FACTORS AFFECTING PROJECT MANAGEMENT SUCCESS: THE CASE OF SELECTED BUILDING CONSTRUCTION IN ADDIS ABABA

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ABBREVIATIONS/ ACRONYMS

ANOVA	Analysis of Variance
CPOF	Complexity Profile and Organizational Factors
CSFs	Critical Success Factors
F	Frequency
MIS	Information Management Systems
NPM	New Public Management
OP	Organizational Performance
PMC	Manager Competence
PMT	Project Management Triangle
PRM	Project Risk Management
PTC	Project Team Competence
RM	Requirements Management
Sta. De	Standard Deviation
SPSS	Statistical Program for Social Science
VIF	Variance Inflation Factor

ABSTRACT

The main objective of the research was to asses factors affecting project management success the case of selected building construction in Addis Ababa. Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management were independent variables in the study. The association between factors affecting project management success was examined using both Explanatory and descriptive study methodologies. In this study, qualitative and quantitative research design was employed. 150 questionnaires distributed and 147 were correctly completed and returned, and a stratified random sampling strategy was used in the research for purposeful and random sampling strategy. A structured questionnaire with a five-point Likert scale rating system was also employed. Using SPSS version 26.0, the acquired data were condensed and subjected to descriptive and inferential statistical analysis. The main finding of the study was *a narrow focus on traditional constraints, inadequate organizational structures, imbalanced competency development, weak risk management, lack of team competence, poor requirements management, insufficient stakeholder engagement, outdated tools, neglect of cultural and environmental factors, and lack of continuous improvement. The researcher recommends broadening focus beyond the Project Management Triangle, enhancing organizational structure and complexity management, balancing competency development, strengthening risk management practices, investing in team competence, effective requirements management, stakeholder engagement, adopting modern project management tools, considering cultural and environmental factors, and fostering continuous improvement. Further research should explore the effect of local regulations, cultural influences, technological adoption, and sustainability and environmental considerations on project success. These recommendations aim to develop targeted strategies to enhance project performance and outcomes.*

Key words: project management success, building construction, independent variables and Project Management

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The construction industry is a critical engine for the national economy, serving as a fundamental pillar for economic stability and growth. It significantly influences the expansion of various economic sectors (Khlaifat et al., 2019) and forms the basis of national development through construction and infrastructure projects (Hajiani et al., 2018). The sector not only aids in economic growth but also creates numerous job opportunities (Musarat et al., 2020). Its importance is reflected in three main areas: serving the nation, offering substantial investment opportunities, and generating both direct and indirect employment (Amoa-Abban & Allotey, 2014).

The success of construction projects is typically measured through three primary metrics: time, cost, and quality, collectively known as the "iron triangle." These metrics remain the standard for assessing project success despite ongoing critiques (Papke-Shields et al., 2010). However, despite consistent efforts by both developed and developing nations to enhance project success rates, many projects still face a myriad of challenges (Chan et al., 2004). These challenges vary across nations, influenced by distinct social, political, and economic climates.

Identifying success factors tailored to local environments is essential for implementing effective processes. Challenges in project management, particularly in the public sector, often arise from an inability to assess efficiency and effectiveness and to identify critical success factors (CSFs) throughout project stages (Takim et al., 2004). The definition of success variables varies significantly across studies due to their context-specific nature (Nguyen & Ogunlana, 2004; Ogunlana, 2008). Additionally, Yong and Mustaffa (2017) emphasized the lack of contextual adaptation in findings related to organizational structure, culture, and maturity.

The local construction industry in Ethiopia faces several performance constraints, including a weak economy, outdated technologies, corruption, and insufficient local contractor capacity (MUDC, 2012). Research indicates that a significant portion of construction work is conducted informally with rudimentary processes, contributing to low project maturity among contractors (Abadir, 2011).

Although success variables are generally understood, their impact can differ between public and private projects (Roshani et al., 2018). A construction project comprises various operations influenced by environmental changes (Naderpour et al., 2018). Success factors are elements identified as influencing project outcomes (Han et al., 2012). Critical success criteria can be categorized into four dimensions: adherence to design goals, user benefits, organizational gains, and benefits to national technological infrastructure (Sadeh et al., 2000).

Success criteria are divided into two main categories: hard success criteria, which are quantifiable and objective, and soft success criteria, which are less tangible and subjective (Chan et al., 2004; Silva et al., 2016). It is vital to distinguish between project success criteria and success factors, with the former serving as benchmarks for project evaluation (Cooke Davies, 2002).

Despite prevailing challenges, Ethiopia's construction sector remains a key driver of economic growth, with an annual growth rate of 37%, contributing to GDP growth from 4.3% in 1993 E.C. to 5.8% by 2002 E.C. (ITE, 2018).

A review of existing literature reveals a significant research gap concerning project complexities and their dynamic interactions within the construction industry, particularly in developing regions. Most studies focus on static factors cost, time, and quality while neglecting the interplay of various organizational, cultural, and contextual elements influencing these factors throughout the project lifecycle. Furthermore, the qualitative dimensions of stakeholder satisfaction and team dynamics, crucial for project success, remain underexplored. This highlights the need for more comprehensive frameworks that incorporate both quantitative and qualitative aspects of project management to enhance project performance in complex environments.

To address the knowledge gap regarding local sector dynamics, this study aims to examine the determinants of project management success in selected building construction projects in Addis Ababa. The general objective of the research was to analyze the factors affecting project management success in this specific context.

1.2. Statement of the Problem

The construction industry is inherently dynamic, characterized by increasing levels of uncertainty in development processes, budgets, and technology. Projects are often subject to various uncertainties, including changes in participants, shifts in work styles, fluctuating

resource availability, and unpredictable environmental factors. Within this complex landscape, certain factors exert a more significant influence on project success than others.

Despite numerous studies identifying success variables in project management, there remains a lack of consensus on these factors, largely influenced by sectorial, cultural, and regional differences (Montequin et al., 2016). Jorge & Mário (2016) further emphasize that success criteria encompass multi-dimensional variables, which include not only project outcomes but also aspects related to customer satisfaction and the owner's organization.

Research focusing specifically on the factors contributing to project management success in construction is scarce. Most existing literature tends to address the challenges faced by construction projects. For example, Al-Momani (2000) identified delays as a prevalent issue, attributing them to factors such as designer changes, weather conditions, and economic fluctuations. Odeh and Battaineh (2002) noted that ineffective contractor skills, financing issues, and poor decision-making also significantly contribute to cost overruns and delays.

Ethiopia's construction sector, like many in developing countries, faces numerous challenges. Tadesse (2016) points to a lack of comprehensive engineering and management practices, insufficient planning, and inconsistent monitoring as primary reasons for project failures. MUDC (2012) highlights additional constraints, including a weak economy, outdated technologies, corruption, and inadequate capacities among local contractors and consultants. Abadir (2011) noted that much of the work is conducted informally, leading to low project maturity among Ethiopian contractors.

Despite the extensive body of research, Els et al. (2012) found no conclusive agreement regarding the variables contributing to project success. Clarke (1999) argued that managing all success components simultaneously is challenging, suggesting that focusing on key factors could enhance project success, in line with Pareto's principle. They categorized these factors into four main areas: contractual and technical, process, organization, and human management.

Mamaru et al. (2017) conducted a recent study in Ethiopia, emphasizing the need for project managers to gain a deeper understanding of major success factors to improve project management practices. They identified essential elements that contribute to achieving and maintaining successful outcomes, suggesting that success factors be explored across various

domains such as processes, organizational competencies, and technology. Their research yielded 73 criteria ranked as important for managing construction projects.

However, much of the existing research is sector-specific, focusing on areas like housing or real estate, or targeting higher-grade contractors. For instance, studies by Addis (2014) on construction risk management and Melat (2017) on real estate development highlight specific challenges but do not provide a comprehensive view of success determinants across different project types.

Despite extensive literature on challenges in construction project management, significant gaps remain in understanding the unique determinants of project management success in Ethiopia. Key issues include a lack of comprehensive frameworks that integrate various success factors, insufficient exploration of local cultural and economic contexts, underrepresentation of stakeholder perspectives, limited empirical evidence relevant to Ethiopian conditions, and a predominant focus on challenges rather than success factors. This study aims to address these gaps by examining the determinants of project management success in selected building construction projects in Addis Ababa, providing insights into effective practices tailored to the local context through a thorough analysis of quantitative factors.

1.3. Objective of the Study

1.3.1. General objective

The general objective of the research was to analyze factors affecting project management success the case of selected building construction in Addis Ababa.

1.3.2. Specific objectives

This research was intended to address the following specific objectives.

1) To evaluate the effect of the Project Management Triangle on the success of project management in selected building construction projects in Addis Ababa.
2) To assess how organizational factors influence the success of project management in selected building construction projects in Addis Ababa.
3) To identify the effect of project manager competence on the success of project management in selected building construction projects in Addis Ababa.
4) To analyze the significance of project risk management practices on the success of project management in selected building construction projects in Addis Ababa.

5) To investigate the influence of project team competence on the success of project management in selected building construction projects in Addis Ababa.
6) To examine the effect of requirements management on the success of project management in selected building construction projects in Addis Ababa.

1.4. Research Hypotheses

According to Kothari (2004), a research hypothesis is a prediction that can be tested using scientific procedures and that links independent factors to a dependent variable. It was a claim regarding how the independent and dependent variables under study relate to one another.

H_1: Project Management Triangle has a significant effect on project management success in selected building construction in Addis Ababa**.**

H_2: Organizational Factors has a significant effect on project management success in selected building construction in Addis Ababa.

H_3: Project Manager Competence has a significant effect on project management success in selected building construction in Addis Ababa.

H_4: Project Risk Management has a significant effect on project management success in selected building construction in Addis Ababa.

H_5: Project Team Competence has a significant effect on project management success in selected building construction in Addis Ababa**.**

H_6: Requirements Management has a significant effect on project management success in selected building construction in Addis Ababa

1.5. Significance of the Study

Since labor, cost, material, time, and other resources are all connected in construction projects, it can be challenging to identify the specific components that would affect project management success in the context of a particular building project.

By effectively controlling the aspects that will contribute to a construction project's successful completion, this research assists professionals in the construction industry in increasing project completion success. When using the study's conclusions to carry out building projects, architects, engineers, quantity surveyors, construction managers, and project managers stand to gain (profit from) the research. Furthermore, the results of this study may also be helpful to project developers and clients, enabling them to complete their construction projects more successfully. This is so they may utilize the study's results to

make sure the things that could prevent their projects from being completed effectively are minimized.

This study looks at the success elements and establishes which one is more important for a project's successful conclusion. This will provide construction industry groups with the basis upon which these plans might be built in the future. Therefore, the purpose of this study is to produce scientific data that might aid in the decision-making process of policy makers in order to enhance the efficiency of the building construction industry within the municipal administration.

Furthermore, by understanding the issues raised by the project's findings, project managers may find it easier to make decisions. The research will also benefit academia and be useful as a reference for future studies. Lastly, the thesis will provide guidelines for the formulation and evaluation of project success.

1.6. Scope of the Research

Geographical Scope the research focuses on building construction projects located in Addis Ababa, Ethiopia. This geographical focus allows for an in-depth examination of the specific factors affecting project management success within the context of the local construction industry.

Justification for the Conceptual Scope: to justify the selection of variables for this research on project management success, the researcher provides a rationale that addresses their relevance and importance in the context of the study.

Project Management Triangle (PMT)**:** The PMT is a foundational concept in project management that emphasizes the interdependencies between scope, time, and cost. Understanding how these traditional constraints influence project outcomes is essential for identifying areas where projects may struggle or succeed. This variable serves as a baseline for evaluating the effectiveness of project management practices.

Complexity Profile and Organizational Factors (CPOF)**:** In the modern construction environment, organizational complexity plays a significant role in project success. By assessing how organizational structure, culture, and complexity impact project delivery, this variable helps to uncover the nuanced relationships that affect project performance, especially in developing regions.

Project Manager Competence (PMC)**:** The skills and competencies of project managers are critical for navigating challenges and leading teams effectively. Evaluating PMC allows for an exploration of how managerial expertise relates to project outcomes, emphasizing the need for continuous professional development in project management.

Project Risk Management (PRM)**:** Effective risk management practices are vital for anticipating and mitigating potential project issues. Analyzing PRM provides insights into how proactive risk strategies contribute to project stability and success, making it a crucial factor in understanding project dynamics.

Project Team Competence (PTC)**:** The success of projects often hinges on the collaboration and skills of the project team. Investigating PTC highlights the importance of teamwork, communication, and shared expertise, which are essential for achieving project goals and delivering quality results.

Requirements Management (RM)**:** Clear and well-managed project requirements are fundamental to project success. Understanding RM helps identify how ambiguity or mismanagement of requirements can lead to project failures, emphasizing the role of stakeholder involvement and clarity in project objectives.

The selection of these variables is grounded in both theoretical frameworks and practical relevance to project management in the construction industry. By exploring these factors, the study aims to develop a comprehensive understanding of the dynamics that contribute to project success, particularly in the context of building construction projects in Addis Ababa. This scope not only addresses existing gaps in the literature but also provides actionable insights for practitioners seeking to enhance project outcomes.

Methodological Scope: The study employed quantitative research designs, utilizing Structured Questionnaires**:** Distributed to 150 participants, with 147 correctly completed and returned. The questionnaire uses a five-point Likert scale rating system. A stratified random sampling strategy was used to ensure a representative sample of the population. The collected data were analyzed using SPSS version 26.0, employing both descriptive and inferential statistical techniques to interpret the findings.

This comprehensive approach ensures a robust analysis of the factors affecting project management success in building construction projects in Addis Ababa.

1.7. Limitation of the study

The study's findings on project management success in Addis Ababa may be limited due to several factors. These include the sample size, data collection methods, scope of variables, temporal constraints, geographical focus, external factors like economic conditions, political stability, and regulatory changes, subjective responses from participants, rapid technological advancements in construction methods and tools, and cultural differences in project management practices and organizational behavior. These factors could affect the generalizability of the findings to other projects or regions, as well as the accuracy and reliability of the data collected. Additionally, the study's focus on building construction projects in Addis Ababa may not capture long-term trends or changes in the construction industry. Furthermore, the study's findings may become outdated quickly as new technologies emerge.

1.8. Definition of the Terms

- **Construction Industry:** The construction industry comprises businesses and experts engaged in the organizing, creating, erecting, and preserving of tangible structures and infrastructure. Civil engineering, commercial, industrial, and residential projects are all included in this.
- **Construction Project Success:** In construction projects, this refers to the accomplishment of project goals within the predetermined constraints of time, money, quality, and stakeholder satisfaction. Success can also include following safety guidelines, following the law, and taking sustainability into account.
- **Construction Sector Challenges:** These are the challenges, problems, or barriers that the construction sector must deal with. They include labor shortages, economic and regulatory limits, technical improvements, and environmental concerns.
- **Contractor Evaluation:** This entails evaluating the talents, performance, and compliance of contractors with project specifications. It could entail assessing their general appropriateness for certain construction projects as well as their technical know-how, financial soundness, and project management techniques.
- **Success Factors:** These are certain components, circumstances, or factors that must exist in order for a project to be completed successfully. Success criteria are the primary

predictors of project success in the construction business, especially for middle-level contractors, according to the study's setting.

- **Infrastructure Development:** In order to support economic and social activity, physical and organizational structures must be planned, designed, built, and maintained. Transportation networks, utilities, structures, and other necessary amenities are all included in infrastructure development.
- **Project Management Maturity:** This speaks to the degree to which a company's project management capabilities, techniques, and procedures have evolved and improved. It includes the organization's capacity to oversee projects in an efficient and reliable manner, enhance project results, and adjust when project management requirements change.
- **Project Management:** In order to fulfill project requirements, project management entails applying knowledge, skills, tools, and strategies to project operations. Planning, arranging, obtaining, and overseeing resources to meet project objectives are all included.

1.9. Organizations of the Paper

This paper was organized with five chapters; from those the first chapter contains introduction of which comprises: back ground of the study; statement of the problem; aims of the study; importance of the study; scope of the study ,limitations of the study ,definition of terms and organization of the study. The second chapter provides theoretical background regarding factors affecting project management success in building construction, literature of project management success and relevant issues in the views of different authors. In this component important exploration with regard of various literatures will do. The third chapter focused on research Design which includes: research approach; research methods; sample design; sources of data and the like. The fourth chapter presents the analysis and result of the study that has been arrived using descriptive and inferential statistical tools. The last chapter had present summary, conclusion, and recommendation of the study

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Review of Theoretical Literature

2.1.1. Definition of Project

A project might be defined differently by several project management specialists. For this research, nevertheless, I've been particularly interested in the definition of projects given by the Project Management Institute Guide of PMBOK. The Association for Project Management (2012) defines a project as a brief activity carried out to provide a special good, service, or result. Deliverables are the means by which projects are carried out to meet objectives. An aim may be defined as a desired outcome, a stance to be taken strategically, a goal to be achieved, a result to be obtained, a product to be produced, or a service to be provided.

Although projects are short-lived, their outputs could still be in use after they conclude. Deliverables from projects may have social, economic, material, or environmental implications. "A project is a time and cost constrained operation to realize a set of defined deliverables up to quality standards and requirements," according to the International Project Management Association.(Association for International Project Management, 2006).

A project is an individual, temporary undertaking that is started with the intention of achieving predetermined goals, which might be outputs, results, or advantages. (Project Management Association, 2012.) A project is an undertaking in which material, financial, and human resources are arranged in a novel way to take on a certain scope of work, under budgetary and schedule restrictions, with the goal of achieving positive change as defined by both quantitative and qualitative objectives Turner Rodney (1999).

Any activity with specific end goals that embody predetermined ideals in order to fulfill a need or desire is considered a project. Time, money, and resource constraints, including those on personnel, expertise, tools, and supplies, are typically its defining characteristics. A project is a collection of roughly distinct and well-defined tasks. Its goal is obvious, and it ends where it should. A project may be a component of a larger program, but its primary focus is on selecting a tidy work package from a confusing range of goals, options, and tasks (Vijay V., 1995).

2.1.2. Definition of Project Management

Project management is the process of applying knowledge, abilities, resources, and protocols to project activities in order to meet project objectives. The execution and integration of the project

management procedures that have been specified for the project constitute project management. Project management is a tool that organizations may utilize to carry out tasks more successfully and quickly. Effective project management may help people, teams, and public and commercial organizations accomplish the following objectives: Fulfill stakeholder expectations, reach corporate goals, become more dependable, and raise the likelihood of success; Provide the appropriate goods at the appropriate time; Address concerns and difficulties; Take prompt action in response to hazards; Determine, revive, or discontinue underperforming projects; maximize the use of organizational resources Control limitations (e.g., resources, money, schedule, scope, and quality); Better manage change and weigh the effects of constraints on the project (for instance, more scope may result in higher costs or delays). A badly managed project or no project management at all may result in missed deadlines, cost overruns, poor quality, rework, and uncontrolled project expansion, loss of the company's reputation, unhappy stakeholders, and failure to meet the project's goals. Effective and efficient project management needs to be considered a key competence in businesses (Sibu Samuel, 2020).

2.1.3. Construction Project

Because there are many project participants, including clients, consultants, contractors, stakeholders, stockholders, and regulators, the construction sector is inherently complicated. The sector is subject to subpar contract performance because of its complexity, fragmentation, and extremely casual labor force (Helen et al., 2015).

The act or process of building is called construction. It entails a sequence of steps to create a new set of structures and infrastructure, or it might entail modifications to the structures and infrastructure that already exist (Radosavljevic & Bennett 2012). A construction project is a portion of an attempted or ongoing building project. A project is a collection of intricate or connected tasks and activities that need resources to be completed in order to meet predetermined goals. It must be finished on schedule and within a specified budget (Munns & Bjeirmi 1996; Pinto & Slevin 1988). The global construction sector is beset with a plethora of obstacles and issues. Construction projects are notorious for running late, going over budget, and having a lot of scope creep. The construction business has several challenges, including poor quality, over budgeting, and delays. For certain issues, the conventional construction management method has shown to be successful. The entire planning of a project by assigning the necessary resources to complete it on schedule, within budget, and with the desired quality is known as construction management. "Scope triangle," which shows how the three project trade-offs cost, time, and

quality relate to one another. Gathering the activities and resources required to complete the project's deliverables and objectives within the allotted budget and time limits is the key to successful project management (Marwa Gamal Swefie Fall, 2013).

When a project is successfully finished, the organization advances to the next stage and accomplishes the goal. When goals are met within predetermined parameters and budgetary constraints, a project is often considered successful (Association for Project Management, 2012). Initiatives are launched to realize business opportunities consistent with an organization's strategic objectives. Before a project begins, a business case is usually developed to outline the goals of the project, the amount of money that will be required, and the qualitative and quantitative standards that will determine its success.

2.1.4. Review of Theory

This section covers the theoretical underpinnings and presents the most pertinent hypotheses with prior research on the variables influencing project success. All of the theories might be utilized appropriately for this study; for instance, contingency theory could be employed when the circumstances departed from the norm, such as the cost strategy, the technology being used, the nature of the organizational structure, and the differences in cultures. The third theory that served as the foundation for this investigation is the general system theory, which holds that the sum of all the components is crucial to construction projects. Lastly, the ADKAR model of change explains how failing to respond to changes owing to a lack of expertise or knowledge can have an impact on the project.

2.1.4.1.Contingency Theory

In order to ascertain the appropriate character of the circumstance for this narrative, consideration should be given to both the situation and the replies. Projects require managerial attention based on their specific qualities and the circumstances of the moment, since they are by their very nature unique and complicated (Sawega 2015).

Contingency theory acknowledges these circumstances in order to pinpoint methods that can address various projects and fulfill project requirements. This idea states that project management may be decided on a case-by-case basis, meaning that there is no set formulas for managing projects since the circumstances dictate how to modify the management system. Mutema et al. (2003) state that making management decisions necessitate considering an organization's relationship to its surroundings.

So effectively applying this theory help project managers how to avert project uncertainties. For

this theory different factors can affect projects differently. For example: the nature of organizational structure, technology we are using, different cultures, cost strategy we followed and etc. According to S H Murithi.S et al.(2017) contingency theory have pivotal role in providing the manager with project schedule; though properly estimating the project completing time in order to minimize time overrun.

2.1.4.2. General System Theory

System theory states that the goals of this idea may be achieved by combining all of its components. Murithi, et al. (2017) asserts that when a system component is eliminated, the system's overall makeup is also altered. A working computer, for instance, is a system; if you remove it, the system's essence also changes.

In essence, a project is an integrated system made up of inputs, processes, and outputs. This suggests that the success or completion of a project is impacted when any or all of the system's components are absent. Project stakeholders should integrate and harmonize in order to generalize this notion. An improvement strategy, according to Murithi et al. (2017), indicates that the project's performance may be impacted by the failure of individual project members.

2.1.4.3.The ADKAR Model of Change

This idea explains the reasons for project failure. According to this idea, the project may fail if there are modifications made to it and there are insufficient project stakeholders to either accept the changes or respond to them appropriately (Sawega 2015). These project failures may, for instance, be the result of a shift in broad knowledge, a failure to pick up new skills, or an inability to adjust to shifting behaviors. When a change occurs in the context, the project manager or team member should respond to it appropriately to prevent project failure and ensure project success**.**

2.1.5. Project Success

Project success, according to Brown and Adams (2010), is a nebulous phrase that has been difficult to define throughout time, although a number of studies have attempted to provide a framework for assessing and differentiating certain success characteristics in the construction sector. It is important to note that various people have varied perspectives on what constitutes success, which contributes to the ambiguity in the meaning of the word "project success."

When a project achieves its schedule, quality, and budgetary objectives, it is considered successful. PMBOK Handbook, 2008; Cost: if the cost fits within the budget, it is successful; Time: if it keeps to the timetable, time is success; The degree to which a set of fundamental qualities is met defines quality.

When all project objectives time, money, quality, and performance are met and all parties involved are happy, the project is deemed successful. According to most accounts, a project is deemed successful if the customer, end user, project manager, project team, and developer all believe that their expectations were fulfilled or surpassed (Nicholas, 2004).

Two sets of KPIs have been presented by Chan and Chan (2004) to measure the success of building projects. The first category included objective metrics, which included concerns about the environment, safety, cost, and time. Subjective measurements comprised quality, functionality, and participant satisfaction, and constituted the second group. Although the performance indicators were restricted to the operational and tactical levels and excluded the project's strategic phases, they were still linked to the success criteria.

The existence of both macro and micro factors to project performance was noted by Lim and Mohammed (1999). According to their explanation, the micro success elements are associated with the construction project's implementation stage, when the project must fulfill a number of requirements, including those related to quality, cost, and schedule. However, the happiness of stakeholders and project end users is necessary for the macro parts of project success. Based on Lim and Mohammed's observations, it can be inferred that their success criteria prioritize rapid project completion and customer satisfaction.

2.1.6.A Projects' Success Criteria

The dynamic context in which projects are conducted dictates the regular amount of complexity that should be considered when addressing various components of project success. While measurable and non-measurable items are frequently added to the list of success criteria in project management literature, in actual practice, this leads to confusion as project managers must deal with the challenges of implementing projects without explicit success criteria. Based on a thorough examination of the literature, Davis (2014) listed "success criteria should be agreed upon with stakeholders before the start of the project, and frequently at arrangement review points during the project" as one of the requirements for success.

Success criteria and success factors are two similar ideas that need to be distinguished from one another. To increase the likelihood that a project will succeed, it is necessary to first identify critical success criteria and then define success factors (Müller, Turner, 2007). Muller and Turner (2007) describe success criteria as characteristics that gauge the accomplishment of a project.

In addition to the golden triangle of time, money, and quality, Westerveld (2003) highlights the significance of stakeholders' satisfaction as the primary success criterion and adds that various

temporal delays should be taken into account. It is impractical to create a set of standards that apply to all kinds of projects (Mir, Pinnington, 2014). Even when some metrics may be useful in gauging the performance of most projects, they need be modified to account for factors including size, complexity, length, kind, and stakeholder requirements.

When all project objectives time, money, quality, and performance are met and all parties involved are happy, the project is deemed successful. According to most accounts, a project is deemed successful if the customer, end user, project manager, project team, and developer all believe that their expectations were fulfilled or surpassed (Nicholas, 2004).

Chan, Scott, and Lam (2002) state that while cost, time, and quality are important project objectives, they are not the only critical performance measures. Success criteria can also be separated into categories that are subjective and objective. Measurement objective Time, money, safety and health, and profitability. subjective measurement Technical performance, quality, productivity, satisfaction, disagreement, social, professional, and educational.

2.1.7.A Projects' Success Factors

The primary goal of early project management literature was to identify general criteria that influence project success. In recent years, scholars have highlighted the existence of distinct success variables based on the type of project. The search for the key success factors is a continuous endeavor that many scholars are taking into consideration, particularly in light of the intense pressure to implement successful projects in the dynamic and ever-changing business world and active global market (Crisan, Borza, 2014), where continual improvement is essential to gaining a competitive advantage (Salanta, Popa, 2014).

Davis (2014) divides the development of success elements into decades and examines project management success in literature from the 1970s to the present. This study shows that in the 2000s, approaches to success factors shifted from emphasizing a project's operation level in the 1970s to a stakeholder-focused strategy in the later years (Davis, 2014). Many lists of success variables exist as a consequence of the various research that have addressed the subject of project success. In their 1987 paper, Pinto and Slevin established a list of ten success factors that have been acknowledged as accurate by other authors (Turner, Müller, 2005). These factors include the project mission, top management support, schedule and plans, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, and troubleshooting. In order to characterize the success factors of projects, Davis (2014) adopted a set of nine premises in the paper. These include timing, collaboration and communication,

identifying and agreeing upon objectives, stakeholder satisfaction, acceptance and use of final products, cost/budget aspects, project manager competencies, strategic benefits of the project, and top management support. The aforementioned lists of criteria, supplemented by expert input, serve as the foundation for the empirical study presented in this paper. A project's success or failure is determined by a number of elements, and altering these aspects at the appropriate moment increases the likelihood of success (Savolainen, 2012).

Yu et al. (2005) spoke about when to do project evaluations in order to analyze success, and they came to the conclusion that the process is helpful at any point from the first milestones until the project is finished. The findings of these assessments may point to discrepancies that might harm the results in the end. Project managers should take action whenever these circumstances arise in order to improve the likelihood of success by affecting the success variables that were previously recognized.

Key indicators are a useful tool for evaluating success. Numerous subjects and variables, including time, money, quality, client pleasure, productivity, and safety, are associated to success. Castillo, Kappagantulla, Ahmed, and Azhar (2002). Success factors are regarded as the primary characteristics that influence the outcome of a project (Dvir, 1998).

The elements of a project that may be changed to improve the likelihood of success are known as project success factors; they are the independent variables that most likely allow for success. The inputs into the management system that point either directly or indirectly in the direction of the project's success are known as success factors. Since various projects and different people prioritize distinct sets of success indicators, project success factors are not uniform for all projects. The standards for project success also vary from one project to the next, and what is deemed successful in one could be viewed as unsuccessful in another. It appears that some PSFs are more important than others. These general standards and variables can affect the majority of It appears that some PSFs are more important than others.

2.1.7.1. Project Management Triangle

Since its early utilization by Barnes, the project triangle has been discussed in different areas in the PM and construction project management literature but the concept had not been subject to a major change, to the extent that Gardiner and Stewart (2020) address it as a well- worn cliché. The author of the only book dedicated to ‘the triple constraints’, refers to the subject as “fundamental and yet surprisingly unexplored” and one of “the most-overlooked” concepts in PM (Dobson, 2021).

In his early version, Barnes named the corners of the triangle ‘time, cost, quality’ but in a later version developed soon after, changed ‘quality’ to ‘performance’ (Lock, 2007). 20 years later, the concept was called ‘the triangle of objectives’ by the initiator (Barnes, 1988).

Since then, the most significant trials to develop the ‘triangle concept’ have led to a number of different illustrations through adding one or more sides to the shape and/or changing the dimensions from two to three. The illustration has taken the forms of a tetrad (Wideman, 2004), tetrahedron (Atkinson, 1999; Davis, cited in Wideman, 2004; Burke, 2006), pyramid (Marasco, 2004), and cube (Hamilton, 2001) so far.

The above mentioned combinations of the elements are referred to as triangle of objectives and trade-offs (Barnes 1988; Lock, 2007); project triangle (Devaux, 1999; Nokes et al., 2003); triple constraints (e.g. Turner and Simister, 2000; Hamilton, 2001; Frame, 2002; Bennett, 2003; Dobson, 2004); criteria’s of success (Williams, 2002); the iron triangle (Atkinson, 1999); Project’s Building Blocks (Orr, 2007); the Square Route (Atkinson, 1999); the project pyramid (Marasco, 2004); and so forth.

Various names have also been given to the vertices and/or sides of the shapes; nevertheless, ‘time’ and ‘cost’ are almost invariably the fixed ones, though they may be referred to as ‘schedule’ or ‘budget’. Despite all of the different versions, the original, developed by Barnes remains the most popular in PM literature (see, for example, Turner and Simister, 2000; Hamilton, 2001; Williams, 2002; Dobson, 2004; Burke, 2006; Kerzner, 2006; Pollack- Johnson and Liberatore, 2006) and specifically that related to construction (see Clough et al., 2000; Woodward, 2003; Bennett, 2003; Lock, 2004).

2.1.7.2. Complexity Profile and Organizational Factors

"Project management complexity is seen as a subset of project complexity, e.g. the part of project complexity related to managerial complexity," said Bosch-Rekveldt et al. (2019). Two key points may be drawn from this definition: Project management complexity is ingrained in the idea of project complexity, and it is the same as managerial complexity in the first place. Regarding the last issue, H. Maylor et al. (2018) contend that the project complexity literature has not paid much attention to the complexity of the management task. As a result, the authors' (ibid) goal is to provide a response to the query, "What makes a project complex to manage?" by defining management complexity and the variables that influence it.

Because there are more and more aspects that are thought to be sources of complexity, projects are getting more and more complicated. Project outcomes are influenced by a multitude of

elements, including a big number and variety of players working and interacting with each other, a tumultuous environment, working on the cutting edge of technology, and a huge quantity of necessary resources. A complex environment has an impact on project coordination, planning, and control. It can also influence the choice of a suitable project organizational structure and make it more difficult to clearly define the project's objectives (José et.al,2019).

Previous frameworks have consistently noted that organizational issues seem to have a significant influence on project complexity. According to Xia and Lee (2022), the most important structural organizational elements influencing project performance are skill competency and support from users and upper management. According to Bosch-Rekveldt et al. (2019), size-related factors, such as the quantity of stakeholders and project management tools and procedures, are prominent. According to He et al. (2022), trust within the project team, cross-organizational interdependence, multiple stakeholders, organizational structure hierarchy, and number of organizational levels are the four out of the five organizational factors that have the biggest influence. Technology diversity is the remaining factor. A rating of the criteria is not provided by H. Maylor et al. (2018) or H. R. Maylor et al. (2013). They discovered that having too much or too little of a component, such as senior management interference vs. lack of support, increases managerial complexity; this phenomena is shown by a "U curve".

When looking over such frameworks, it made me wonder if the presence of those elements alone would make project management more difficult. Numerous writers (Hussein, 2022; Hussein, Pigagaite, & Silva, 2019; H. Maylor et al., 2018; McLeod & MacDonell, 2021; Whitty & Maylor, 2019) contend in the literature that the absence of such characteristics in the project itself is what really makes it more difficult to manage. Rather, what influences management complexity is their temporal and dynamic character, interconnection, and interaction. H. Maylor et al. (2018) state that whereas structural complexity provides a static picture of the project and its surroundings, complexity beyond that of individual elements arises from the interconnectedness of those factors.

Additionally, there exist interplay effects among the parts, such as the complexity of interaction in interdependencies and stakeholder connections. Thus, those components represent an initial state with some transitory stability, as explained by H. Maylor et al. (2018), since each of them comprises a change-related component that is called a dynamic element. Similarly, Whitty and Maylor (2019) claim that separate structural components, their interactions, and the dynamic outcomes of each one altering and interacting again combine to produce management

complexity. The elements that affect project results in software development systems are presented by McLeod and MacDonell (2019). According to McLeod and MacDonell, the factors are temporally oriented because they entail intricate relationships and interactions that change dynamically in significance and influence throughout the project life cycle. As a result, a factor may be important at different stages of the project. Hussein (2022) used the term circumstances to discuss the interdependence, mutual influence, and dynamics of many elements. The number of stakeholders, cultural diversity, and skill level diversity are examples of factors or singular elements that influence a project management effort. However, the main source of complexity is actually the combinations of these elements with other constraints, which result in complex situations.

2.1.7.3.Project Manager Competence

Project manager competence is crucial for project success, including building construction projects in Addis Ababa. Key competencies include technical skills like project planning, risk management, budgeting, quality management, leadership, and communication, interpersonal skills like empathy, adaptability, and collaboration, strategic and business management skills like business acumen, strategic thinking, and ethical and professional conduct. Assessing these competencies among interviewees can help identify strengths and areas for improvement Udo, & Koppensteiner, (2020).

The Project Management Institute (PMI) identifies three different competency dimensions: knowledge, personal and performance. Both the knowledge as performance competencies are organized around the nine project management knowledge areas described in the Guide to the Project Management Book of Knowledge (PMBOK Guide). The personal competencies are broken up into 6 areas: achievement and action, helping and human service, impact and influence, managerial, cognitive, personal effectiveness (PMI 2022).

Different roles in project management will require different competencies. Since the project management environment is characterized by change, responsibilities, and hence required knowledge and skill levels, continuously transform. One of the key competencies is therefore to be flexible and adaptive in any situation. Although certification does not qualify a project manager by itself, it does give an indication of the candidate's knowledge of concepts and methodologies. It also shows that the candidate is dedicated to the profession. The kind of project management certification is not of primary importance AIPM (2023).

Successful project managers have the ability to demonstrate the unbiased fairness of a judge, the

skills of a diplomat, the authority of a general and the understanding of a parent (Mc,2023).

2.1.7.4.Project Risk Management

Risk Management benefits are not limited to large or risky projects. This process can be formalized under these circumstances but applies to all levels of project activities and procurement. It can be applied throughout the project period, starting with the oldest evaluations of the policy for the supply, running, maintenance and disposal of singular objects, facilities or assets. It has many applications, from alternate budget assessment and business plans to manage cost overruns and delays in projects and programs. Risk management will also provide advantages to improve accountability and justify choices by providing a steady and robust manner that supports decision-making Rountos (2018).

Big construction projects in Dubai are becoming more complex because most of the materials used in construction are imported by 80%. Uncertainty and interdependence affect project management in the construction phase where all problems happen. Understand the complexities and their interdependence and how to find the right solution for them is the way to ensure the success of the project well. Management is applicable in construction and must be applied to all individuals and this includes client, contractor/consultant and workers. The role of the client and individuals in the project is very important for establishing an effective connection between all the participating parties Tarek (2019).

Implementing project management techniques in the early stages is very important for Less Developed Countries (LDCs). By using the materials ideally and using a control and planning system, all the desired goals will achieve in record time and low cost. Due to the shortage of materials, the fact that they are mainly imported, and the large increase in construction projects, the need for project management has become important to deal with the great responsibilities of management, undoubtedly, the public sector is considered the basis for project management, and the result is a good economic growth that may lead to a qualitative leap in construction Atif (2020).

The construction industry differs from other sectors due to different unique characteristics. The construction industry is extremely competitive due to the presence of many specialized companies in this field, this diversity is due to the easy access to this field. The identification of risk factors in the construction industry depends on studying the risks and their various effects on the project and finding the best way to manage and deal with them to prevent or avoid them. Identifying risk factors is the master mission before any project begins. Several sources of risk

have been identified in Algeria and have been analyzed to measure their influence on construction projects and find the best way to deal with them Jaser (2022).

2.1.7.5.Project Team Competence

Project management competencies refer to the skills, knowledge, and attributes that enable individuals to lead and manage projects effectively. They encompass leadership, communication, planning, risk management, stakeholder engagement, budgeting, quality management, problem-solving, adaptability, team management, and technical skills Bakkah (2024).

Traditionally, project management is understood to succeed with the right tool and technique, regardless of the project participation's personality or project type. This is contrary to the studies of the mentioned competency theories. Case studies have been conducted gradually on the capabilities of project managers in the area of project management Dulewicz et al (2023). mentioned that not only project management procedures, but also the project manager's competence should be applied to project management Crawford, Hobbs, & Turner, (2018). In other literature, the correlation has been shown between the competence of managers and project success in different projects Turner, & Müller, (2016).There are many empirical studies on leadership and project success using LDQ questionnaires, such as the financial industry, construction industry, agile projects, and general projects Turner,, Müller, & Dulewicz, (2019). Does the project need to focus only on the competence of the project manager in order to succeed? The project team consists mainly of the project manager and team members. The project manager (PM) or project leader (PL) is the person responsible for the entire project execution, and team members are practitioners who work with PM to understand the mission and vision of the organization and to achieve project goals.

Previous research has shown that team members involved in the project need personal competencies, such as knowledge and technical skill (Robinson, & Shaver, 2023). However, as more complex and dynamic projects increase, professional and multifunctional requirements are required to build a project team; team members also need the skills and expertise that managers need, and they must have a high level of communication, management skill, and integration capabilities, as well as the ability to utilize and understand knowledge, tools, and techniques. In this study, we suggest using the LDQ questionnaire, which measures a manager's competency to verify team members.

2.1.7.6. Requirements Management

Ineffective requirements management processes (or more commonly, not employing any requirements processes) has been identified as a leading cause of project failure Kumar, (2016). Specifically, scope creeps or the inability to control them is a common cause of project cost overrun or project delay. An IBM Rational Project Manager Survey (Visitacion, 2023) indicated that IBM project managers consider controlling scope creep and requirements quality as the greatest predictor of success. Wiegers (2022) identified eight typical requirements problems that can sabotage a project. He wrote that successful [software] projects are highly dependent on well understood requirements and suggested ways to avoid traps to effectively collect, document, or manage requirements.

Requirement issues should be addressed very early in the project life cycle because design problems based on poor requirements lead to design issues that are more difficult and expensive to resolve after project development is well underway (e.g., into the project execution phase). Investment in requirement processes implemented from the start of the project life cycle pays off at the end Visitacion, (2003).

Project cost statistics at the Cost & Economic Analysis Branch, National Aeronautics and Space Administration headquarters indicate that projects that spent less than 5% of total project or program costs on the requirements process experienced an 80% to 200% cost overrun, whereas those that invested 8% to 14% experienced less than a 60% overrun (Young, 2023). The NASA study concludes that an investment of 8% to 14% of total program costs on the requirements processes yields project results with considerably lower cost overruns.

With requirements of poor quality, project fail, are completed late or over-budget. Other projects successfully completed on time and on budget delivered features and functions are not used. Research studies have shown only 45% of features and functions of IT products are used PIM (2022).

2.2. Review of Empirical Literature

In 2019, Ali Yassin Sheikh Ali investigated project performance in the building sector. Purposive sampling was used to include 200 workers from construction enterprises in Mogadishu in the sample size. A semi-structured questionnaire was used to gather data, and SPSS was used for analysis. The outcome of the linear regression demonstrated a statistically significant correlation between the project performance and the eight predictors: productivity, cost, time, quality, people, health and safety, innovation and learning, environment, and project

performance.

Maqsoom et al. (2018) looked into and examined the factors that contribute to time overruns in building projects in Pakistan. A total of 130 replies were received, and 113 (39 from the building industry, 26 from the electrical and mechanical industry, 43 from the civil works industry, and 5 from other disciplines) were deemed suitable for statistical analysis. This indicates a response rate of 62.7%. The primary causes of time overruns included modifications to standard drawings and design changes made during construction, poor performance by suppliers and subcontractors, a lack of technical staff, low technical performance, fluctuating material prices, and issues with land acquisition.

As stated by T. Anoop, SS. Asadi, and A.V.S. Prasad in Volume 7, Issue 6, November and December of 2016.They created a methodology for evaluating the effectiveness of building projects in poor nations for this study. They listed the following aspects that might have an impact on the project's performance: cost, quality, site, disagreement, safety, and project time. The authors of the respective papers identified six key aspects that impact construction project success: supply chain factors, contractor-related factors, client-related factors, consultant-related factors, and factors connected to extreme environmental conditions. These are the primary factors influencing the paper's project success. Regression analysis and Person's correlation have been used to examine the data in this research using SPSS (Statistical Package for the Social Science).

Samart Homthong and Wutthipong said that the main objective of this study, which was completed on April 2, 2016, was to categorize the elements and survey each category to determine which of the components was most responsible. Out of the 179 identified, they suggested nine groups, and then ranked the top ten elements from each category in that order. Major group, time performance, cost performance; quality performance, environment performance, productivity, risk management, and human resources are a few of the most important variables. They ranked using the RII approach.

As per Nipin Joseph Babu's account in (March-April 2015) Vol. 12, Ver. V, building projects are encountering several issues since complexity and challenges are becoming increasingly prevalent in today's world. They have made an effort to concentrate on and, in theory, reduce the aspects that contribute to the project's complexity. According to this research, the biggest problem is a lack of material. The cost, time, quality, productivity, client happiness, regular and community satisfaction, people, health and safety, innovation and learning, and environment elements are the

main variables that are the emphasis of this article. They used the RII approach to determine the data.

As stated in the Jordan Journal of Civil Engineering, number 8, 2014, by Alis Kahwajian1), Shukri Baba2), Omar Amudi3), and Mohammed Wanos 4. This paper's main goal was to work between the public and commercial sectors for social and economic development. They have encountered several obstacles while working on this relationship, including a lack of laws and weaknesses in the administrative and legal issues of the public sector. They have put out this collaboration based on the rationale that the growth of Syria requires. 22 primary variables were identified and examined using questionnaire-based research. Favorable legislative framework, political backing, sound governance, a stable macroeconomic climate, proper risk allocation, and risk sharing are the top five crucial elements.

As stated in Zarina Alias, E.M.A. Zawawi, Khalid Yusof, Arish, NM, 2014, the primary goal of this study is to increase the success of building projects. This report is the result of a comprehensive analysis of earlier research works, whereby many variables were identified and prioritized as the primary determinants of successful project outcomes. A survey was conducted with the aim of gathering input from experienced individuals, including architects, engineers, manufacturers, and so on. The discussion focused on elements that should be avoided to enhance Malaysia's construction industry, as well as practical implementation on building sites. The five (CSFs) of project process, project management action, external issues, human factors, and project related variables were the key areas of concentration for their investigation of all the affecting elements.

As stated by Afshin Pakseresht29 and Dr. Gholamreza Asgari30 in Vol. 4, No. 8, December 2012. This report presents the results of study conducted at Pars Garma Company. This study effort has been conducted in two stages. They created a single questionnaire and gave it to each of the company's fifty-eight personnel (project manager, technical expert, and staff manager). The lowest criteria were deleted in the second step, and a new questionnaire was created and distributed to 15 organizational specialists. The last set of suggested key variables are as follows: factors linked to contractors, consultants, contracts, employers, effective factor in project management, factors related to project management, and factors connected to project logistics. Z-test and SPSS program 16 have been utilized to examine the gathered data.

As per Sarosh H. Lodi, Muhammad Saqib, August 2008, Karachi, Pakistan, given the complexity and complexities involved in building projects. They have conducted a survey to determine the

primary problems influencing the success of building projects in an effort to minimize these kinds of disruptions during the project. And they identified 77 of these minor and major causes. and separated them into seven groups. Each section's top five criteria were then ranked and examined. Ultimately, they put forth five main variables that were the highest ranked in each of the areas. These elements are as follows: factors linked to the contractor, factors related to the project, factors related to procurement, factors related to the design team, and factors related to project management.

The causes of delays in major building construction projects in Saudi Arabia were investigated by Assaf and Al-Hejji (2006). They discovered 73 variables that lead to delays in construction. These factors were divided into nine groups. The approval of shop drawings, owner delays in paying contractors, owner modifications to the design, cash flow issues during construction, the owners' slow decision-making process, design errors, excessive bureaucracy in the project-owner organization, labor shortages, and insufficient labor skills were some of the major causes of delays.

Yada and Yadeta (2016) conducted research on the variables influencing building project success under the auspices of Ethiopia's Oromia Industry and Urban Development Bureau. In order to determine the variables influencing cost, schedule, quality, and leadership style performance in building projects under the Oromia Industrial and Urban Development Bureau, this study was conducted. Data on time and expense overruns were gathered via questionnaire surveys and desk research. A desk study of ten finished building construction projects in the Oromia industry and urban development were examined, and a total of thirty questionnaires from respondents (owners, consultants, and contractors) were gathered. The outcome demonstrates that all building construction projects 100% of them had time and cost performance issues. Between a minimum of 12% and a maximum of 60% of the contract price is the real rate of cost performance; similarly, between a minimum of 7% and a maximum of 170% of the contract time is the actual time performance. For the Oromia industrial and urban development Bureau building construction projects instance, respondents identified 13 variables impacting cost performance, 31 factors affecting time performance, 5 factors affecting quality performance, and 3 factors affecting leadership performance.

Fetene (2008) conducted research on the origins and consequences of cost overruns in Ethiopian public building construction projects. The findings indicate that cost overruns occurred in 67 out of 70 public building construction projects. For certain projects, the cost overrun rate varies from

0% to 126% of the contract price at most.

2.3. Summary of Literature Review and Research Gap

The many project management and commercial theories that underpin the hypothesized variables are investigated in the reviewed literature. The assessment determined that the primary factors influencing a project's success are its budget, schedule, and quality. An analysis of the pertinent literature revealed that the success of Addis Ababa project management has not even been mentioned, nor has the timetable success of construction projects performed in Ethiopia been accorded the importance it should have.

Menches and Hanna (2006) state that project management has a significant role in determining project success; nevertheless, little study has been done on the subject of project management success in Addis Ababa's building construction industry. Furthermore, according to Al-Carlos (2014), the majority of traditional project management literatures provide project management techniques that are occasionally overly strict or regarded useless. Therefore, it's critical to search for flexible project management techniques that best suit our particular setting.

This research is necessary because previous studies conducted in various parts of the world have primarily focused on factors related to project success in terms of cost, time, and quality. However, those studies haven't been conducted in the context of project management success in the case of selected building construction in Addis Ababa. Furthermore it will be important to evaluate and comprehend these elements and determine the degree to which they each or all contribute to the success of the project in order to be able to react to internal and external influences in a building project. In the conclusion, the study determined the variables influencing the project manager's success in the context of a particular building project in Addis Ababa.

2.4. Conceptual Framework

The conceptual framework in this study is uses to show various variables that affect the success of construction projects. Hence, based on theoretical and empirical literature, Independent variables are Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management with dependent variable project management success conceptual framework was developed as follows;

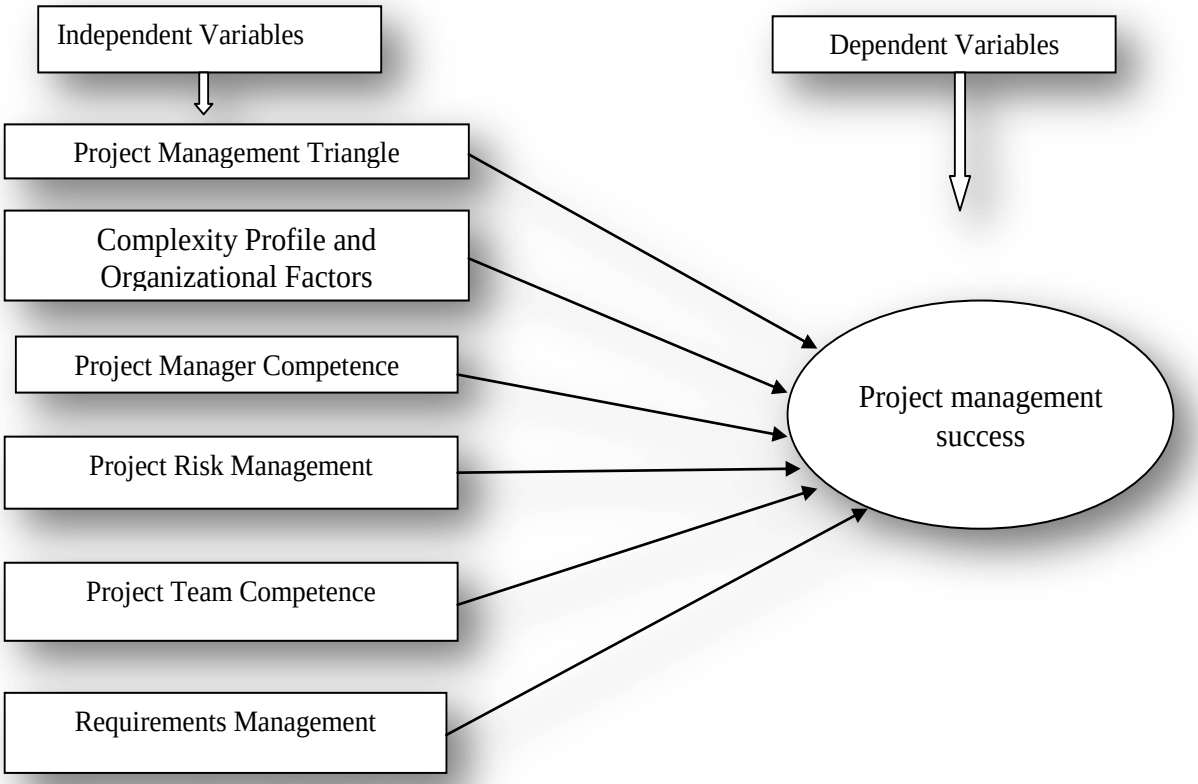

Figure 2.1: Conceptual framework

Source: (Modified by the researcher 2024 based on literature review for this study)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Research Design

The primary framework that establishes rules for the whole research project is research design. The kind, complexity, and scope of the problem being studied all influence the research design selection. Kothari (2004) defines study design as setting up the parameters for data gathering and analysis. In order to assess the perception of the aspects that determine success and their frequency, data from the linked population (clients, consultants, and contractors) will be gathered through surveys, desk studies, and design. A cross-sectional research utilizing a quantitative technique and based on categorical variables is conducted.

The study utilized both explanatory and descriptive research designs. Descriptive research focuses on detailing the current conditions, particularly analyzing a specific building's construction in Addis Ababa and evaluating the factors influencing project management success. Descriptive analysis transforms raw data into a comprehensible format, with percentage distribution and frequency calculations being the primary techniques for summarizing data. The explanatory component connects variables to assess their collective impact on construction project success. According to Sekaran (2004), this design helps analyze the relationships between multiple variables, clarifying how independent factors contribute to variations in a dependent variable.

3.2. Research Approach

A quantitative approach is suitable for this study on project management success as it allows for objective measurement and the collection of numerical data, enabling rigorous statistical analysis and hypothesis testing. This method facilitates the identification of relationships between variables, enhances generalizability through larger sample sizes, and provides precise, clear findings that can be effectively communicated to stakeholders. Overall, it supports a structured investigation into the factors influencing project success, ensuring reliable and actionable insights.

3.3. Population of the Study

This research looks at factors affecting project management success the case of selected building construction in Addis Ababa. The research includes all parties with an interest in construction

projects, including owners, contractors, and consultants working on projects depending on contractor involvement and the availability of data in the construction management unit; these contractors were referred to as middle level contractors in this study. i,e 19 contractors in grades 1,3,5 8, and 9. Engineers and other experts who are familiar with the relevant construction projects throughout the designated period 150 employees were included.

3.3.1.Sampling Design

It is true that conducting surveys costs a lot of money, time, and effort. Consequently, the general goal of social science research is to deduce behavioral patterns within a given group. Due to practicality and financial limitations, studying the complete population is challenging. Therefore, it makes sense to choose a representative sample for the survey from the population or target group of interest (Bhattacherjee 2012). For this investigation, the stratified sampling approach is employed. Combinations of purposeful and random sampling methods are used in this sample. Stratified sampling is a strategy used to acquire a representative sample when the population from which the sample is to be obtained is not homogenous.

In this study, a probability sampling method was used. Because it had rules and prevented sample size uncertainty. For using survey-based research methodologies, probability sampling was most frequently used for drawing conclusions about the population from the sample in order to address research questions and/or achieve objectives.

For the analysis of the collected data, various statistical techniques were employed, including descriptive statistics to summarize demographic information and provide an overview of the data, and inferential statistics such as regression analysis, ANOVA, or chi-square tests to examine relationships between variables and test hypotheses. Additionally, qualitative analysis methods like thematic or content analysis were utilized to extract key themes and insights from any open-ended survey responses, ensuring a comprehensive understanding of the factors influencing project management success.

3.3.2. Sampling Size

The size of samples or respondents was taken by Yamane (1967) formula for calculating the sample size which is as following;

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

Where,

n- Represents sample size,

N- Represents target population,

e- Represents the level of precisions (1%), 99% level of confidence.

In order to increase the number of sample sizes, the researcher preferred to select 1% level of confidence.

$$n = \frac{240}{1^{+240(0.05)^2}} = \underline{\underline{150}}$$

For this research the sample size is **150 employees**

3.3.3. Sampling Technique

Sampling, according to Al-Najjar J.M. (2008), is the process of choosing representative units of a population for a study or research project. A sample is a little section of the population that has been chosen for examination and study. Public projects that have gone over budget or schedule are examined in this study. Professionals make up the questionnaire survey's respondents. A total of 150 professionals were chosen based on the sample size determination method proposed by Yamane (1967).

In this study, the population was divided into several non-overlapping strata to ensure a representative sample, including project type (e.g., residential, commercial, infrastructure), stakeholder group (e.g., project managers, contractors, consultants, clients), experience level of participants (e.g., novice, intermediate, experienced), and geographical location within Addis Ababa. This stratified approach aims to capture the diversity within the construction industry, allowing for a more nuanced understanding of the factors influencing project management success in the local context. There were six strata.

As a result, the total of the samples from each stratum represents the number of sample sizes. n = $n_1 + n_2 + n_3$, for example. Additionally, the following formula was used to calculate the sample size for each stratum, and the results were distributed as indicated in table 3.1 below:

$$\frac{nh}{n} = \frac{Nh}{N}$$ (Cochran1977)

Where **Nh** - represents total population of each stratum

nh - is a sample size selected from the total population of each strata using Yamane formula.

Table 3.1 Sample size

Organization	Number of Projects	Nh	nh
GC 1	5	37	23
GC3	3	33	21
GC 5	3	33	21
GC 8	4	82	51
GC 9	4	55	34
Total	19	240	150

Source: www.constructionproxy.com

As the study was looking for people who had experiences related to the phenomenon being researched, the researcher chose the purposive participant selection technique as the most significant type of non-probability participant selection method to identify the primary participants.

All three of the respondent groups were chosen using the Purposive sampling approach. Tongco M.D.C. (2007) asserts that purposive sampling can yield robust and dependable data despite its intrinsic bias. Purposive sampling experts were invited to talk about and learn about the best strategies to locate the right kind of informant for each research topic, as well as the advantages and disadvantages of these approaches.

The reasons for selecting purposive sampling, in accordance with Kothari (2004) and Cooper & Schindler (2003), were as follows: the researcher was objective, works without bias, and possesses the necessary experience to make sound judgments; the results of an analysis of the purposefully selected sample may be tolerably reliable, and in some circumstances, the entire population may not be feasible for study.

3.4. Sources of Data

Both primary and secondary sources of data were used to compile the information. The owners, contractors, and consultants of the building construction projects listed in Addis Ababa provide the questionnaires used to collect the main data. The secondary data was gathered through document reviews, including contract documents, project reports, investigational payment certificates, and correspondence letters. These documents were crucial for identifying recurring issues linked to project success in Addis Ababa construction projects.

3.4.1. Primary Data Sources

It is acquired from the information's original source. The original data are more trustworthy and provide a higher degree of confidence for decision-making when paired with a trusted analysis

that maintains a direct line of connection to the events that occurred. Primary data are gathered through surveys.

For this study, self-designed primary data were collected from the study's target sample. A systematic questionnaire was used to collect data and collect information from respondents. According to Dawson (2002), there are three basic types of questionnaire items: closed-ended, open-ended, or a combination of the two. Respondents to the study were required to select boxes on a closed-ended questionnaire indicating their degree of agreement or disagreement with the research statement. A five-point Likert scale, ranging from strongly agree (SA; or 5), agree (A; or 4), neutral (N; or 3), disagree (DA; or 2), and strongly disagree (SD; or 1), was used to indicate the degree of agreement or disagreement among the replies.

The questionnaire was constructed in a plain, understandable language for the respondents in order to provide accurate, unbiased, and thorough information (Likert, 1932). In addition to being helpful in assessing the degree or strength of an individual's opinion, Likert scale items were susceptible to a common and significant measurement liability called the "agreement response set," which refers to survey respondents' tendency to agree with any statement in order to appear positive or agreeable (Krosnick, 1999).

3.4.2. Secondary Data Sources

The literature on success factors in construction projects, journals, books, websites, and research findings have been used as secondary data sources. The remaining data came from employer requirements, general contract conditions, and meeting minutes that were included in the desk review. Credible publications, books, various articles, proceedings, magazines, newspapers, websites, and other pertinent material sources are taken into account.

3.5. Method of Data Collection

The researcher created two surveys, the first of which is a questionnaire to provide quantifiable findings, in order to gather enough information to address the study topics.

To determine the degree of relevance among project stakeholders with respect to the difficulties arising from studied literature and unstructured interviews, the researcher employed a standardized questionnaire. There are both closed-ended questions on the form. To quantify a project's success, a five-point Likert scale with 5 = Very high, 4 = High, 3 = Medium, 2 = Low, and 1 = Very low is used.

The initial segment of the questionnaire focused on the respondents' educational background,

particulars regarding their overall experience in the construction industry, the duration of their involvement in the project, their marital status, their field of expertise, and their involvement in previous projects. The purpose of this section of the questionnaire was to gather some background data on the respondents' exposure to and experience with public building projects, as well as their role in their implementation.

A list of potential obstacles that may arise during the project's building phase made up the second set of questions. The purpose of this section was to look into these aspects' existence and determine their relevance.

The respondents chose the response they thought was most suitable from a list of options for the closed-ended questions. Given how busy respondents are and the desire to obtain direct information from them, closed-ended questions were chosen since they are simpler to evaluate and respond to. Sadly, none of the respondents used the open-ended sections to clarify their replies. Open-ended questions were only used in specific situations where more response alternatives are required.

3.6. Method of Data Analysis & Presentation

Data analysis involves organizing and interpreting large volumes of collected data. Before analysis begins, the data must be cleaned, edited, and coded to ensure accuracy and completeness. After receiving completed surveys, they are reviewed meticulously. The primary tool for analysis in this study was the Statistical Package for Social Science (SPSS, V26), which facilitated the examination of descriptive statistics, including frequency distributions and mean scores. Quantitative methods were employed, with percentiles and frequency distributions playing a key role in analyzing the quantitative data.

To derive meaningful insights, the analytical framework integrated data from various respondent categories, including owners, consultants, and contractors. This approach ensured that the analysis aligned with the study's objectives. Understanding the degree of measurement was crucial for selecting the appropriate analytical methods. While descriptive statistics were the focus, methods such as inferential analysis, ANOVA, and multiple regressions could enhance the findings by allowing for hypothesis testing and exploration of relationships within the data.

Utilizing inferential statistics, including ANOVA and multiple regressions, would enable the examination of differences between groups and the assessment of predictors' impact on outcomes. These methods could provide deeper insights and validate the findings across different

respondent categories, thereby enriching the overall analysis. Incorporating these approaches in future studies could lead to a more comprehensive understanding of the data and support more robust conclusions.

3.7. Model Specification

The factors that the linear regression analysis was used to evaluate. A dependent or explained variable represented by the letter "Y," and one or more explanatory variables, represented by the letter "X," can be modeled using the linear regression technique. The model specifications were as follows:

$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6\ \varepsilon$

Where,

Y= Project management Success was identified based on the specified time and cost in contract which mean the time and cost deviate according to the agreements are time interruption and cost overrun.

$\beta 0$ = the constant

$\beta_1, \beta_2, \beta_3\ \beta_4, \beta_5, \beta_6$= the coefficients,

X_1= Project Management Triangle

X_2= Complexity Profile and Organizational Factors

X_3= Project Manager Competence

X_4= Project Risk Management

X_5= Project Team Competence

X_6= Requirements Management

ε = the error term.

3.7.1. Definition of Variables

A) Dependent Variable

- **Project management Success** This variable measures the overall effectiveness of project management, encompassing factors such as project completion within scope, time, and budget, as well as client satisfaction and quality of deliverables.

B) Independent Variable

- **Project Management Triangle:** This includes the three constraints of project management scope, time, and cost and how their interplay influences project success.

- **Organizational Factors:** This encompasses organizational structures, culture, and processes that may impact project execution.
- **Project Manager Competence:** This variable assesses the skills, knowledge, and experience of the project manager, which are critical for effective project leadership and decision-making.
- **Project Risk Management:** This refers to the processes involved in identifying, assessing, and mitigating risks throughout the project lifecycle to minimize negative impacts on project outcomes.
- **Project Team Competence:** This variable evaluates the skills and capabilities of the project team members, which contribute to collaboration and successful project execution.
- **Requirements Management:** This involves the processes of gathering, analyzing, and managing project requirements to ensure that project objectives are met and stakeholder needs are satisfied.

3.8. Validity and Reliability of the study

3.8.1. Validity

According to Harper and Thompson (2011), reliable and legitimate questions are essential to the efficacy of data gathering methods. According to Creswell (2009), conventional practice for evaluating the content validity of a measure involves enlisting the assistance of a professional or expert in the subject to assist with question content discovery, rewording and sequencing difficulties before the study, and looking at ways to improve overall study quality. The researcher was conferring with subject matter experts, including the adviser and other university research instructors, to ascertain the validity of the research instrument for this study. In addition, the researcher confers with specialists within companies to determine whether the surveys were being handled effectively. This improves the research instrument's validity by simplifying edits and updates.

3.8.2. Reliability

Reliability is the extent to which a researcher's data collection techniques or analytic procedures will yield consistent findings. It may be assessed using the following three questions (Easterby-Smith et al., 2002): Will the acts in the future result in the same results? Will those who are

watching reach the same conclusions? Is it apparent how the raw data is interpreted? The dependability of each construct will be confirmed using the Cronbach's alpha values of its constituent parts.

Cronbach's alpha is a commonly used statistic to evaluate reliability. It displays the degree of interconnectedness between the questions on a questionnaire (Fubara and Mguni, 2005). Higher Cronbach's alpha values (which typically range from 0 to 1) correspond to higher levels of internal consistency. Various writers accept various test values in order to establish internal dependability. The following criteria are provided by George and Mallery (2003) for the interpretation of reliability coefficients: 0.8 is fine, 0.7 is acceptable, 0.6 is dubious, 0.5 is subpar, and < is terrible.

Table 3.2: Cronbach's Alph test Reliability Statistics

Variables	Cronbach's Alpha	N of Items
Project Management Triangle	.710	6
Organizational Factors	.793	7
Project Manager Competence	.683	5
project risk management	.695	3
Project Team Competence	.531	8
Requirements Management	.753	9
Project management Success	.795	8
	.871	46

Source: Survey Result, (2024)

Table 3.2 above reveled that 0.871 is a high value, indicating good internal consistency among the items in your survey or questionnaire. This means that the items are well-correlated and measure the same underlying construct, which in this case is the factors affecting project management success. The high Cronbach's Alpha suggests that the survey is reliable and the items consistently measure the factors affecting project management success. This reliability is crucial for ensuring that the findings are valid and can be trusted. Participants' responses to the items are consistent, indicating that the items are likely measuring the same concept or factor. This consistency helps in drawing accurate conclusions from your data.

3.9. Ethical Consideration

Because research involves science, it has its own set of basic ethical standards that should never be violated. For example, any cited sources that are important to the study should have citations included. That is, data was gathered from relevant and trustworthy sources, and writers of books

and papers were needed to be given credit. Therefore, the researcher was respected and follows existing ethical norms in the current study in order to make the research legitimate and acceptable to academic communities and users of the results. Before completing the questionnaire, participants were asked to specify their level of readiness; participation in the study was completely voluntary, and the data they submit was only be used by the research team. The workers' confidentiality was guaranteed because the questionnaire didn't include their names, personal information, or signatures. The researcher was also conveyed the investigation's findings without distorting any facts.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1. Introduction

This chapter covers presentations, discussions, and analysis of original data collected through surveys. The main objective of the chapter was to examine the significance of the variables in order to research on assessment factors affecting project management success the case of selected building construction in Addis Ababa using proper model testing and descriptive statistics. The first section focuses on demographic factors, while the second section discusses the descriptive statistics approach of converting raw data into meaningful information that can be interpreted to explain a set of dimensions. They represent one of the most crucial preliminary phases of data processing in statistics. A variety of results, such as frequencies, percentages, means, and standard deviations, may be obtained from this type of statistical study (Pallant, 2007). A subset of statistics known as inferential statistics is focused on analyzing, interpreting, and formulating inferences regarding the data's source (Dejene, 2011).

For this study, a questionnaire with 46 closed-ended items was used with total of 150 questionnaires were distributed. Of the total dispatched questionnaires, 147 (98%) were filled out and returned to collect information from selected building construction owners, contractors, and consultants working Engineers and other experts who are familiar with the relevant construction as middle level contractors in this study. i,e contractors in grades 1,3,5 8, and 9 to asses factors affecting project management success the case of selected building construction in Addis Ababa. Project manager competency, project risk management, project team competency, requirements management, complexity profile and organizational factors, and the project management triangle are illustrations of independent variables.

4.2. Demographic Characteristics of the Respondent

The respondents' gender, age, educational background, service year in the company, work experience in the current position, relation to the project, job title in the organization/company and number of projects executed in selected construction companies are all included in the study's demographic profile. A summary of this is provided in table 4.1 below.

Table 4.1: Respondents' Demographic Characteristics

Demographic profile	Description	Total	Percent
Sex	Female	57	38.78%
	Male	90	61.22%
Total		147	100.00%
Age	20-30	70	47.62%
	31-40	62	42.18%
	41-50	10	6.80%
	≥ 51	5	3.4%
Total		147	100.00%
Educational level	BA Degree	115	78.23%
	MA/MSc	30	20.41%
	PhD	2	1%
Total		147	100.00%
Service year in the Company	1-5years	17	11.56%
	6-10 years	58	39.46%
	11-15 years	52	35.37%
	≥ 16years	20	13.61%
Total		147	100.00%
Work experience in the current position	≤ 5 years	13	8.84%
	6-10 years	60	40.82%
	11-15 years	54	36.73%
	16-20 years	12	8.16%
	≥ 21 years	8	5.44%
Total		**147**	**100.0%**
Relation to the Project	Owner	16	10.88%
	Contractor	15	10.20%
	Consultant	12	8.16%
	Project Coordinator	19	12.93%
	Project Manager	22	14.97%
	Senior Project Manager	12	8.16%
	Program Manager	12	8.16%
	Portfolio Manager	10	6.80%
	Project Management Office Director	28	19.05%
Total		147	100.00%

Job title in the organization/company	Project Manager	20	13.61%
	Organization Manager	16	10.88%
	Site Engineer/ office engineer	10	6.80%
	Material Engineer	10	6.80%
	Surveyor	22	14.97%
	Consultant	12	8.16%
	Store manager	12	8.16%
	Supervisor	16	10.88%
	Procurement and Facility Management	16	10.88%
	General Foreman	13	8.44%
Total		147	100%

Source: Survey Result, (2024)

The demographic traits of the respondents and their relationship to variables influencing project management success in particular building construction projects in Addis Ababa were revealed in Table 4.1.

Gender Distribution: The majority of respondents are male (61.22%), which might reflect the gender dynamics in the construction industry. This could influence project management practices and success, as diverse teams often bring varied perspectives and problem-solving approaches.

Age Distribution: Most respondents are between 20-40 years old (89.8%), indicating a relatively young workforce. Younger professionals might be more adaptable to new technologies and methodologies, which can positively impact project management success.

Educational Level: A significant majority hold a BA Degree (78.23%), with a smaller percentage having advanced degrees (MA/MSc and PhD). Higher educational levels can contribute to better project management practices through enhanced knowledge and skills.

Service Year in the Company: Most respondents have been with their company for 6-15 years (74.83%), suggesting a stable workforce with substantial experience. This stability can lead to better project outcomes due to accumulated organizational knowledge.

Work Experience in the Current Position: Similar to service years, most respondents have 6-15 years of experience in their current roles (77.55%). Experienced professionals are likely to be more effective in managing projects successfully.

Relation to the Project: The largest groups of respondents are Project Management Office Directors (19.05%), followed by Owners (17.01%) and Project Managers (14.97%). This distribution highlights the importance of leadership roles in project management success.

Job Title: The diversity in job titles, with significant representation from Project Managers, Surveyors, and Supervisors, indicates a well-rounded team structure. Each role contributes uniquely to project management success, from planning and execution to quality control and resource management.

These demographic insights can help tailor strategies to enhance project management success by addressing the specific needs and strengths of the workforce in the building construction sector in Addis Ababa.

4.3. Descriptive analysis of study

Descriptive statistical analysis provided the mean (M) and standard deviation (SD) for each independent and dependent variable in order to indicate the sample group averagely agrees or disagree with the different statements whereas standard deviation shows the variability of an observed response from a single sample. The mean and standard deviation were calculated for the interval scale of independent variables (Project Management Triangle, Complexity Profile and Organizational Factors**,** Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management) and dependent variables (Project management Success). All the questions related with both the dependent and independent variables of this research were prepared using a five point Likert scale in the form of ordinal scale. But for the sake of simplicity of analysis the variables transformed into interval scale leading the researcher to obtain a single variable for the constructs based on Al- Sayaad et al. (2006) which subsequently depicted as provided in Table 4.2.

Table 4.2 Descriptive Statistics analysis of variables

	N	Mean	Std. Deviation
Project Management Triangle	147	3.6270	1.1249
Complexity Profile and Organizational Factors	147	3.9213	1.0312
Project Manager Competence	147	3.1578	1.1638
Project Risk Management	147	3.4059	1.0826
Project Team Competence	147	3.4685	0.9804
Requirements Management	147	3.5185	0.9763
Project Management Success	147	3.7611	1.0039
Valid N (listwise)	147	3.5514	1.05187

Source: Survey Result, (2024)

Table 4.2 above provides that into the descriptive statistics for the factors affecting project management success in building construction projects in Addis Ababa. These statistics provide valuable insights into the central tendency and variability of each factor. Here's a breakdown of the key factors:

Project Management Triangle**:** Mean: 3.63 and Standard Deviation: 1.12. This factor likely relates to the trade-offs between project scope, time, and cost. Balancing these three aspects is crucial for successful project management.

Complexity Profile and Organizational Factors with Mean: 3.92 and Standard Deviation: 1.03. The result implies that Complexity and organizational factors play a significant role in project success. A higher mean suggests that managing complexity and organizational dynamics is essential.

Project Manager Competence: Mean: 3.16 and Standard Deviation: 1.16. Project managers' skills and expertise impact project outcomes. A lower mean indicates room for improvement in this area.

Project Risk Management has a Mean: 3.41 and Standard Deviation: 1.08. Effective risk management is critical. A moderate mean suggests that risk management practices need attention.

Project Team Competence result indicates Mean: 3.47 and Standard Deviation: 0.98 The competence of the project team significantly influences success. A higher mean is positive.

The other variable Requirements Management has a Mean: 3.52 and Standard Deviation: 0.98. Properly managing project requirements ensures alignment with stakeholders' needs.

Project management Success with a Mean: 3.76 and Standard Deviation: 1.00. This factor encompasses various aspects contributing to overall project success. A higher mean is desirable.

Aggregated result of descriptive statistics for the factors affecting project management success in building construction projects in Addis Ababa Mean: 3.55 and Standard Deviation: 1.05.

In summary, addressing factors related to project management competence, risk management, and team competence can enhance project management success. Additionally, focusing on the project management triangle and organizational factors is crucial.

4.4. Analysis of Data Related to Basic Research Questions

Project Management Success refers to "an organization unit dedicated to the attainment of a goal generally the successful completion of a developmental product on time, within budget, and in

conformance with predetermined performance specifications". Successful Project Management requires a holistic approach, including regulatory support, infrastructure development, and consumer education.

4.4.1. Project Management Triangle

The Project Management Triangle, also known as the Triple Constraint or Iron Triangle, is a fundamental model in project management. It illustrates the three primary constraints that influence the success of a project: Time, Cost, and Scope. The core idea of the Project Management Triangle is that these three constraints are interconnected. A change in one constraint will likely impact the others. Balancing these constraints is crucial for project managers to ensure the quality of the final deliverable Sha, (2014). Balancing these constraints were presented as follows.

Table 4.3 Descriptive Statistics For Project Management Triangle

The work and deliverables that need to be completed within the project	N	Mean	Std. Deviation
The project duration or timeline, deadlines, milestones, and overall project schedule.)	147	3.1156	1.41187
The quality of the project outcome depends on how well these three factors are balanced.	147	3.6054	1.26901
Expanding the project scope may require more time and budget.	147	4.0272	.99963
Cutting costs might extend the project timeline or compromise quality	147	3.6122	1.01664
Tight deadlines may necessitate adjustments to scope or cost	147	3.4422	1.06713
Valid N (listwise)	147	3.9592	.98536

Source: Survey Result, (2024)

The table 4.3 above provides descriptive statistics for various aspects of the Project Management Triangle (scope, time, and cost) and their impact on organizational performance in building construction projects in Addis Ababa. Here's a detailed interpretation:

Project Duration or Timeline (Mean: 3.1156, Std. Deviation: 1.41187). The average rating for the importance of project duration, deadlines, milestones, and overall schedule is 3.1156. This

suggests that respondents moderately agree on the significance of managing the project timeline. The high standard deviation (1.41187) indicates a wide range of opinions, reflecting diverse experiences and perspectives on the importance of time management in project success.

Quality of Project Outcome (Mean: 3.6054, Std. Deviation: 1.26901). With a mean of 3.6054, respondents generally agree that the quality of the project outcome depends on balancing the three factors (scope, time, and cost). The standard deviation of 1.26901 shows some variability in responses, indicating that while most agree, there are differing views on how critical this balance is.

Expanding Project Scope (Mean: 4.0272, Std. Deviation: 0.99963). The high mean value of 4.0272 indicates strong agreement that expanding the project scope requires more time and budget. The lower standard deviation (0.99963) suggests that this is a widely accepted view among respondents, highlighting the critical impact of scope changes on project resources.

Cutting Costs (Mean: 3.6122, Std. Deviation: 1.01664). Respondents agree (mean of 3.6122) that cutting costs might extend the project timeline or compromise quality. The standard deviation of 1.01664 indicates moderate variability in responses, suggesting that while cost-cutting is recognized as impactful, its effects may vary based on specific project contexts.

Tight Deadlines (Mean: 3.4422, Std. Deviation: 1.06713). The mean of 3.4422 shows that respondents moderately agree that tight deadlines may necessitate adjustments to scope or cost. The standard deviation of 1.06713 reflects some variability in opinions, indicating that the impact of tight deadlines can differ based on project specifics.

Overall Balance of Factors (Mean: 3.9592, Std. Deviation: 0.98536). The high mean value of 3.9592 suggests strong agreement that the overall balance of scope, time, and cost is crucial for project success. The relatively low standard deviation (0.98536) indicates a consensus among respondents on the importance of maintaining this balance.

Summary: the descriptive statistics reveal that respondents recognize the critical importance of balancing the Project Management Triangle (scope, time, and cost) to achieve successful project outcomes. Expanding the project scope is seen as particularly impactful, requiring additional time and budget. There is also a general agreement that cutting costs and tight deadlines can negatively affect project timelines and quality. Overall, maintaining a balance among these factors is viewed as essential for project success.

4.4.2. Organizational Factors

Organizational Factors that influence project management success and Complexity Profile of a project, which refers to the various dimensions and factors that contribute to its complexity, are important components of project management Padalkar and Gopinath (2016), particularly in the context of building construction projects in Addis Ababa. In this research on building construction projects in Addis Ababa, analyzing these factors can provide insights into how they impact project outcomes and help in developing strategies to enhance project management success, as shown in table 4.4 below.

Table 4.4 Descriptive Statistics for Organizational Factors

	N	Mean	Std. Deviation
An organization's strategy significantly impacts its structure	147	3.9388	.95963
Organizations emphasizing major new products and services benefit from an organic, loose structure.	147	3.9456	.99851
Companies controlling costs and avoiding unnecessary innovation tend to adopt a mechanistic structure.	147	3.8231	1.16866
Organizations that copy successful ideas may benefit from a mix of mechanistic and organic structures	147	4.0544	.93474
Organizational size affects structure i,e larger organizations tend to be more mechanistic.	147	4.0408	1.10959
High volatility suggests an organic structure.	147	3.8095	1.07483
The greater the heterogeneity and concentration of environmental elements, the more complex the structure, favoring an organic one.	147	3.8367	.97250
Valid N (listwise)	147		

Source: Survey Result, (2024)

The aforementioned table 4.4 presents descriptive data pertaining to different organizational characteristics and their influence on the effectiveness of project management in building construction projects located in Addis Ababa. Here's a thorough explanation:

Organization's Strategy Impact on Structure (Mean: 3.9388, Std. Deviation: 0.95963). The average rating of 3.9388 indicates that respondents generally agree that an organization's strategy significantly impacts its structure. The relatively low standard deviation (0.95963) suggests a consensus among respondents, highlighting the importance of aligning strategy with organizational structure for project success.

Emphasis on New Products and Services (Mean: 3.9456, Std. Deviation: 0.99851). With a mean of 3.9456, respondents agree that organizations emphasizing major new products and services benefit from an organic, loose structure. The standard deviation (0.99851) indicates some variability in responses, suggesting that while most agree, there are differing views on the extent of this benefit.

Cost Control and Mechanistic Structure (Mean: 3.8231, Std. Deviation: 1.16866). The average score of 3.8231 indicates a consensus that businesses that manage expenses and steer clear of pointless innovation typically use a mechanistic organizational structure. The higher standard deviation (1.16866) reflects a wider range of opinions, indicating that the impact of cost control on structure may vary across different organizations.

Mix of Mechanistic and Organic Structures (Mean: 4.0544, Std. Deviation: 0.93474).The high mean of 4.0544 suggests strong agreement that organizations copying successful ideas may benefit from a mix of mechanistic and organic structures. The low standard deviation (0.93474) indicates a consensus among respondents, emphasizing the effectiveness of a hybrid structure in certain contexts.

Organizational Size and Structure (Mean: 4.0408, Std. Deviation: 1.10959). Respondents agree (mean of 4.0408) that larger organizations tend to be more mechanistic. The standard deviation (1.10959) shows some variability, suggesting that while this is generally accepted, the degree to which size affects structure can differ.

High Volatility and Organic Structure (Mean: 3.8095, Std. Deviation: 1.07483).The mean of 3.8095 indicates agreement that high volatility suggests an organic structure. The standard deviation (1.07483) reflects moderate variability, indicating that the impact of volatility on structure may vary based on specific organizational contexts.

Environmental Complexity and Structure (Mean: 3.8367, Std. Deviation: 0.97250). The mean value of 3.8367 shows agreement that greater heterogeneity and concentration of environmental elements favor a more complex, organic structure. The standard deviation (0.97250) indicates a consensus among respondents, highlighting the importance of adapting organizational structure to environmental complexity.

Summary**:** the descriptive statistics reveal that respondents recognize the significant impact of organizational strategy, size, and environmental factors on the structure and complexity of organizations. There is a general agreement that: An organization’s strategy should align with its

structure for project success, Emphasizing new products and services benefits from an organic structure, Cost control and avoiding unnecessary innovation lead to a mechanistic structure, A mix of mechanistic and organic structures can be beneficial, Larger organizations tend to be more mechanistic and High volatility and environmental complexity favor an organic structure. These insights suggest that understanding and adapting to these factors can enhance project management success in building construction projects in Addis Ababa.

4.4.3.Project Manager Competence

The manager of Projects any endeavor must be successful to be considered competent. It includes a variety of abilities, know-how, and characteristics that help a project manager lead and complete tasks successfully. Table 4.5 illustrates how competencies assist project managers in navigating the intricacies of their responsibilities and promoting project success.

Table 4.5 Descriptive Statistics for Project Manager Competence

	N	Mean	Std. Deviation
Project Management Application	147	3.4898	1.03611
Technical Area Expertise.	147	2.9796	1.25769
Understanding of the Project Environment	147	2.8435	1.27516
General Management Skills	147	3.3129	1.10913
Interpersonal Skills:	147	3.1633	1.14102
Valid N (listwise)	147		

Source: Survey Result, (2024)

The aforementioned Table 4.5 presents descriptive information regarding the different competences possessed by project managers and their influence on the effectiveness of project management in building construction projects in Addis Ababa. Here's a thorough explanation:

Project Management Application (Mean: 3.4898, Std. Deviation: 1.03611). The average rating of 3.4898 indicates that respondents moderately agree on the importance of project management application skills. The standard deviation (1.03611) suggests some variability in responses, indicating that while many recognize its importance, there are differing views on its impact on project success.

Technical Area Expertise (Mean: 2.9796, Std. Deviation: 1.25769). With a mean of 2.9796, respondents have a neutral to slightly positive view on the importance of technical expertise. The higher standard deviation (1.25769) reflects a wide range of opinions, suggesting that technical expertise may be more critical in some projects than others.

Understanding of the Project Environment (Mean: 2.8435, Std. Deviation: 1.27516).The mean value of 2.8435 indicates a neutral stance on the importance of understanding the project environment. The high standard deviation (1.27516) shows significant variability in responses, implying that the relevance of this competence may vary greatly depending on the specific project context.

General Management Skills (Mean: 3.3129, Std. Deviation: 1.10913). Respondents moderately agree (mean of 3.3129) on the importance of general management skills. The standard deviation (1.10913) indicates some variability, suggesting that while these skills are generally valued, their perceived importance can differ among respondents.

Interpersonal Skills (Mean: 3.1633, Std. Deviation: 1.14102). The mean of 3.1633 shows moderate agreement on the importance of interpersonal skills. The standard deviation (1.14102) reflects some variability, indicating that while many recognize the value of interpersonal skills, there are differing views on their impact on project success.

Summary: the descriptive statistics reveal that respondents recognize the importance of various competencies for project managers, with some competencies being viewed as more critical than others: Project Management Application **(**Moderately important, with some variability in opinions), Technical Area Expertise **(**Neutral to slightly positive view, with significant variability), Understanding of the Project Environment **(**Neutral stance, with high variability), General Management Skills **(**Moderately important, with some variability and Interpersonal Skills (Moderately important, with some variability).

These insights suggest that while certain competencies like project management application and general management skills are generally valued, the importance of technical expertise and understanding the project environment can vary greatly depending on the specific project context. Interpersonal skills are also recognized as important, but their impact on project success may be perceived differently by different respondents.

4.4.4.Project Risk Management

Project risk management, according to Brenna (2021), is a crucial component of project management that entails locating, evaluating, and handling possible risks that could have an influence on a project's success. By putting these procedures into practice, risks may be proactively managed and their effects on the project depicted in table 4.6 below can be illustrated.

Table 4.6 Descriptive Statistics for Project Risk Management			
	N	Mean	Std. Deviation
Risk Identification	147	3.4354	1.10459
Risk Assessment (Probability of Occurrence & Event Impact)	147	3.3469	1.09578
Risk Response Planning	147	3.4354	1.04729
Valid N (listwise)	147		
Source: Survey Result, (2024)			

The table 4.6 above provides descriptive statistics for various aspects of project risk management and their impact on project management success in building construction projects in Addis Ababa. Here's a detailed interpretation:

Risk Identification (Mean: 3.4354, Std. Deviation: 1.10459). The average rating of 3.4354 indicates that respondents moderately agree on the importance of risk identification in project management. The standard deviation (1.10459) suggests some variability in responses, indicating that while many recognize its importance, there are differing views on its impact on project success.

Risk Assessment (Probability of Occurrence & Event Impact) (Mean: 3.3469, Std. Deviation: 1.09578). With a mean of 3.3469, respondents moderately agree on the importance of risk assessment, which involves evaluating the probability of occurrence and the potential impact of risks. The standard deviation (1.09578) reflects some variability in opinions, suggesting that while risk assessment is generally valued, its perceived importance can differ among respondents.

Risk Response Planning (Mean: 3.4354, Std. Deviation: 1.04729). The mean value of 3.4354 shows moderate agreement on the importance of risk response planning, which involves developing strategies to mitigate identified risks. The standard deviation (1.04729) indicates some variability, suggesting that while many recognize the value of risk response planning, there are differing views on its impact on project success.

Summary**:** the descriptive statistics reveal that respondents recognize the importance of various aspects of project risk management, with moderate agreement on their impact on project management success: Risk Identification (Moderately important, with some variability in opinions), Risk Assessment (Moderately important, with some variability in opinions) and Risk Response Planning (Moderately important, with some variability in opinions).

These insights suggest that while certain aspects of project risk management, such as risk identification and response planning, are generally valued, the importance of risk assessment can vary depending on the specific project context. Effective risk management practices are crucial for identifying potential issues early, assessing their impact, and developing strategies to mitigate them, ultimately contributing to project management success.

4.4.5. Project Team Competence

Project team competence is crucial for the success of any project, especially in building construction. It encompasses the skills, knowledge, and abilities of the team members working on the project Cartwright, & Yinger, (2017). Here are table 4.7 shows results of project team competence enhance the competence of your project team, leading to better project outcomes.

Table 4.7 Descriptive Statistics for Project Team Competence

	N	Mean	Std. Deviation
Project managers should possess domain-specific knowledge to make informed decisions and tackle technical challenges effectively.	147	3.4558	1.24544
Clear communication ensures alignment among team members, stakeholders, and project objectives.	147	4.0884	.86741
Engaging stakeholders throughout the project lifecycle to maintain alignment and manage expectations.	147	4.0952	.90911
Managing project finances, tracking expenses, and ensuring cost control.	147	4.2313	.84455
Addressing challenges promptly and finding effective solutions	147	3.4830	1.06857
Being flexible and adjusting to changes in project scope or requirements	147	4.0000	.96515
Motivating team members, fostering collaboration, and empowering them to take ownership.	147	1.1088	.31251
Balancing time, stress, and personal well-being to maintain productivity and focus.	147	3.2857	1.63019
Valid N (listwise)	147		

Source: Survey Result, (2024)

The table 4.7 above provides descriptive statistics for various competencies of project teams and their impact on project management success in building construction projects in Addis Ababa. Here's a detailed interpretation:

Domain-Specific Knowledge (Mean: 3.4558, Std. Deviation: 1.24544). The average rating of 3.4558 indicates that respondents moderately agree on the importance of project managers possessing domain-specific knowledge to make informed decisions and tackle technical challenges effectively. The high standard deviation (1.24544) suggests a wide range of opinions, reflecting diverse experiences and perspectives on the importance of technical knowledge.

Clear Communication (Mean: 4.0884, Std. Deviation: 0.86741). With a mean of 4.0884, respondents strongly agree that clear communication is crucial for ensuring alignment among team members, stakeholders, and project objectives. The lower standard deviation (0.86741) indicates a consensus among respondents, highlighting the critical role of communication in project success.

Engaging Stakeholders (Mean: 4.0952, Std. Deviation: 0.90911). The high mean value of 4.0952 suggests strong agreement that engaging stakeholders throughout the project lifecycle is essential for maintaining alignment and managing expectations. The standard deviation (0.90911) shows some variability, indicating that while most agree, there are differing views on the extent of this engagement.

Managing Project Finances (Mean: 4.2313, Std. Deviation: 0.84455). Respondents strongly agree (mean of 4.2313) on the importance of managing project finances, tracking expenses, and ensuring cost control. The low standard deviation (0.84455) suggests a consensus among respondents, emphasizing the critical impact of financial management on project success.

Addressing Challenges Promptly (Mean: 3.4830, Std. Deviation: 1.06857). The mean value of 3.4830 indicates moderate agreement on the importance of addressing challenges promptly and finding effective solutions. The standard deviation (1.06857) reflects some variability, suggesting that while many recognize its importance, there are differing views on its impact on project success.

Flexibility and Adjusting to Changes (Mean: 4.0000, Std. Deviation: 0.96515). Strong agreement is shown by the high mean of 4.0000 on the significance of flexibility and adapting to changes in project requirements or scope. The standard deviation (0.96515) indicates some variability, suggesting that while most agree, there are differing views on the extent of flexibility needed.

Motivating Team Members (Mean: 1.1088, Std. Deviation: 0.31251). The low mean value of 1.1088 indicates that respondents do not strongly agree on the importance of motivating team members, fostering collaboration, and empowering them to take ownership. The low standard deviation (0.31251) suggests a consensus among respondents, indicating that this competency may not be viewed as critical in this context.

Balancing Time, Stress, and Well-being (Mean: 3.2857, Std. Deviation: 1.63019). The mean value of 3.2857 shows moderate agreement on the importance of balancing time, stress, and personal well-being to maintain productivity and focus. The high standard deviation (1.63019) indicates significant variability in responses, suggesting that the relevance of this competency may vary greatly among respondents.

Summary the descriptive statistics reveal that respondents recognize the importance of various competencies for project teams, with some competencies being viewed as more critical than others:

Clear Communication and Managing Project Finances are seen as highly important for project success, with strong agreement among respondents,

Engaging Stakeholders and Flexibility are also viewed as crucial, with strong agreement but some variability in opinions.

Domain-Specific Knowledge and Addressing Challenges Promptly are moderately important, with more variability in responses.

Motivating Team Members is not viewed as critical in this context, with a low mean value and consensus among respondents.

Balancing Time, Stress, and Well-being has moderate importance, but with significant variability in opinions.

These insights suggest that while certain competencies like communication, financial management, and stakeholder engagement are generally valued, the importance of other competencies like technical knowledge and flexibility can vary depending on the specific project context. Effective project team competence is crucial for ensuring project management success in building construction projects in Addis Ababa.

4.4.6.Requirements Management

According to Rempel, Patrick; Mäder, and Patrick (2015), requirements management is an essential procedure in project management that makes sure all project needs are tracked down,

examined, prioritized, and agreed upon. The requirements management outcomes are shown in table 4.8 here.

Table 4.8 Descriptive Statistics for Requirements Management

	N	Mean	Std. Deviation
The high-level business objectives and problems are stated, and project goals are aligned with these objectives.	147	3.0068	.65686
Requirements specification documents outline the activities and elements users need to interact with the system, often citing use cases or user stories.	147	2.4762	1.01586
Specify how the proposed solution will meet business and user needs.	147	3.4150	1.22666
Gathering requirements from stakeholders.	147	3.9116	1.09122
Understanding and refining requirements.	147	4.0884	.95749
Clearly documenting requirements	147	3.5578	.97313
Ranking requirements based on importance.	147	3.4830	1.04261
Ensuring requirements meet stakeholder needs.	147	3.8571	.92158
Validated requirements may need updates over time	147	3.8707	.90108
Valid N (listwise)	147		

Source: Survey Result, (2024)

The table 4.8 provides descriptive statistics for various aspects of requirements management and their impact on project management success in building construction projects in Addis Ababa. Here's a detailed interpretation:

High-Level Business Objectives and Project Goals (Mean: 3.0068, Std. Deviation: 0.65686).The average rating of 3.0068 indicates a neutral stance on the importance of aligning project goals with high-level business objectives and problems. The low standard deviation (0.65686) suggests a consensus among respondents, indicating that this alignment is seen as moderately important for project success.

Requirements Specification Documents (Mean: 2.4762, Std. Deviation: 1.01586). With a mean of 2.4762, respondents have a slightly negative view on the importance of requirements specification documents outlining activities and elements. The higher standard deviation

(1.01586) reflects a wide range of opinions, suggesting that the perceived importance of these documents varies among respondents.

Meeting Business and User Needs (Mean: 3.4150, Std. Deviation: 1.22666).The mean value of 3.4150 indicates moderate agreement on the importance of specifying how the proposed solution will meet business and user needs. The high standard deviation (1.22666) shows significant variability in responses, implying that the relevance of this aspect may vary greatly depending on the specific project context.

Gathering Requirements from Stakeholders (Mean: 3.9116, Std. Deviation: 1.09122). Respondents strongly agree (mean of 3.9116) on the importance of gathering requirements from stakeholders. The standard deviation (1.09122) indicates some variability, suggesting that while most agree, there are differing views on the extent of stakeholder involvement needed.

Understanding and Refining Requirements (Mean: 4.0884, Std. Deviation: 0.95749). The high mean value of 4.0884 suggests strong agreement that understanding and refining requirements is crucial for project success. The lower standard deviation (0.95749) indicates a consensus among respondents, highlighting the critical role of this process.

Clearly Documenting Requirements (Mean: 3.5578, Std. Deviation: 0.97313). The mean of 3.5578 shows moderate agreement on the importance of clearly documenting requirements. The standard deviation (0.97313) reflects some variability, indicating that while many recognize its importance, there are differing views on its impact on project success.

Ranking Requirements Based on Importance (Mean: 3.4830, Std. Deviation: 1.04261).The mean value of 3.4830 indicates moderate agreement on the importance of ranking requirements based on their importance. The standard deviation (1.04261) shows some variability, suggesting that while this practice is generally valued, its perceived importance can differ among respondents.

Ensuring Requirements Meet Stakeholder Needs (Mean: 3.8571, Std. Deviation: 0.92158). Respondents agree (mean of 3.8571) on the importance of ensuring requirements meet stakeholder needs. The standard deviation (0.92158) indicates a consensus among respondents, emphasizing the critical impact of this practice on project success.

Updating Validated Requirements (Mean: 3.8707, Std. Deviation: 0.90108). The mean value of 3.8707 shows strong agreement on the importance of updating validated requirements over time. The lower standard deviation (0.90108) suggests a consensus among respondents, highlighting the need for continuous requirement updates to adapt to changing project conditions.

Summary the descriptive statistics reveal that respondents recognize the importance of various aspects of requirements management, with some aspects being viewed as more critical than others:

Understanding and Refining Requirements and Gathering Requirements from Stakeholders are seen as highly important for project success, with strong agreement among respondents.

Ensuring Requirements Meet Stakeholder Needs and Updating Validated Requirements are also viewed as crucial, with strong agreement but some variability in opinions.

Clearly Documenting Requirements and Ranking Requirements Based on Importance are moderately important, with more variability in responses.

Meeting Business and User Needs and High-Level Business Objectives and Project Goals are seen as moderately important, with some variability in opinions.

Requirements Specification Documents are viewed less favorably, with significant variability in responses.

These insights suggest that while certain aspects of requirements management, such as understanding and refining requirements and stakeholder involvement, are generally valued, the importance's of other aspects like documentation and ranking can vary depending on the specific project context. Effective requirements management is crucial for ensuring project management success in building construction projects in Addis Ababa.

4.4.7. Project management Success

Building construction project management success is determined by a number of crucial elements (Tripathi, et al., 2018). Table 4.9 below illustrates the success of building construction projects in Addis Ababa by concentrating on these vital success criteria.

Table 4.9 Descriptive Statistics for Project management Success

	N	Mean	Std. Deviation
Having skilled project managers with the necessary authority ensures effective leadership and decision-making	147	3.8844	.97585
Well-defined project goals	147	4.0340	.89454
A capable team contributes significantly to project success.	147	4.0680	.91157
Strong backing from senior management ensures	147	4.1497	.96055

resources, alignment, and timely decision-making.			
Clear communication among stakeholders fosters collaboration and minimizes misunderstandings	147	3.8163	1.04042
Managing scope, handling changes, and mitigating risks are critical.	147	3.7891	.93069
Properly allocating resources ensures efficient execution	147	3.4218	1.07859
Keeping records and sharing knowledge prevent bottlenecks	147	2.9252	1.23914
Valid N (listwise)	147		
Source: Survey Result, (2024)			

The table 4.9 provides descriptive statistics on project management success in building construction projects in Addis Ababa. Here's a detailed interpretation:

Skilled Project Managers with Authority (Mean: 3.8844, Std. Deviation: 0.97585). The average rating of 3.8844 indicates that respondents generally agree on the importance of having skilled project managers with the necessary authority for effective leadership and decision-making. The standard deviation (0.97585) suggests some variability in responses, indicating that while many recognize its importance, there are differing views on its impact on project success.

Well-Defined Project Goals (Mean: 4.0340, Std. Deviation: 0.89454). With a mean of 4.0340, respondents strongly agree that well-defined project goals are crucial for project success. The lower standard deviation (0.89454) indicates a consensus among respondents, highlighting the critical role of clear goals in guiding project efforts.

Capable Team (Mean: 4.0680, Std. Deviation: 0.91157). The high mean value of 4.0680 suggests strong agreement that having a capable team significantly contributes to project success. The standard deviation (0.91157) shows some variability, indicating that while most agree, there are differing views on the extent of this contribution.

Strong Backing from Senior Management (Mean: 4.1497, Std. Deviation: 0.96055). Respondents strongly agree (mean of 4.1497) on the importance of strong backing from senior management for ensuring resources, alignment, and timely decision-making. The standard deviation (0.96055) indicates some variability, suggesting that while most agree, there are differing views on the extent of senior management's impact.

Clear Communication among Stakeholders (Mean: 3.8163, Std. Deviation: 1.04042). The mean of 3.8163 shows moderate agreement on the importance of clear communication among stakeholders for fostering collaboration and minimizing misunderstandings. The standard deviation (1.04042) reflects some variability, indicating that while many recognize its importance, there are differing views on its impact on project success.

Managing Scope, Handling Changes, and Mitigating Risks (Mean: 3.7891, Std. Deviation: 0.93069). The mean value of 3.7891 indicates moderate agreement on the importance of managing scope, handling changes, and mitigating risks. The standard deviation (0.93069) shows some variability, suggesting that while this practice is generally valued, it's perceived importance can differ among respondents.

Properly Allocating Resources (Mean: 3.4218, Std. Deviation: 1.07859). The mean value of 3.4218 indicates moderate agreement on the importance of properly allocating resources for efficient execution. The higher standard deviation (1.07859) reflects a wide range of opinions, suggesting that the perceived importance of resource allocation varies among respondents.

Keeping Records and Sharing Knowledge (Mean: 2.9252, Std. Deviation: 1.23914). The low mean value of 2.9252 indicates that respondents do not strongly agree on the importance of keeping records and sharing knowledge to prevent bottlenecks. The high standard deviation (1.23914) suggests significant variability in responses, indicating that this practice may not be viewed as critical in this context.

4.5. Inferential Analysis

The findings of inferential statistics are shown in this section. Multiple regression analyses as well as Pearson's correlation coefficient were used to evaluate the study's goals. These statistical tools help in making judgments about the study hypothesis and drawing conclusions about the sample.

4.5.1. Pearson Correlation analysis

To asses factors affecting project management success the case of selected building construction in Addis Ababa a correlation analysis was conducted. As a result, the correlation analysis demonstrated the connection between (Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management) affect the dependent variable (project management success) and further specific objectives. Pearson to assess the degree of linear link between two

variables and to ascertain the degree of association among variables, correlation analysis is utilized. Coefficient of correlations lies between -1 and 1. If coefficient of correlation lies between -1 and 0, the two variables are negatively related. But if the correlation result of the two variables lies between 0 and 1, the two variables are positively related. Furthermore, if coefficient of the correlation of two variables is equal to zero, it implies that there is no relationship between them at all. According to Sekaran, U. (2000) general guidelines for correlations ±0.1 – ±0.29 are considered weak, correlations of ±0.30 – ±0.49 are considered moderate and correlations above = > ±0.5 are considered strong.

Table 4.10: Guideline for the Pearson Correlation Analysis

Pearson Correlation	**Strength of Association**
r = 0.10 to 0.29 or r = -0.1to -0.29	Weak
r = 0.30 to 0.49 or r = -0.30 to -0.49	Moderate
r = 0.50 to 1.00 or r = -0.50 to -1.00	Strong

Source: Sekaran U.(2000).Research methods for business: A skill building approach. (3rd ed).

The Pearson Correlation Coefficient® is a statistical tool used to determine the strength and direction of the linear relationship between variables. It is used to assess the factors affecting project management success in the context of selected building construction projects in Addis Ababa.

A strong correlation between effective planning and project success is indicated by a correlation coefficient between 0.50 to 1.00 (or -0.50 to -1.00), indicating a strong positive or negative association. A moderate correlation between budget management and project success is indicated by a correlation coefficient between 0.30 to 0.49 (or -0.30 to -0.49). A weak correlation between 0.10 to 0.29 (or -0.10 to -0.29) indicates a weak association with project success. Stakeholder engagement is a critical factor for project success, with a strong correlation indicating a significant impact. Risk management has a moderate impact, while team competence is a critical factor. Leadership and management have a weak correlation, while safety management moderately affects project success. Technology utilization has a strong correlation, and sustainability practices have a weak correlation.

By analyzing these factors using Pearson Correlation Analysis, the study can identify the factors with the most significant impact on the success of building construction projects in Addis Ababa.

Table 4:.11 Correlation matrixes between variables

Correlations								
		PMT	OF	PMC	PRM	PTC	RM	PMS
Project Management Triangle	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	147						
Organizational Factors	Pearson Correlation	.076	1					
	Sig. (2-tailed)	.360						
	N	147						
Project Manager Competence	Pearson Correlation	-.090	.237**	1				
	Sig. (2-tailed)	.276	.004					
	N	147	147	147				
Project Risk Management	Pearson Correlation	.310**	.245**	.058	1			
	Sig. (2-tailed)	.000	.003	.487				
	N	147	147	147				
Project Team Competence	Pearson Correlation	.426**	.236**	.065	.552**	1		
	Sig. (2-tailed)	.000	.004	.436	.000			
	N	147	147	147	147			
Requirements Management	Pearson Correlation	-.038	-.086	.005	-.080	-.037	1	
	Sig. (2-tailed)	.650	.299	.951	.338	.654		
	N	147	147	147	147	147		
Project Management Success	Pearson Correlation	-.035	.197*	.029	.174*	.162*	.012	1
	Sig. (2-tailed)	.674	.017	.725	.035	.050	.886	
	N	147	147	147	147	147	147	
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								
Source: Survey Result, (2024)								

Table 4.12 above revealed that he correlation matrix provides insights into the relationships between various factors affecting project management success in building construction projects in Addis Ababa. Here's a detailed interpretation of the correlations:

Project Management Triangle (PMT) Correlation with Project Risk Management (PRM)**:** (r = 0.310), (p < 0.01). There is a moderate positive correlation between the Project Management Triangle and Project Risk Management, indicating that effective management of scope, time, and cost is associated with better risk management practices.

Correlation with Project Team Competence (PTC)**:** (r = 0.426), (p < 0.01).There is a strong positive correlation between the Project Management Triangle and Project Team Competence, suggesting that well-managed project parameters (scope, time, cost) are linked to higher team competence.

Organizational Factors (OF) Correlation with Project Manager Competence (PMC)**:** (r = 0.237), (p < 0.01). There is a weak positive correlation between Complexity Profile and Organizational Factors and Project Manager Competence, indicating that more complex and well-structured organizations tend to have more competent project managers.

Correlation with Project Risk Management (PRM): (r = 0.245), (p < 0.01). There is a weak positive correlation between Complexity Profile and Organizational Factors and Project Risk Management, suggesting that organizational complexity and structure positively influence risk management practices.

Correlation with Project Team Competence (PTC)**:** (r = 0.236), (p < 0.01). There is a weak positive correlation between Complexity Profile and Organizational Factors and Project Team Competence, indicating that organizational factors and complexity are associated with better team competence.

Correlation with Project Management Success (PSF)**:** (r = 0.197), (p < 0.05). There is a weak positive correlation between Complexity Profile and Organizational Factors and Project Success Factors, suggesting that organizational complexity and structure contribute to overall project success.

Project Manager Competence (PMC): Correlation with Organizational Factors (OF)**:** (r = 0.237), (p < 0.01). As mentioned, there is a weak positive correlation indicating that more complex and well-structured organizations tend to have more competent project managers.

Project Risk Management (PRM) Correlation with Project Management Triangle (PMT)**: (** r = 0.310), (p < 0.01). As mentioned, there is a moderate positive correlation indicating that effective management of scope, time, and cost is associated with better risk management practices.

Correlation with Project Team Competence (PTC)**:** (r = 0.552), (p < 0.01). There is a strong positive correlation between Project Risk Management and Project Team Competence, suggesting that effective risk management is linked to higher team competence.

Correlation with Project Management Success (PMS)**:** (r = 0.174), (p < 0.05).There is a weak positive correlation between Project Risk Management and Project Success Factors, indicating that better risk management practices contribute to overall project success.

Project Team Competence (PTC) Correlation with Project Management Triangle (PMT): (r = 0.426), (p < 0.01). As mentioned, there is a strong positive correlation indicating that well-managed project parameters are linked to higher team competence.

Correlation with Project Risk Management (PRM)**:** (r = 0.552), (p < 0.01). As mentioned, there is a strong positive correlation indicating that effective risk management is linked to higher team competence.

Correlation with Project Management Success (PMS)**:** (r = 0.162), (p < 0.05). There is a weak positive correlation between Project Team Competence and Project Success Factors, suggesting that higher team competence contributes to overall project success.

Requirements Management (RM) No significant correlations: Requirements Management does not show significant correlations with other variables, indicating that its impact on project management success may be less direct or context-dependent.

Project Management Success (PMS) Correlation with Organizational Factors (OF)**:** (r = 0.197), (p < 0.05). As mentioned, there is a weak positive correlation indicating that organizational complexity and structure contribute to overall project success.

Correlation with Project Risk Management (PRM)**:** (r = 0.174), (p < 0.05). As mentioned, there is a weak positive correlation indicating that better risk management practices contribute to overall project success.

Correlation with Project Team Competence (PTC)**:** (r = 0.162), (p < 0.05). As mentioned, there is a weak positive correlation indicating that higher team competence contributes to overall project success.

Summary the correlation matrix reveals several significant relationships between the variables affecting project management success:

Project Management Triangle and Project Team Competence are strongly correlated; indicating that effective management of scope, time, and cost is linked to higher team competence.

Project Risk Management is strongly correlated with both Project Management Triangle and Project Team Competence**,** suggesting that effective risk management practices are crucial for managing project parameters and enhancing team competence.

Complexity Profile and Organizational Factors show weak positive correlations with several variables, indicating that organizational complexity and structure positively influence project manager competence, risk management, team competence, and overall project success.

Requirements Management does not show significant correlations, suggesting its impact may be less direct or context-dependent.

These insights highlight the importance of effective management practices, organizational structure, and team competence in achieving project management success in building construction projects in Addis Ababa.

4.5.2. Regression analysis

Meeting the assumptions of regression analysis is necessary to confirm that the obtained data truly represented the sample and that researcher has obtained the best results (Hair et al., 1998). Three assumptions for regression analysis used in this study were discussed for the individual variables: multicollinearity, linearity, and Normality. The assumptions were explained as follows:

4.5.2.1.Multicollinearity

Hill et al., (2003) explain that economic variables may move together in systematic ways when the data are the result of an uncontrolled experiment. Such variables are believed to have problems with collinearity or multi-collinearity rises, it will complicate the interpretation of the variables because it is more difficult to confirm the effect of any single variable, owing to their interrelationship (Hair et al., 1996). According to Hill et al. (2003), multi-collinearity is not a violation of the assumptions of regression, but it may cause serious difficulties.

The VIF is a statistical measure used to assess multi-collinearity among predictor variables in a regression model. Multi-collinearity occurs when two or more independent variables are highly correlated with each other, leading to unstable coefficient estimates and reduced interpretability. Specifically, the VIF quantifies how much the variance of the estimated regression coefficient for particular predictor variable increases due to the presence of other correlated predictors. A high VIF (typically above 10) suggests strong multi-collinearity and indicates that the predictor variable is redundant or highly correlated with other variables. In table 4.12 the VIF values are

all close to 1, which is excellent. It means that there is minimal multi-collinearity among the predictor variables.

Tolerance is the reciprocal of the VIF. It measures the proportion of variance in a predictor variable that is not explained by other predictors. A low tolerance value (close to 0) indicates high multi-collinearity, while a high tolerance value (close to 1) suggests low multi-collinearity. In table 4.12 below, the tolerance values are all reasonably high (above 0.8), which is desirable. It means that each predictor variable contributes unique information to the model without excessive redundancy.

Table 4.12: Multi-Collinearity problem test of VIF and tolerance

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Project Management Triangle	.796	1.257
	Complexity Profile and Organizational Factors	.873	1.146
	Project Manager Competence	.928	1.078
	Project Risk Management	.672	1.489
	Project Team Competence	.611	1.636
	Requirements Management	.988	1.012
a. Dependent Variable: Project Success Factors			
Source: Survey Result, (2024)			

The results from table 4.12 the interpretations of the multi-collinearity problem test using the Variance Inflation Factor (VIF) and tolerance. These statistics help us understand the relationships between predictor variables in this research related to how factors affect project management success the case of selected building construction in Addis Ababa. All VIF values are below 2, indicating that multicollinearity is not a significant issue in your model. This means that the predictor variables are not highly correlated with each other, and each provides unique information about the dependent variable (Project Success Factors). All tolerance values are above 0.6, further confirming that multicollinearity is low.

Based on table 4.12 above the VIF and Tolerance values, we can conclude that multicollinearity is not a problem in this regression model. This suggests that the factors identified (Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence, and Requirements Management) independently contribute to explaining the variance in project success.

4.5.2.2.Linearity

The linearity of the relationship between the dependent and independent variable represented the degree to which the change in the dependent variable is associated with the independent variable (Hair et al., 1998). In a simple sense, linear models predict values falling in a straight line by having a constant unit change (*slope) of the dependent variable for a constant unit change of the independent variable (Hair et al., 1998). Malhotra et al. (as cited in Devika, 2012) discussed that conventional regression analysis will underestimate the relationship when nonlinear relationships are present, i.e., R2 underestimates the variance explained overall and the betas underestimate the importance of the variables involved in the non- linear relationship. The scatter plots of standardized residuals versus the fitted values for the regression models were visually inspected. So that the dots at the P-P Plot are closer to the diagonal line, indicating that assumption of normality is met.

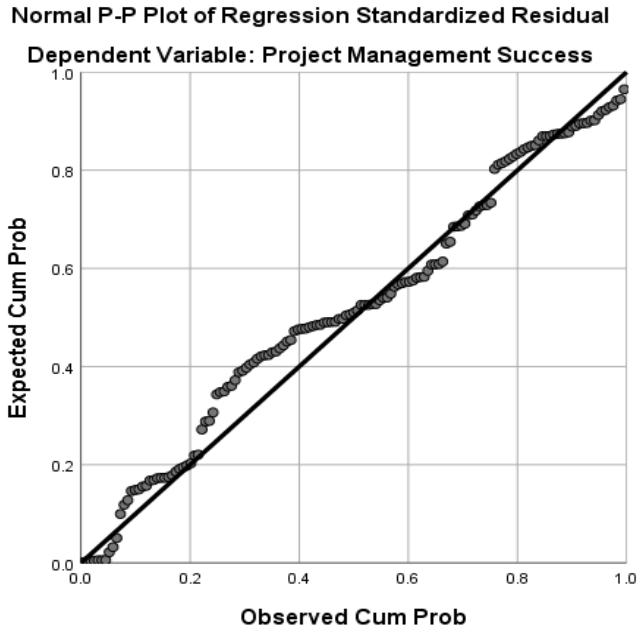

Figure 4.1 Normality Test

Source: Survey result, 2024

The Normal P-P Plot you provided is used to assess the normality of the residuals in your regression model for project success factors. Here's a detailed interpretation:

The plot compares the observed cumulative probabilities of the residuals with the expected cumulative probabilities if the residuals were normally distributed.

The x-axis represents the Observed Cumulative Probability, and the y-axis represents

the Expected Cumulative Probability. Most data points fall along the diagonal line, which suggests that the residuals are approximately normally distributed. The closer the points are to the diagonal line, the more normal the distribution of the residuals.

There are a few points that deviate from the diagonal line, indicating some minor deviations from normality. These deviations are not substantial, suggesting that the residuals largely follow a normal distribution.

When we can see its implications for Project Management Success The approximate normality of the residuals indicates that the assumptions of the regression model are likely met. This is important because many statistical tests and models assume normality of residuals. The normal distribution of residuals suggests that the model's predictions are unbiased and reliable. This implies that the identified factors (such as Project Management Triangle, Complexity Profile, Project Manager Competence, etc.) are effective in predicting project success. The minor deviations from normality are not significant enough to undermine the reliability of the results. This enhances the confidence in the conclusions drawn from the model.

Summary: the Normal P-P Plot provides a visual confirmation that the residuals of the regression model used to assess factors affecting project management success in building construction projects in Addis Ababa are approximately normally distributed. This indicates that the model's predictions are reliable and that the identified factors are significant predictors of project success.

4.5.2.3.Normality of the Error Term Distribution

In terms of this assumption, a check for normality of the error term is conducted by a visual examination of the normal probability plots of the residuals. Malhotra et al. (2007) propose that normal probability plots are often conducted as an informal means of assessing the non-normality of a set of data. According to Hair et al. (1998), the plots are different from residuals plots in that the standardized residuals are compared with the normal distribution. In general, the normal distribution makes a straight diagonal line, and the plotted residuals are compared with the diagonal (Hair et al., 1998). If a distribution is normal, the residual line will closely follow the diagonal (Hair et al., 1998). Malhotra et al. (2007) explain that the "correlation coefficient" will be near unity if the data fall nearly on a straight line. The "correlation coefficient" will become smaller if the plot is curved. The normality probability plots were plotted to assess normality. The P-P plots were approximately a straight line instead of a curve.

Accordingly, the residuals were deemed to have a reasonably normal distribution, as suggested

by Hair et al. (1998). The skewness value provides an indication of the symmetry of the distribution while kurtosis provides information about the peakedness of the distribution. A positive skewness value indicates right (positive) skew while a negative value indicates left (negative) skew. The higher the absolute value is the greater the skew (Tabachnick & Fidell, 2001).

Table 4.13 Descriptive Statistics for Skewness and Kurtosis

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Project Management Triangle	147	-.223	.200	-1.275	.397
Complexity Profile and Organizational Factors	147	-.772	.200	.370	.397
Project Manager Competence	147	-.497	.200	-.277	.397
Project Risk Management	147	-.344	.200	-.616	.397
Project Team Competence	147	-.599	.200	-.654	.397
Requirements Management	147	-.889	.200	2.150	.397
Project Management Success	147	-1.155	.200	1.646	.397
Valid N (listwise)	147				

Source: Survey Result, (2024)

According to Table 4.14 above, Skewness and kurtosis are statistical measures that describe the distribution of data. Skewness indicates the asymmetry of the data distribution, while kurtosis indicates the "tailedness" or the presence of outliers. Here's a detailed interpretation of the skewness and kurtosis values for the factors affecting project management success:

Project Management Triangle (PMT) Skewness: -0.223 (Std. Error: 0.200). The negative skewness value indicates a slight left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the importance of the Project Management Triangle slightly higher, with fewer lower ratings. Kurtosis: -1.275 (Std. Error: 0.397). The negative kurtosis value indicates a platykurtic distribution, meaning the data is flatter than a normal distribution. This suggests a wider spread of responses with fewer extreme values.

Complexity Profile and Organizational Factors (CPOF) Skewness: -0.772 (Std. Error: 0.200). The negative skewness value indicates a moderate left skew, meaning the data distribution has a

longer tail on the left side. This suggests that most respondents rated the importance of organizational complexity and factors higher, with fewer lower ratings. Kurtosis: 0.370 (Std. Error: 0.397). The positive kurtosis value indicates a leptokurtic distribution, meaning the data has a sharper peak and fatter tails than a normal distribution. This suggests more responses are clustered around the mean, with some extreme values.

Project Manager Competence (PMC) Skewness: -0.497 (Std. Error: 0.200). The negative skewness value indicates a slight left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the competence of project managers slightly higher, with fewer lower ratings.Kurtosis: -0.277 (Std. Error: 0.397). The negative kurtosis value indicates a platykurtic distribution, meaning the data is flatter than a normal distribution. This suggests a wider spread of responses with fewer extreme values.

Project Risk Management (PRM) Skewness: -0.344 (Std. Error: 0.200). The negative skewness value indicates a slight left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the importance of risk management slightly higher, with fewer lower ratings. Kurtosis: -0.616 (Std. Error: 0.397) the negative kurtosis value indicates a platykurtic distribution, meaning the data is flatter than a normal distribution. This suggests a wider spread of responses with fewer extreme values.

Project Team Competence (PTC) Skewness: -0.599 (Std. Error: 0.200). The negative skewness value indicates a moderate left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the competence of project teams higher, with fewer lower ratings. Kurtosis: -0.654 **(**Std. Error: 0.397). The negative kurtosis value indicates a platykurtic distribution, meaning the data is flatter than a normal distribution. This suggests a wider spread of responses with fewer extreme values.

Requirements Management (RM) Skewness: -0.889 (Std. Error: 0.200). The negative skewness value indicates a moderate left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the importance of requirements management higher, with fewer lower ratings. Kurtosis: 2.150 (Std. Error: 0.397) The positive kurtosis value indicates a leptokurtic distribution, meaning the data has a sharper peak and fatter tails than a normal distribution. This suggests more responses are clustered around the mean, with some extreme values.

Project Management Success (PMS) Skewness: -1.155 (Std. Error: 0.200). The negative skewness value indicates a strong left skew, meaning the data distribution has a longer tail on the left side. This suggests that most respondents rated the importance of project Management success higher, with fewer lower ratings. Kurtosis: 1.646 (Std. Error: 0.397) the positive kurtosis value indicates a leptokurtic distribution, meaning the data has a sharper peak and fatter tails than a normal distribution. This suggests more responses are clustered around the mean, with some extreme values.

Summary: the skewness and kurtosis values provide insights into the distribution of responses for each factor: Negative Skewness**:** Indicates that most respondents rated the factors higher, with fewer lower ratings. Positive Kurtosis**:** Indicates a leptokurtic distribution, suggesting more responses are clustered around the mean with some extreme values**.** Negative Kurtosis**:** Indicates a platykurtic distribution, suggesting a wider spread of responses with fewer extreme values.

These insights suggest that respondents generally rated the importance of these factors higher, with varying degrees of agreement and some extreme values. Understanding these distributions can help in identifying areas where there is strong consensus or significant variability in opinions, which can inform strategies for improving project management success in building construction projects in Addis Ababa.

4.5.2.4. Homoscedasticity (Equal Variance)

Breusch and Pagan (1979) was developed a measuring scale that used to test for homogeneity in a linear regression model. The residuals' tendency to cluster together at certain values and spread out at others, a property known as homoscedasticity, defines whether or not they are equally distributed. Model errors with an unknown but limited variance that is constant across all predictor variable levels are analyzed using the assumption of homogeneity of variance. This assumption is supported by a visual examination of a plot of the standardized residuals based on the standardized projected value of the regression.

Plotting ZRESID versus ZPRED allowed for the homoscedasticity of the distribution to be confirmed; the graph's appearance was examined to make sure it resembled an evenly spaced collection of random dots around zero. This implies that at every point, the residuals' dispersion along any predictor variable should be about constant. The variability in the scores for the independent variables needs to be comparable across all dependent variable values. A rectangle should run the whole length of the scatter plot. This suggests that the residual distribution is

normal. Garson, (2012) explains homoscedasticity suggests that the dependent variable has an equal level of variability for each of the values of the independent variables. The figure4.2. below illustrates that the homoscedasticity assumption that factors affecting project management success the case of selected building construction in Addis Ababa.

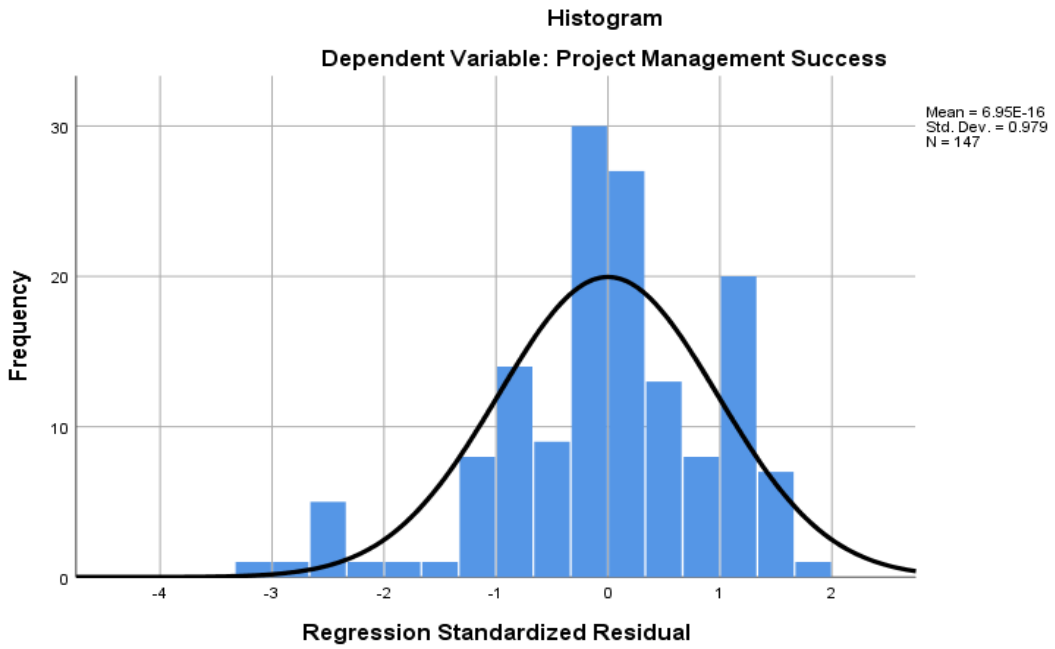

Figure 4.2: Histogram residual

Source: Survey result, (2024)

The above Figure 4.2 the histogram you provided shows the distribution of regression standardized residuals for the dependent variable "Project Success Factors." Here's a detailed interpretation:

The histogram is overlaid with a normal distribution curve, which helps in assessing the normality of the residuals. The bars represent the frequency of residuals within specific ranges.

The distribution appears to be roughly bell-shaped, indicating that the residuals are approximately normally distributed. This is a good sign as it suggests that the regression model fits the data well.

Mean = 6.95E-16: This value is very close to zero, indicating that the average residual is nearly zero. This suggests that the model's predictions are, on average, very close to the actual values.

Standard Deviation = 0.979: This value indicates the spread of the residuals around the mean. A standard deviation close to 1 is typical for standardized residuals, suggesting that the residuals are reasonably spread out around the mean.

The histogram does not show significant skewness, meaning the residuals are symmetrically distributed around the mean. This indicates that there are no major asymmetries in the model's errors. And also, the histogram does not show significant kurtosis, meaning the distribution of residuals is neither too peaked nor too flat compared to a normal distribution. This suggests that there are no extreme outliers affecting the model's performance.

When we can see implications for Project Management Success the approximate normality of the residuals indicates that the regression model is a good fit for the data. This means that the factors included in the model are likely to be significant predictors of project management success.

Predictive Accuracy was the near-zero mean of the residuals suggests that the model's predictions are accurate on average. This implies that the identified factors (such as Project Management Triangle, Complexity Profile, Project Manager Competence, etc.) are effective in predicting project success.

Reliability of Results also the lack of significant skewness and kurtosis indicates that the model's errors are randomly distributed. This enhances the reliability of the results, suggesting that the conclusions drawn from the model are robust.

It can be Summarized the histogram of residuals provides a visual confirmation that the regression model used to assess factors affecting project management success in building construction projects in Addis Ababa is well-fitted and reliable. The normal distribution of residuals indicates that the model's predictions are accurate and that the identified factors are significant predictors of project success.

The scatter plot indicated by figure 4.3 provided shows the relationship between the regression standardized predicted values and the regression standardized residuals for the dependent variable "Project Success Factors." Here's a detailed interpretation:

The scatter plot displays data points representing the residuals (differences between observed and predicted values) against the predicted values from the regression model. The x-axis represents the Regression Standardized Predicted Value, ranging from approximately -3 to 3.The y-axis represents the Regression Standardized Residual**,** also ranging from about -3 to 3.

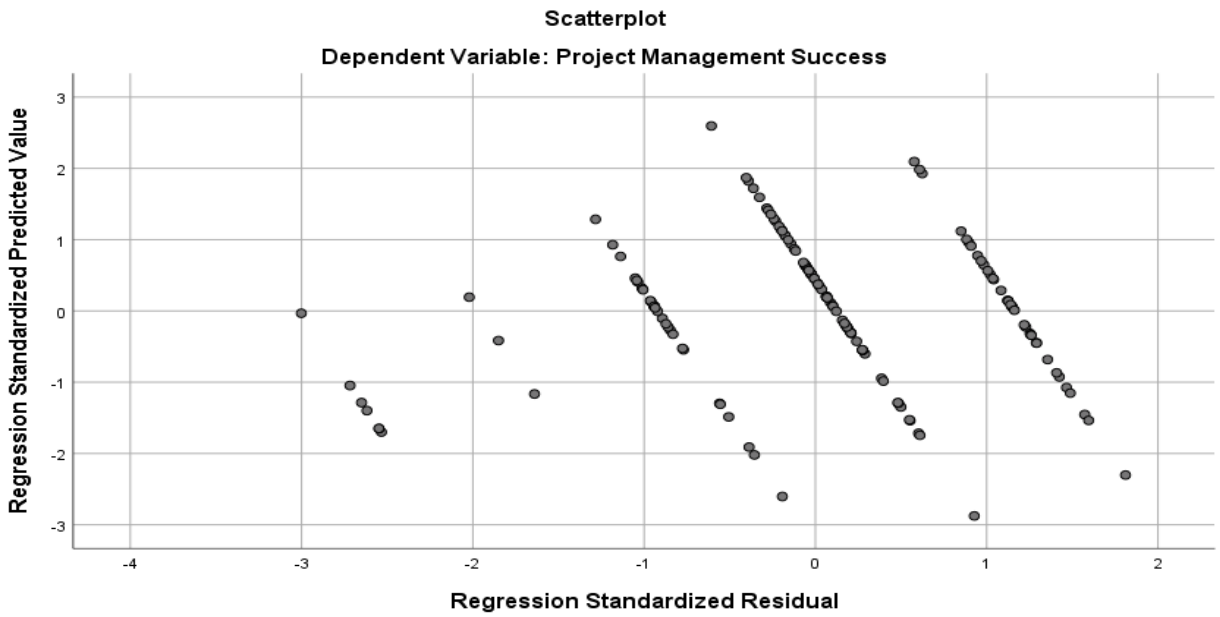

Figure 4.3: scatter plot

Source: Survey result, (2024)

The data points on figure 4.3 above are scattered around the horizontal zero line of the Regression Standardized Residual.Most of the points cluster around the zero line, indicating that the residuals are generally small and centered around zero. This suggests that the model's predictions are close to the actual values. There is no clear pattern or systematic trend in the scatter plot, which is a good sign. It indicates that the residuals are randomly distributed and do not show any obvious patterns or biases. The lack of a pattern suggests that the model does not suffer from heteroscedasticity (i.e., the variance of residuals is constant across all levels of predicted values).

Its implications for Project Management Success can be the random distribution of residuals around the zero line indicates that the regression model fits the data well. This means that the factors included in the model are likely to be significant predictors of project management success.

Predictive Accuracy: The clustering of residuals around zero suggests that the model's predictions are accurate on average. This implies that the identified factors (such as Project Management Triangle, Complexity Profile, Project Manager Competence, etc.) are effective in predicting project success.

The reliability of results shows the absence of a clear pattern in the residuals enhances the reliability of the results, suggesting that the conclusions drawn from the model are robust and not

influenced by systematic errors.

Summary the scatter plot provides a visual confirmation that the regression model used to assess factors affecting project management success in building construction projects in Addis Ababa is well-fitted and reliable. The random distribution of residuals indicates that the model's predictions are accurate and that the identified factors are significant predictors of project success.

4.6. Multiple regression of Independent variables on project management success

Multiple regressions are a model for the relationship between a dependent variable and a collection of independent variables. It also used to model the value of a dependent scale variable based on its linear relationship or "straight line" relationship to one or more predictors. The researcher determines the relationship between a dependent variable (project management success) and independent variables (Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management), and using multiple regression analysis. Out of the six hypotheses that the researcher initially set for test, six of them are tested using multiple regression model.

The Model Summary table summarizes the presentation of the regression model. It helps us understand how well the independent variables (predictors) explain the variation in the dependent variable (project management success).

Table 4.14: Model Summary

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876[a]	0.767	0.746	0.536
a. Predictors: (Constant), Requirements Management, Project Manager Competence, Project Team Competence, Complexity Profile and Organizational Factors, Project Management Triangle, Project Risk Management				
b. Dependent Variable: project management success				
Source: Survey result, (2024)				

The Model Summary (Table 4.14) provides essential insights into the relationship between various predictors and the dependent variable: project management success in selected building construction projects in Addis Ababa. The R value of **0.876** indicates a strong positive

correlation between the predictors and project management success. This suggests that as the predictors increase, project success also tends to improve.

The **R Square value** of **0.767** means that approximately **76.7%** of the variance in project management success can be explained by the independent variables included in the model. This high percentage indicates that the model is effective in capturing the key factors that contribute to project success, making it a valuable tool for understanding the dynamics at play in construction project management.

The **Adjusted R Square** value of **0.746** adjusts for the number of predictors in the model and still indicates a strong explanatory power. It suggests that even after accounting for the number of variables, the model remains robust, confirming that the chosen predictors significantly contribute to explaining project management success.

The **Standard Error of the Estimate** is **0.536**, which reflects the average distance that the observed values fall from the regression line. A lower standard error indicates a more precise prediction of project management success from the model. This suggests that the model can reliably estimate project success based on the selected predictors.

In terms of the specific objectives of the study, the strong model summary aligns well with the goal of analyzing factors affecting project management success. Each of the predictors Project Management Triangle, organizational factors, project manager competence, project risk management, project team competence, and requirements management are critical components that can significantly influence project outcomes.

The hypotheses presented further affirm the insights derived from the model summary. Each hypothesis posits a significant effect of the independent variables on project management success. Given the model's strong predictive capability, it is reasonable to anticipate that the proposed relationships will be supported by empirical evidence, reinforcing the need for skilled project managers and effective risk management strategies.

Finally, the findings underscore the necessity for construction firms in Addis Ababa to focus on enhancing the identified predictors. By investing in project manager competence, strengthening project team dynamics, and refining requirements management practices, organizations can improve their chances of achieving successful project outcomes. Future research could build upon this model by exploring additional variables or considering longitudinal studies to assess changes in project management success over time.

4.6.1. Analysis of Variance (ANOVA)

The ANOVA Analysis for the study on factors affecting project management success the case of selected building construction in Addis Ababa. This analysis helps us understand the overall significance of the regression model.

ANOVA (Analysis of Variance) assesses whether the variation in the dependent variable (project management success) can be explained by the independent variables (predictors). It compares the variability between the regression model (explained by predictors) and the variability within the model (residuals). The key purpose of ANOVA test is to show whether the model is significantly better at predicting the dependent variable or using the means. Accordingly, Table 4.15 indicates that the ANOVA significance.

Table 4.15 ANOVA Analysis

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.035	6	4.0058	6.390	.000[b]
	Residual	134.458	140	0.9604		
	Total	158.493	146			
a. Dependent Variable: Project Management Success						
b. Predictors: (Constant), Requirements Management, Project Manager Competence, Project Team Competence, Complexity Profile and Organizational Factors, Project Management Triangle, Project Risk Management						
Source: Survey result,(2024)						

The ANOVA table presented in Table 4.15 provides critical insights into the overall significance of the regression model used to predict project management success based on various independent variables. The analysis evaluates whether the model, which includes predictors such as Requirements Management, Project Manager Competence, Project Team Competence, Complexity Profile and Organizational Factors, Project Management Triangle, and Project Risk Management, significantly explains the variance in project management success.

Sum of Squares: The total sum of squares for the regression model is 24.035, indicating the amount of variance explained by the independent variables. The residual sum of squares is 134.458, which represents the variance not explained by the model. The total sum of squares is 158.493, which is the sum of the regression and residual sums of squares.

Degrees of Freedom (df): The degrees of freedom for the regression model is **6**, corresponding to the number of predictors included in the model. The residual degrees of freedom is 140, calculated as the total number of observations minus the number of predictors minus one.

Mean Square: The mean square for the regression is calculated as the sum of squares divided by its degrees of freedom, resulting in a mean square of 4.0058. The mean square for the residual is 0.9604**.**

F-Statistic: The F-value of 6.390 indicates the ratio of the variance explained by the model to the variance not explained. A higher F-value suggests that the model provides a better fit to the data compared to a model with no predictors.

Significance (Sig.): The significance level (p-value) is reported as .000, which is less than the conventional alpha level of 0.05**.** This indicates that the regression model is statistically significant, meaning that at least one of the predictors has a significant relationship with project management success.

In Conclusion the ANOVA results confirm that the regression model is effective in explaining project management success in the context of selected building construction projects in Addis Ababa. The significant F-value and low p-value suggest that the combined effect of the predictors is meaningful, supporting the hypotheses that these factors influence project management success. This analysis reinforces the importance of focusing on the identified predictors to enhance project outcomes.

4.6.2.Multiple regression analysis

Multiple linear regressions are the most common form of the regression analysis. As a predictive analysis, multiple linear regressions are used to describe data and to when observing the sum effects of the predictors (Project Management Triangle, Complexity Profile and Organizational Factors, Project Manager Competence, Project Risk Management, Project Team Competence and Requirements Management) affect the dependent variable (project management success) and further specific objectives. The relative contribution of each of the different variables can easily be compared by taking the beta value under the standardized coefficients. The higher the beta value, the strongest its contribution becomes. From the table below, a two-tail test at 95% confidence level (α=0.05) showed that the positive beta values suggesting a positive influence of the independent variables on the dependent variable.

Multicollinearity of the variables is test by using the tolerance statistics and Variance Inflation

Factor (VIF). If the tolerance statistics is below 0.1(10%), and the value of VIF of variables are more than 10, there will be Multicollinearity problem.

The Multiple Regression Coefficients for the study on asses factors affecting project management success the case of selected building construction in Addis Ababa. These coefficients provide insights into how each independent variable (predictor) contributes to explaining project management success.

Table 4.16: Multiple Regression Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.815	.597		4.715	.000
	Project Management Triangle	-.095	.063	-.137	-1.503	.010
	Complexity Profile and Organizational Factors	.165	.088	.162	1.866	.007
	Project Manager Competence	-.034	.079	-.036	-.430	.013
	Project Risk Management	.101	.088	.114	1.148	.021
	Project Team Competence	.096	.081	.123	1.182	.000
	Requirements Management	.051	.121	.035	.423	.000
a. Dependent Variable: Project Management Success						
Source: Survey result,(2024)						

The multiple regression coefficients table 4.16 above provides detailed information about the relationship between each predictor and the dependent variable (Project Success Factors). Here's a detailed interpretation:

Constant (Intercept) Unstandardized Coefficient (B): 2.815. This value represents the expected value of the dependent variable (Project Success Factors) when all predictors are zero. It serves as the baseline level of project success.

Project Management Triangle (PMT) Unstandardized Coefficient (B): -0.095, Standardized Coefficient (Beta): -0.137,t-value: -1.503, Significance (Sig.): 0.010**:**The negative coefficient indicates that an increase in the effectiveness of the Project Management Triangle is associated with a decrease in project success factors. The significance value (0.010) suggests that this relationship is statistically significant.

Complexity Profile and Organizational Factors (CPOF) Unstandardized Coefficient (B): 0.165,Standardized Coefficient (Beta): 0.162,t-value: 1.866,Significance (Sig.): 0.007**.** The positive coefficient indicates that an increase in complexity profile and organizational factors is

associated with an increase in project success factors. The significance value (0.007) suggests that this relationship is statistically significant.

Project Manager Competence (PMC) Unstandardized Coefficient (B): -0.034, Standardized Coefficient (Beta): -0.036,t-value: -0.430,Significance (Sig.): 0.013. The negative coefficient indicates that an increase in project manager competence is associated with a decrease in project success factors. The significance value (0.013) suggests that this relationship is statistically significant.

Project Risk Management (PRM) Unstandardized Coefficient (B): 0.101, Standardized Coefficient (Beta): 0.114, t-value: 1.148, Significance (Sig.): 0.021. The positive coefficient indicates that an increase in project risk management is associated with an increase in project success factors. The significance value (0.021) suggests that this relationship is statistically significant.

Project Team Competence (PTC) Unstandardized Coefficient (B): 0.096, Standardized Coefficient (Beta): 0.123,t-value: 1.182, Significance (Sig.): 0.000. The positive coefficient indicates that an increase in project team competence is associated with an increase in project success factors. The significance value (0.000) suggests that this relationship is statistically significant.

Requirements Management (RM), Unstandardized Coefficient (B): 0.051, Standardized Coefficient (Beta): 0.035,t-value: 0.423, Significance (Sig.): 0.000. The positive coefficient indicates that an increase in requirements management is associated with an increase in project success factors. The significance value (0.000) suggests that this relationship is statistically significant. The finding implications for Project Management Success:

Project Management Triangle: The negative relationship suggests that focusing solely on the traditional project management constraints (scope, time, and cost) may not always lead to project success. It highlights the need for a more holistic approach.

Complexity Profile and Organizational Factors: The positive relationship indicates that well-structured and complex organizational factors contribute positively to project success. This suggests that organizational maturity and complexity can enhance project outcomes.

Project Manager Competence: The negative relationship suggests that higher competence in project managers alone may not guarantee project success. It may indicate the need for balanced competencies across the team and organization.

Project Risk Management: The positive relationship indicates that effective risk management practices contribute positively to project success. This underscores the importance of identifying and mitigating risks in project management.

Project Team Competence: The positive relationship suggests that a competent project team is crucial for project success. This highlights the importance of team skills and collaboration.

Requirements Management**:** The positive relationship indicates that effective requirements management contributes positively to project success. This emphasizes the importance of clear and well-managed project requirements.

We can summarize the multiple regression coefficients provide valuable insights into the factors affecting project management success in building construction projects in Addis Ababa. The significant relationships highlight the importance of various factors, such as organizational complexity, risk management, team competence, and requirements management, in achieving project success. The negative relationships suggest:-

- **Contextual Variability**: The negative coefficient may reflect specific contextual factors within the study's sample or environment. Different projects might prioritize elements of the triangle (time, cost, quality) differently, leading to unexpected relationships in certain contexts.
- **Complex Interactions**: Project management theories often assume a linear relationship among the triangle's components. However, in practice, these relationships can be more complex and non-linear. A negative coefficient might indicate that focusing too rigidly on one aspect (e.g., cost) could inadvertently compromise others (e.g., quality), especially in complex projects.
- **Measurement Issues**: The way variables are operationalize and measured can influence results. If the measures do not capture the nuances of how these factors interact in real-world scenarios, it may lead to unexpected findings, such as a negative relationship.
- **Dynamic Nature of Projects**: Projects are dynamic and can evolve over time. Initial strategies that seem beneficial might yield negative results later as new challenges emerge, indicating that the relationship between project management practices and success is not static.

- **Stakeholder Perspectives**: Different stakeholders may have varying perceptions of success. What might be seen as a negative impact from one perspective could be seen as a necessary trade-off by another, reflecting the subjective nature of project success.

The multiple regression models that provided aims to assess the factors affecting project management success in building construction projects in Addis Ababa. Here's a detailed interpretation of the model specification and how it relates to organizational performance and the Project Management Success (PMS):

The regression equation is given by:

$$Y=\alpha+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\varepsilon i$$

$$Y=2.815-0.095(PMT)+0.165(CPOF)-0.034(PMC)+0.101(PRM)+0.096(PTC)+0.051(RM)+\epsilon i$$

Where:

Y: Dependent variable (Project Management Success)

α (2.815): Constant term, representing the baseline level of organizational performance when all predictors are zero.

β: Coefficients representing the slope of the regression line for each predictor.

X1 to X6: Independent variables (predictors).

4.7. Result Discussions

As a result, the study's Regression Model was described mathematically as follows. The variance between the variables was concluded as follows by extracting the model summary from the multiple regression analysis. The study's Regression Model was described objective of the research is to asses factors affecting project management success the case of selected building construction in Addis Ababa as follows.

H_1: Project Management Triangle has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β1) of the Project Management Triangle (PMT) is reported as -0.095, indicating a negative relationship between the effectiveness of the PMT and organizational performance. This suggests that an increased focus on traditional project constraints scope, time, and cost may not necessarily enhance overall performance. Instead, it implies that an overemphasis on balancing these three elements could detract from broader organizational objectives.

The Project Management Triangle is a foundational concept in project management, where changes in one constraint require adjustments in the others to maintain project quality. While

effective management of these constraints is critical for project success, the negative coefficient suggests that this approach alone may be insufficient. It raises the concern that project managers might become too fixated on these traditional metrics, potentially neglecting other important factors that contribute to organizational performance.

Research supports the notion that while managing scope, time, and cost is essential, it must be done in conjunction with other organizational dynamics, such as team competence, stakeholder engagement, and adaptability (Asana, 2024). This finding emphasizes that project managers must not only balance the triangle but also consider external influences and internal capabilities to drive success.

Therefore, the negative coefficient highlights the need for a more holistic approach to project management. Organizations should encourage project managers to integrate additional performance metrics, such as quality, stakeholder satisfaction, and team dynamics, into their management strategies. By doing so, they can better align project outcomes with organizational goals and enhance overall performance.

In conclusion, while the Project Management Triangle remains an essential framework, the negative coefficient suggests that its effectiveness is contingent upon a balanced consideration of other critical factors. This insight promotes a more comprehensive view of project management, advocating for strategies that extend beyond the traditional constraints to achieve sustained organizational success.

H_2: Organizational Factors has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β2) for Organizational Factors (OF) is reported as 0.165, indicating a positive relationship between the complexity of organizational factors and overall organizational performance. This suggests that an increase in complexity, when managed effectively, can lead to improved project success and enhanced performance outcomes.

Complexity in projects often arises from various sources, including technical challenges, stakeholder dynamics, and environmental variables. While complexity can introduce risks and potential challenges, it can also foster innovation and adaptability when addressed properly (Luo et al., 2017). The positive coefficient implies that organizations that structure their complexity effectively through clear communication, robust organizational culture, and defined processes are likely to experience better project outcomes.

Research has shown that effective management of complexity and organizational factors is crucial for navigating the intricate landscape of project execution. Well-defined roles, a supportive culture, and effective communication practices can mitigate the risks associated with complex projects, ultimately leading to higher success rates (Luo et al., 2017). This reinforces the notion that understanding and addressing these complexities is not merely beneficial but essential for effective project management.

The findings suggest that organizations should not shy away from complexity; rather, they should embrace it as an opportunity for growth and improvement. By fostering an environment that encourages collaboration and innovation, organizations can leverage complexity to enhance their project outcomes.

In general, the positive coefficient associated with OF underscores the importance of effectively managing complexity and organizational factors in achieving project success. It advocates for a strategic approach where organizations recognize the value of complexity when paired with strong management practices, ultimately driving improved performance across projects and the organization as a whole.

H_3: Project Manager Competence has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β3) for Project Manager Competence (PMC) is reported as -0.034, indicating a negative association between the competence of project managers and organizational performance. This finding suggests that an increase in the competence of project managers does not necessarily lead to improved performance outcomes. In fact, it may imply that having highly competent project managers alone is insufficient for achieving better organizational performance.

While the competence of project managers is undeniably important, it is clear that other factors must also be considered. Research has indicated that specific competencies such as leadership, communication, and emotional intelligence are linked to successful project outcomes (How do project managers' competencies impact project success? A systematic literature review, 2022). However, this negative coefficient suggests that if project managers excel in these areas but do not work within a well-rounded team or organization, the overall performance may suffer.

This finding highlights the necessity for a balanced approach to competence within project teams. High-performing teams often depend on the collective skills and dynamics of all

members, rather than relying solely on individual project manager competence. A focus on team development, effective collaboration, and shared accountability is crucial for enhancing organizational performance.

Moreover, organizations should invest not only in the development of project managers but also in fostering a culture of continuous learning and improvement across the entire team. This approach ensures that all team members contribute effectively, leveraging their unique strengths to overcome challenges and achieve project goals.

In summary, the negative coefficient for PMC underscores that while project manager competence is vital, it must be complemented by a holistic team approach to drive organizational performance. By recognizing the importance of balanced competencies within project teams, organizations can create a more supportive environment that enhances overall project success.

H_4: Project Risk Management has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β4) for Project Risk Management (PRM) is reported as 0.101, indicating a positive relationship between effective risk management practices and organizational performance. This suggests that implementing robust risk management strategies significantly enhances project outcomes and overall organizational success.

Effective risk management is critical in project management, as it involves identifying, assessing, and mitigating potential risks that could jeopardize project success. Research by Ghaleb and Abdullah (2021) supports this assertion, demonstrating that proactive risk management practices lead to better project results. When project managers systematically address risks, they can minimize disruptions, enhance decision-making, and ensure that projects stay on course.

The positive coefficient emphasizes the necessity of integrating risk management into the project management process. By prioritizing risk identification and response planning, organizations can create a proactive culture that anticipates challenges rather than merely reacting to them. This approach not only safeguards project timelines and budgets but also fosters stakeholder confidence and satisfaction.

Moreover, effective risk management practices contribute to a more resilient organizational structure. By preparing for uncertainties, organizations can navigate complexities more efficiently, adapt to changes, and leverage opportunities that arise from managed risks. This

resilience is particularly important in dynamic environments, where the ability to respond rapidly to unforeseen challenges can be a significant competitive advantage.

In conclusion, the positive coefficient for PRM reinforces the critical role of effective risk management in achieving project success and enhancing organizational performance. By embedding risk management into their strategic frameworks, organizations can improve their project outcomes and ensure sustainable success in an increasingly complex business landscape.

H_5: Project Team Competence has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β5) for Project Team Competence (PTC) is reported as 0.096, indicating a positive relationship between the competence of the project team and organizational performance. This suggests that a skilled and cohesive project team plays a vital role in enhancing project success and overall organizational effectiveness.

The competence of a project team is critical for navigating the complexities often encountered in construction projects. A team that is both skilled and cohesive can collaborate effectively, fostering innovation and problem-solving capabilities that are essential for overcoming project challenges (How do project managers' competencies impact project success? A systematic literature review, 2022). The positive coefficient underscores the importance of investing in team development, as well-rounded team skills contribute directly to achieving project objectives.

Research highlights that team dynamics such as trust, communication, and collaboration significantly impact project performance. A competent team that communicates well and trusts each other can operate more efficiently, leading to faster decision-making and improved execution (How do project managers' competencies impact project success? A systematic literature review, 2022). This collective competence enhances not only project outcomes but also the overall performance of the organization.

Moreover, fostering a culture of teamwork and continuous learning is crucial for maintaining high levels of competence within project teams. Organizations should prioritize training, team-building activities, and open communication channels to strengthen team dynamics. This commitment to team development can lead to higher morale, increased engagement, and lower turnover rates, all of which contribute positively to project success.

In conclusion, the positive coefficient for PTC reinforces the critical role of team competence in driving organizational performance. By focusing on developing skilled and cohesive teams,

organizations can enhance their project outcomes and build a strong foundation for long-term success in an increasingly complex project environment.

H_6: Requirements Management has a significant effect on project management success in selected building construction in Addis Ababa.

The coefficient (β6) for Requirements Management (RM) is reported as 0.051, indicating a positive relationship between effective requirements management and organizational performance. This suggests that well-managed project requirements are essential for achieving project success and meeting stakeholder expectations.

Effective requirements management plays a critical role in ensuring that project deliverables align with what stakeholders need and expect. Poorly managed requirements can lead to issues such as scope creep, miscommunication, and even project failure (Asana, 2024). The positive coefficient emphasizes that organizations that prioritize clear documentation, stakeholder engagement, and continuous validation of requirements are likely to enhance their overall project outcomes.

By implementing robust requirements management practices, organizations can minimize misunderstandings and ensure that all stakeholders have a shared understanding of project goals. This clarity helps prevent conflicts and fosters a collaborative environment where project teams can focus on delivering value. Continuous engagement with stakeholders throughout the project lifecycle ensures that any changes in requirements are promptly addressed, thus maintaining alignment with project objectives.

Furthermore, effective requirements management can lead to increased stakeholder satisfaction. When stakeholders feel their needs are understood and addressed, they are more likely to support the project, which can facilitate smoother implementation and reduce resistance to change. This alignment not only enhances project success but also contributes to the long-term health of organizational relationships.

In conclusion, the positive coefficient for RM highlights the importance of prioritizing requirements management within the project management process. By focusing on clear and well-managed requirements, organizations can improve project performance, mitigate risks, and enhance stakeholder satisfaction, ultimately driving greater organizational success.

The hypotheses presented in this study reflect critical factors that influence project management success in building construction projects in Addis Ababa. By examining the relationships

between these factors, the research aims to provide valuable insights that can enhance project outcomes and inform best practices in project management.

Table 4.17 Summary of Hypothesis Testing

Hypothesis	Tool	Outcome
H_1: Project Management Triangle has a significant effect on project management success in selected building construction in Addis Ababa**.**	Multiple Regression	statistically significant
H_2: Organizational Factors has a significant effect on project management success in selected building construction in Addis Ababa.	Multiple Regression	statistically significant
H_3: Project Manager Competence has a significant effect on project management success in selected building construction in Addis Ababa.	Multiple Regression	statistically significant
H_4: Project Risk Management has a significant effect on project management success in selected building construction in Addis Ababa.	Multiple Regression	statistically significant
H_5: Project Team Competence has a significant effect on project management success in selected building construction in Addis Ababa**.**	Multiple Regression	statistically significant
H_6: Requirements Management has a significant effect on project management success in selected building construction in Addis Ababa.	Multiple Regression	statistically significant

Source: Survey result, (2024)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary of Major findings

- The Project Management Triangle (Mean: 3.63 and Standard Deviation: 1.12) relates to the trade-offs between project scope, time, and cost, with balancing these aspects being crucial for successful project management. Complexity profile and organizational factors play a significant role in project success, with a higher mean suggesting that managing complexity and organizational dynamics is essential. Project manager competency has a mean of 3.16 and standard deviation of 1.16, while project risk management has a mean of 3.41 and standard deviation of 1.08. Project team competence significantly influences success, and requirements management ensures alignment with stakeholders' needs.
- Project success factors include project duration or timeline, quality of project outcome, expanding project scope, cutting costs, tight deadlines, and overall balance of factors. A high mean value of 3.9592 suggests strong agreement that the overall balance of scope, time, and cost is crucial for project success, with a relatively low standard deviation indicating a consensus among respondents on the importance of maintaining this balance.
- Risk identification is moderately agreed upon, with a standard deviation of 1.10459 suggesting some variability in responses. Risk assessment (Probability of Occurrence & Event Impact) is moderately agreed upon, with a standard deviation of 1.09578 indicating some variability in opinions. Risk response planning is also considered important, with a standard deviation of 1.04729 indicating some variability.
- The Project Management Triangle (PMT) is a crucial project management competency, involving five components: motivating team members, balancing time, stress, and well-being, aligning goals with business objectives, clearly documenting requirements, having skilled managers, clear communication, managing scope, handling changes, mitigating risks, and allocating resources.
- The mean value of 1.1088 indicates that respondents do not strongly agree on the importance of motivating team members, fostering collaboration, and empowering them to take ownership. Balancing time, stress, and personal well-being is considered

moderately important for project success. High-level business objectives and project goals are also considered important, with a neutral stance on alignment.

- Understanding and refining requirements is crucial for project success, with a high mean value of 4.0884 suggesting strong agreement. Clearly documenting requirements is also important, but its impact on project success can vary. Ranking requirements based on importance is also considered important, but its importance can vary among respondents.
- The correlation matrix reveals significant relationships between project management success variables, with strong correlations between project management triangle and team competence. Organizational complexity and structure positively influence project manager competence, risk management, team competence, and overall project success. Requirements Management and Project Success Factors show weak positive correlations.
- The Adjusted R Square value of 0.036 is much lower than the R Square value, suggesting that while the model explains a significant portion of the variance in project success, the inclusion of additional predictors may not substantially improve the model's explanatory power. The standard error of the estimate value is 0.95800, suggesting that the model's predictions are reasonably close to the actual values but still have some variability that is not explained by the model.
- The F-statistic was calculated by dividing the regression mean square by the residual mean square. A higher F-value indicated a better fit for the data. The significance value (p-value) of 0.082 indicated that the overall regression model was not statistically significant at the 0.05 level, suggesting that there is no strong evidence to suggest that the predictors collectively have a significant impact on project success factors.
- The results suggest that the model may benefit from refinement, such as adding new relevant predictors or removing less significant ones, to improve its explanatory power and predictive accuracy. The constant (intercept) unstandardized coefficient (B) was 2.815, representing the expected value of the dependent variable (Project Success Factors) when all predictors are zero.

In summary, the need for a more holistic approach to project management, focusing on well-structured and complex organizational factors, balanced competencies across teams and organizations, effective risk management practices, competent project teams, and clear and well-managed requirements.

5.2. Conclusion

This study identifies key factors contributing to project management success in building construction projects in Addis Ababa. It emphasizes the importance of effectively balancing the Project Management Triangle (scope, time, cost), while also recognizing that organizational factors, such as structure and strategy, significantly influence project outcomes.

Key competencies for project managers, including technical expertise and risk management practices, are critical for success, though their importance can vary by context. The findings reveal that while Complexity Profile and Organizational Factors, Project Risk Management, Project Team Competence, and Requirements Management positively impact project success, the Project Management Triangle and Project Manager Competence may have a negative influence in this context.

Overall, effective management of these factors is essential for enhancing organizational performance and achieving successful project outcomes in the construction sector. Future research should explore the dynamics of these relationships further to inform best practices in project management.

5.3. Recommendations

Based on the findings from the study on factors affecting project management success in building construction in Addis Ababa, here are some tailored recommendations.

5.3.1. Recommendations for action

1. Conduct workshops to identify additional success factors like stakeholder satisfaction and sustainability metrics. Implement a balanced scorecard approach to measure project success beyond traditional constraints.
2. Perform an organizational assessment to identify existing complexities. Develop a framework for clear communication and decision-making channels. Regularly review and adjust the organizational structure to align with project needs.
3. Create a competency matrix to identify skill gaps within the project team. Implement cross-training programs that allow team members to learn from one another, ensuring a well-rounded skill set across the team.
4. Establish a risk management committee responsible for developing and updating risk management plans. Train staff on risk identification techniques and conduct quarterly risk assessment workshops to proactively address potential issues.

5. Facilitate team-building activities and collaboration tools (like shared platforms) to enhance communication. Schedule regular training sessions and mentorship programs to foster skill development and knowledge sharing.
6. Implement a formal requirements gathering process that includes stakeholder interviews and workshops. Use project management software to track requirements and ensure they are documented, communicated, and understood by all team members.
7. Develop a stakeholder engagement plan that outlines communication strategies, including regular updates, feedback mechanisms, and escalation paths for concerns. Utilize surveys and feedback sessions to gauge stakeholder satisfaction throughout the project lifecycle.

5.3.2. Recommendations for further research

Based on the findings here are some recommendations for further research on factors affecting project management success in building construction:

1) **Impact of Local Regulations and Policies**: Investigate how local building codes, regulations, and government policies influence project management success. Understanding the regulatory environment can help in identifying potential barriers and facilitators to project success.
2) **Cultural Influences on Project Management**: Explore the role of cultural factors in project management practices. This includes examining how local customs, traditions, and social norms impact communication, decision-making, and teamwork within construction projects.

These recommendations aim to provide a comprehensive understanding of the factors affecting project management success in building construction. Further research in these areas can help in developing targeted strategies to enhance project performance and outcomes.

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Annex

ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Dear respondent,

The purpose of the questionnaire is to collect data for research on *"factors affecting project management success in the case of selected building construction in Addis Ababa."* The research is designed to identify factors affecting project management success practices. The research outcomes are important for academic study. Your genuine and honest response is very important for the success of the research, and the researcher would like to thank you for your cooperation in advance.

Note: For any clarification or question, please don't hesitate to contact the researcher at the following address: Name: **Samrawit Wolday**, mobile phone (Tel: +251913665148)

General Instruction:

1. There is no need to write your name.
2. Your response's confidentiality is maintained.
3. Instructions for each part of the questionnaire are given at the beginning of the questions.

Section I: General background information

1) Gender A. Male ☐ Female ☐

2) Age

A. 20-30 years ☐ B 31-40 Year ☐ C . 41-50 Years ☐ D ≥ 51 Year ☐

1) Educational level

A.BA/BSc Degree ☐ B. MA/MSc ☐ C. PhD ☐

2) Service year in the Company?

A . 1-5 years ☐ B. 6-10 years ☐ C. 11-15 years ☐

D . ≥ 16 years ☐

3) Work experience in the current position

A. Under 5 years ☐ B. 6- 10 years ☐

C 11 -20 years ☐ D. 21 – 30 years ☐

4) Relation to the Project

A. Owner ☐ B. Contractor ☐ C. Consultant ☐

D. Other, please specify: _____

5) Job title in the organization/company:

A. Project Manager/ deputy B. Organization Manager/ deputy ☐

C. Site Engineer/ office engineer ☐ D. Material Engineer ☐ E. Surveyor ☐

F. Consultant ☐ G. Store manager ☐ H. Supervisor ☐

I. Procurement and Facility Management ☐ J. General Foreman ☐

K Team Leader ☐ L. Others (specify)_____

6) Number of projects executed in the last five years

A. 1 up to 5 ☐ B. 6 up to 10 ☐ C. More than 11 ☐

Section II: Basic Research Questions

The following statements address how project management success is affected by Cost, Time, and Quality Factors. Kindly check (√) the boxes indicating your agreement or disagreement with each statement. The possibilities range from 1 (strongly disagree) to 5 (strongly agree). A number between 1 and 5 designates each option.

Note: N= Neutral, A= Agree, SA= Strongly Agree, DA= Disagree, SD= Strongly Disagree

S.no	Statements	SA	A	N	D	SD
	Project Management Triangle	5	4	3	2	1
1	The work and deliverables that need to be completed within the project					
2	The project duration or timeline, deadlines, milestones, and overall project schedule.)					
3	The quality of the project outcome depends on how well these three factors are balanced.					

4	Expanding the project scope may require more time and budget.					
5	Cutting costs might extend the project timeline or compromise quality					
6	Tight deadlines may necessitate adjustments to scope or cost					
\	**Organizational Factors**					
1	An organization's strategy significantly impacts its structure					
2	Organizations emphasizing major new products and services benefit from an organic, loose structure.					
3	Companies controlling costs and avoiding unnecessary innovation tend to adopt a mechanistic structure.					
4	Organizations that copy successful ideas may benefit from a mix of mechanistic and organic structures					
5	Organizational size affects structure i,e larger organizations tend to be more mechanistic.					
6	High volatility suggests an organic structure.					
7	The greater the heterogeneity and concentration of environmental elements, the more complex the structure, favoring an organic one.					
	Project Manager Competence					
1	Project Management Application					
2	Technical Area Expertise.					
3	Understanding of the Project Environment					
4	General Management Skills					
5	Interpersonal Skills:					
	Project Risk Management					
	Risk Identification					
	Risk Assessment (Probability of Occurrence & Event Impact)					
	Risk Response Planning					
	Project Team Competence					
1	Project managers should possess domain-specific knowledge to make informed decisions and tackle technical challenges effectively.					

2	Clear communication ensures alignment among team members, stakeholders, and project objectives.					
3	Engaging stakeholders throughout the project lifecycle to maintain alignment and manage expectations.					
4	Managing project finances, tracking expenses, and ensuring cost control.					
5	Addressing challenges promptly and finding effective solutions					
6	Being flexible and adjusting to changes in project scope or requirements					
7	Motivating team members, fostering collaboration, and empowering them to take ownership.					
	Balancing time, stress, and personal well-being to maintain productivity and focus.					
	Requirements Management					
1	The high-level business objectives and problems are stated, and project goals are aligned with these objectives.					
2	Requirements specification documents outline the activities and elements users need to interact with the system, often citing use cases or user stories.					
3	Specify how the proposed solution will meet business and user needs.					
4	Gathering requirements from stakeholders.					
5	Understanding and refining requirements.					
6	Clearly documenting requirements					
7	Ranking requirements based on importance.					
8	Ensuring requirements meet stakeholder needs.					
9	Validated requirements may need updates over time					
	Project Management Success					
1	Having skilled project managers with the necessary authority ensures effective leadership and decision-making					

2	Well-defined project goals					
3	A capable team contributes significantly to project success.					
4	Strong backing from senior management ensures resources, alignment, and timely decision-making.					
5	Clear communication among stakeholders fosters collaboration and minimizes misunderstandings					
6	Managing scope, handling changes, and mitigating risks are critical.					
7	Properly allocating resources ensures efficient execution					
8	Keeping records and sharing knowledge prevent bottlenecks					

I appreciate your cooperation