance criteria are formally signed off and approved by the customer or sponsor. Formal documentation received from the customer or sponsor acknowledging formal stakeholder acceptance of the project's deliverables is forwarded to the Close Project or Phase process
2. Change Requests - The completed deliverables that have not been formally accepted are documented, along with the reasons for non-acceptance of those deliverables. Those deliverables may require a change request for defect repair.
3. Work Performance Information - Includes information about project progress, such as which deliverables have started, their progress, which deliverables have finished, or which have been accepted.

4. **Project Document Updates** - Project documents that may be updated as a result of the Validate Scope process include any documents that define the product or report status on product completion. Verified project documents may require approvals from the customer or sponsor in the form of signatures or signoffs.

VI. 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. It's used to manage the actual changes when they occur and is integrated with the other control processes. The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources is referred to as scope creep. Change is inevitable; therefore some type of change control process is mandatory for every project (PMI, 2017).

Inputs

The inputs used in the Control Scope process include; the project management plan, requirements documentation, requirements traceability matrix, work performance data and organizational process assets.

Tool and Techniques

1. **Variance Analysis** - Variance analysis is a technique for determining the cause and degree of difference between the baseline and actual performance. Project performance measurements are used to assess the magnitude of variation from the original scope baseline. Important aspects of project scope control include determining the cause and degree of variance relative to the scope baseline and deciding whether corrective or preventive action is required.

Outputs

1. **Work Performance Information** - Includes correlated and contextualized information on how the project scope is performing compared to the scope baseline. It can include the categories of the changes received, the identified scope variances and their causes,

how they impact schedule or cost, and the forecast of the future scope performance. This information provides a foundation for making scope decisions.

2. Change Requests - Analysis of scope performance can result in a change request to the scope baseline or other components of the project management plan. Change requests can include preventive or corrective actions, defect repairs, or enhancement requests.
3. Project Management Plan Updates - Project management plan updates may include, but are not limited to:
 - Scope Baseline Updates; if the approved change requests have an effect on the project scope, then the scope statement, the WBS, and the WBS dictionary are revised and reissued to reflect the approved changes through Perform Integrated Change Control process.
 - Other Baseline Updates; if the approved change requests have an effect on the project besides the project scope, then the corresponding cost baseline and schedule baselines are revised and reissued to reflect the approved changes.
4. Project Documents Updates - Project documents that may be updated include, but are not limited to: requirements documentation, and requirements traceability matrix.
5. Organizational Process Assets Updates - Organizational process assets that may be updated include, but are not limited to: causes of variances, corrective action chosen and the reasons, and other types of lessons learned from project scope control.

Frequent problems faced in 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.

2.1.3. Scope Change

The term scope change is often used interchangeably with scope creep. It is therefore essential to investigate and explain the difference between the two

A change to the project scope does not necessarily mean it classifies as scope creep (Teye Amoatey & Anson, 2017). Although a change to the project scope is considered to be inevitable by some researchers, so might the possibility of scope creep be (Larson & Larson, 2009). On the other hand, Hussain (2012) and Farok & Garcia (2016) suggest that scope creep and scope change are entirely different. Changing the scope of a project is an official decision from the project manager, whereas scope creep is unofficial change to the scope that grows slowly and incrementally, thereby the name “*creeping*”. The unofficial, creeping nature of unauthorized scope changes is supported by Kerzner (2017) who states that some project managers view scope creep as scope changes without approval.

However, in some instances, unauthorized changes to the project scope can yield positive results by changes presenting themselves as previously overlooked opportunities which adds value for the customer (Larson & Gray, 2014). Such opportunities are a natural part of the project evolution process, where the customer does not know what they want, leading to iterative methods and changes where positive project features are added (Kerzner, 2014). An owner’s trust in project management teams can lead to freer project modifications if they see the need or situational timing to do so by gaining leverage room for more autonomous creativity and imagination to propose new scope changes (Wich, 2009).

Orlando (2013) goes as far as recommending scope change to be embraced on the pretense that the changes are defined, while scope creep is best avoided. Even though scope changes can prove to be positive for projects and the expected deliverables, there is research evidence pointing out that that the amount of change incurred on a project is negatively correlated with project cost and overall productivity of project team members (Ibbs, 1997). Furthermore, Ibbs’ (1997) quantitative assessment of project change impacts found that the amount of changes applied to a project is directly correlated to increased costs and decline in productivity. However, Ibbs (1997) discusses controlled change with negative results and does not qualify as scope creep.

Meredith & Mantel (2011) suggest that regardless of how detailed a project is planned, scope changes before project completion are almost guaranteed. Similar to that of Meredith &

Mantel, Kerzner (2017) notes that scope changes happen due to the human nature of not being able to completely comprehend, or even less so, entirely describe a project at the very start, especially on larger, complex projects. Scope change can transform itself to scope creep if the intended changes are not correctly managed, thereby preventing the project from completing its objectives (Love et al., 2002).

2.1.4. Scope Creep

According to existing project management literature, the definitions of scope creep are varied and somewhat disputable as to the causes and extent of scope creep in projects. While scope change is a natural occurrence in projects since the inception of project management practices, the term scope creep seems to have its origins in the early and mid-1990's. There was no agreed use of the term in the 1980s (Larson & Larson, 2009). The first mention of scope creep can be found in Johnson (1991), although without further explanation of what scope creep involves. Golan & Ziarko (1995) provide a definition that *“scope creep evolves from the improper management of expectations of the user or expert and moving project goals or changing objectives”*.

However, Hurst & Hanessian (1995) report regarding IT outsourcing is the first article to highlight that scope creep is a negative event, arguing that *“all projects must be linked to specific business objectives to prevent scope creep”*. APM (2006) defines scope creep as *“the term sometimes given to the continual extension of the scope of some projects”* also adopted by Kerzner (2017). APM's definition bases itself on the assumption that it happens *sometimes* in projects and only extends the scope of these projects. The APM definition neglects cost and quality aspects which other literature takes into consideration. PMI (2017) employs a wider definition of scope creep as *“the uncontrolled expansion to product or project scope without adjustments to time, cost and resources”*. The PMI definition includes cost and resources as opposed to APM with emphasis on the words uncontrolled expansion.

Scope can creep manifest itself in different ways, but no matter how scope creep embodies itself in the various phases the project life cycle, scope creep is deemed detrimental, especially to the overall project budget and schedule (Kuprenas & Nasr, 2003). Orlando (2013) recommends that scope creep should be averted due to its inherently harmful properties to which it might bestow on a project. Larson & Gray (2014)

found that many projects do indeed suffer from scope creep, noting that scope creep is the tendency for the project scope to expand over time. Researchers make the argument that changing requirements, specifications and priorities is usually the culprits behind scope creep (Greiman, 2013), a statement which is more in line with PMI's definition and countering APM's stance that it only happens sometimes to some projects.

With the researcher's viewpoints and definitions as mentioned above on how scope creep can be defined, the project management literature on scope creep definition varies, but generally points in the same direction albeit using different words and language. The consensus lies in the conclusion that scope creep has negative impacts on projects, the project management organization and customers (Teye, Amoatey & Anson, 2017).

Causes of Scope Creep

2.1.4.1. Project Life Cycle

The point to which scope creep manifests itself in the project life-cycle is somewhat ambiguous and debated in the literature. As previously mentioned, scope creep shows in the early phases of the project according to Larson & Gray (2014) while Davis & Radford (2014) and Kerzner (2017) suggest that scope creep can occur during any of the project life cycle phases. Barry et al. (2002) takes an external stance on scope creep and suggests that scope creep is the result of the incremental changes to project requirements. These changes originate as a response to the ever-changing environment surrounding the project across the entire project life cycle. The researchers further argue that the size of projects grows with scope creep, resulting in higher project efforts. Therefore, the environmental rate of change dictates the amount of scope creep and project duration. Kerzner (2017) lists several topics on the potential causes of scope creep, which are highlighted in the next sub topics. Kerzner's extensive list serves as the topic categorization basis for assessing the different elements and causes leading to scope creep. Some of his definitions are used as explanatory aid where other researchers contemplate specifics or fill gaps in these topic areas.

2.1.4.2. Poor Scope Definition

A poor scope definition and WBS leads to assumption-making in the project organization (Kerzner, 2014). In its most rudimentary sense, a too-broad scope statement is an open invitation for scope creep (Greiman, 2013). While the scope can be formulated in a too-broad sense, the consensus amongst researchers strongly indicates scope creep occurs as a result of a poorly defined scope, either by the customers or project managers (Carkenord, 2014). In the instances of a too-broad or poor scope definitions, both serve as high-potential breeding-grounds for creating a vacuum to be filled of misunderstanding requirements and what the intended results of the project are, steering the project into unfamiliar directions. Davis & Radford (2014) notes that ambiguity in projects is a direct result from a poorly defined scope statement.

2.1.4.3. Poor Communication

A weak or broad scope definition is likely to affect communication negatively as a consequence. Scope creep stemming from a poorly defined or too-broadly formulated scope can cause misinterpretations in the project organization and ill-defined requirements (Kerzner, 2014). Misinterpretation can derive from the mixing of tasks, use of imprecise language, and lack of patterns, structure or a clear chronological work assignment order like the WBS (Inder & Rivera, 2007).

Furthermore, considerable variation in task sizes and work description within these same tasks is a factor which can lead to misinterpretation. Furthermore, the lack of a third party or a change management team to review the project progress and scope worsens communication efforts. Other identified communication-related causes of scope creep are the lack of procedures for managing change, lack of risk analysis and a lack of a formal communication plan. The absence of these formalities and plans can make the scope challenging to control by presenting a confusing set of documents leading the project team to rely on assumption-making (Inder & Rivera, 2007). Poor contingency planning and informal communication may make essential information to decision-makers unavailable which could influence them to make conclusions on false or inaccurate grounds.

Moreover, miscommunication can happen by a project manager's unwillingness to say no to clients, stakeholders or project team members with the intention to please (Turk, 2010). Another line of thought regarding the integration of proposed ideas, Baker (2006) suggests that by unconditionally saying no to all requests for change will eliminate scope creep. Although saying yes and accepting change on behalf of project team members and customers is well-intentioned, failing to take into account the impacts of accepting seemingly small change requests without officially communicating the changes to the scope is a significant factor for enabling scope creep. The consequences of accepting change and not communicating the agreed changes affect the sponsor, project team and stakeholders by unknowingly forcing longer work hours in addition to increased costs and delays for the project customer (Zimmerman, 2000).

2.1.4.4. Neglecting Stakeholder Requirements and Expectations

The lack of stakeholder engagement or stakeholder ignorance of the project scope can lead to scope creep as suggested by Hussain (2012). The suggestion is in line with Bellenger's (2003) engineering perspective, proposing that scope creep can occur by unforeseen conditions and inexperienced clients without proper knowledge of the project's technical processes. Inexperience and insufficient knowledge result in a poorly and inaccurately formulated scope document. Furthermore, not only stakeholder engagement and inexperience affect the scope. Internal stakeholder disagreement and failure to include relevant stakeholders in planning can play a crucial role for enabling stakeholder related scope creep (Carkenord, 2014).

On the other hand, Larson & Gray (2014) specify that strong customer interest leads to excessive scope creep by taking precedence over the parent organization's interests. However, scope creep can be positive in the eyes of stakeholders and sponsors, only intending to do good for the project by adding value or supplying a better way to perform work which could potentially solve a problem. However, progressive and incremental idea-generation can make project managers fail to consider the potential long-term impacts the changes and ideas can have (Walker, 2012).

A bright and complete formulation of the project scope is still not enough to minimize scope creep if project managers ignore stakeholders opinions and concerns (Greiman,

2013). Failure to understand what is in the customer's best interest or managing their expectations in the initial phase of the project life cycle can lead to costly downstream changes (Kerzner, 2014). The project manager's likelihood of encountering scope creep is reduced if there is a good understanding of what the stakeholders wish to see completed according to Farok & Garcia (2016). Sponsors and stakeholders typically tend to expect that others will match their level of understanding of the scope, where the underlying assumption is that the different aspects of the scope are self-explanatory to project managers regardless of quality (Larson & Larson, 2009).

2.1.4.5. Project Organization Systems

Moneke & Echeme's (2016) cause and effect analysis indicate that the underlying project management processes and systemic problems are the enabling factors of scope creep by allowing it to culminate and eventually harm a project. The study, therefore, dismisses external factors as causes of scope creep. Shirazi et al. (2017) further list poor information transformation, external and internal changes and unmanaged expectations as the main reasons for scope creep.

On the notion that scope creep can stem from systemic and procedural issues, the assumption that projects are only manageable by its individual parts leads to a narrow managerial perspective, failing to see minor changes and the subsequent impacts on the project in a holistic view (Shapiro & Lorenz, 2000). These minor and "foggy" changes may seem small by looking at the project's smaller parts but can, in reality, lead to cost overruns, increased project complexity and extension of the project scope. Shapiro & Lorenz (2000) note that project manager's excessive faith in the accuracy of the project schedule and cost predictions leads to overestimation. If a project has become subject to delays and increased costs during project reviews, project managers might add or remove project features in an exaggerated or panicked response to the information derived from project review updates.

2.1.4.6. Underestimating Complexity

Large and complex projects such as megaprojects are more prone to scope creep due to the sheer size and complexity which usually involves rework to some extent according to Greiman (2013) and Farok & Garcia (2016). The larger the project, the larger the ambitions

might be, leading to overconfidence in the estimation of realistic achievements (Kerzner, 2014). Hussain (20128) counters Greiman's argument by stating that there is an inverse relationship between the size of the project and the direct cost of scope creep.

However, Hussain adds that in the context of construction projects, this is likely due to the hiring of a professional external project manager for megaprojects. The complexity of larger projects can create a "fog of war", where downstream effects of decisions are not visible, even though they are deemed positive at the time and point in the organization where the decision is made (Kerzner, 2014).

2.1.4.7. Lack of Change Control

A weak or lenient change control process will be unable to perform its reason for existence, to prevent unnecessary changes leading to continuous scope creep (Kerzner, 2014). A formalized framework of change control is imperative for preventing scope creep from occurring by acting as the first line of defense against unauthorized and uncontrolled changes.

If approval and review processes are lacking, the acceptance criteria of change are non-existent, and project team members are free to make unnoticed changes (Turk, 2010). A lack of change control diminishes the value of the implemented changes to stakeholders, and without proper documentation, the reflection of these unauthorized changes will materialize in the final cost account of the project (Wich, 2009). The event of unauthorized changes to the project scope is one of the critical issues to whether the scope change will lead to scope creep.

2.1.4.8. Perfectionism

Perfectionism can occur by project team hubris, causing scope change to exceed specifications and requirements in the project scope further instead of achieving deliverables and objectives in the agreed manner and terms (Kerzner, 2014). Inder & Rivera (2007) suggest that project engineers are perfectionist individuals by nature, which can lead to scope creep by excessive focus on perfecting parts of the project instead of focusing on the project as a whole.

2.1.4.9. Other Causes of Scope Creep

Meredith & Mantel (2011) suggest that internal jealousy, mistrust, and conflict between departments can lead to uncontrolled scope creep, in addition to lesser involvement of stakeholders in the later project life cycle phases. A lack of managerial information, poor understanding of the original project and conflict in the decision-making process are other lesser-known perpetrators of scope creep (Farok & Garcia, 2016).

Impacts of Scope Creep

Project management literature widely accepts that scope creep, in most cases, results in added cost and project delays (Greiman, 2013, Larson & Gray, 2014). Moreover, Kerzner (2017) suggests that scope creep can be detrimental to a project's success because scope deviation leads to increased costs and delays. Prabhakar & Quah's (2008) literature review on scope creep in software projects states that the most common negative consequences are missed deadlines and over-spending. Wich (2009, p. 3) proposes that a wandering scope will not only affect cost and time but is catastrophic in every imaginable aspect of a project.

Besides cost overruns and delays, scope creep makes the project quality poor (Moustafaev, 2014). Scope creep in specific areas of a project can have a significant impact due to the interdependent nature of project life cycles and objectives, thereby influencing other areas in the project (Madhuri et al., 2018). These dependencies are one of the primary causes for the severe financial impacts scope creep has on projects, as the overturn of previous scope change decisions are proved to be costly (Kerzner, 2014).

As such, scope creep is a self-perpetuating cost factor leading to even more scope creep by compounding problems as the project progresses. With a widening scope due to scope creep, the intricacy of interactions and interdependencies amongst work packages and tasks in the WBS grows until it causes project delay, further aggregating pressure on the project organization. The increased pressure can, in turn, lead to even more unauthorized decisions in and in-between departments. The accuracy of cost and schedule estimates are thereby diminished, resulting in more scope creep than initially identified (Shapiro & Lorenz, 2000).

2.1.5. Project Performance

In project management literature, the performance of a project is frequently conceived of in terms of success or failure although identifying just what constitutes these can be problematic. In general there is lack of consensus on how to define success, lack of success and failure and despite their frequent use, such terms are perceived to be vague and difficult to measure. Wateridge (1998) further states that success or failure is not an absolute or black and white concept. Projects may be viewed as successful to varying degrees, depending on which success criteria are met.

There have been various attempts over the history of project management to define suitable criteria against which to define and measure project performance. Perhaps the most well recognized of these is the long established and widely used “iron triangle” of time, cost and quality (Atkinson, 1999). Ika (2009) argues that although the definition of quality is potentially very broad in relation to the iron triangle, it is often restricted to meeting scope or functional and technical specifications.

Time dimension of assessing project performance is the most common aspect brought out in the literature review. Pretorius et al (2012) found out that project management organizations with mature time management practices produce more successful projects than project management organizations with less mature time management practices.

Project time is the absolute time that is calculated as the number of days/weeks from start on site to practical completion of the project. Speed of project implementation is the relative time (Chan, 2001). Kariungi (2014) expressed that energy sector projects were completed on time due to factors such as efficient procurement procedures, favourable climatic factors, and timely availability of funds and proper utilization of project planning tools.

Completion of the project within the budget is another dimension that is used to measure project performance. Chan (2001) states that cost can be computed in form of unit cost, percentage of net variation over final cost and so on. The project monitoring and evaluation team may control the costs using Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) techniques. Projects often face cost overruns during the implementation phase; hence a proactive approach is essential for monitoring project costs and detection of potential problems (Cheng et al, 2012).

Another important dimension in project performance includes customer satisfaction (Dvir, 2005). A project that in the final analysis leads to customer satisfaction would be said to be successful. Evaluating the performance of project is beneficial to both the stakeholders by enabling them to appraise the services received and to project manager by helping them to improve their services (Besner & Hobbs, 2008).

Project success relates to the end product's goals in terms of performance and fulfilling the technical requirements, as well as customer satisfaction. Successful projects also contributes to company's success in long term in terms of gaining a competitive advantages; enhancing company's reputation; increasing the market share; and reaching specified revenue and profits.

In a nutshell project performance can be assessed on the basis of completion within scheduled time, completion within reasonable cost and within budget, quality achievement, meeting of technical requirement, project achieving user satisfaction and finally achievement of organizational objectives.

2.1.6. Project Scope and 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 implementation 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 (Larson & Gray, 2014).

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.

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): "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.

2.2. Empirical Literature

Over the past years, a number of empirical studies on project scope management and the issues that come with it have been done. With the aim of relating the real world experience of the topic with the theoretical agreements, the study has reviewed the findings of previous literature about project scope management. Hence, the following section presents the empirical review of some of the studies.

Walliman (2011) investigated the importance of scope management in relation to the overall success of a project and found that an effective scope management of a project certifies the successful management of other strategic project management capacities including time, cost and quality.

Mirza et al (2013) conducted a study titled significance of scope in project success. The rationale for the study was that though there is a clear understanding of the need to achieve project success, surprisingly little is published on significance of scope on project success. The study discussed that scope should be properly defined and controlled and what can be the major factors behind mismanagement of scope and how it can be overcome. It concluded that a better appreciation of the distinction between project and product scope can bring a higher possibility of project success.

Al-Rubaiei, Nifa and Musa (2018) assessed the importance of the scope management, how it is viewed by project management different methods and what is its impact on the project outcomes. The study concluded that, it is suggested to make the most verified choice of methods or standards resulting from explanation of the task on optimizing the project's scope to the following measures: profit, time, cost and quality.

Looking at studies conducted specifically in the African continent, an empirical study done by *Fabiola et al. (2015)* analyzed the scope change management as a tool for project success in Rwanda. The purpose of this study was to find out if the changes in project scope would lead to success of the project in term of delivering quality results. According to the study when managing a project there are times when project implementers will have to make decision to change the project scope to be able to meet the project objectives. A descriptive research design was identified as design of study and took a population of was 30 employees working in the area of projects operations and management to identify challenges associated with changing the project scope. The study has used a census sampling technique. The research found out that changes in project activities provoke the changes in project cost, time and quality of the product/service of the project. When the project cost and time are increased, it gives the opportunity to provide quality product by using quality materials/services and using advanced technology which leads to the beneficiaries' satisfaction because of receiving product/service of the good quality.

Ugochi & Ifeanyi (2016) identified, explored and modelled the causes and effects of scope creep on large scale public sector construction projects in the South East Geopolitical Zone of Nigeria and identified the causative factors of scope creep of large scale public sector construction projects, ranked them in the order of relative severity index and developed a fishbone/Ishikawa diagram as a visual aid, which will help to address the problems.

Banda & Pretorius (2016) study determined the effect of scope definition on public building projects that are implemented by project implementing agencies in Malawi and found that there is a significant direct correlation between scope definition and the corresponding performance of the sampled infrastructure projects.

Another study conducted by *Damoah (2015)* on investigation into causes and effects of project failure in government projects in developing countries; a case study on Ghana, stated that scope change is one of the main areas that contribute to project failure. In most projects,

requirements are either altered before the commencement of work or altered halfway through the project's life cycle, but rarely are these changes effected by the completion date. This is more evident in information system project management. From a more generic perspective, he referenced Zhang (2013) who argues that "project changes have been conventionally treated as having heavy or negative impacts on project completion and, in theory; they should not happen if project activities have been perfectly planned and scheduled". In other words, changes in the scope of projects are bound to happen and if they happen, it has negative effects on the completion time, more especially in complex projects that involves multi-stage iterative process.

An empirical research on the application of project scope management practices on project success has been done by *Ogunberu et al. (2018)*. The study was done to review the importance of project scope management on the implementation of information and communication technology on telecommunication organizations in Nigeria. The study collected primary data using questionnaires on 375 samples of respondents which contains 125 project sponsors, 125 project managers and 125 project team members. With the application of descriptive and inferential statistics, the analysis of the result reveals that the major project scope management success criteria are customer satisfaction and customer expectation. According to the study, project costing and project quality as project scope success criteria are less critical. The regression results of the study show that customer satisfaction, customer expectation, resource allocation and Project duration have significant impact on the success of the project in the selected organizations.

Looking at studies conducted on Ethiopia in this regard, there are only a few to be found. One is *Belete's (2019)* study titled practices and challenges of project scope management: the case of Awash bank. The study identified that error in defining scope, insufficient involvement of stakeholder and value adding change brought by stakeholders as the major causes of scope creep. The study gave recommendation for the improvement of scope management; by using standard guidelines in managing scope, by giving attention for scope definition by participating all stakeholders, by using additional tools and techniques and also by using proper line of communication inside the team and with stakeholders.

Another is *Hailemariam's (2020)* study, which attempted to assess the status of scope management practices of Addis Ababa city road Authority. The findings of the study showed that though the scope management practice of the road construction projects is at good status,

it was also understood that the ineffectiveness of most projects in meeting their initially set objectives was because of the incapability of the authority in managing stake holder's requirements for the projects.

The results of the empirical literature review show that project scope management is crucial in ensuring project success. A good practice of project scope management enables the project team to focus on the necessary requirements of the project, hence time and budget constraints can be achieved as planned. The uncontrolled need of all project stakeholders can be limited by implementing appropriate scope management practices. Project scope management guarantees that project implementers and other stakeholders are on the same page about what work is and isn't part of the project.

The majority of the literature confirms that many projects experience scope change due to various reasons. This strengthens the theory that scope change is inevitable. But those changes must be done in a controlled manner and all stakeholders must be consulted and have the information about the effect of scope change on delivery time of the product or service and budget of the project.

Most of the study's focused on scope management in general and don't reveal which aspect of project scope management is missed the most. This study attempts to fill this knowledge gap by pinpointing the most encountered problem associated with the tasks and activities of the six processes of project scope management as outlined by project management institute's 'A Guide to the Project Management Body of Knowledge'.

2.3. Theoretical Framework

The intended outcome of the study is to assess the scope management practices of Walia Technologies when undertaking IT projects and the performance of the projects. Project scope management is a process that helps in determining and documenting the list of all the project goals, tasks, deliverables, deadlines, and budgets. Six processes are involved in accurately identifying the project's scope. If all six processes are effectually employed, it will lead to an effective project scope management process.

Effective Project scope management influences the overall project performance. The level of efforts ensured during scope definition phase defines the success during the design and implementation phase. Effective project scope management gives a clear idea about the time, labor, and cost involved in the project. It helps to avoid common issues like: constantly changing requirements, pivoting the project direction when it's already mid-way, realizing that the final outcome isn't what was expected, going over the discussed budget and falling behind the project deadlines.

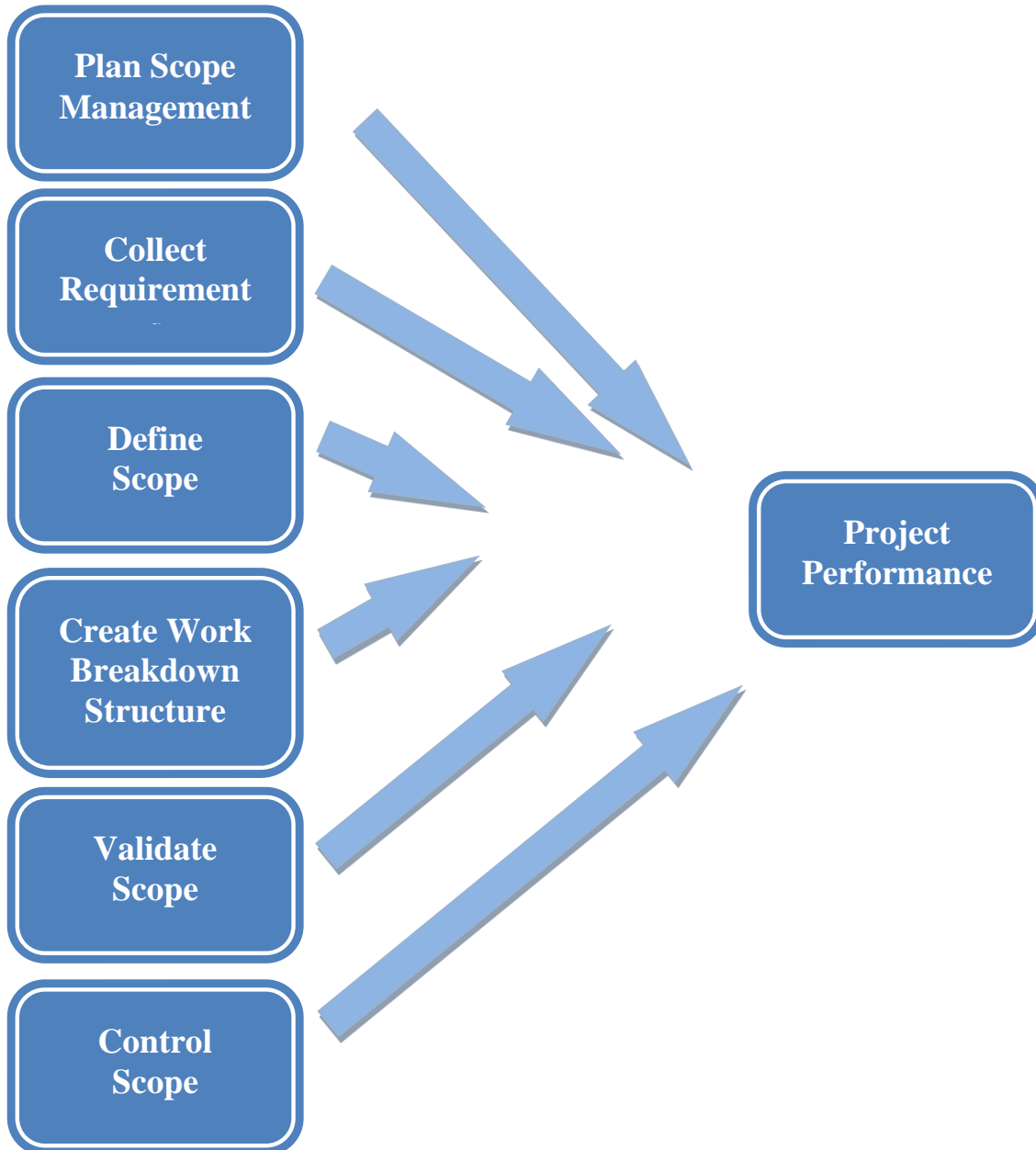
The six processes are;

- i. **Planning Scope Management** – It is the first process in project scope management where a scope plan document is created and can be referred in the later stages of the project. The document mainly helps in defining, managing, validating, and controlling the project's scope.
- ii. **Collecting requirements** - The next step is to work out stakeholder/client requirements and expectations. One will be required to document all the project requirements, expectations, budgets, and deliverables through interviews, surveys, and focus groups. This is a rather important step because more often than not, stakeholders can have unrealistic requirements or expectations and the project managers would be required to step in to find a solution that is acceptable by everyone.
- iii. **Defining the Scope** – At this step, the collected requirements are turned into a well detailed description of the service or product that's to be delivered through the project. The developed project scope statement can be referred throughout the project.
- iv. **Creating Work Breakdown Structure** – At this step, all the work which needs to be done in the project is broken down and all tasks are assigned to project team members. It lists the deliverables that need to be completed and their respective deadlines as well.
- v. **Validating Scope** - In this step, the scope and deliverables that have been recorded are sent to project executives and stakeholders to get the necessary approvals. Scope validation needs to be done before starting the project to ensure that if something goes wrong then it is easy to find where it went wrong.
- vi. **Controlling Scope** - Project managers need to ensure that as the project begins, it always stays within the defined scope. In case there are some

things that need to change, then the proper change control process should be followed.

Conceptual Framework

Figure 2.3: Conceptual Framework



Chapter Three - Research Methodology

3.1. Research Design

Research design is a framework for action that bridges research questions and the execution or implementation of research questions. Research design is important because it allows the many research techniques to go smoothly, resulting in research that is as professional as possible, giving the most information with the least amount of work, time, and money (Akhtar, 2016).

According to Chandran & Kothari (2004), there are five types of research designs. These are observation, descriptive, exploratory, experimental and diagnostic design. The selection of a specific research design depends on the purpose of the research, theoretical paradigm informing the research, the context or situation within which the research is carried out, and the research techniques employed to collect and analyze the data. In order to bring the most out of the result of this study, a descriptive design is implemented to answer research questions and attain the objectives.

3.2. Description of Study Area

The study area is particularly focused on assessing scope management practices in Information Technology projects undertaken by Walia Technologies located in Addis Ababa, Ethiopia and the projects performance. The reason why Walia Technologies is chosen for the case is because the researcher is familiar with the company and its projects.

3.3. Research Approach

The study used a mixed method approach where both qualitative and quantitative research methods are implemented to collect and analyze data. Descriptive survey method was applied to generate quantitative data and examine the project scope management processes used by the project team through a structurally developed questionnaire. Additionally, reviewing literature related to the topic area is used as a supplement for the data validation and drawing a conclusion.

3.4. Population and Sampling

A population refers to an entire group of people, events, or things of interest that the researcher wishes to investigate and from which they can make inferences based on the sample statistics (Sekaran, 2013). 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).

Since the objective of the study is to assess the scope management practices information technology projects undertaken by Walia Technologies and the projects performance, the target population of the study is project team members and project managers employed by Walia Technologies and client representatives involved within the projects. The entire population of this study is 75 individuals, broken down to 55 project personnel employed by Walia Technologies and 20 client representatives or IT / procurement personnel employed by the client organizations. As the population of the study is manageable, total population sampling is implemented for primary data collection.

3.5. Data Collection Instruments

Using several methods in a study is important to triangulate the result of each method involved. Solely relying on a single method can adversely affect the reliability and validity of the results, eventually disconcerting the conclusions drawn and the recommendations made (Currie, 2005).

In line with this, in order to get the appropriate data the study has employed both primary and secondary sources of data. Primary data are those which are collected for the first time and thus happen to be original in character (Kothari, 2004). As primary sources of data a questionnaire has been used to help in answering questions related to the study objectives. The questionnaire has been developed through review of relevant literature focusing on the processes related with project scope management practices and has been carefully designed to include both close and open ended questions.

Secondary data are those that are already available, and refer to data that have already been collected and analyzed by someone else (Kothari, 2004). As a secondary data source document analysis of relevant books, articles, journals, online information and documents

related with the projects under study have been investigated to supplement and serve as the bases for the instruments and findings of the study.

3.5.1. Validity and Reliability

Validity is defined as how much any measuring instrument measures what it is intended to measure. Validity refers to the issue of whether an indicator (or set of indicators) that is devised to gauge a concept really measures that concept. On the other hand, the tendency toward consistency found in repeated measurements is referred to as reliability. This can be checked by comparing the responses for similar or consistent questions of the questionnaire and interview.

Several ways of establishing validity are: content validity; 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 similar previous researches. In addition, the Cronbach's Alpha using SPSS has been calculated to measure the reliability of the collected qualitative data. According to Hair, et al., (2006), if α is greater than 0.7, it means that it has high reliability and if α is smaller than 0.3, then it implies that there is low reliability. The overall Cronbach's Alpha is 0.970 with 36 measurement items. It's a very strong value, implying the items are highly correlated. The Cronbach's Alpha for each sub variable is listed below.

Table 3.2: Cronbach' Alpha values for variables

	Variables	Cronbach' Alpha Value	Number of Items
1	Plan Scope Management	0.791	4
2	Collect Requirements	0.803	4
3	Define Scope	0.912	7
4	Create Work Breakdown Structure	0.795	4
5	Validate and Control Scope	0.846	6
6	Scope Change Management Practices	0.918	6
7	Project Performance	0.923	5

Source: Survey Result, 2022

3.5.2. Ethical Consideration

The information which has been gathered from participants has been treated with highest degree of confidentiality and has only be used for the purposes of the study. This gathered information will not be revealed to anybody without the participants consent. The participants have been informed on the purpose of the research. The researcher has also preserved the anonymity of the participants by not writing the names of all those involved in the research.

3.6. Method of Data Analysis

Qualitative and statistical/quantitative methods of data analysis have been used to analyze the data collected from different data sources. Creswell (2009), there is more insight to be gained from the combination of both qualitative and quantitative research than either form by itself. Their combined use provides an expanded understanding of research problems. Thus, with the intention of getting the general picture of the research under study, both quantitative and qualitative methods of data analysis have been used in conducting the study.

The data that was collected from respondents has been analyzed using data analytical software ‘statistical packages for social sciences’ (SPSS). For presenting the different types of descriptive data, analysis methods such as frequency, percentage, simple tabulation, cross tabulation, mean and standard deviation have been employed.

Chapter Four - Data Analysis and Discussion

4.1. Introduction

In this chapter, the results of the data collected from the survey have been analyzed and discussed. It presents the analyzed data from the questionnaire. The data from questionnaire are presented in tables and the interpretation of what is shown in tables follows. The notable points that were raised in the questionnaire follow the interpretation of tables to create a better understanding of the situation.

Participants in this study were members of IT projects employed by Walia Technologies who had responsibilities related to the everyday management of the project activities and the client representatives who worked closely with project team members.

The questionnaire employed by the study is broadly divided into three different sections. The first section is concerned with the demographic information of the respective respondents. Information such as the respondent's gender, age, education level, years of experience and position within the organization were collected. The second section of the questionnaire is concerned with the respondent's outlook about the scope management practices of Walia Technologies when undertaking IT projects.

The final section of the questionnaire is concerned with the performance of Walia Technologies IT projects and the scope change management practices it employs. Other facets included in the questionnaire include questions regarding challenges faced by the project team in managing scope, whether respondents experienced scope change in the projects they were involved in, what the sources of the scope change were and the challenges encountered when managing scope change.

The questionnaire used by the study was distributed to 75 individuals. Out of the 75 questionnaires distributed, 56 were returned, giving a response rate of 75%. The collected information from the questionnaires was then analyzed using data analytical software 'statistical packages for social sciences' (SPSS) version 20.

4.2. Demographic Information of Respondents

In this section, the demographic characteristic of the respondents is presented. Information such as the respondent's gender, age, education level, years of experience and position within the organization is presented below.

Table 4.1: Respondents by Gender

	Frequency	Percentage
Male	27	48%
Female	29	52%
Total	56	

Source: Survey Result, 2022

As can be observed from the above table, out of the 56 respondents of the questionnaire, while 29 were female accounting for 52% of all respondents, 27 of the respondents were male accounting for 48%. When classifying the respondents on whether they are part of the project teams employed by Walia Technologies or are client representatives involved in the project, a different picture emerges. Out of the ten client representatives that responded to the study, while 9 of them were men, there was only a single female respondent.

Conversely, out of the 46 individuals who were part of the project teams employed by Walia Technologies and responded to the study, while 28 of them were females accounting for 61% of all respondents, only 18 of the respondents were male accounting for 39%. Considering Walia Technologies prides itself with being a women empowering organization, it's not surprising that the majority of its employees are women.

Table 4.2: Respondents by age group

	Frequency	Percentage
Under 25	7	13%
25 – 35	30	54%
35 – 45	13	23%
45 – 55	4	7%
Above 55	2	4%
Total	56	

Source: Survey Result, 2022

With regards to the age of the respondents, the majority of the respondents belong to the age group 25 – 35 accounting for 54% of all respondents. This age group is followed by the 35 - 45 age group accounting for 23% and the under 25 age group accounting for 13%. On the

other hand, the 45 – 55 age group accounts for only 7% of the respondents while the above 55 age group only accounts for 4% of the respondents.

This can be seen as a reflection of Ethiopia’s demographic features, as the majority of the population is young. According to Pala, Eker and Melek (2008), youth are ambitious and quickly adapt to new ideas and changes when compared to the elderly. However the youth may lack experience and for that matter the balance in organization is brought by the older more experienced staff.

Table 4.3: Respondents by highest level of education

	Frequency	Percentage
Diploma	0	0%
Degree	39	70%
Graduate Degree (Masters)	17	30%
Post Graduate (PHD)	0	0%
Total	56	

Source: Survey Result, 2022

Regarding the highest educational level of the respondents, all of the respondents fell in to two categories. While 39 of the respondents had at the least a BA Degree accounting for 70% of the total respondents, 17 of the respondents had at the least a Master’s Degree accounting for 30% of the respondents. The data support the claim that the respondents are well-educated and informed individuals who are capable of carrying out their responsibilities and expectations.

Table 4.4: Respondents by level of experience

	Frequency	Percentage
Less than 1 Year	0	0%
1 - 3 Years	8	14%
3 -5 Years	14	25%
5 - 10 Years	23	41%
More than 10 Years	11	20%
Total	56	

Source: Survey Result, 2022

The level of work experience of the respondents was also recorded and analyzed. Accordingly, the majority of the respondents had work experience of 5 – 10 years accounting for 41% of the respondents, followed by 3 – 5 years of experience accounting for 25% and above ten years of work experience accounting for 20% of the respondents. Conversely, there

were no respondents with less than one years of experience and respondents with 1 – 3 years of experience only accounted for 14% of all respondents. This indicates that the majority of the respondents have prior experience managing IT projects and can provide accurate information on Walia Technologies' scope management processes.

Table 4.5: Respondents by position within organization

		Frequency	Percentage
Walia Technologies	Project Manager	3	5%
	Network Engineer	17	30%
	Enterprise Engineer	11	20%
	Systems Engineer	15	27%
Client Organization	IT Personnel	7	13%
	Procurement Personnel	3	5%
Total		56	

Source: Survey Result, 2022

With regards to the respondent’s position within the organization they work in, among those who work for the client organization, the majority were IT personnel, the rest being procurement personnel. Among those who are employed by Walia Technologies, 3 were project managers, 17 were network engineers, 11 were enterprise engineers and 15 were systems engineers. As the project respondents are from different disciplines, they bring an array of perspectives to the study.

4.3. Project Scope Management Practices

A project's scope management can make or ruin it. If the scope of the project is not handled properly, it can swiftly deviate from the original plan, disrupting the project's timeline and depleting the budget. Many projects fail as a result of this. The study has attempted to assess Walia Technologies scope management practices by presenting the study participants with statements that relate to the six processes of project scope management; plan scope management, collect requirements, define scope, create work breakdown structure, validate and control scope.

The study's target respondents were asked to rate their agreement with the statements of inquiry about scope management practices. On the statement, the responses are scored on a five-point Likert scale, with 1 denoting strong disagreement, 2 denoting disagreement, 3 denoting neutrality, 4 denoting agreement, and 5 denoting strong agreement.

4.3.1. 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. The study provided the following four statements to respondents and asked them to show to what extent they agreed with the statements.

Statement 1 - A clear scope management plan is developed for the project describing how the project's scope will be defined, developed, monitored, controlled, and verified.

Statement 2 - The project manager, the project client, selected project team members and other stakeholders are all actively involved in the development of the project's scope management plan.

Statement 3 - Expert judgment from an individual or group with specialized education, knowledge, skill, experience, or training is used in developing the scope management plan.

Statement 4 - Factors such as organization's culture, existing infrastructure, personnel administration, and marketplace conditions are given due attention when developing the project's scope management plan.

Table 4.6: Response to Plan Scope Management

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	24	42.9%	30	53.6%	2	3.6%	0	0.0%	0	0%	56	4.3929	0.56177
Statement 2	10	17.9%	29	51.8%	5	8.9%	12	21.4%	0	0%	56	3.6607	1.014
Statement 3	14	25.0%	25	44.6%	7	12.5%	10	17.9%	0	0%	56	3.7679	1.02675
Statement 4	25	44.6%	28	50.0%	2	3.6%	1	1.8%	0	0%	56	4.3750	0.64842
Aggregate Mean Score											4.05		

Source: Survey Result, 2022

With an aggregate mean of 4.05, it can be observed that the majority of the respondents agreed with the statements presented under the topic. The lower mean values of 3.6607 and 3.7679 were recorded expressing a higher margin of disagreements with statement 2 and statement 3. For the remaining two statements, the majority of the respondents said they either agreed or strongly agreed.

As indicated above, the study raised four statements to assess the scope management planning of Walia Technologies in its IT projects. For the first statement, with a mean of 4.39, almost 96% of the respondents either agreed or strongly agreed with only the remaining 4% of the respondents saying neutral. For the second statement, unlike the first statement showed mixed results. While 70% of the respondents either agreed or strongly agreed, 21% of the respondents disagreed with the statement, while 9% said neutral. It was further mentioned by study respondents in the questionnaire that client and stakeholder involvement is minimal at this stage in some projects. This indicates that in projects with low client and other key stakeholder input, the client will have a poor knowledge of how the project scope will be defined, developed, monitored, controlled and verified.

As with the second statement, the third statement also showed mixed results. While 70% of the respondents either agreed or strongly agreed, 18% of the respondents disagreed with the statement, while 13% said neutral. It was further pointed out that, similar to the previous statement, no persons or organizations with specialized knowledge, skill, experience, or training were involved in the projects some study participants were working on. It was also added here that there exists a shortage of staff with expertise or specialized knowledge within Walia Technologies. The final statement in the plan scope management topic with a mean of 4.37 almost 95% of the respondents either agreed or strongly agreed with it.

4.3.2. Collect Requirements

Collect requirements is the process of determining, documenting and managing stakeholder needs and requirements to develop a plan guiding how these requirements are going to be documented and managed all over the phases of the project. The study provided the following four statements to respondents and asked them to show to what extent they agreed with the statements.

Statement 1 - The client's needs and expectations for the project are carefully collected and in turn quantified and documented by the project team.

Statement 2 - The client's requirements are elicited, analyzed and recorded in enough detail by the project team to be included in the project's scope baseline and to be measured once project execution begins.

Statement 3 - A plan is developed to guide how these requirements are too managed over all the phases of the project.

Statement 4 - Tools such as interviews, questionnaires & surveys, focus groups and facilitated workshops are used in identifying and defining the features and functions of the desired project deliverables.

Table 4.7: Response to Collect Requirements

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	19	33.9%	35	62.5%	2	3.6%	0	0.0%	0	0%	56	4.3036	0.53364
Statement 2	14	25.0%	38	67.9%	1	1.8%	3	5.4%	0	0%	56	4.1250	0.68920
Statement 3	12	21.4%	36	64.3%	3	5.4%	5	8.9%	0	0%	56	3.9821	0.79572
Statement 4	10	17.9%	28	50.0%	5	8.9%	13	23.2%	0	0%	56	3.6250	1.03682
Aggregate Mean Score											4.01		

Source: Survey Result, 2022

With an aggregate mean of 4.01, it can be observed that the majority of the respondents agreed with the statements presented under the topic. The lower mean value of 3.6520 was recorded expressing a higher margin of disagreement with statement 4. For the rest of the statements, the majority of the respondents said they either agreed or strongly agreed.

As indicated in the above, the study raised four statements to assess the collect requirements process of Walia Technologies in its IT projects. As can be observed from the above table, the majority of the respondents either agreed or strongly agreed with the first three statements with means of 4.30, 4.13 and 3.98 and combined percentages of 96%, 93% and 86% for statements 1, 2 and 3 respectively.

Statement 4 was the outlier in the collect requirements topic. Among the respondents, 23% disagreed while 9% said neutral, with the statement. Study participants further stated that Walia Technologies employed no additional tools in some of the projects they were involved in, aside from the document provided by the client outlining the its goals and requirements for the project. Moreover, information acquired from the client about the project's resources, such as operating PCs, servers, routers, and other telecommunication and information technology resources, may be incorrect. If this is the case, it will cause issues and delays during the project implementation phase, as well as scope changes.

4.3.3. Define Scope

Define scope is the process of developing a detailed description for the project and is critical to project success as it builds upon the major deliverables, assumptions and constraints that are documented during project initiation. The study provided the following six statements to respondents and asked them to show to what extent they agreed with the statements.

Statement 1 – An in depth description of the project is developed through the project scope statement relating in detail the project’s major deliverables and the work required to create those deliverables.

Statement 2 – Existing risks, assumptions and constraints are analyzed when developing the project’s scope.

Statement 3 – Expertise provided by any group or individual with specialized knowledge or training is given due consideration in defining the scope of the project.

Statement 4 – Tools such as meetings and facilitated workshops are employed to include key stakeholders, so as to reach cross-functional and common understanding of the project objectives and its limits.

Statement 5 – Scope management tasks associated with the project’s scope are well documented and were made accessible to all members of the project team and relevant stakeholders.

Statement 6 – The developed project scope statement provided a common understanding of the project scope among all project stakeholders.

Statement 7– Budget, schedule and quality of the project are clearly defined in the project scope.

Table 4.8: Response to Define Scope

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	29	51.8%	24	42.9%	2	3.6%	1	1.8%	0	0.0%	56	4.4464	0.658
Statement 2	5	8.9%	19	33.9%	3	5.4%	25	44.6%	4	7.1%	56	2.9286	1.203
Statement 3	9	16.1%	28	50.0%	6	10.7%	13	23.2%	0	0.0%	56	3.5893	1.022
Statement 4	12	21.4%	28	50.0%	5	8.9%	11	19.6%	0	0.0%	56	3.7321	1.017

Statement 5	10	17.9%	26	46.4%	3	5.4%	17	30.4%	0	0.0%	56	3.5179	1.111
Statement 6	18	32.1%	33	58.9%	2	3.6%	3	5.4%	0	0.0%	56	4.1786	0.741
Statement 7	24	42.9%	31	55.4%	1	1.8%	0	0.0%	0	0.0%	56	4.4107	0.531
Aggregate Mean Score											3.83		

Source: Survey Result, 2022

With an aggregate mean of 3.83, though lower than the previous two, still indicates that the majority of the respondents agreed with the statements presented under the topic. The lower mean values of 2.9286, 3.5893, 3.7321 and 3.5179 were recorded respectively, expressing a higher margin of disagreements with statement 2, statement 3, statement 4 and statement 5. For the rest of the statements, the majority of the respondents said they either agreed or strongly agreed.

As indicated above, the study raised seven statements to assess the define scope process of Walia Technologies in its IT projects. As can be observed from the above table, for statement 1, statement 6 and statement 7; with means of 4.446, 4.179 and 4.411, the majority of the respondents gave a favorable answer with 95%, 91% and 98% of the respondents indicating they either agree or strongly agree with statements 1, 6 and 7 respectively.

Conversely, for statement 2, statement 3, statement 4 and statement 5; a higher margin of the respondents gave not favorable answers with 52%, 23%, 20% and 30% of the respondents indicating they either disagree or strongly disagree with statements 2, 3, 4 and 5 respectively. It was also pointed out that assumptions made by Walia Technologies based on information provided by client organizations about existing resources that are critical to the project and the client organizations already have are not always carefully analyzed. Because these resources are so important during project execution, if Walia Technologies' assumptions regarding the client organization's resources and their state of readiness differ from reality, there will be additional delays and complications.

Moreover, according to study participants, there may exist communication gap with project team members and even with the client and relevant stakeholders about the project's scope management tasks. It was also pointed out by some study participants that there was no involvement of individuals or groups with specialized knowledge, skill, experience and training in defining the projects scope in the projects they were involved in.

4.3.4. Create Work Breakdown Structure

Create work breakdown structure is the process of hierarchically decomposing the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables. The key benefit of this process is that it provides a structured vision of what has to be delivered. The study provided the following four statements to respondents and asked them to show to what extent they agreed with the statements.

Statement 1 - A scope baseline which is the approved version of the project scope statement and work breakdown structure is developed for the project.

Statement 2 - A hierarchical decomposition of the total scope of work that provides detailed activities & scheduling information about each component of work to be carried out by the project team to create the project’s required deliverables is developed.

Statement 3 - The organizations policies and procedures, project files and lessons learned from previous projects are taken into consideration when developing the projects work breakdown structure.

Statement 4 - Due attention is given to activity duration, activity sequencing and cost estimation when developing the project’s work breakdown structure.

Table 4.9: Response to Create Work Breakdown Structure

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	19	33.9%	36	64.3%	1	1.8%	0	0.0%	0	0.0%	56	4.3214	0.50837
Statement 2	25	44.6%	29	51.8%	2	3.6%	0	0.0%	0	0.0%	56	4.4107	0.56494
Statement 3	28	50.0%	27	48.2%	1	1.8%	0	0.0%	0	0.0%	56	4.4821	0.53906
Statement 4	11	19.6%	24	42.9%	5	8.9%	16	28.6%	0	0.0%	56	3.5357	1.11133
Aggregate Mean Score											4.19		

Source: Survey Result, 2022

With an aggregate mean of 4.19, it can be observed that the majority of the respondents agreed with the statements presented under the topic. The lower mean value of 3.5357 was recorded conveying a higher margin of disagreement with statement 4. For the rest of the statements, the majority of the respondents said they either agreed or strongly agreed.

As indicated in the above, the study raised four statements to assess the create work breakdown structure process of Walia Technologies in its IT projects. As can be observed

from the above table, the majority of the respondents either agreed or strongly agreed with the first three statements, scoring a mean of 4.321, 4.411 and 4.482 and having a combined percentages of 98%, 96% and 98% for statements 1, 2 and 3 respectively.

For statement 4, 29% of the respondents disagreed with the statement. It was pointed by study participants that in some cases, due attention is not paid to activity duration and activity sequencing, and that there is no proper assignment of work packages, with some project team members being assigned large amounts of work to complete in a short period of time. In fact, some project team members may be working on more than one project at a given time, aggravating the problem. Another issue raised here is that, due to the repetitious nature of some of the project's work packages, some project team members may exhibit reduced work morale and commitment, negatively impacting the project's timeliness.

4.3.5. Validate and Control Scope

Validate scope is the process of formalizing acceptance of the completed project deliverables. On the other hand, control scope is the process of monitoring the status of the projects scope and managing changes to the scope baseline. The study provided the following six statements to respondents and asked them to show to what extent they agreed with the statements.

Statement 1 - Project deliverables that meet the acceptance criteria are formally signed off by the client.

Statement 2 - There are clear agreements with the client on how to verify activities and project deliverables with the project scope statement on a regular basis.

Statement 3 - There exists a continuous process of reviews and communication with the client to ensure both are up to date concerning the state of the project.

Statement 4 - Inspection activities such as measuring, examining and validating are done to determine whether work and deliverables meet requirements and project acceptance criteria.

Statement 5 - Work performance information is established that correlates and contextualizes information on how the project scope performed compared to the scope baseline.

Statement 6 - Formal documentation received from the client acknowledging formal stakeholder acceptance of the project's deliverables is forwarded to the Close Project.

Table 4.10: Response to Validate and Control Scope

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	16	28.6%	38	67.9%	2	3.6%	0	0.0%	0	0.0%	56	4.2500	0.51346
Statement 2	14	25.0%	32	57.1%	7	12.5%	3	5.4%	0	0.0%	56	4.0179	0.77439
Statement 3	7	12.5%	17	30.4%	11	19.6%	21	37.5%	0	0.0%	56	3.1786	1.08052
Statement 4	23	41.1%	29	51.8%	4	7.1%	0	0.0%	0	0.0%	56	4.3393	0.61131
Statement 5	10	17.9%	32	57.1%	11	19.6%	3	5.4%	0	0.0%	56	3.8750	0.76426
Statement 6	21	37.5%	33	58.9%	2	3.6%	0	0.0%	0	0.0%	56	4.3393	0.54861
Aggregate Mean Score											3.95		

Source: Survey Result, 2022

With an aggregate mean of 3.95, though lower than some of the other results, still indicates that the majority of the respondents agreed with the statements presented under the topic. The lower mean value of 3.1786 was recorded expressing a higher margin of disagreement with statement 3. For the rest of the statements, the majority of the respondents said they either agreed or strongly agreed.

As indicated in the above, the study raised six statements to assess the validate scope and control scope processes of Walia Technologies in its IT projects. As can be observed from the above table, the majority of the respondents either agreed or strongly agreed with the all statements except statement 3, scoring a mean of 4.25, 4.018, 4.339, 3.875 and 4.339 and having combined percentages of 96%, 82%, 93%, 75% and 96% agreeing or strongly agreeing for statements 1, 2, 4, 5 and 6 respectively.

For statement 3, while 20% of the respondents stayed neutral, almost 38% of the respondents disagreed with the statement. It was pointed by study participants that there might exist a communication gap between the client and Walia Technologies. The client organization might not have a clear idea about the state of the project and in what condition project deliverables are.

Another issue that was raised was that though there are clear agreements with the client on how to verify activities and project deliverables, the reality on the ground may be different. An example given by study participants here was part of the project deliverables of a given project may be installing a cyber-security solution or deploying an exchange system on 500

computers. But during project implementation, it may be found out that out of the 500 computers, 30 of the computers are found to be defective and the cyber-security solution or exchange system cannot be installed. In projects this actually happened in, though the client representatives are informed and asked either to procure new computers or take out the defective computers from the project's scope, any action from the client and its representatives is very slow, delaying the project's schedule.

Furthermore, given that most of Walia Technologies staff is women, in communication with client representatives, it was pointed out during interview sessions that client representatives don't take them seriously creating difficulties for the existence of a continuous process of reviews and communication with the client to ensure both are up to date concerning the state of the project. Another factor that might exacerbate this issue is that, when Walia Technologies uses its foreign staff in projects, additional communication problems are created because of language barriers, difference in work cultures and communicating parties working in different time zones.

4.4. Scope Change Management Practices and Project Performance

Modification to the agreed upon scope is scope change. It is considered as inherent in the nature of projects because of their complexity and the inevitable appearance of unforeseen problems. The first thing that happens after the change of the scope of a project is a reaction from the project manager who may manage this scope change event in different ways. A correlation does exist between scope change management and project performance in the literature. For example Chick (1999) disclosed that the earlier a change occurs in a project, the lesser it affects the project's schedule hence its performance.

The study has attempted to assess Walia Technologies scope change management practices and its project performance by presenting the study participants with the following statements.

Statement 1 – There is a formal agreement with the client on how to handle scope changes.

Statement 2 – The client knows exactly what it wants/expects from the project from the start of the project.

Statement 3 – Before a scope change is made on the project, a request form is filled out.

Statement 4 – Changes in the scope of the project is always communicated with all stakeholders.

Statement 5 – Particular project team members are assigned for scope change management.

Statement 6 – There exists proper awareness among all the project’s stakeholders that a change in the project’s scope in turn results in changes in the projects quality, schedule, & cost.

Table 4.11: Response to Scope Change Management Practices

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	0	0.0%	15	26.8%	10	17.9%	22	39.3%	9	16.1%	56	2.5536	1.06035
Statement 2	7	12.5%	19	33.9%	8	14.3%	20	35.7%	2	3.6%	56	3.1607	1.15643
Statement 3	3	5.4%	10	17.9%	12	21.4%	21	37.5%	10	17.9%	56	2.5536	1.14288
Statement 4	18	32.1%	32	57.1%	6	10.7%	0	0.0%	0	0.0%	56	4.2143	0.62419
Statement 5	9	16.1%	14	25.0%	7	12.5%	21	37.5%	5	8.9%	56	3.0179	1.28617
Statement 6	21	37.5%	27	48.2%	6	10.7%	2	3.6%	0	0.0%	56	4.1964	0.77271
Aggregate Mean Score											3.43		

Source: Survey Result, 2022

With an aggregate mean of 3.43, the answers provided by respondents showed mixed results for the statements presented under the topic. The lower mean values of 2.5536, 3.1607, 2.5536 and 3.0179 were recorded respectively, indicating a higher margin of disagreements with statement 1, statement 2, statement 3, and statement 5. For the rest of the statements, the majority of the respondents said they either agreed or strongly agreed.

For statement 1, statement 2, statement 3 and statement 5; a higher margin of the respondents gave not favorable answers. For statement 1, while 55% of the respondents either disagreed or strongly disagreed with the statement, 18% of the respondents said neutral. For statement 2, while 39% of the respondents either disagreed or strongly disagreed with the statement, 14% of the respondents said neutral. For statement 3, while 55% of the respondents either disagreed or strongly disagreed with the statement, 21% of the respondents said neutral. For statement 5, while 46% of the respondents either disagreed or strongly disagreed with the statement, 13% of the respondents said neutral.

Conversely, for statement 4 and statement 6, the majority of the respondents answered favorably, scoring a mean of 4.214 and 4.196 and with 89% and 86% of the respondents either agreeing or strongly agreeing with statements 4 and 6 respectively.

With regards to assessing the performance of Walia Technologies IT projects, the study provided the following five statements to study participants.

Statement 1 – Project milestones and deliverables were achieved within deadlines.

Statement 2 – The project fulfilled the required specification and expected objectives of the project.

Statement 3 – The project was completed within the specified time.

Statement 4 – The project was completed within the specified budget.

Statement 5 – The project was completed based on the agreed up on scope.

Table 4.12: Response to Project Performance

	Strongly Agree (5)		Agree (4)		Neutral (3)		Disagree (2)		Strongly Disagree (1)		Total		
	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Fr	Pr	Frequency (Fr)	Mean	SD
Statement 1	0	0.0%	17	30.4%	10	17.9%	21	37.5%	8	14.3%	56	2.6429	1.06904
Statement 2	11	19.6%	31	55.4%	8	14.3%	6	10.7%	0	0.0%	56	3.8393	0.86921
Statement 3	0	0.0%	14	25.0%	5	8.9%	27	48.2%	10	17.9%	56	2.4107	1.05790
Statement 4	0	0.0%	18	32.1%	13	23.2%	22	39.3%	3	5.4%	56	2.8214	0.95550
Statement 5	8	14.3%	22	39.3%	11	19.6%	10	17.9%	5	8.9%	56	3.3214	1.19251
Aggregate Mean Score											3.01		

Source: Survey Result, 2022

With an aggregate mean of 3.01, the answers provided by respondents also showed mixed results for the statements presented under the topic. The lower mean values of 2.6429, 2.4107 and 2.8214 were recorded respectively, expressing a higher margin of disagreements with statement 1, statement 3, and statement 4. There was a higher degree of agreements for the rest of the statements.

For statement 2 and statement 5, the majority of the respondents either agreed or strongly agreed scoring a mean of 3.839 and 3.321, with a combined percentages of 75% and 54% agreeing or strongly agreeing, respectively. Contrariwise, for statement 1, statement 3 and statement 4, a higher margin of the respondents either disagreed or strongly disagreed, with combined percentages of 52%, 66% and 45% respectively for statements 1, 3 and 4.

4.5. Challenges of the Project Team in Managing Scope

One of the most common causes of project failure is poor project scope management. Like in any other professions, there are challenges encountered during the implementation of scope management. As shown below, the study presented four key challenges the project team might face in managing the projects scope.

Table 4.13: Response to Challenges faced by the Project Team in managing Scope

	Frequency	Percentage
Unclear Project Goals	9	7.6%
Lack of proper communication	38	31.9%
Lack of proper tools and techniques	18	15.1%
Managing scope change	54	45.4%
Total	119	

Source: Survey Result, 2022 (Note- respondents were asked to mark all that apply)

As can be observed from the above table, among the four key challenges faced by the project team in managing scope presented to the study respondents, managing scope changes was listed as the primary challenge the project team faces when managing scope with a percentage of 45%. Following managing scope change, lack of proper communication was listed with a percentage of 32%. Lack of proper tools and techniques came in third with 15% and unclear project goals fourth with 8%.

It was further elucidated that managing scope changes is the most challenging task. Because of Walia Technologies IT projects in their nature being complex and big in size; it is difficult to define every requirement at the beginning and to anticipate every feature that may be needed or desired. Thus, there may be changes in scope at the middle of the projects and managing those changes will be a major challenge for the project tem. Furthermore, changing direction and focus to meet the change requests and to complete the project within planned schedule, cost and quality adversely impacts project team morale.

With regards to communication, as indicated earlier as the majority of Walia Technologies staff are women, it was pointed out that a communication gap is created as client representatives don't take them seriously. Furthermore, the communication gap is further exacerbated when Walia Technologies foreign staffs are involved because of language

barriers, difference in work cultures and communicating parties working in different time zones. Another reason put forth by study participants that aggravates the communication problem is the country’s unreliable internet connection, especially when the project is taking place in a geographic area outside of Addis Ababa.

Study respondents were also asked what they consider to be the major faults of the project team in managing scope are.

Table 4.14: Response to Major Faults of the Project Team in managing Scope

	Frequency	Percentage
Lack of project management skill	23	17.0%
Absence of proper definition of client requirements	41	30.4%
Poor Communication	48	35.6%
Low Commitment	15	11.1%
No proper use of tools and techniques	8	5.9%
Total	135	

Source: Survey Result, 2022 (Note- respondents were asked to mark all that apply)

As can be observed from the above table, poor communication was listed first as a major fault of the project team in managing scope, recording a percentage of 36%, with absence of proper definition of client requirements coming in second, recording a percentage of 30%. Lack of project management skill came in third with 17%, while low commitment and no proper use of tools and techniques were last, with 11% and 6% respectively.

4.6. Scope Change

As discussed earlier, modification to the agreed upon scope of a project is scope change. The study attempted to ascertain if the study participants experienced a scope change in the projects they were involved in.

Table 4.15: Response to Experience of Scope Change

	Frequency	Percentage
Yes	53	94.6%
No	3	5.4%
Total	56	

Source: Survey Result, 2022

According to the results, while 95% of the respondents said that they have experienced scope changes in the projects they were involved in, only 5% said no. The study also attempted to

establish what the sources of the scope change were. As pointed out earlier, because of Walia Technologies IT projects in their nature being complex and big in size; it is difficult to define every requirement at the beginning and to anticipate every feature that may be needed or desired. Thus, some form change in the projects scope is bound to happen. Another reason mentioned is that in some instances, assumptions made about the client’s existing resources that are integral to the project’s implementation and the reality on the ground may be different. In this case, either it causes projects delays or some form of change in scope to occur.

Table 4.16: Response to Sources of the Change in Scope

	Frequency	Percentage
Error in defining project scope	6	4.6%
Error in collection of requirements	22	16.8%
Value-adding change	38	29.0%
Implementing a contingency plan or work around	21	16.0%
Clients see the outcome and want change	44	33.6%
Total	131	

Source: Survey Result, 2022 (Note- respondents were asked to mark all that apply)

As can be observed from the above table, clients seeing the outcome and wanting changes to be made is the first reason put forth with a percentage of 34% followed by making a value-adding change with a percentage of 29%. Implementing a contingency plan or work around and error in collection of requirements both showed similar figures with 16% and 17% respectively. Error in defining project scope as a source of change in a projects scope came in last with 5%.

Study participants were also asked what the challenges were when managing scope change.

Table 4.17: Response to Challenges encountered when Managing Scope Change

	Frequency	Percentage
Lack of clearly defined scope change management practices	38	35.8%
Managing increased work in a short amount of time	45	42.5%
Reorganizing the project budget and schedule	19	17.9%
Project team members resistance to change	4	3.8%
Total	106	

Source: Survey Result, 2022 (Note- respondents were asked to mark all that apply)

Managing increased work in a short amount of time was listed as the primary challenge encountered when managing scope change with a percentage of 43%. It was followed by lack of clearly defined scope change management practices with 36% and reorganizing the project budget and schedule with 18%. Project team member's resistance to change as a challenge encountered when managing scope change came in last with 4%. It was further elaborated that in certain instances, some project tasks will be adjusted, and something new will be introduced, but the cost will remain the same. In this instance, the project team will have to factor in the additional work into the project's initial schedule and budget without being able to add resources because the budget has not changed.

Chapter Five - Summary, Conclusion and Recommendation

This chapter presents not only the summary of findings discussed in chapter four but concludes the study and provides recommendation to different stakeholders.

5.1. Summary and Conclusion

Project scope management plays a vital role for project success or failure, though the success of a project is also influenced by other factors. The study intended to assess the scope management practices of Walia Technologies in its IT projects and the project's performance. To this end, the study presented its participants with the six processes that constitute project scope management, according to project management institute's 'A Guide to the Project Management Body of Knowledge'.

In general, it can be observed from the results of the data analysis that Walia Technologies fairly accomplished the majority of the activities presented in the questionnaire with regards to the six processes of project scope management, i.e., plan scope management, collect requirements, define scope, create work breakdown structure, validate scope and control scope.

Plan scope management had an aggregate mean of 4.05, indicating respondents of the study in general agreed that tasks and activities associated with plan scope management process were carried out by Walia Technologies. But as shown by a having a higher margin of respondents disagreeing with some of the statements and further elaborated, in some of the projects study participants were involved in client and stakeholder involvement was absent during planning scope management and no persons or organizations with specialized knowledge, skill, experience, or training were involved.

Collect requirements had an aggregate mean of 4.01, also indicating respondents in general agreed that tasks and activities associated with collect requirements process were carried out by Walia Technologies. It was pointed out here by study participants that in the projects they were involved in, besides from the document provided by the client outlining its needs and

requirements for the project; tools such as interviews, surveys, and facilitated workshops were not employed by Walia Technologies in identifying and defining the features and functions of the desired project deliverables.

Define Scope had an aggregate mean of 3.83, although lower than the above two, still indicated respondents in general agreed that tasks and activities associated with define scope process were carried out by Walia Technologies. But as shown by a having a higher margin of respondents disagreeing with some of the statements and further discussed by study participants, in some of the projects study participants were involved in, there existed a communication gap within the project team and also with the client for tasks associated with scope management, and that there was no involvement of individuals or groups with specialized knowledge, skill, experience and training in defining the projects scope. Furthermore, Walia Technologies assumptions about the client organizations resources are not carefully analyzed. As these resources are critical during project implementation, when the assumptions made differ from the reality in the ground, delays and complications are created during project implementation.

Create work breakdown structure had an aggregate mean of 4.19, indicating respondents in general agreed that tasks and activities associated with create work breakdown structure process were carried out by Walia Technologies. It was also pointed out here by study participants that besides the shortage of manpower and shortage of employees with specialized knowledge the organization suffers from, due attention is not given to assignment of work packages, activity duration and activity sequencing in some projects.

Validate scope and Control scope processes had an aggregate mean of 3.95, although lower than some of the other results, still showed respondents in general agreed that tasks and activities associated with validate scope and control scope process were carried out by Walia Technologies. It was also pointed out here by study participants that a problem occurs for the existence of a continuous process of reviews and communication with the client to ensure both are up to date concerning the state of the project; as Walia Technologies employs foreign staff who face difficulties when communicating with client representatives because of language barriers, difference in work cultures and communicating parties working in different time zones. Also, given that the majority of Walia Technologies staff are women, the communication problem is exacerbated as client representatives don't take them seriously.

The study has also attempted assess Walia Technologies scope change management practices and the performance of its projects. With regards to scope change management practices, with an aggregate mean score of 3.43, the answers provided by the study's respondents showed mixed results for whether or not the tasks and activities associated with scope change management were carried out by Walia Technologies. It was also pointed out here by study participants that a formal agreement may not always exist with the client on how handle scope changes, a request form may not always be filled out when scope change is made on a project and specific project team members are not always assigned for scope change management.

Compared to Walia Technologies scope management practices, its scope change management practices appear to be weaker, as indicated by its scope change management practices having a lower aggregate mean score of 3.43 compared to the aggregate mean of the scope management practices.

It has been showed in the data analysis chapter that the majority of the respondents of the study said they had experienced some form of scope change in all of Walia Technologies projects. Considering that Walia Technologies IT projects in their nature being complex and big in size; thus being difficult to define every requirement at the beginning and to anticipate every feature that may be needed or desired; it isn't a surprise that some form of scope change ensues. Among the reasons given for the scope change by the study's participants, the majority rated clients seeing the outcome and wanting change as the primary reason, followed by value adding change.

With respect to challenges faced by the project team in managing scope, managing scope change was rated first closely followed by lack of proper communication. Walia Technologies communication problem is further worsened by lack of good communication lines between Walia Technologies local majority women staff and also its foreign staff with client representatives working on the projects.

For project performance, with an aggregate mean score of 3.01, the answers provided by the study's respondents also presented mixed results. It was also pointed out here by study participants that while Walia Technologies projects were completed based on either the original or amended scope agreed with the clients and the projects fulfilled the required specification and expected objectives of the projects; in most projects the project milestones

and deliverables were not achieved within deadlines, projects were not completed within the specified budget and time. The major reason put forth by study participants for this is scope changes, as they cause a loss of control and change of focus from the project team's planned work and negatively impact team morale.

It was pointed out in the study's literature that the two most common dimensions to assess a project's performance are time dimension and completion of the project within the budget. Based on the two parameters, it can be said that Walia Technologies projects performance level to be weak. This is further supported by study's finding both in the literature which pointed out that a project's scope management can make or ruin it and that in large and complex IT projects of Walia Technologies, some form of scope change is bound to happen as it is very difficult to define every requirement at the beginning and anticipate every feature that may be needed or desired; and from its findings from the collected data which showed some form of scope change to exist in all of the Walia Technologies projects and the fact that managing scope change being rated as the primary challenge faced by the project team in managing scope, adversely affecting project performance.

It should also be stressed here that Walia Technologies projects performance level was observed to be strong when other dimensions are used to assess a project's performance; such as achievement of project and organizational objectives, meeting of technical requirements, quality achievement and project attaining user satisfaction.

In general, the findings of the study indicate that Walia Technologies carries out the tasks and activities of project scope management's six processes as outlined by project management institute's 'A Guide to the Project Management Body of Knowledge' in a fairly good manner though there is still room for improvement and that its weaker application of scope change management tasks and activities have resulted in its projects performance level to be weak when the dimensions to assess a project's performance are time dimension and completion of the project within the budget.

5.2. Recommendation

The following recommendations were made based on the findings of the literature review and the findings of the data analysis to improve Walia Technologies' scope management practices.

- It is advised that Walia Technologies scope management practices be uniform across all its IT projects. If the same standards of scope management practices are applied across all projects, the performance of the projects will also be similar.
- There is a need for a better application of scope change management practices as it was observed from the collected data to be weaker, when compared to Walia Technologies scope management practices. Moreover, findings of the study show scope change to be the primary challenge faced by the project team in managing scope.
- An effective and efficient communication line and regular meetings should exist between Walia Technologies and its clients, so that the client is involved in from the development of the project's scope management plan in the beginning, to scope management tasks clearly being understood to all and to be up to date about the state of the project and about any changes that are to be made on the scope of the project.
- Expert judgment from an individual or group with specialized education, knowledge, skill, experience, or training should be employed to help in developing the scope management plan and in defining the scope of the project.
- Tools such as interviews, questionnaires & surveys, focus groups and facilitated workshops should be used in identifying and defining the features and functions of the desired project deliverables.
- There is a need for a careful assessment of assumptions that were made, constraints and risks that were identified by Walia Technologies about its clients the resources the clients have that are critical for the projects.
- To avoid higher workloads being placed upon project team members, greater attention need to be given to assignment of work packages, activity duration and activity sequencing. Furthermore, additional staff if possible with specialized knowledge or skill should be hired to avoid manpower shortages. Trainings should also be made available to Walia Technologies existing staff, so as to improve their knowledge and skill about project management.

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Annex – I Questionnaire

Questionnaire

Dear respondent, the purpose of this questionnaire is to gather data on the effect of project scope management on the performance of IT projects undertaken by Walia Technologies. I am conducting this study in partial fulfilment of my graduate degree in Masters of Project Management from Addis Ababa University School of commerce. The study is purely for academic reasons and the information you provide will be treated with confidentiality. Your genuine, frank and timely response is vital for success of the study. I kindly request you to respond to each items of the question very carefully.

If you have any query, please don't hesitate to contact me.

Thank you very much for your time and assistance.

Geleta Kelbessa Kera
Phone No. - +251-939-83-71-18
Email – geleta.23@gmail.com

Instructions

Please tick (X) against the right answer or briefly explain your answer where applicable. A Five point Likert type scale is used in the questionnaire. The scales have the following meaning.

1 = Strongly Disagree
2 = Disagree

3 = Neutral
4 = Agree

5 = Strongly Agree

Part I: Demographic Information of Respondent

1. Gender

Male	Female

2. In which age group do you belong?

Under 25	25-35	35-45	45-55	Above 55

3. Highest level of Education

Diploma	Degree	Graduate Degree (Masters)	Post Graduate (PHD)

If you have other certifications or have professional memberships, please specify _ _ _ _ _

4. How long have you worked within your organization?

Less than 1 year	1 - 3 years	3 - 5 years	5 - 10 years	More than 10 years

5. What is your position with in your Organization?

Walia Technologies	Project Manager	
	Network Engineer	
	Enterprise Engineer	
	Systems Engineer	
Client Organization	IT Personnel	
	Procurement Personnel	

If any other, please specify _ _ _ _ _

Part II: Project Scope Management Processes

The following set of statements relate to your outlook about the scope management practices of Walia Technologies when undertaking IT projects. Please carefully read and show to what extent you agree with the statements by marking an (X) sign.

1	Plan Scope Management	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
1.1	A clear scope management plan is developed for the project describing how the project's scope will be defined, developed, monitored, controlled, and verified.					
1.2	The project manager, the client, selected project team members and other stakeholders are all actively involved in the development of the project's scope management plan.					

1.3	Expert judgment from an individual or group with specialized education, knowledge, skill, experience, or training is used in developing the scope management plan.					
1.4	Factors such as organization's culture, existing infrastructure, personnel administration, & marketplace conditions are given due attention when developing the project's scope management plan.					

If your project team has faced difficulties with the above tasks and activities, please specify

2	Collect Requirements	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
2.1	The client's needs & expectations for the project are carefully collected & in turn quantified and documented by the project team.					
2.2	The client's requirements are elicited, analysed and recorded in enough detail by the project team to be included in the project's scope baseline and to be measured once project execution begins.					
2.3	A plan is developed to guide how these requirements are to be managed over all the phases of the project.					
2.4	Tools such as interviews, questionnaires & surveys, focus groups and facilitated workshops are used in identifying and defining the features and functions of the desired project deliverables.					

If your project team has faced difficulties with the above tasks and activities, please specify

3	Define Scope	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
3.1	An in depth description of the project is developed through the project scope statement relating in detail the project's major deliverables and the work required to create them.					
3.2	Existing assumptions, constraints and risks are carefully analysed when developing the project's scope.					

3.3	Expertise provided by any group or individual with specialized knowledge or training is given due consideration in defining the scope of the project.					
3.4	Tools such as meetings and facilitated workshops are employed to participate key stakeholders, so as to reach cross-functional and common understanding of the project objectives and its limits.					
3.5	Scope management tasks associated with the project's scope are well documented and were made accessible to all members of the project team, client and other relevant stakeholders.					
3.6	The developed project scope statement provides a common understanding of the project scope among all project stakeholders.					
3.7	Budget, schedule and quality of the project are clearly defined in the project scope.					

If your project team has faced difficulties with the above tasks and activities, please specify

4	Create Work Breakdown Structure	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
4.1	A scope baseline which is the approved version of the project scope statement and work breakdown structure is developed for the project.					
4.2	A hierarchical decomposition of the total scope of work that provides detailed activities & scheduling information about each component of work to be carried out by the project team is developed.					
4.3	The organizations policies and procedures, project files and lessons learned from previous projects are taken into consideration when developing the projects work breakdown structure.					
4.4	Due attention is given to activity duration, activity sequencing and cost estimation when developing the project's work breakdown structure.					

If your project team has faced difficulties with the above tasks and activities, please specify

5	Validate and Control Scope	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
5.1	Project deliverables that meet the acceptance criteria are formally signed off by the client.					
5.2	There are clear agreements with the client on how to verify activities and project deliverables with the project scope statement on a regular basis.					
5.3	There exists a continuous process of reviews and communication with the client to ensure both are up to date concerning the state of the project.					
5.4	Inspection activities such as measuring, examining and validating are done to determine whether work and deliverables meet requirements and project acceptance criteria.					
5.5	Work performance information is established that correlates and contextualizes information on how the project scope performed compared to the scope baseline.					
5.6	Formal documentation received from the client acknowledging formal stakeholder acceptance of the project's deliverables is forwarded to the Close Project.					

If your project team has faced difficulties with the above tasks and activities, please specify

Part III: Scope Change Management Practices and Project Performance

The following set of statements relate to your outlook about the scope change management practices of Walia Technologies and the performance of the IT projects. Please carefully read and show to what extent you agree with the statements by marking an (X) sign.

1	Scope Change Management Practices	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
1.1	There is a formal agreement with the client on how to handle scope changes.					
1.2	The client knows exactly what it wants/expects from the project from the start of the project.					
1.3	Before a scope change is made on the project, a request form is filled out.					
1.4	Changes in the scope of the project is always communicated with all stakeholders.					
1.5	Particular project team members are assigned for scope change management.					

1.6	There exists proper awareness among all the project's stakeholders that a change in the project's scope in turn results in changes in the projects quality, schedule, & cost.					
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If your project team has faced difficulties with the above tasks and activities, please specify

2	Project Performance	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
2.1	Project milestones and deliverables were achieved within deadlines.					
2.2	The project fulfilled the required specification and expected objectives of the project.					
2.3	The project was completed within the specified time.					
2.4	The project was completed within the specified budget.					
2.5	The project was completed based on the agreed up on scope.					

If your project team has faced difficulties with the above tasks and activities, please specify

3. What are the major challenges faced by the project team in managing scope?
(Mark all that apply)

Unclear Project Goals	Lack of Proper Communication	Lack of proper tools and techniques	Managing scope change

If any other, please specify -----

 4. What do you consider the major faults of the project team in managing scope? (Mark all that apply)

Lack of project management skill	Absence of proper definition of client requirements	Poor communication	Low commitment	No proper use of tools and techniques

If any other, please specify -----

6. Did you experience a scope change in the projects you were involved in?

Yes	No

6. What were the sources of the change in scope in the projects you were involved in? (Mark all that apply)

Error in defining project scope	Error in collection of requirements	Value-adding change	Implementing a contingency plan or work around	Clients see the outcome and want change

If any other, please specify -----

7. What were the challenges encountered when managing scope change?

Lack of clearly defined scope change management practices	Managing increased work in a short amount of time	Reorganizing the project budget and schedule	Project team members resistance of change

If any other, please specify _____

Thank you very much for your time and assistance.