

The Effect of Project Planning Process on Success of
Public Construction Projects: The Case of Jimma Town



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Declaration

I hereby declare that this thesis entitled “The Effect of Project Planning Process on Success of Public Construction Projects: The Case of Jimma Town” has been carried out by me under the guidance and supervision of Dr. ESHETU YADECHA (PHD) The study is original and has not been submitted for the award of any degree or diploma to any University or institutions.

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Abstract

The public project is particularly a demanding undertaking, with the requirement to meet diverse demands. Despite huge investment, public sector projects tend to complete behind schedule, indicating shortfall in various project factors. The objective of this study was to examine the effect of the project planning process on the success of public construction projects in Jimma Town, Ethiopia. It aims to investigate the effects of project planning process and project success, with a focus on Resource estimation, Project scheduling, Risk management strategies and Stakeholder engagement. The design of this study was descriptive and explanatory through both quantitative and qualitative approach method. The primary and secondary sources of data were utilized. The primary data was collected by questionnaire and interview, while secondary data was obtained from relevant literature and documents. The sampling was determined based on the target population and sampling techniques such as probability random sampling and non-probability purposive sampling. A total of 142 questionnaires were distributed, for which obtained 92.25% response rate. The collected data was analyzed using regression model in Statistical Package for Social Science (SPSS) software version 20.0. We found there are strong relation (which the result indicates R^2 80.8%) between project planning process and project success. Also, the Study findings revealed that, resource estimation in planning process, Schedule planning process; risk management in planning process, and stake holder engagement has a significant effect on project success of public construction project at Jimma town municipality. So, it is highly recommended to give attention to those factors because all of these have an immediate and continues effect on project life cycles, to the excellent outcomes of project success at Jimma town municipality.

Keywords

Project Planning Process on Success of Public Construction Projects

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CHAPTER ONE

1 .INTRODUCTION

1.1 Background of the Study

Munns and Bjeirmi (1996) as the collection of unique and complex activities/processes that requires resources to achieve the desired objective define project. On the other hand, PMI (2008) defines Project Management the application of tools, techniques, knowledge and skills to the project these activities/processes to achieve the objectives. According to the Project Management Institute provides the definition of a project as ‘A project is a temporary endeavor undertaken to create a unique product, service, or result’ (Erik & Clifford, 2011). Project planning refers to executive activities through decomposition, enunciation, and justification (Serrador, 2012).

Planning is simply that which comes before action. In construction project management, project planning is preceded by business planning, which is the act of making the deal before project execution (Zwikael & Globerson, 2009). Planning can be conceptualized as a project phase and as project effort. Planning phase refers to the associated efforts that preceded project execution. The planning effort, on the other hand, refers to the amount of effort in work hours or money that is used in planning. One cannot overemphasize the value of preparation to project success.

Serrador (2013) argues that while preparation is not a silver bullet for ensuring automatic project success, there is a link between project planning and project quality. Wang and Gibson (2008) regard conventional wisdom as the connection between planning and performance because planning is the bedrock of all successful projects even from the time of the ancient pyramids. Careful planning reduces risks and increases project success rate because it helps project managers to consider different scenarios and prepare to prevent the worse from happening (Serrador, 2016).

On the other hand, inadequate planning of construction projects may result in loss of time, money and other resources; and it increases the possibility of adverse events, like personal injury, loss of potential contracts, or legal action (Wang & Gibson, 2008). Incidentally, these project-related problems are also compounded by their broad scale and complex characterization in the construction industry (Damoah et al., 2018). Project planning is widely thought to be an

important contributor to project success. However, does the research affirm its impact and give guidance as to how much effort should be spent planning.

Construction projects have a high rate of failure, as many of them are not completed either on time or within budget. Aljohani, Ahiaga-Dagbui and Moore (2017) opine that nine out of every ten-construction projects experience budget overruns. The construction industry has a poor reputation for timely project completion that is within budget. This usually stems from frequent design changes, payment delays, unreliable contractor financing and poor cost estimation among others. Many construction projects also suffer from weak material management, ineffective tendering documentation and inadequate or limited experience on the part of constructors (Aljohani et al., 2017).

Effective project planning plays a critical role in achieving success in public construction projects. The planning phase sets the foundation for project execution, ensuring that resources are identified, allocated, and utilized efficiently, risks are managed effectively, stakeholders are engaged, and project schedules are established Chan et al. (2008). However, there is a need to understand the specific aspects of project planning that contribute to successful outcomes in the context of public construction projects in Jimma Town, Ethiopia.

Resource identification, allocation, and utilization are key components of the project-planning phase. Previous research has highlighted the importance of proper resource management in achieving project success. For instance, a study by Abidin et al. (2018) emphasized the significance of accurately identifying and allocating resources to ensure efficient project execution. However, the specific process of resource estimation and utilization during the project-planning phase for public construction projects in Jimma Town has not been extensively studied.

Accurate cost estimation is another crucial aspect of project planning. Flawed cost estimation methods can lead to budget overruns and financial challenges during project execution. Research by Chan et al. (2008) indicated that accurate cost estimation is essential for effective project planning and control. However, the accuracy of the cost estimation methods employed during the project planning process for public construction projects in Jimma Town remains unexplored.

Risk management is an integral part of project planning, and effective strategies are necessary to identify, assess, and mitigate potential risks. Prior studies, such as the work of Ahiaga-Dagbui and Smith (2016), have emphasized the importance of risk management in construction projects. However, the effectiveness of risk management strategies employed during the project planning process for public construction projects in Jimma Town requires evaluation.

Stakeholder engagement is vital for project success, as stakeholders play a significant role in shaping project outcomes. Studies, such as the research conducted by Olander and Landin (2005), have highlighted the positive effective of stakeholder engagement on project success. However, the level of stakeholder engagement during the project-planning phase for public construction projects in Jimma Town needs to be assessed.

Timely completion of public construction projects is a key objective for project success. Effective project scheduling is crucial to minimize delays and ensure timely completion. Research by El-Sayegh (2008) emphasized the importance of improved project scheduling in achieving project objectives. However, the effective of improved project scheduling on minimizing delays and ensuring timely completion of public construction projects in Jimma Town requires investigation. Addressing these challenges requires a proactive and collaborative approach, involving all relevant stakeholders, conducting thorough assessments, and developing robust project plans that consider potential risks and uncertainties. Effective project management practices, continuous monitoring, and adaptive decision-making are essential to overcome these challenges and ensure the successful planning of public construction projects in Jimma town

1.2. Statement of the Problem

The importance of project planning in achieving project success- For example, a study by Ogunlana et al. (2012) found that effective project planning significantly influences project outcomes, including cost control, timely completion, and stakeholder satisfaction. Similarly, in the context of public construction projects, a study by Chan and Kumaraswamy (1997) highlighted the pivotal role of project planning in reducing project delays and cost overruns despite the existing literature on project planning, there is a lack of specific research focusing on the effective of the project planning process on the success of public construction projects

Projects are needed to be accomplished within the period, budgeted cost, and required quality. However, many projects take longer time to complete, cost more than essential and some projects are cancelled because of various factors directly and/or indirectly related with it al. (2017). Additionally (Tariku, 2016) showed in his study that most of the projects in Ethiopia are delivered in the traditional method and have been known for their cost overrun and late completion time. The complexity of construction projects requires careful planning and effective scheduling of project tasks. Whilst management is known to be a science and an art that involves planning and controlling, construction management is heavily dependent on the economic consumption of resources available for timely project completion (Park et la., 2013). It suffices that effective planning of construction projects could increase the chances of project success by far, but there are no guarantees of success in construction projects.

The process of resource estimation and utilization during the project-planning phase for public construction projects in Jimma Town Municipality office lacks comprehensive understanding. Examining project documentation for specific public construction projects in Jimma Town can provide evidence of how resources were estimated and utilized. This could include project proposals, budget allocations, and progress reports that may shed light on the comprehensiveness of the understanding and implementation of resource estimation and utilization.

The specific challenges and issues related to identifying, allocating, and effectively utilizing resources within the project-planning phase remain unclear (Abidin et al., 2018). The accuracy of cost estimation methods employed during the project planning process for public construction projects in Jimma Town requires evaluation. Cost estimation and budgeting: Investigation helps in estimating the overall project cost by considering various factors such as site conditions, labor costs, material availability, and construction methods. Accurate cost estimation is crucial for budgeting purposes and ensuring financial feasibility. It is essential to identify potential and limitations in the current cost estimation methods, which may lead to budget overruns and financial challenges during project execution (Chan et al., 2008).

The effectiveness of risk management strategies employed during the project planning process for public construction projects in Jimma Town needs evaluation. Understanding the strengths and weaknesses of existing risk management practices will contribute to identifying potential gaps and improving risk mitigation approaches (Ahiaga-Dagbui & Smith, 2016). The level of

stakeholder engagement the project planning phase for public construction projects in Jimma Town requires evaluation. The extent to which stakeholders are involved, their participation in decision-making, and their influence in shaping project outcomes need to be assessed (Olander & Landin, 2005).

Different studies examined what and why project failed. For instance, the short fall in meeting a client's " project expectation about completion-time, quality and cost by a contractor is adjudged project failure. Other researchers such as Nzekwe, et al., (2015), Elsokhn and Othman (2014) and Othman (2013) shared this same opinion. Meanwhile, in the view of Otim et al., (2016) project failure could be due to improper planning and poor management of resources. O'Flaherty (1993) while reflecting on property development projects suggest that project failure could arise from the failure of an owner or developer stopping to provide the required maintenance management to a developed property.

According to Tariku, R. (2016) Project Delivery Systems and Their Effects on Cost and Time Overrun On Ethiopian Road Authority Projects. Addis Ababa Institute of Technology School of Graduate Studies From the outcomes it was revealed that all the three groups of respondents generally agreed that out of a total of 88 factors the top ten influencing factors are Contractor's financial difficulty, Escalation of materials price, and Ineffective project planning and scheduling, Delay in progress payments for completed works, Lack of skilled professional in contractor organization, Fluctuating labors availability, Late delivery of materials, Low productivity of labor, Unqualified/inadequate experienced labor, Insufficient data collection and survey before design.. This research gap limits the town's ability to identify and address the challenges and bottlenecks that hinder project success. Limited Resources: One of the primary challenges is the availability of limited resources, including financial resources, skilled labor, materials, and equipment. Insufficient resources can impede the project planning process and hinder the timely and successful completion of construction projects. Unclear Project Objectives and Scope: Inadequate clarity or ambiguity in defining project objectives and scope can lead to misunderstandings and misalignment among project stakeholders. Without clear goals and a well-defined scope, it becomes difficult to develop an effective project plan and allocate resources appropriately Land Acquisition and Right-of-Way Issues: Acquiring land and securing right-of-way for public construction projects can be challenging, especially in urban areas where

space is limited. Dealing with landowners, negotiating fair compensation, and addressing legal and administrative procedures can cause delays and increase project costs. Therefore, there is a need to assess the impacts of the project planning process on the success of public construction projects in Jimma Town to enhance project outcomes and contribute to the field of project management by answering the following research questions.

1.3 Research Questions

1. How do public constructions in Jimma Town handle resource estimation during the project-planning phase?
2. How can the impact of improved project scheduling be measured in minimizing delays and ensuring timely completion of public construction projects in Jimma Town?
3. How effective are the risk management strategies employed during the project planning process for public construction projects in Jimma Town?
4. What is the level of stakeholder engagement during the project-planning phase for public construction projects in Jimma Town?

1.4 Objectives of the Study

1.4.1 General Objectives

- The general objective of the study is to examine effects of Project Planning Process on Success of Public Construction Projects the Case of Jimma Town

1.4.2 Specific Objectives

- To investigate the process of resource estimation during the project planning phase for public construction projects in Jimma Town.
- To determines the impact of improved project scheduling on minimizing delays and ensuring timely completion of public construction projects in Jimma Town.
- To explain the effectiveness of risk management strategies employed during the project planning process for public construction projects in Jimma Town.
- To determine the level of stakeholder engagement during the project planning phase for public construction projects in Jimma Town.

1.5 Significance of the Study:

The study on effective of the project planning process on the success of public construction projects in Jimma Town holds significant value in the following ways:

Practical Implications: The findings of this study will provide practical insights for project managers, policymakers, and stakeholders involved in public construction projects in Jimma Town. By understanding the effective of the project planning process on project success, stakeholders can make informed decisions, allocate resources efficiently, and implement effective strategies to improve project outcomes.

Improved Project Success Rates: By identifying the factors within the project planning process that contribute to project success, the study will enable project managers in Jimma Town to address critical issues and challenges. This, in turn, will enhance project success rates, leading to timely completion, cost control, and improved stakeholder satisfaction.

Cost and Time Efficiency: Effective project planning can significantly contribute to cost and time efficiency in public construction projects. The study will help identify areas for improvement in the planning phase, enabling project managers to streamline processes, optimize resource allocation, and reduce delays and cost overruns.

Stakeholder Engagement: The study will shed light on the importance of stakeholder involvement and engagement in the project planning process. Understanding the role of stakeholders and their influence on project success will facilitate better communication, collaboration, and decision-making among project participants, fostering a more inclusive and successful project environment.

1.6 Scope of the Study:

The study on effective of the project planning process on the success of public construction projects in Jimma Town. The scope of the study was disseminated both in geographically as well as the contents the study focus on it. Geographically the study was specifically oromia region Jimma Town, Ethiopia, examining public construction projects within its jurisdiction. It was consider different types of projects, such as infrastructure development, building construction, and urban planning initiatives. Regarding to the contents of the research, the study was focused

on Project Planning Process. This means the research was primarily concentrated on the project planning phase, encompassing activities such as project initiation, scoping, scheduling, resource estimation, risk management, and stakeholder engagement. The research will involve project managers, project team members, and relevant stakeholders involved in public construction projects in Jimma Town.

1.7 The Organization of the Study

This study work is organized in the first chapter presents introduction of the study and presents the statement of the problem, research questions, research objectives, significance of the study scope of the study, operational definition of terms and organization of the study. The second Chapter is contains Literature Review related with the topic of the research and attempts to present a theoretical background and framework for the research. Third Chapter contains Methodology the research design, research approaches sampling design and techniques, sources of data and data collection method sand instruments and data analysis followed to achieve research objectives. The fourth, fifth and sixth chapter presents Results, discussion and conclusion and recommendation of this study respect.

1.8 Operational Definitions of Terms:

Project Planning Process: In this study project planning process refers to a systematic and structured approach to define project objectives, determine Resource estimation, Project scheduling, Risk management strategies, Stakeholder engagement and Cost estimation methods e during the planning phase of public construction projects Aaltonen, K., & Kujala, J. (2010).

Success of Public Construction Projects: In this study Success of Public Construction Projects refers to the achievement of project objectives within the defined constraints of time, determines project scope and cost. It includes factors such as timely completion, quality of deliverable and overall project outcomes of public construction project (Lim & Mohamed, 1999).

Effective: In this study, effective refers to the influence or effect that the project planning process has on the success of public construction projects in Jimma town. It encompasses both positive and negative consequences that can arise from the planning phase and affect project outcomes Aibinu, A. A., & Jagboro, G. O. (2002).

Stakeholder Engagement: In this study, Stakeholder Engagement refers to the active involvement and collaboration of individuals or groups who have an interest or influence in the public construction project in the case of Jimma town. It includes communication; participation in decision-making and addressing stakeholder concerns throughout the project planning process Freeman, R. E. (1984). Stakeholder engagement positively influences project success.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Theoretical Framework

This section focuses on the relevant literature about project planning success of public construction projects in general. A comprehensive literature review will be conducted related to project planning success related, theories, project success, characteristics, selection criteria, and success factors. Planning is the second phase of a project, following initiation and prior to execution and closure (PMI, 2013). Project planning stipulates a set of decisions concerning the ways that things should be done in the future, in order to execute the plan for a desired product or service. PMI (2013) specified that the Planning Process Group consist of those processes performed to establish the total scope of the effort, define and refine the objectives, and develop the course of action required to attain those objectives. In addition, those Planning processes develop the project management plan and the project documents that will be used to carry out the project.

The goal of the planning phase of a project is to prepare the structure for project execution and control. According to Idoro (2012a), project planning and project performance are two complementary activities in project management and the basis of project success or failure is defined in project planning. The conceptual framework for this study is derived from the literature review that has identified the processes at the planning stage and suggested measures of project success of construction projects. PMBOK[®] (PMI, 2013) identifies the standards processes that should be performed by a project manager. Of the 47 processes identified in the guide, 24 (51%) are planning processes. 19 out of 24 project planning processes identified by the PMBOKR are measured in this study. According to PMI (2013), those processes consist of “Project Management Plan, Project Scope Document, Requirements Document, Design Specification, Work Breakdown Structure, Project Schedule/ Activities list, Project Schedule/ PERT or GANTT Chart, Project Schedule/ Activity Duration Estimates, Develop Project Schedule, Project Staff Assignments, Role and Responsibility Assignments, Activity Resource Requirements, Activity Cost Estimates, Determine Budget, Quality Management Plan,

Communication Management Plan, Risk Management Plan/ Risk Register, Procurement Management Plan and Stakeholder Management Plan”. Project success is measured by project efficiency and project effectiveness. Youcef and Nils (2017) defines project efficiency as the production of an output in a qualified and competent way in terms of the agreed scope, cost, time and quality, where quality is not a constraint per se but is often a by-product of the other three factors (scope, time and cost). Efficiency is more about comparing the outputs of the project to its inputs. In this study, project efficiency is measured in the development of construction projects by project cost and project schedule.

According to Olsson (2008), effectiveness can be related to doing the right things and it is an external type of measurement. He added that the effectiveness of a construction process can be seen as the ability of the process to satisfy the requirements, objectives and priorities related to customers in the construction industry, primarily the project owners. Effectiveness is focused on how the construction process contributes to increased value for the owners and users. In this study, project effectiveness is measured in the development of construction projects by customer satisfaction and the overall project performance

2.2. Definitions of Project, Project Planning and Project Planning Success

2.2.1. Definition of Project

A project is a series of tasks, which are performed over a definable period to accomplish a particular set of objectives. Provided that the project has the following characteristics, it is likely to be a one-time programmed, it has a life cycle with clear start and end details, it has budget and is likely to involve the use of several resources, most of which may be scarce and need to be shared among others (Akewushola et al, 2012). Similarly, a project is any temporary effort to achieve a distinct objective or outcome. Meredith and Mantel (2012) also noted that a project is usually a one-time task, with a well-defined list of the desired result. It may be divided into subtasks needed to achieve the project's goals. Therefore, a project is complex enough that the subtasks require careful preparation, precedent, coordination and monitoring of costs and outputs. Maylor (2010) also identified the project as a temporary entity needing to use predefined resources to achieve a particular and predefined result or result at a given moment. In other words, project is a one-time, multitask job with a definite starting point, a definite end, a clearly

defined scope of work, a budget and, usually, a temporary team (Lewis, 2001). A project may be described as any set of activities and tasks; has a particular purpose to be achieved within specifications; has specified start and end dates; consumes human and non-human resources (i.e. money, personnel, equipment); has funding limits; and is multi-functional (Kerzner, 2013).

2.2.2 Definition of Project Planning

The project plan acts as a project life-long roadmap and can be updated as much as appropriate. The project plan is a template by which the client and the project team will calculate performance (Kerzner, 2013). Good preparation is useful in the management of time, costs, processes of transition, risks and quality issues. This also leads to appropriate workforce control and external stakeholders managing to ensure prompt completion of projects (Serrador, 2012).

2.2.3. Project Planning Success

It has often proved difficult to define words such as success, because different things to different people and is very context-dependent. Different companies have different definitions of success. Generally, if an organization achieves its goals and expectations at a specific period time, it can be considered a success. Jugdev & Moller, (2006) Trying to identify what success means in the project context is like asking a group of people to reach on consensus on the definition of "good art" (Jugdev & Moller, 2006).

The term 'success' itself has undergone a change in the complex project environment with so many stakeholders involved. The objective of public project is to ensure the success of the project, and this involves not only managing the time, cost, and quality, generally known as 'the iron triangle', but also satisfying a number of criteria for the success measure, such as no-disputes and complying with safety norms (Tabish & Jha, 2011).

2.2.4. Project Success:

Project success can be defined as the achievement of project objectives and desired outcomes. It encompasses meeting project requirements, delivering the project within budget and schedule, satisfying stakeholders' expectations, and achieving the desired level of quality (Lim & Mohamed, 1999).

2.2.5. Public Construction Projects:

Public construction projects are infrastructure development initiatives undertaken by government bodies or public agencies to address the needs of the public. These projects include the construction or renovation of public buildings, transportation systems, utilities, and other public facilities (Chen et al., 2012). Effective project planning has several impacts on the success of public construction projects. It helps in accurate resource allocation, risk identification and mitigation, efficient scheduling, and stakeholder engagement, resulting in improved project performance, cost control, and timely completion (Abdul-Rahman et al., 2018; Zou et al., 2016).

2.3. Process of Resource Identification, Allocation, and Utilization

The process of resource identification, allocation, and utilization plays a crucial role in the project planning phase of public construction projects. Effective management of resources ensures that the necessary personnel, materials, equipment, and finances are allocated appropriately to achieve project objectives. The following literature review provides insights into the process of resource identification, allocation, and utilization during the project planning phase for public construction projects.

2.3.1. Resource Identification in Project Planning:

Resource identification is a vital aspect of project planning for public construction projects. It involves identifying and categorizing the various resources required to successfully execute the project. This literature review provides insights into the process of resource identification in project planning for public construction projects, highlighting key concepts and relevant studies. Resource identification involves identifying and categorizing the various resources required for a construction project. This includes human resources (skilled labor, project managers), physical resources (materials, equipment), and financial resources (budgets, funding) (Faniran & Love, 2012). Accurate identification of resources is crucial to ensure that the project is adequately staffed and resourced to meet its objectives.

2.3.1.1. Importance of Resource Identification:

Resource identification is crucial for ensuring that the project has the necessary resources to achieve its objectives. It involves identifying human resources, physical resources, and financial resources required for the project (Faniran & Love, 2012). Accurate identification of resources

enables project managers to effectively allocate resources, plan timelines, and estimate costs, leading to efficient project execution.

2.3.1.2. Challenges in Resource Identification:

Resource identification in project planning is not without challenges. One of the major challenges is the dynamic nature of construction projects, which often require adjustments and modifications to the identified resources (Nawi et al., 2016). Additionally, incomplete or inaccurate information during the planning phase can lead to resource identification challenges, impacting project performance.

2.3.1.3. Techniques for Resource Identification:

Various techniques and tools can aid in resource identification during project planning. One such technique is Work Breakdown Structure (WBS), which breaks down the project into smaller components, facilitating the identification of required resources for each task (Kumar & Kumar, 2017). Additionally, information systems and databases can be utilized to store and retrieve resource information efficiently.

2.3.1.4. Integration of Technology:

The integration of technology, such as Building Information Modeling (BIM), has revolutionized the resource identification process in project planning. BIM enables project teams to visualize and simulate resources, facilitating accurate identification and allocation (Arayici et al., 2011). It enhances collaboration among stakeholders and improves the overall efficiency of resource management.

By considering the importance of resource identification, challenges faced, techniques employed, and the integration of technology, project managers can enhance their ability to effectively identify resources during the project planning phase of public construction projects. This will contribute to improved project outcomes, including efficient resource allocation, cost estimation, and project scheduling.

2.3.2. Resource Allocation in Project Planning:

Resource allocation is a critical process in project planning for public construction projects. It involves assigning identified resources to specific project tasks and activities to ensure their

efficient utilization. This literature review provides insights into the process of resource allocation in project planning for public construction projects, highlighting key concepts and relevant studies. Resource allocation refers to the process of assigning identified resources to specific project tasks and activities. It involves considering factors such as resource availability, project priorities, and constraints (e.g., budget, time) (Khosrowshahi & Arayici, 2012). Effective resource allocation ensures that resources are optimally distributed to achieve project objectives efficiently.

2.3.2.1. Importance of Resource Allocation:

Resource allocation is essential for optimizing the utilization of available resources and achieving project objectives within the given constraints. It involves considering factors such as resource availability, project priorities, and constraints like budget and time (Kerzner, 2017). Effective resource allocation ensures that resources are distributed appropriately, minimizing bottlenecks and maximizing project efficiency.

2.3.2.2. Techniques for Resource Allocation:

Various techniques and methodologies can aid in resource allocation during project planning. One commonly used approach is Linear Programming (LP), which mathematically models resource allocation problems to optimize resource utilization (Hobbs & Binhadyan, 2017). Additionally, algorithms like Genetic Algorithms (GA) and Particle Swarm Optimization (PSO) have been applied to resource allocation problems in construction projects to find optimal solutions.

2.3.2.3. Challenges in Resource Allocation:

Resource allocation in public construction projects can face several challenges. Some common challenges include uncertainties in resource availability, conflicting project priorities, and changing project requirements (Faniran et al., 2014). Additionally, inadequate communication and coordination among project stakeholders can hinder effective resource allocation.

2.3.2.4. Technology-Enabled Resource Allocation:

The integration of technology, such as Building Information Modeling (BIM) and project management software, has revolutionized resource allocation in project planning. BIM allows project teams to visualize and simulate resource allocation scenarios, enabling better decision-

making (Arayici et al., 2011). Project management software facilitates real-time tracking of resource allocation, improving coordination and communication among project stakeholders.:

By considering the importance of resource allocation, employing appropriate techniques, addressing challenges, and leveraging technology, project managers can enhance their ability to allocate resources effectively during the project planning phase of public construction projects. This will contribute to improved project performance, resource utilization, and overall project success.

2.3.3. Resource Utilization in Project Planning:

Resource utilization is a crucial aspect of project planning in public construction projects. It involves effectively managing and utilizing allocated resources throughout the project lifecycle. This literature review provides insights into the process of resource utilization in project planning for public construction projects, highlighting key concepts and relevant studies. Resource utilization focuses on utilizing allocated resources efficiently throughout the project lifecycle. It involves monitoring and controlling resource usage, tracking productivity, and making adjustments as necessary to optimize resource performance and minimize waste (Chen et al., 2013). Maximizing resource utilization contributes to project success by enhancing productivity and reducing costs.

2.3.3.1. Importance of Resource Utilization:

Resource utilization plays a significant role in project success by maximizing productivity and minimizing waste. Effective resource utilization ensures that allocated resources are used efficiently, contributing to timely project completion and cost control (Chen et al., 2013). It involves monitoring and controlling resource usage, tracking productivity, and making adjustments as necessary.

2.3.3.2. Factors Affecting Resource Utilization:

Several factors can influence resource utilization in public construction projects. These include project complexity, project scheduling, availability of resources, skill levels of the workforce, and coordination among project teams (Faniran & Love, 2012). Understanding these factors is crucial for project managers to optimize resource utilization during the planning phase.

2.3.3.3. Techniques for Resource Utilization:

Various techniques and strategies can be employed to enhance resource utilization in project planning. One such technique is resource leveling, which aims to balance resource demand and supply to avoid overutilization or underutilization (Kerzner, 2017). Resource leveling helps to achieve a more even distribution of resources throughout the project duration, optimizing resource utilization.

2.3.3.4. Technology-Enabled Resource Utilization:

The integration of technology, such as project management software and data analytics, has transformed resource utilization in project planning. Project management software allows real-time tracking of resource usage, facilitating better monitoring and control (Arayici et al., 2011). Additionally, data analytics techniques can be applied to historical project data to identify patterns and improve resource utilization in future projects.

By considering the importance of resource utilization, understanding influencing factors, employing appropriate techniques, and leveraging technology, project managers can optimize resource utilization during the project planning phase of public construction projects. This will contribute to improved project performance, productivity, and cost-effectiveness.

2.3.4. Integration of Building Information Modeling (BIM) in Resource Management:

The integration of Building Information Modeling (BIM) has revolutionized resource management in public construction projects. BIM is a digital representation of the physical and functional characteristics of a project, providing a collaborative platform for stakeholders to manage and exchange information. This literature review provides insights into the integration of BIM in resource management for public construction projects, highlighting key concepts and relevant studies. The integration of Building Information Modeling (BIM) technology in resource management during the project planning phase has gained significant attention. BIM enables the visualization and simulation of project resources, facilitating improved resource identification, allocation, and utilization (Arayici et al., 2011). It enhances communication and collaboration among project stakeholders, leading to more efficient resource management.

2.3.4.1. Benefits of BIM in Resource Management:

BIM offers numerous benefits in resource management for public construction projects. It provides a comprehensive and centralized database of project information, including 3D models, schedules, and cost data, facilitating efficient resource allocation and optimization (Arayici et al., 2011). BIM enables stakeholders to visualize and analyze the impact of resource allocation decisions, enhancing coordination and collaboration.

2.3.4.2. BIM-Enabled Resource Planning and Allocation:

BIM supports resource planning and allocation by providing real-time insights into the availability and utilization of resources. It allows project managers to simulate different resource allocation scenarios, considering factors such as project schedule, cost, and labor requirements (Eastman et al., 2011). BIM's visual nature helps stakeholders make informed decisions regarding resource allocation and avoid conflicts or bottlenecks.

2.3.4.3. BIM-Enhanced Clash Detection and Coordination:

Resource management in public construction projects is closely tied to clash detection and coordination. BIM enables clash detection by identifying conflicts between different resources, such as equipment, materials, and labor, in the project model (Fan et al., 2015). By identifying clashes early in the planning stage, project teams can optimize resource allocation and minimize rework, saving time and costs.

2.3.4.4. BIM-Integrated Cost Estimation and Budgeting:

Effective resource management requires accurate cost estimation and budgeting. BIM facilitates the integration of cost data with the project model, enabling real-time cost tracking and analysis (Elmualim et al., 2014). By linking resource information with cost data, project managers can make informed decisions regarding resource allocation while staying within budget constraints.

The integration of BIM in resource management for public construction projects offers significant advantages in terms of efficient resource allocation, clash detection, cost estimation, and coordination. By leveraging BIM's capabilities, project managers can enhance resource utilization, improve project outcomes, and optimize overall project performance.

2.4. Cost Estimation Methods Employed by Public Construction during the Project Planning Process

The accuracy of cost estimation methods employed during the project planning process for public construction is a critical research objective. Accurate cost estimation is essential for budgeting, resource allocation, and decision-making, ensuring that projects are completed within financial constraints. This literature review provides insights into the evaluation of cost estimation methods in the project planning process for public construction projects, highlighting key concepts and relevant studies.

2.4.1. Importance of Accurate Cost Estimation:

Accurate cost estimation is a critical aspect of the project planning process for public construction projects. It serves as a fundamental pillar for successful project management, ensuring that projects are financially viable, resources are optimally allocated, and budgets are effectively managed. This literature review provides insights into the importance of accurate cost estimation in the project planning process for public construction, highlighting key concepts and relevant studies.

Accurate cost estimation is crucial for successful project planning in public construction. It provides the foundation for budget development, cost control, and financial forecasting throughout the project lifecycle (Abbas et al., 2018). Accurate cost estimates help project managers make informed decisions regarding resource allocation, procurement, and risk management.

2.4.1.1. Foundation for Budget Development:

Accurate cost estimation forms the foundation for budget development in public construction projects. It enables project managers and stakeholders to determine the financial requirements of the project, including the costs associated with labor, materials, equipment, and other resources (Abbas et al., 2018). Reliable cost estimates provide a basis for establishing realistic budgets and financial planning.

2.4.1.2. Cost Control and Financial Forecasting:

Accurate cost estimation is crucial for effective cost control and financial forecasting. It allows project managers to monitor and track project costs throughout the project lifecycle, comparing

actual costs against estimated costs (Khosrowshahi et al., 2013). This enables early identification of cost variances, facilitating proactive measures to address cost overruns or deviations from the budget.

2.4.1.3. Informed Decision-Making:

Accurate cost estimation provides project managers with reliable information for informed decision-making. It allows them to evaluate the financial viability of different project alternatives, assess the feasibility of proposed changes, and make strategic decisions regarding resource allocation (Kaming et al., 2014). Accurate cost estimates enable stakeholders to understand the financial implications of their decisions and choose the most cost-effective options.

2.4.1.4. Risk Management Cost Estimation:

Accurate cost estimation plays a crucial role in risk management during the project planning process. It helps identify and quantify potential financial risks associated with the project, allowing project managers to develop appropriate risk response strategies (Chan et al., 2010). Accurate cost estimates support the assessment of contingency budgets and the implementation of risk mitigation measures.

By emphasizing the importance of accurate cost estimation, project managers can ensure realistic budgeting, effective cost control, informed decision-making, and proactive risk management. This, in turn, contributes to the successful delivery of public construction projects within financial constraints and enhances overall project performance.

2.4.2. Cost Estimation Methods and Techniques:

Various cost estimation methods and techniques are employed during the project planning process in public construction. These include parametric estimation, analogy-based estimation, expert judgment, and bottom-up estimation (Choudhury et al., 2017). Each method has its strengths and limitations in terms of accuracy, complexity, and data requirements.

Cost estimation methods and techniques employed during the project planning process for public construction projects play a crucial role in determining the accuracy of cost estimates. Choosing appropriate and reliable methods is essential to ensure that cost estimates are as accurate as possible. This literature review provides insights into cost estimation methods and techniques in

the project planning process for public construction, highlighting key concepts and relevant studies.

2.4.2.1. Parametric Estimation:

Parametric estimation is a widely used cost estimation method that relies on historical data and mathematical models to estimate costs based on project parameters. It involves establishing cost relationships between project characteristics, such as size, area, or volume, and cost elements (Bubshait et al., 2016). Parametric estimation provides a quick and efficient way to estimate costs by leveraging data from similar past projects.

2.4.2.2. Analogy-Based Estimation:

Analogy-based estimation involves comparing the project at hand with similar completed projects to estimate costs. It relies on the assumption that projects with similar characteristics tend to have similar costs (Choudhury et al., 2017). This method utilizes historical data and expert judgment to identify relevant analogies and make cost estimates based on those comparisons.

2.4.2.3. Expert Judgment:

Expert judgment is a cost estimation technique that relies on the knowledge and experience of industry experts. Experts assess various project parameters and use their judgment to estimate costs based on their professional expertise (Khosrowshahi et al., 2013). This method is particularly useful when historical data or other quantitative information is limited.

2.4.2.4 .Bottom-Up Estimation:

Bottom-up estimation, also known as detailed estimation, involves estimating costs for individual project components or activities and then aggregating them to arrive at the total project cost. This method requires a detailed breakdown of project tasks, quantities, and unit costs (Abbas et al., 2018). It provides a granular and accurate estimation approach but can be time-consuming.

The choice of cost estimation method depends on project characteristics, available data, and the level of accuracy required. Project managers should consider the strengths and limitations of each method and choose the most appropriate approach to ensure accurate cost estimation during the project planning process for public construction projects.

2.4.3. Factors Influencing Cost Estimation Accuracy:

Several factors influence the accuracy of cost estimation in public construction projects. These factors include project complexity, availability and quality of data, project scope, project stage, and experience and expertise of estimators (Kaming et al., 2014). Understanding these factors is crucial for evaluating the accuracy of cost estimation methods and identifying areas for improvement.

Several factors can influence the accuracy of cost estimation methods employed during the project planning process for public construction projects. Understanding these factors is crucial for evaluating the accuracy of cost estimation and identifying areas for improvement. This literature review provides insights into the factors influencing cost estimation accuracy in public construction projects, highlighting key concepts and relevant studies.

2.4.3.1. Project Complexity:

The complexity of the project is a significant factor that can affect cost estimation accuracy. Complex projects with unique design requirements, technical challenges, or intricate scopes of work are more prone to uncertainties and cost variations (Kaming et al., 2014). The level of complexity impacts the availability and quality of data, making accurate cost estimation more challenging.

2.4.3.2. Availability and Quality of Data:

The availability and quality of data directly impact the accuracy of cost estimation. Accurate cost estimation relies on comprehensive and reliable data related to labor rates, material costs, equipment costs, productivity rates, and other project-specific data (Abbas et al., 2018). Insufficient or outdated data can lead to inaccurate estimates and cost overruns.

2.4.3.3. Project Scope:

The clarity and completeness of the project scope influence cost estimation accuracy. A well-defined project scope with clear objectives, deliverables, and specifications provides a solid foundation for accurate cost estimation (Choudhury et al., 2017). Changes or ambiguities in the project scope can lead to uncertainties and inaccuracies in cost estimates.

2.4.3.4. Project Stage:

The stage of the project at which cost estimation is performed can impact accuracy. Early-stage estimates are typically less accurate due to limited project information, while estimates prepared at later stages with more detailed design and planning tend to be more accurate (Khosrowshahi et al., 2013). Accuracy improves as the project progresses and more information becomes available.

2.4.3.5. Experience and Expertise of Estimators:

The experience and expertise of estimators significantly influence cost estimation accuracy. Experienced estimators with a deep understanding of construction processes, industry norms, and cost drivers are more likely to produce accurate estimates (Bubshait et al., 2016). Estimators' ability to interpret project requirements, analyze data, and apply appropriate estimation techniques impacts the accuracy of cost estimates.

By considering these factors and addressing their influence on cost estimation accuracy, project managers can improve the reliability of cost estimates during the project planning process for public construction projects. This, in turn, leads to better cost control, more effective resource allocation, and improved project outcomes.

2.4.4. Evaluation of Cost Estimation Methods:

Researchers have conducted studies to evaluate the accuracy of cost estimation methods employed in public construction projects. These studies compare estimated costs with actual project costs to assess the effectiveness and reliability of different estimation techniques (Bubshait et al., 2016). Such evaluations help identify the strengths and weaknesses of estimation methods and guide improvements in cost estimation practices.

Review of Literature: Evaluation of Cost Estimation Methods

Cost estimation is a critical aspect of the project planning process for public construction projects. Accurate cost estimation is essential for effective project management, budget allocation, and decision-making. This review aims to evaluate the accuracy of cost estimation methods employed during the project planning process for public construction. The review will focus on the evaluation of various cost estimation methods and their effectiveness in achieving accurate cost estimates.

2.4.4.1. Comparative Analysis of Cost Estimation Methods:

Several researchers have conducted comparative analyses of different cost estimation methods to determine their accuracy and reliability. These studies compare traditional methods, such as expert judgment and historical data analysis, with advanced techniques like parametric modeling, machine learning, and artificial intelligence. The findings of these studies provide insights into the strengths and limitations of different methods, enabling project managers to select the most appropriate approach for their specific projects.

2.4.4.2. Accuracy Assessment of Historical Data Analysis:

Historical data analysis involves using past project data to estimate costs for similar future projects. Researchers have evaluated the accuracy of this method by comparing predicted costs with actual costs of completed projects. These studies assess the factors affecting the accuracy of historical data analysis, such as data quality, project similarity, and inflation adjustments. The findings help project managers understand the reliability of historical data as a cost estimation tool.

By evaluating the accuracy of cost estimation methods during the project planning process for public construction projects, researchers and practitioners can gain insights into the effectiveness of different techniques and identify areas for improvement. This will contribute to enhanced cost control, better resource allocation, and improved overall project performance.

2.5. Effectiveness of Risk Management Strategies Employed during the Project Planning

Risk management is a critical aspect of the project planning process in public construction projects. It involves identifying, assessing, and mitigating potential risks to ensure successful project delivery. This literature review aims to assess the effectiveness of risk management strategies employed during the project planning process for public construction projects. By examining relevant studies, we can gain insights into best practices and identify areas of improvement in risk management strategies.

2.5.1. Risk Management Strategies in Construction Projects:

The effectiveness of risk management strategies can significantly impact the overall success of construction projects. According to Zhang and Ng (2019), risk management strategies typically

encompass risk identification, risk assessment, risk response planning, and risk monitoring and control. They emphasize the importance of proactive risk management practices to minimize project disruptions and enhance project outcomes.

Risk management strategies play a crucial role in the project planning process for public construction projects. Effective risk management helps identify, assess, and mitigate potential risks, ensuring project success and minimizing negative impacts. This literature review provides insights into risk management strategies employed during the project planning process for public construction projects, highlighting key concepts and relevant studies.

2.5.1.1. Importance of Risk Management in Construction Projects:

Risk management is essential in construction projects to proactively address potential threats and uncertainties that can impact project outcomes. It involves identifying risks, assessing their potential impact, and developing strategies to mitigate or manage them (El-Sayegh, 2008). Effective risk management enhances decision-making, reduces cost overruns, improves project scheduling, and minimizes disruptions.

2.5.1.2. Risk Identification and Assessment:

Risk identification and assessment are fundamental steps in risk management. Various techniques, such as brainstorming, checklists, and interviews, are employed to identify potential risks in construction projects (Chapman & Ward, 2003). Risk assessment involves evaluating the likelihood and potential impact of identified risks to prioritize them for further action.

2.5.1.3. Risk Mitigation and Control:

Risk mitigation and control strategies aim to minimize the impact of identified risks on project objectives. Strategies can include risk avoidance, risk transfer through insurance or contracts, risk reduction through preventive measures, and risk acceptance with contingency plans (Kasim et al., 2016). Effective risk mitigation and control measures help protect project schedules, budgets, and quality standards.

2.5.1.4. Stakeholder Engagement and Communication:

Engaging stakeholders and promoting effective communication are critical aspects of risk management. Involving stakeholders in risk identification and assessment processes fosters a

shared understanding of project risks and facilitates the development of appropriate risk responses (Al-Bahar & Crandall, 1990). Timely and transparent communication ensures that risks are well understood and appropriate actions are taken.

2.5.1.5. Lessons Learned and Knowledge Management:

Capturing, documenting, and disseminating lessons learned from past projects are valuable risk management strategies. Knowledge management systems and databases allow project teams to learn from previous experiences, identify recurring risks, and apply effective risk management strategies (Hinze, 2003). This promotes continuous improvement and enhances risk management effectiveness.

By employing effective risk management strategies, project stakeholders can identify, assess, and mitigate risks during the project planning process for public construction projects. This enables proactive decision-making, enhances project outcomes, and contributes to the successful delivery of projects within defined parameters.

2.5.2. Risk Assessment Techniques:

Various risk assessment techniques are employed in public construction projects to identify and evaluate potential risks. A study by Aibinu and Jagboro (2002) highlights the application of quantitative risk assessment techniques, such as the Analytical Hierarchy Process (AHP) and the Monte Carlo simulation, to improve risk management effectiveness. These techniques enable project managers to prioritize risks and allocate appropriate resources for risk mitigation.

Risk assessment techniques are essential components of effective risk management strategies employed during the project planning process for public construction projects. These techniques help identify and evaluate potential risks, allowing project stakeholders to make informed decisions and develop appropriate risk mitigation measures. This literature review provides insights into risk assessment techniques in the context of public construction projects, highlighting key concepts and relevant studies.

2.5.2.1. Qualitative Risk Assessment:

Qualitative risk assessment involves a subjective evaluation of risks based on their likelihood and potential impact. It relies on expert judgment and experience to assess risks on a qualitative

scale, such as high, medium, or low (Chapman & Ward, 2003). Qualitative risk assessment provides a quick and cost-effective method to prioritize risks and determine their significance.

2.5.2..2. Quantitative Risk Assessment:

Quantitative risk assessment involves a more rigorous and quantitative analysis of risks using numerical data and probabilistic techniques. It incorporates statistical models and data analysis to quantify the likelihood and impact of risks, often using techniques like Monte Carlo simulation (Aaltonen & Kujala, 2010). Quantitative risk assessment provides more precise risk quantification and supports more detailed decision-making.

2.5.2.3. Risk Probability and Impact Assessment:

Risk probability and impact assessment is a commonly used technique in risk assessment. It involves evaluating the likelihood of a risk occurring and its potential impact on project objectives (Hillson & Murray-Webster, 2007). This technique utilizes a matrix or scoring system to assign ratings to risks based on their probability and impact levels, helping prioritize risks for further analysis and response planning.

2.5.2.4. Risk Checklists and Templates:

Risk checklists and templates provide a structured approach to risk assessment. They consist of predefined lists of potential risks and associated risk factors that project teams can review and tailor to their specific project context (Al-Bahar & Crandall, 1990). Risk checklists and templates help ensure comprehensive risk identification and facilitate consistent assessment across projects.

2.5.2.5. Delphi Technique:

The Delphi technique is a consensus-based method that involves collecting and synthesizing input from a panel of experts to assess risks (Jia et al., 2013). It uses a structured iterative process to gather anonymous input and reach a consensus on risk assessment. The Delphi technique helps mitigate biases and subjectivity in risk assessment and leverages collective expertise.

By employing these risk assessment techniques during the project planning process for public construction projects, project stakeholders can systematically identify, analyze, and prioritize

risks. This enables effective risk management and supports the development of appropriate risk mitigation strategies, ultimately contributing to successful project outcomes.

2.5.3. Risk Response Planning and Implementation:

Effective risk response planning involves developing strategies to mitigate identified risks. A research article by El-Sayegh (2008) emphasizes the importance of integrating risk response planning with project scheduling. The study suggests that incorporating risk response activities, such as contingency planning and resource allocation, into project schedules can enhance risk management effectiveness and improve project outcomes.

2.5.4. Risk Monitoring and Control:

Risk monitoring and control are essential components of risk management strategies. A study by Odeyinka and Yusif (2013) focuses on risk monitoring techniques, such as regular progress reporting, site visits, and performance evaluation, to ensure that risk mitigation measures are effective. The research highlights that continuous monitoring and control of risks enable timely corrective actions, contributing to successful project delivery.

2.5.5. Success Factors for Risk Management in Public Construction Projects:

To enhance the effectiveness of risk management strategies, it is crucial to consider success factors specific to public construction projects. A study by Loosemore et al. (2006) identifies stakeholder collaboration, managerial support, and effective communication as key success factors. The research emphasizes the need for a proactive risk management culture and the involvement of all stakeholders throughout the project lifecycle.

The effectiveness of risk management strategies plays a vital role in the success of public construction projects. This literature review highlighted various aspects of risk management, including risk assessment, response planning, monitoring, and control. The cited studies provide valuable insights into best practices and success factors for risk management in public construction projects. By incorporating these findings into project planning processes, stakeholders can enhance risk management effectiveness and improve project outcomes.

2.6. Level of stakeholder engagement during the project planning phase for public construction projects

Assessing the level of stakeholder engagement during the project planning phase for public construction projects is a crucial research objective. Stakeholder engagement involves actively involving and collaborating with stakeholders throughout the project planning process to ensure their input, address their concerns, and foster a sense of ownership. This literature review provides insights into stakeholder engagement during the project planning phase for public construction projects, highlighting key concepts and relevant studies.

Importance of Stakeholder Engagement:

Stakeholder engagement is vital for successful project planning in public construction projects. Engaging stakeholders, including project owners, government agencies, local communities, and end-users, fosters collaboration, improves decision-making, and enhances project outcomes (Kanjanaootra et al., 2017). Effective stakeholder engagement ensures that project objectives align with stakeholders' needs and expectations.

2.6.1. Stakeholder Identification and Analysis:

Stakeholder identification and analysis are critical steps in stakeholder engagement. It involves identifying and understanding the various stakeholders involved in the project, their interests, influence, and potential impacts (Freeman, 1984). Stakeholder analysis helps project teams prioritize stakeholders and tailor engagement strategies to address their specific needs. Stakeholder identification and analysis are crucial aspects of assessing the level of stakeholder engagement during the project planning phase for public construction projects. Understanding the stakeholders involved, their interests, and their potential impact on the project is essential for effective engagement strategies. This literature review provides insights into stakeholder identification and analysis in the context of public construction projects during the project planning phase, highlighting key concepts and relevant studies.

2.6.1.1. Importance of Stakeholder Identification and Analysis:

Stakeholder identification and analysis are fundamental for successful stakeholder engagement. Properly identifying and analyzing stakeholders allows project teams to understand their roles, interests, and potential influence on the project (Olander & Landin, 2005). This understanding is

crucial for tailoring engagement strategies, addressing stakeholders' concerns, and fostering effective collaboration.

2.6.1.2. Stakeholder Identification Techniques:

Various techniques can be employed to identify stakeholders in public construction projects. These techniques include stakeholder mapping, brainstorming sessions, interviews, and document analysis (Mitchell et al., 1997). Stakeholder mapping, for example, helps visualize the relationships between stakeholders and their level of influence, allowing for targeted engagement efforts.

2.6.1.3. Stakeholder Analysis Frameworks:

Stakeholder analysis frameworks provide structured approaches to assess stakeholders' interests, influence and potential impacts. One commonly used framework is the Power-Interest Grid, which categorizes stakeholders based on their level of power and interest in the project (Mendibil & Hughes, 2007). Other frameworks, such as the Salience Model, consider attributes like legitimacy, urgency, and power to prioritize stakeholders.

2.6.1.4. Engaging Key Stakeholders:

Identifying and engaging key stakeholders are essential for effective stakeholder engagement during the project planning phase. Key stakeholders are those who have a significant impact on the project or are highly affected by its outcomes (Freeman, 1984). Engaging key stakeholders early in the planning phase helps ensure their concerns and perspectives are considered in decision-making processes.

2.6.1.5. Continuous Stakeholder Identification and Analysis:

Stakeholder identification and analysis should be an ongoing process throughout the project planning phase. As the project evolves, new stakeholders may emerge, and the interests and influence of existing stakeholders may change (Bryson et al., 2014). Continuous stakeholder identification and analysis help project teams stay responsive to stakeholder needs and adapt their engagement strategies accordingly.

By employing effective stakeholder identification and analysis techniques, project stakeholders can gain a comprehensive understanding of the stakeholders involved in public construction projects during the project planning phase. This understanding facilitates targeted engagement

efforts, promotes collaboration, and improves project outcomes by incorporating diverse perspectives and addressing stakeholders' concerns

2.6.2. Communication and Consultation:

Effective communication and consultation are essential components of stakeholder engagement. Open and transparent communication channels allow project teams to share project information, gather feedback, and address stakeholders' concerns (Olander & Landin, 2005). Regular consultations with stakeholders enable their active participation and input in the project planning process.

2.6.3. Collaborative Decision-Making:

Stakeholder engagement involves collaborative decision-making processes that include stakeholders' perspectives and expertise. Collaborative decision-making allows stakeholders to contribute to project planning, assess trade-offs, and collectively resolve conflicts (Bryson et al., 2014). It fosters a sense of ownership and promotes more sustainable and inclusive project outcomes.

2.6.4. Evaluation of Stakeholder Engagement:

Researchers have developed frameworks and methodologies to evaluate the level of stakeholder engagement during the project planning phase. These evaluations assess the effectiveness of stakeholder engagement strategies, the extent of stakeholder involvement, and the impact of engagement activities on project outcomes (Kanjanaabootra et al., 2017). Evaluations provide insights into areas for improvement and guide future stakeholder engagement efforts.

By assessing the level of stakeholder engagement during the project planning phase for public construction projects, project stakeholders can ensure effective collaboration, shared decision-making, and project success. This leads to improved project outcomes, increased stakeholder satisfaction, and enhanced long-term project sustainability.

2.7. Empirical Review

2.7. 1. Determining the Impact of Improved Project Scheduling on Minimizing Delays and Ensuring Timely Completion of Public Construction Projects

Determining the impact of improved project scheduling on minimizing delays and ensuring timely completion of public construction projects is a critical research objective. Effective project scheduling plays a key role in managing project timelines, optimizing resources, and mitigating delays. This literature review provides insights into the impact of improved project scheduling on minimizing delays and ensuring timely completion of public construction projects, highlighting key concepts and relevant studies.

2.7.2. Importance of Project Scheduling:

Project scheduling is crucial for the successful execution of public construction projects. It involves the systematic allocation of resources, sequencing of activities, and determination of project durations (Abdullahi et al., 2017). Effective project scheduling enables efficient resource utilization, identifies critical project milestones, and establishes a timeline for project completion.

2.7.3. Minimizing Delays through Improved Scheduling:

Improved project scheduling techniques can help minimize delays in public construction projects. Utilizing techniques such as critical path method (CPM), resource leveling, and schedule compression can enable better identification of critical activities, allocation of resources, and optimization of project timelines (Odeh & Battaineh, 2002). Effective scheduling reduces the likelihood of delays and allows for proactive management of potential issues that may arise during project execution.

2.7.4. Resource Optimization and Time Management:

Improved project scheduling facilitates resource optimization and efficient time management. By accurately allocating resources and sequencing activities, project managers can minimize resource conflicts, prevent bottlenecks, and streamline project workflows (Zayed et al., 2018).

This enables the timely completion of project tasks and reduces the likelihood of delays caused by resource constraints.

2.7.5. Early Identification of Potential Delays:

Improved project scheduling allows for the early identification of potential delays, enabling proactive measures to mitigate risks. Through techniques like schedule risk analysis and "what-if" scenario analysis, project managers can assess the impact of uncertainties, changes, and risks on project schedules (El-Sayegh, 2008). Early identification of potential delays supports timely intervention and the implementation of appropriate mitigation strategies.

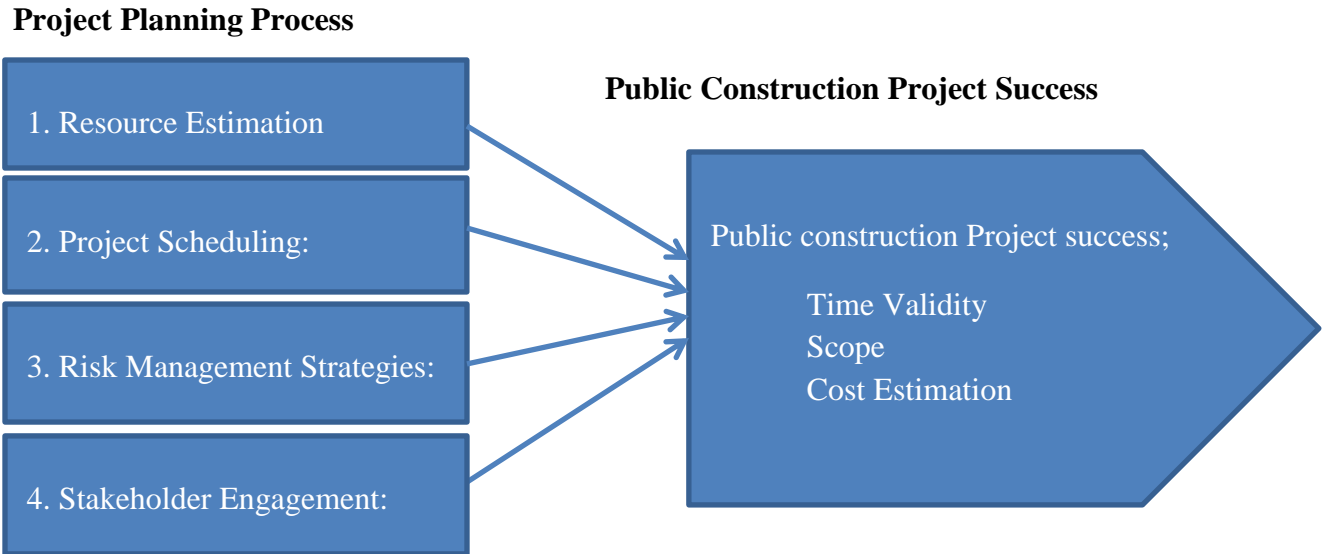
2.7.6. Technology and Digital Tools in Project Scheduling:

The use of technology and digital tools can significantly enhance project scheduling and contribute to timely project completion. Building Information Modeling (BIM), project management software, and scheduling tools enable improved visualization, collaboration, and automation in scheduling processes (Cao et al., 2020). These tools help streamline scheduling activities, improve communication among project stakeholders, and enhance project control.

By focusing on improved project scheduling, public construction projects can benefit from minimized delays and timely completion. Effective scheduling techniques, resource optimization, early identification of potential delays, and the utilization of technology and digital tools are key factors in achieving successful project outcomes.

2.8. Conceptual Frameworks

This conceptual framework provides a structure for understanding and analyzing the relationships between the independent variables (resource identification, cost estimation, risk management, stakeholder engagement, and project scheduling) and the dependent variable (success of public construction projects). It also acknowledges the potential mediating and moderating factors that may influence these relationships. The conceptual framework also considers the research methods and data collection techniques that will be employed to assess the effectiveness of the project planning process on the success of public construction projects. This includes questionnaire surveys, interviews, document analysis, and statistical analysis of quantitative data. The independent variables and dependent variables:



Source: Authors Own Compilation, 2024

2.9. Hypothesis

1. Resource Estimation during Project Planning Phase:

Null Hypothesis (H0): There is no significant difference in the process of resource estimation during the project planning phase for public construction projects in Jimma Town.

Alternative Hypothesis (Ha): There is a significant difference in the process of resource estimation during the project planning phase for public construction projects in Jimma Town.

2. Impact of Improved Project Scheduling on Minimizing Delays:

Null Hypothesis (H0): Improved project scheduling has no impact on minimizing delays and ensuring timely completion of public construction projects in Jimma Town.

Alternative Hypothesis (Ha): Improved project scheduling has a significant impact on minimizing delays and ensuring timely completion of public construction projects in Jimma Town.

3. Effectiveness of Risk Management Strategies during Project Planning:

Null Hypothesis (H0): The risk management strategies employed during the project planning process for public construction projects in Jimma Town are not effective.

Alternative Hypothesis (Ha): The risk management strategies employed during the project planning process for public construction projects in Jimma Town are effective.

4. Level of Stakeholder Engagement during Project Planning:

Null Hypothesis (H0): There is no significant difference in the level of stakeholder engagement during the project planning phase for public construction projects in Jimma Town.

Alternative Hypothesis (Ha): There is a significant difference in the level of stakeholder engagement during the project planning phase for public construction projects in Jimma Town¹.

CHAPTER THREE

3. RESEARCH METHODS AND METHODOLOGY

The chapter outlines the design of the study that was conducted and provides an overview of the key components involved in gathering and analyzing the data. This chapter describes the methodology of the study, which includes the study area, research design, research approach, types and sources of data, target population, sampling design, sample size, data collection methods, and data analysis methods.

3.1. Study Area

The Jimma town is 353 Km southwest of Addis Ababa. Altitude in the zone varies from 880 to 3,340 m above sea level; the topography includes mountains, dissected plateaux, hills, plains, valleys, and gorges. There are several perennial rivers and intermittent streams. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this city has a total population of 227,499, of whom 114,230 are female and 113,269 male. With an area of 50.52 square kilometers, Jimma has a population density of 2,394.30 all are urban inhabitants. A total of 32,191 households were counted in this city, which results in an average of 3.76 persons to a household, and 30,016 housing units. The three largest ethnic groups reported in Jimma were the Oromo (36.71%), the Amhara (27.14%) and the Dawuro (10.05%); all other ethnic groups made up 26.1% of the population.

3.2. Research Design:

The research design for this study was descriptive analysis of the effect of project planning processes on the success of public construction projects Jimma Town Research design serves as the foundation and structure for research, guiding researchers in selecting the appropriate techniques and tools to achieve their study's objectives. This research was employed a descriptive approach, focusing on characterizing and drawing conclusions about the specific situation or case being investigated. Schindler and Cooper (2003) highlight that the primary purpose of a descriptive research design is to delineate a subject by profiling groups, individuals, or events, thereby addressing problems.

This approach is particularly suitable for examining effects of Project Planning Process on Success of Public Construction Projects the Case of Jimma Town. By incorporating both self-administered questionnaires and interviews, the descriptive research method allows for an in-depth analysis of data, enabling the researcher to delineate, elucidate, and juxtapose findings.

Descriptive research is instrumental in providing comprehensive insights, understanding, and responses to research scenarios. It encompasses a holistic approach to data collection and analysis, offering a more profound interpretation of results. As Mugenda (2003) outlines, descriptive research involves data gathering to address questions about the subject's present condition. It's a case-based methodology that involves compiling, scrutinizing, and presenting data, which aids researchers in thoroughly examining and elucidating the issues, thereby obtaining detailed information about the study area. Consequently, descriptive research design is the chosen method for depicting the current circumstances in the study area.

3.3 Research Approach

This study was conducted mixed method approaches. In these situations, it is best to use so-called mixed methods approaches in which the researcher was used both quantitative and qualitative methods. Because mixed methods research is a flexible approach where what the researcher wants to find out toward the impact of project planning Process on project success in Jimma Town.

Mixed research method is the incorporation of various qualitative and quantitative strategies within a single study. The choice of mixed approach has great significances for the researcher to see the research issue in multidimensional directions. The reason for using this method is to maximize the strength of each method by enabling the researchers to gather dependable information. Employing such multi-method in one study is integrating design more preferable and for practical knowledge that enable the researcher to collect diverse type of data which give best understanding of the research problem.

3.3.1. Quantitative Approach

Quantitative research refers to a systematic and empirical approach to research that focuses on collecting and analyzing numerical data to generate objective and statistically significant findings. It involves the use of quantifiable variables, structured data collection methods, and

statistical analysis techniques to draw conclusions and make generalizations about a population or phenomenon. Employing such method in one study is integrating design more preferable and for practical knowledge that enable the researcher to collect diverse type of data which give best understanding of the research problem

This approach would involve gathering numerical data to examine effective of the project planning process on success of public construction project. Data would be collected through surveys/questionnaires administered to project planning stakeholders (plan managers, construction profession, and other stakeholders) in Jimma Town. The collected data would be analyzed using statistical techniques to quantify relationships and draw conclusions (Creswell, & Plano Clark, 2018).

3.3.2. Qualitative Approach

The qualitative approach would involve interviews and/ with key stakeholders, including project planners, contractors, and representatives of relevant government agencies. These interviews would explore their experiences, perceptions, and insights regarding the project planning process and its impacts on project success. Thematic analysis would be used to identify patterns, themes, and key findings from the qualitative data (Creswell, & Plano Clark, 2018).

3.4 Types and Sources of Data

Basically, there are two sources of data: primary and secondary data. To conduct this research, both primary and secondary data sources were used to acquire the data. The researcher used both primary and secondary types of data. The quantitative data was collected as a primary source of information for the study. A document analysis was also be used as sources of secondary data which relied on published and unpublished materials.

The primary data was collected by using quantitative and qualitative method. Quantitative data will gather and generate through questionnaires that was analyze by using descriptive and analytical. Qualitative data collect through questionnaires, was analyze thematically and. These primary sources of information are mainly from respondents who are currently working in the Municipality of constriction office in Jimma zone and Self-administered questionnaires allow individuals to provide responses to specific questions in a structured

Secondary data was collected from project documents that have cost, time, scope and other published and unpublished form by reviewing such like scholarly journal articles, books, magazines, academic papers, utilizing government and non-government official reports, internet sources, profiles, Inventories documents and other public websites are a common to gathering secondary data. This is useful in setting the contextual and theoretical framework for this study. The quantitate data will collect and analyze separately.

3.5 Target Population

According data received from Jimma town Municipality construction office, there are a total of around 220 individuals working at different position like project managers, construction professionals and stakeholders. The details of study populations are as follow.

Project Managers: based on the data received from Jimma town Municipality of construction office, project managers are consist of 15 individuals responsible for over-seeing the planning and execution of public construction projects in municipality of constriction office. These managers are playing a crucial role in resource estimation, cost estimation, risk management, and stakeholder engagement during the project planning phase.

Construction Professionals: Data from Jimma town municipality of constriction office professionals in Jimma Town Municipality of constriction office are 115 individuals with expertise in various areas of construction, such as architects, engineers, quantity surveyors they are involved in the project planning process and contribute to resource identification, cost estimation, risk management, and stakeholder engagement.

Stakeholders: The study populations for stakeholders are encompassing 80 individuals and organizations affected by or having an interest in public construction projects in Jimma Town. This group was includes government officials, community representatives, local residents, regulatory bodies. Their engagement and influence during the project-planning phase can affect project success.

Contractor: A contractor is a party, whether a 10 individual or an organization, that is contracted by the project owner or client to perform specific construction activities or provide specialized services within a construction project. Contractors are responsible for executing the work according to the project plans, specifications, and contractual agreements. They may be

involved in various stages of the project, including planning, design coordination, procurement, construction, and project closeout. Contractors can include general contractors who oversee the entire construction process, as well as subcontractors who specialize in specific trades or disciplines

3.6 Sample and Sampling Techniques

Totally there are 220 target populations, from which, 80 Stakeholders, 15 project Managers, contractors, 10 Construction professionals 115 (regulatory professionals) under Jimma Municipality office. A stratified random sampling technique was employed to select a representative sample of project planners, managers, and stakeholders involved in public construction projects in Jimma Town. Stratification was based on different types of projects (e.g., infrastructure, buildings) and organizations (e.g., government agencies, private contractors). Purposive sampling was used to select key stakeholders who possess valuable insights and experiences related to project planning processes case study Jimma Town. Those were including project managers, planners, and representatives from government agencies and local communities involved in public construction projects The sample size (n) for managers, construction professional and stakeholders are adjusted using the Yamane formula (1967). Confidence level used is 95% with degree of variability (p) equivalent to 5% (0.05).

$$\text{Using Yamane (1967)} \quad n = \frac{N}{1 + Ne^2}$$

Where N=target population (220) & e=5% emerging error

n=sample size

$$n = \frac{220}{1 + 220(0.05)^2} = \frac{220}{1.55} = 142$$

Where N is the population size; n is the Sample size; and e is the level of precision (Yamane, 1967). By considering a precision level of 5%, the final sample sizes are 142. From the target population we proportionally allocate the calculated sample size to each category of their position (Table 1).

The sampling frame included the list of professionals within Jimma town as published by the respective registration body. Cluster sampling will be used due to the nature of respondents to be

involved in the study. Lists of professionals who have their offices based in Jimma town will be obtained from respective regulatory office. The project planners and contractors who have been involved in at least two public construction works in the past 3years in Jimma town municipality

$$\text{of constriction office } n_i = \frac{N_i \times n}{N}$$

Formula used for population proportional to size allocation shows the sample distribution among different category of target population.

Table 1: Sample Distribution among Different Category of Target Population

| Cluster | Target population | Sampled Population | Percentage (%) |
|---------------------------|-------------------|--------------------|----------------|
| Managers | 15 | 10 | 7.1 |
| Construction professional | 115 | 74 | 52.1 |
| Stakeholders | 80 | 52 | 36.6 |
| Contractor | 10 | 6 | 4.2 |
| Total | 220 | 142 | 100 |

Sources: Data from Jimma Town Municipality Office December 2024

3.7 Variables

By measuring resource estimation, time validity, scope, and cost, the study gains an understanding of how these factors contribute to project success. The collected data provides insights into the accuracy of resource planning, adherence to timelines, scope management, and financial control. Analyzing these variables helps identify the key drivers of project success and informs future project management practices.

Dependent Variable:

"Success of public construction projects (project completion within cost, scope and time validity).

Independent Variables:

- Resource Estimation
- Project Scheduling
- Risk Management Strategies

➤ Stakeholder Engage

Table 2: Dependent and Independent Variables

| Independent Variables Project Planning Process | Dependent variables Success of Public Construction Projects |
|--|---|
| 1. Resource Estimation | Time Validity Scope Cost Estimation |
| 2. Project Scheduling | |
| 3. Risk Management Strategies | |
| 4. Stakeholder Engage | |

The successful integration of time validity, scope, and cost estimation is crucial for project success. When these factors are well-planned, aligned, and managed effectively, they contribute to achieving project objectives, delivering the desired scope of work within the specified time frame, and remaining within the allocated budget. However, if any of these factors are mismanaged, it can lead to project delays, cost overruns, or incomplete deliverables, resulting in project failure

3.8. Data Collection Methods and Instruments

3.7.1 Data Collection Instruments

Survey was conducted to gather quantitative and qualitative data on resource Estimation, Project scheduling planning, project risk management and the level of stakeholder engagement. A structured questionnaire which has Socio demographic variables and Likert scale type's questions, was developed and administered to project planners, managers, and relevant stakeholders involved in public construction projects in Jimma Town. Open ended questions were used to collect qualitative data from key informants, which will support tour quantitative finding during the discussion.

3.7.2 Methods of Data Analysis:

In the process of data analysis, a strategy of concurrent nested strategy was employed, where two data collection methods (questionnaires and interviews) were used. The study used qualitative data to elaborate or expand the findings of the quantitative finding. The quantitative data was cleaned, coded and entered to SPSS version 20.0, where we conduct descriptive analysis for

further exploration of the data pattern. The quantitative data was carefully explored by conducting different descriptive analysis, (frequency distribution, computing measures of central tendency and distribution, test for variety of assumptions like normality, homosidicity, collinearity, correlation, and model fitness test), to understand the pattern of the data. All assumptions were tested at 95% confidence interval (p value <0.005) and for other test as per their specific parameter. Different variables were computed to new variables to measure effect of their pulled value on dependent variables. Following exploratory descriptive analysis, highlight conduct linear regression model to determine the effect of independent variables on dependent variable. The result had presented by frequency distribution tables, charts and figures for the qualitative analysis of qualitative data, content analysis was employed in this study as it is best suited to achieve the objectives of the study by analysing effective of project planning process. Content analysis refers to the process of categorizing verbal or behavioural data to classify, summarize, and tabulate the data.

3.9 Validity and Reliability

Validity and reliability are two important concepts in research methodology that affects the quality and trustworthiness of a study. Let us discuss how these concepts apply to the title "The Effectiveness of Project Planning Process on Success of Public Construction Projects: The Case of Jimma Town. Validity refers to the extent to which a study measures what it intends to measure and accurately represents the phenomenon under investigation. In the context of the title, validity would involve ensuring that the research effectively examines the relationship between the project planning process and the success of public construction projects in Jimma Town. Reliability of the data; A great deal of care and skill was exercised by the researchers in the collection, analysis, and presentation to ensure reliability. From the analysis, Cronbach's Alpha (coefficient of reliability) based on the average inter-item correlations are evaluated for each parameter. In addition, the Cronbach Alpha value for was 0.705 (Table 2).

Table 3: Reliability Statistics

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|--|------------|
| 0.705 | 0.851 | 42 |

3.10 Model Specification

The effect of independent variables over dependent variable in the study area will be explained using the following multiple regression model or equation. It will be used to predict the value of certain variable based on the other variable. The intended effect on Project success by the factors of project planning process, like Resource estimation, Cost estimation methods, Risk management strategies and Stakeholder engagement: will be considered using the following model= (X1, X2, X3.X4,)

Linear regression analysis was conducted and degree of relationship between variables dependent (criterion) independent variables (predictors) was calculated by the following formula

$Y_i = a + bX_i + e_i$. Where: Y_i = observed value of Y

A = Y intercept B=slope, X_i = its observed value of x and e_i = is an observational error

Note: X is the independent variables y is dependent variables Intercept a, is expected value of y when x is 0. Slope increasing when x increase by a unit amount, k is number of variables.

For this study we will use the following model question

$Y = a + B_1x_1 + b_2x_2 + \dots + b_kx_k + e$ $Y = R + E + RM + S$ $X_1 =$ Resource estimation: $X_2 =$ Project scheduling $X_3 =$ Risk management strategies: $X_4 =$ Stakeholder engagement

3.11 Ethical Consideration

Ethical clearance letter was obtained from JU, BECO with referral Number of RGSC/78/2024 and communicated to Jimma town municipality and for each project owners. Then principal investigator communicated the objective of the study with the project manager and the study participants. After getting consent from the management, data collection was started. And informed consent was obtained from each respondent verbally

3.12 Dissemination Plan

Finding from this study will be communicated to Jimma University School of post graduate study, after getting approval; it will further be communicated to Jimma Town municipality office. All effort will be used to publish on reputable journal to share the finding with scientific community.

CHAPTER FOUR

4. 1 RESULTS AND DISCUSSION

This chapter presents Summary finding of this study both from quantitative and qualitative results. From expected 142 study participants 8 were not found due to turnover of staffs from contractor sides, and questioner was distributed for 134 individuals. Among the 134 questionnaires that were distributed to concerned body as a representative of the total population 131 questionnaires were properly filled and returned which is 92.25% response rate. This response rate was excellent to make conclusions for the study. The response rate was representative. According to Mugenda (1999) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was excellent. The first part of the questionnaire consists of the demographic information of the participants related to personal and professional characteristics. Whereas the second part intended to obtain respondent's opinion. The third part intended to obtain the level of agreement success factors of public projects in Jimma town municipality, and the final part intended to obtain perception regarding project planning process of the study organization. This analysis is conducted based on the knowledge areas and the conceptual frameworks developed in chapter two.

4.1.1. Socio-Demographic Characteristics

Base on Table 4: Socio-demographic characteristics refer to the social and demographic attributes of individuals or groups that are used to describe and understand their characteristics in a study or research context. These characteristics provide important information about the participants and help researchers analyze and interpret their findings in relation to specific variables. In the provided example, the socio-demographic characteristics of the study participants are described based on two variables: sex and age category.

- 1. Sex:-Male:** There were 84 male participants, which accounts for 64.1% of the total participants. **Female:** There were 47 female participants, representing 35.9% of the total participants.
- 2. Age category:-** 18-25: There were 27 participants in the age category of 18-25, making up 20.6% of the total participants.- 26-35: There were 45 participants in the age category of 26-

35, accounting for 34.4% of the total participants.- 36-45: There were 50 participants in the age category of 36-45, representing 38.2% of the total participants.- 46-55: There were 9 participants in the age category of 46-55, comprising 6.9% of the total participants.

- 3. Educational Background:-**The data provides insights into the educational background of the respondents. The majority of respondents, accounting for 50.4%, held a bachelor's degree. This indicates a high level of undergraduate education among the sample. The second-largest group consisted of individuals with a master's degree, representing 18.3% of respondents. This suggests a significant proportion of respondents with advanced degrees. Diploma holders comprised 16.8% of the sample, indicating a substantial representation of individuals with vocational or technical qualifications. High school graduates accounted for 13.7% of respondents, indicating a smaller but still notable presence of individuals with a secondary education. A very small proportion (0.8%) of the respondents held a doctorate, suggesting a limited number of respondents with the highest level of educational attainment.
- 4. Years of Experience:-**The respondents' years of experience were categorized into different ranges, providing insights into their professional background. The largest group consisted of individuals with 1-5 years of experience, representing 48.9% of the sample. This suggests a significant proportion of relatively early-career professionals. The second-largest group was individuals with more than 15 years of experience, comprising 22.9% of respondents. This indicates a notable presence of seasoned professionals with extensive industry knowledge. Those with 6-10 years of experience accounted for 14.5% of the sample, suggesting a smaller but still significant proportion of mid-career professionals. The 11-15 years range represented 10.7% of respondents, indicating a relatively smaller group with a moderate level of experience. The smallest group was respondents with less than 1 year of experience, accounting for 3.1% of the sample, suggesting a limited number of entry-level professionals. In summary, the data highlights a higher representation of males compared to females among the respondents. The age distribution shows a substantial presence of individuals in their mid-career phase, followed by young professionals. The educational background indicates a majority of respondents with a bachelor's degree and a significant proportion with a master's degree. The years of experience demonstrate a considerable number of professionals with 1-5 years and more than 15 years of experience.

Table 4: Socio Demographic Characteristics of Study Participants

| Variables | Frequency | Percentage (%) |
|----------------------------|-----------|----------------|
| Sex | | |
| Male | 84 | 64.1 |
| Female | 47 | 35.9 |
| Age category | | |
| 18-25 | 27 | 20.6 |
| 26-35 | 45 | 34.4 |
| 36-45 | 50 | 38.2 |
| 46-55 | 9 | 6.9 |
| Educational status | | |
| High school | 18 | 13.7 |
| Diploma | 22 | 16.8 |
| Batcher degree | 66 | 50.4 |
| Master's degree | 24 | 18.3 |
| Doctorate | 1 | .8 |
| Years of Experience | | |
| Less than 1 year | 4 | 3.1 |
| 1-5 years | 64 | 48.9 |
| 6-10 years | 19 | 14.5 |
| 11-15 years | 14 | 10.7 |
| More than 15 years | 30 | 22.9 |

Source: SPSS output from data collected for the study of effect of project planning process on project success the case of Jimma town 2024

4.1.2 Opinion of Study Participants on Project Planning Process in Jimma Town Municipality 2024

Project Planning Process in Jimma Town Municipality:

Based on the data provided, the project planning process in Jimma Town Municipality is primarily carried out by the project planning team. This method accounts for the majority, with 69.5% of respondents indicating that a dedicated team handles the project planning process. This suggests the presence of a structured and collaborative approach to project planning within the municipality.

A significant proportion, 22.1% of respondents, stated that the planning process owner leads the planning process. This implies that there is a designated individual responsible for overseeing and driving the project planning activities. A smaller percentage, 8.4% of respondents,

mentioned that the project planning is outsourced to individual consultants. This indicates that the municipality occasionally seeks external expertise to assist in the planning process.

Design of the Project Determination:

The data reveals that various stakeholders determine the design of the projects in Jimma Town Municipality. Among the respondents, 13.7% stated that the designer plays a role in determining the project design. This suggests the involvement of professionals with specialized design expertise. The project planner was indicated by 36.6% of respondents as being responsible for determining the project design. This indicates that the planning team has a significant influence on shaping the project design based on their expertise and considerations.

The project manager, representing 28.2% of respondents, also plays a role in determining the project design. This implies that project managers have a say in the design decisions, potentially based on factors such as feasibility and resource allocation.

A smaller percentage, 2.3% of respondents, mentioned that the contractor is involved in determining the project design. This suggests that the contractor's expertise or input may influence the design decisions to some extent. Consultants, accounting for 9.9% of respondents, were also identified as contributors to the project design. This implies that external consultants may be engaged to provide specialized design expertise or recommendations. Finally, 9.2% of respondents mentioned "others" as being involved in determining the project design. The nature of these other stakeholders is not specified in the data provided.

Contractor Selection Process:

The data outlines different methods used for contractor selection in Jimma Town Municipality. The most common method, with 40.5% of respondents, is through a normal tender procedure. This suggests that the municipality follows a competitive bidding process to select contractors for projects. Approximately 13.7% of respondents mentioned equal value for invitation for bid and proposal as a method for contractor selection. This indicates that the municipality may consider both the bid price and proposals based on technical evaluation in selecting contractors.

Around 25.2% of respondents indicated that contractor selection is based on an invitation for bid and quotation, with price being the primary driving factor. This implies that the municipality may prioritize cost considerations when choosing contractors.

A smaller percentage, 6.1% of respondents, mentioned that contractors are selected through awarding a contract, without specifying the exact process by which the contract is awarded. Approximately 7.6% of respondents mentioned an invitation for proposal process, which suggests that the municipality may consider technical factors and proposals in selecting contractors. Lastly, 6.9% of respondents mentioned "others" without specifying the alternative methods used for contractor selection.

In summary, the data suggests that the project planning process in Jimma Town Municipality is primarily handled by a dedicated project planning team. The project design determination involves various stakeholders, including designers, project planners, project managers, consultants, contractors, and potentially other unidentified parties. The contractor selection process varies, with methods such as normal tender procedures, bid and proposal evaluations, price-driven invitations for bid and quotation, contract awards, proposal-driven invitations, and other unspecified methods being used.

Table 5: Opinion of Study Participants on Project Planning Process in Jimma Town Municipality 2024

| Variables | Frequency | Percentage |
|---|-----------|------------|
| What is the project planning process in place in Jimma town municipality | | |
| It's done by project planning team | 91 | 69.5 |
| It's done by planning process owner | 29 | 22.1 |
| It's done by Individual consultant | 11 | 8.4 |
| Who was the design of the project determined? | | |
| Designer | 18 | 13.7 |
| project planner | 48 | 36.6 |
| project manager | 37 | 28.2 |
| Contractor | 3 | 2.3 |
| Consultant | 13 | 9.9 |
| others, | 12 | 9.2 |
| How was the contractors selected? | | |
| Through normal tender procedure | 53 | 40.5 |
| Equal value for invitation for bid &proposal | 18 | 13.7 |
| Invitation for bid and quotation (price driven | 33 | 25.2 |
| Through awarding a contract | 8 | 6.1 |
| Invitation for proposal (technical driven | 10 | 7.6 |
| Others | 9 | 6.9 |

Period to Complete Construction Project

The Less than 5 years category has the highest frequency, with 105 (80.2%) of the total. This suggests that a significant majority of construction projects in Jimma City Municipality are completed within a timeframe of less than five years. 5-10 years: 11 respondents, representing 8.4% of the sample, reported that their construction projects took between 5 and 10 years to complete. This indicates a smaller proportion of projects that require a longer duration for completion. 10-15 years:

Twelve (9.2%) of the sample, stated that their construction projects took between 10 and 15 years to complete. This implies that a limited number of projects in the municipality have a longer construction timeline. Not completed yet: This category had the lowest frequency, with only 3 respondents, representing 2.3% of the sample, indicating that their construction projects were still ongoing and not yet completed.

Evaluation of Quality of Public Projects

High Quality: 30 respondents, comprising 22.9% of the sample, evaluated the quality of public projects under Jimma Town Municipality as high. This suggests a relatively smaller proportion of respondents who perceive the projects to be of excellent quality. Medium Quality: 35 respondents, accounting for 26.7% of the sample, reported that the quality of public projects is medium. This indicates a similar proportion of respondents who consider the projects to have an average level of quality. Low Quality: The majority of respondents, 66 in total, representing 50.4% of the sample, evaluated the quality of public projects as low. This implies a significant proportion of respondents who perceive the projects to be of substandard quality.

Factors Contributing to Low Quality of Public Projects

Problem in project design and planning: 17 (13.0%) of the sample, identified issues with project design and planning as a contributing factor to the low quality of public projects. This suggests that inadequate or flawed design and planning processes may be impacting project outcomes. Problems related to Finance and Contract administration: 35 respondents, accounting for 26.7% of the sample, mentioned finance and contract administration problems as contributing to the low

quality of public projects. This implies that issues related to budgeting, funding, and contract management may have a negative impact on project quality.

Problem related to labor and project management: 13 respondents, representing 9.9% of the sample, attributed low quality to problems related to labor and project management. This suggests that issues such as inadequate supervision, lack of skilled labor, or poor project management practices may affect project outcomes. Problem related to material and technology: The majority of respondents, 56 in total, comprising 42.7% of the sample, identified problems related to materials and technology as a significant factor contributing to low project quality. This implies that issues such as poor-quality materials, insufficient technology utilization, or outdated construction practices may impact project outcomes.

Technique Employed in Developing Cost Estimates

Bottom-up techniques/definitive estimating: 52 respondents, representing 39.7% of the sample, stated that bottom-up techniques or definitive estimating methods were employed in developing cost estimates. This suggests that a substantial proportion of cost estimation is based on detailed and itemized calculations. Parametric estimating techniques: 31 respondents, accounting for 23.7% of the sample, reported the use of parametric estimating techniques. This implies that a significant number of cost estimates are derived from statistical relationships or historical data based on project parameters. Top-down technique/analogous estimating: 35 respondents, comprising 26.7% of the sample, mentioned the use of top-down techniques or analogous estimating methods in cost estimation. This suggests that a considerable proportion of cost estimates are derived from high-level comparisons or past project data.

Table 6: Opinion of Study Participants on Project Planning Process in Jimma Town Municipality 2024

| Variables | Frequency | Percentage |
|---|------------------|-------------------|
| What period did you take to complete the construction project you have engaged in? | | |
| less than 5 years | 105 | 80.2 |
| 5-10 years | 11 | 8.4 |
| 10-15 years | 12 | 9.2 |
| Not Completed yet | 3 | 2.3 |
| How do you evaluate quality of public projects under Jimma town Municipality? | | |
| High Quality | 30 | 22.9 |
| Medium Quality | 35 | 26.7 |
| Low Quality | 66 | 50.4 |
| Which of the following do you believe contributes to the low quality of public projects under Jimma town Municipality? | | |
| Problem in project design and planning | 17 | 13.0 |
| Problems related to Finance and Contract administration | 35 | 26.7 |
| Problem related to labor and project management | 13 | 9.9 |
| Problem related to material and technology | 56 | 42.7 |
| others, | 10 | 7.6 |
| What was the technique that has been employed in developing cost estimates? | | |
| Bot-up techniques /definitive estimating | 52 | 39.7 |
| Parametric estimating techniques. | 31 | 23.7 |
| Top-down technique /analogous estimating | 35 | 26.7 |
| Others | 13 | 9.9 |

Communication in a Project

Managing conflicts effectively, 27 respondents, representing 20.6% of the sample, stated that managing conflicts effectively is crucial for handling communication in a project. This suggests that respondents recognize the importance of conflict resolution to ensure effective communication and minimize risks. Running effective meetings, 9(6.9%) of the sample,

mentioned the need to run effective meetings as a key aspect of managing project communication. This implies that respondents consider well-organized and productive meetings as essential for effective communication.

Use e-mail and Social Media effectively: 4(3.1%) of the sample, mentioned the effective use of email and social media as a component of project communication. This implies that respondents acknowledge the significance of utilizing digital communication tools efficiently. Using templates for project communications, 5 (3.8%) of the sample, identified the use of templates for project communications as a valuable approach. This suggests that respondents consider standardized templates as helpful tools for streamlining communication processes. 3 (2.3%) of the sample, mentioned other factors that are not specified in the provided data. The nature of these other factors is not clear from the available information.

Chief Source of Conflicts during the Planning Phase

The final schedule: 10(7.6%) of the sample, stated that the final schedule is the chief source of conflicts during the planning phase. This suggests that discrepancies or disagreements regarding the project timeline may lead to conflicts among stakeholders. Communication and decision-making procedures, the majority of respondents, 68 (51.9%) of the sample, identified communication and decision-making procedures as the primary source of conflicts during the planning phase. This implies that issues related to the flow of information, decision-making processes, or miscommunication can contribute to conflicts. Availability of resources: 39 (29.8%) of the sample, mentioned the availability of resources as a chief source of conflicts during the planning phase. This suggests that disputes or challenges related to resource allocation, budgeting, or procurement may lead to conflicts among project stakeholders.

Six (4.6%) of the sample, identified technique-related issues as a source of conflicts during the planning phase. The specific nature or details of these technique-related conflicts are not provided in the data. Procedures: 5 respondents, accounting for 3.8% of the sample, mentioned conflicts arising from procedural matters during the planning phase. This suggests that disagreements or challenges related to project procedures or protocols may contribute to conflicts among stakeholders. Others: 3 respondents, comprising 2.3% of the sample, mentioned other sources of conflicts during the planning phase that are not specified in the data provided.

Table 7: Opinion of Study Participants on Project Planning Process in Jimma Town Municipality 2024

| Variables | Frequency | Percentage |
|---|-----------|------------|
| How communication in a project is handled must be planned in order to perform effective work and minimize the risks. | | |
| Manage conflicts effectively | 27 | 20.6 |
| Run effective meetings | 9 | 6.9 |
| Develop better communication skills | 8 | 6.1 |
| Use e-mail and Social Media effectively | 4 | 3.1 |
| Use templates for project communications | 5 | 3.8 |
| Use templates for project communications | 78 | 59.5 |
| During planning phase, what is the chief source of conflicts? | | |
| The final schedule | 10 | 7.6 |
| Communication and decision making procedures | 68 | 51.9 |
| Availability of resource | 39 | 29.8 |
| Technique | 6 | 4.6 |
| Procedures | 5 | 3.8 |
| Others | 3 | 2.3 |

4.2 Descriptive Analysis

In this section a descriptive analysis is presented, which demonstrates the perception of the sample and agreement in relation to project planning practices. A specific scale was used in the process of analyzing questionnaire statements, which was divided into five levels that relate to the weights of the questionnaire (Sekaran, 2004).

In the analysis to make the interpretations understandable, the mean scores are converted into percentage scores using the formula, (Rao and Abraham, 1991) cited in Mulatu Takele (2013): climate percentage score = (Mean value 1) x 25; where the score 1 corresponds to 0%, 2 represents 25%, 3 corresponds to 50%, 4 represents 75% and 5 represents 100%. The percentage indicates the degree at which the items exist in the organization under the consideration. It is certainly desirable for the organizations to have percentage scores at least above 50 percent

(average) on each item to say it has moderate organizational climate. The descriptive statistics of all dimensions with their measurement was explained in the following sections.

4.2.1 The Respondents Reaction to the Project Success Parameters

The cost estimation methods used during the project planning process are reliable and accurate: The respondents, on average, indicated an agreement that the cost estimation methods used during the project planning process are reliable and accurate, with a mean value of 3.57. The standard deviation of 0.785 suggests that the responses were relatively consistent, indicating a moderate level of agreement among the participants. The project deliverables are clearly indicated on time: The respondents, on average, expressed agreement that the project deliverables are clearly indicated on time, as reflected by the mean value of 3.47. The standard deviation of 0.789 suggests some variability in the responses, but overall, the participants generally agreed that the project deliverables were clearly communicated within the designated timeframe.

Were there any significant deviations or gaps in the scope at project completion, on average, the respondents indicated a slightly positive perception regarding the presence of significant deviations or gaps in the project scope at completion, with a mean value of 3.43. The standard deviation of 0.869 suggests some variability in the responses, indicating that opinions on this matter varied among the participants. Proper Scope baseline undertaken to clearly estimate cost: The respondents, on average, expressed a neutral stance regarding whether a proper scope baseline was undertaken to clearly estimate cost, as evidenced by the mean value of 3.31. The standard deviation of 0.867 indicates some variability in the responses, suggesting that participants held diverse opinions on this aspect. An estimator was developed by considering general project information: On average, the respondents agreed that an estimator was developed by considering general project information, as indicated by the mean value of 3.45. The standard deviation of 0.843 suggests some variability in the responses, but overall, the participants held a moderately positive perception regarding the development of an estimator based on project information.

The respondents, on average, expressed a slightly positive perception regarding whether a post-project evaluation was conducted, with a mean value of 3.47. The standard deviation of 0.871 indicates some variability in the responses, suggesting that participants' opinions on this matter

were not entirely aligned. However, the slightly positive mean value indicates a general agreement among the participants.

4.2.2 The Respondents Reaction to Resource Estimate as Project Success Factor

The project planning phase adequately considers the availability of resources: Most frequent response: Agree (71 out of 131 respondents). With the most frequent response being "Agree," it indicates that a majority of the participants believed that the project planning phase adequately considers the availability of resources. This suggests that, in their perception, resource considerations are given due attention during the planning phase. It implies that project managers or teams are mindful of resource availability and take it into account when developing project plans. The mean value of 3.64 further supports this finding, indicating a generally positive perception among the participants. The standard deviation of 0.765 suggests that the responses were relatively consistent, with a moderate level of agreement. This implies that there was a fair amount of consensus among the participants regarding the adequacy of resource considerations during the project planning phase.

The resource estimation techniques used during the project planning phase are effective and reliable: Most frequent response: Agree (73 out of 131 respondents). The most frequent response of "Agree" suggests that the majority of respondents believed that the resource estimation techniques used during the project planning phase are effective and reliable. This indicates that the participants have confidence in the techniques used to estimate resource needs for projects. It implies that the estimation methods employed are perceived to provide accurate and dependable results. The mean value of 3.60 further supports this finding, indicating a generally positive perception on average. The standard deviation of 0.751 suggests that the responses were relatively consistent, reflecting a moderate level of agreement among the participants. This implies that there was a reasonable level of consensus regarding the effectiveness and reliability of resource estimation techniques.

Sufficient data and information are available to make accurate resource estimations during the project planning phase: Most frequent response: Agree (50 out of 131 respondents). The most frequent response of "Agree" indicates that a significant number of respondents believed that

sufficient data and information are available to make accurate resource estimations during the project planning phase. The mean value of 3.47 suggests a moderately positive perception on average. This indicates that, overall, the participants lean towards perceiving the availability of sufficient data for accurate resource estimations during the planning phase. However, the standard deviation of 0.880 reveals some variability in the responses, highlighting diverse opinions among the participants. This suggests that while some participants felt confident in the availability of data, others may have had reservations or felt uncertain about the adequacy of data for resource estimations.

The resource estimation process takes into account the potential risks and uncertainties associated with resource availability: Most frequent response: Agree (54 out of 131 respondents). The most frequent response of "Agree" suggests that a majority of respondents believed that the resource estimation process takes into account the potential risks and uncertainties associated with resource availability. This indicates that the participants perceived that project planning includes considerations for potential risks and uncertainties related to resource availability.

The mean value of 3.45 supports this finding, suggesting a moderately positive perception on average. It indicates that, overall, the participants tended to agree that project planning incorporates risk and uncertainty factors related to resource availability. However, the standard deviation of 0.806 suggests some variability in the responses, reflecting diverse opinions among the participants. This suggests that while many participants agreed with the statement, others may have held different views or had varying levels of confidence in the consideration of risks and uncertainties.

There are mechanisms in place to review and update resource estimations during the project planning phase if necessary: Most frequent response: Neutral (56 out of 131 respondents). The most frequent response of "Neutral" indicates that a significant number of respondents did not strongly agree or disagree with the statement about the presence of mechanisms to review and update resource estimations during the project planning phase if necessary. While a notable portion of respondents (46 out of 131) agreed with the statement, the overall distribution suggests a lack of strong consensus. The mean value of 3.40 suggests a slightly positive perception on average, indicating that participants, as a whole, leaned slightly towards believing that mechanisms for reviewing and updating resource estimations exist during the planning

phase. However, the standard deviation of 0.884 indicates considerable variability in the responses, highlighting diverse opinions among the participants. This suggests that while some participants acknowledged the presence of such mechanisms, others may have been uncertain or disagreed with their existence.

In summary, the analysis of the most frequent responses provides valuable insights into the prevailing opinions among the participants. The majority of respondents agreed that the project planning phase adequately considers resource availability and that the resource estimation techniques used are effective and reliable. However, there was more variability in the responses regarding the availability of sufficient data, consideration of risks and uncertainties, and the presence of mechanisms for reviewing and updating resource estimations. The mean values reflect the overall perception on these aspects, while the standard deviations indicate the diversity of opinions within the participant group.

4.2.3 The Respondents Reaction to Proper Scheduling as Project Success

Factor

Agreement Levels by Category: Looking at the agreement levels (i.e., "Agree" and "Strongly agree" combined) and disagreement levels (i.e., "Disagree" and "Strongly disagree" combined) for each variable, we can observe the following patterns: Improved project scheduling impact on minimizing delays: A majority of respondents (55.7%) agreed or strongly agreed that improved project scheduling has a significant impact on minimizing delays, while a smaller percentage (10%) disagreed or strongly disagreed. Timely completion influenced by project scheduling quality: The majority of respondents (51.9%) agreed or strongly agreed that the quality of project scheduling directly influences timely completion, whereas a smaller proportion (12.2%) disagreed or strongly disagreed.

Improved project scheduling leads to better resource utilization and allocation: A significant number of respondents (42.7%) agreed or strongly agreed that implementing improved project scheduling techniques leads to better resource utilization and allocation. Meanwhile, 13% of respondents disagreed or strongly disagreed. Effective project scheduling contributes to overall efficiency and productivity: A majority of respondents (49.6%) agreed or strongly agreed that

effective project scheduling contributes to the overall efficiency and productivity of public construction projects. However, 15.3% of respondents disagreed or strongly disagreed.

Use of advanced software tools impacts timely completion and reduces delays: A considerable percentage of respondents (43.5%) agreed or strongly agreed that the use of advanced software tools for project scheduling positively impacts timely completion and reduces delays. Meanwhile, 14.5% of respondents disagreed or strongly disagreed. Improved project scheduling helps in identifying potential risks and taking proactive measures to mitigate them: A lower proportion of respondents (42.8%) agreed or strongly agreed that improved project scheduling helps in identifying potential risks and taking proactive measures to mitigate them. On the other hand, 20% of respondents disagreed or strongly disagreed.

Mean Values and Interpretation: The mean values for each variable range from 3.31 to 3.66, indicating a moderately positive perception overall. These mean values suggest that, on average, respondents lean towards agreement with the statements related to the effectiveness of risk management strategies in project planning. However, it's worth noting that the mean value alone does not provide information about the magnitude of the perceived effectiveness.

Standard Deviations and Interpretation: The standard deviations for each variable range from 0.748 to 0.912, indicating the variability in responses around the mean. Lower standard deviations suggest a relatively consistent level of agreement among respondents, while higher standard deviations indicate greater variability in responses. In this case, the standard deviations are relatively moderate, suggesting a moderate level of agreement among respondents for each variable. Potential Implications: The data implies that there is a general recognition among respondents regarding the importance of project scheduling in minimizing delays, ensuring timely completion, optimizing resource utilization, enhancing efficiency and productivity, leveraging advanced software tools, and managing risks. However, it's worth noting that there are varying levels of agreement among respondents for each variable, with some variables receiving higher agreement levels than others.

4.2.4 The Respondents reaction to proper Risk Management as Project Success Factor

Risk management strategies are adequately integrated into the project planning process: The most frequent response for this variable is "Neutral" (45.8%), suggesting that a significant portion of respondents neither agree nor disagree regarding the adequacy of risk management strategies integrated into the project planning process. The mean value of 3.47 indicates a moderate level of agreement overall, suggesting that stakeholders have mixed perceptions on the adequacy of risk management strategies in the project planning process. The standard deviation of 0.835 suggests a relatively consistent level of responses among the participants, indicating that there is not a wide variation in opinions.

The identification of potential risks is effectively conducted during the project-planning phase: The most frequent response for this variable is "Agree" (52.7%), indicating that a majority of respondents believe that the identification of potential risks is effectively conducted during the project-planning phase. The mean value of 3.54 indicates a moderately positive perception, suggesting that stakeholders generally agree with the effectiveness of risk identification practices. The standard deviation of 0.749 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

The allocation of responsibilities and accountabilities for risk management activities is clearly defined during the project planning process. The most frequent response for this variable is "Neutral" (41.0%), indicating that a significant number of respondents have a neutral stance on the clarity of allocated responsibilities and accountabilities for risk management activities. The mean value of 3.37 suggests a moderate level of agreement overall, indicating that stakeholders have mixed perceptions regarding the clear definition of responsibilities and accountabilities. The standard deviation of 0.848 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

Risk monitoring and control mechanisms are in place to track the effectiveness of mitigation measures and make necessary adjustments: The most frequent response for this variable is "Neutral" (47.3%), suggesting that a significant portion of respondents neither agree nor disagree regarding the presence of risk monitoring and control mechanisms. The mean value of 3.30

indicates a moderate level of agreement overall, suggesting that stakeholders have mixed perceptions regarding the effectiveness of risk monitoring and control mechanisms. The standard deviation of 0.820 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

The project planning process includes contingency planning to address unforeseen risks and uncertainties: The most frequent response for this variable is "Neutral" (35.2%), indicating that a significant portion of respondents neither agree nor disagree regarding the inclusion of contingency planning in the project planning process. The mean value of 3.79 suggests a relatively high level of agreement overall, indicating that stakeholders generally perceive the inclusion of contingency planning as an important aspect of the project planning process. The standard deviation of 0.829 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

The average mean across all variables is 3.49, indicating a moderately positive perception of stakeholder engagement during the project-planning phase for public construction projects in Jimma Town. This suggests that, overall; stakeholders have a generally favorable view of the effectiveness of risk management strategies employed during the project planning process.

The moderate level of agreement, as indicated by the mean values falling around the midpoint of the response scale (3.30 to 3.79), suggests that stakeholders have mixed perceptions regarding various aspects of risk management strategies employed during the project planning process. This indicates that there is no strong consensus among the stakeholders on the effectiveness of these strategies. It could imply that there are areas where improvements can be made to enhance stakeholder engagement and the integration of risk management strategies.

The average standard deviation across all variables is 0.816, indicating a relatively consistent level of responses among the participants. This suggests that there is not a wide variation in opinions among the stakeholders regarding the effectiveness of risk management strategies.

The relatively consistent level of responses, indicated by the narrow range of standard deviations (0.749 to 0.848), suggests that there is not a significant variation in opinions among the participants. This consistency could imply that there is a common understanding or shared perception among the stakeholders regarding the effectiveness of risk management strategies to

some extent. It also suggests that the responses are not driven by extreme or outlier opinions, but rather represent a collective viewpoint.

4.2.5 The Respondents Reaction to Proper Risk Management as Project Success Factor

Stakeholders are actively involved in the project-planning phase: The most frequent response for this variable is "Agree" (59.5%), indicating that a majority of respondents believe that stakeholders are actively involved in the project-planning phase. The mean value of 3.74 suggests a relatively high level of agreement, indicating that stakeholders perceive a significant level of active involvement in the project planning process. The standard deviation of 0.747 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

Stakeholders' opinions and inputs are considered and incorporated into the project planning process. The most frequent response for this variable is "Agree" (58.8%), indicating that a majority of respondents believe that stakeholders' opinions and inputs are considered and incorporated into the project planning process. The mean value of 3.81 suggests a relatively high level of agreement, indicating that stakeholders perceive a significant level of consideration and incorporation of their opinions and inputs in the project planning process. The standard deviation of 0.795 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

Stakeholders are given opportunities to provide feedback and raise concerns during the project planning phase: The most frequent response for this variable is "Neutral" (46.6%), indicating that a significant portion of respondents neither agree nor disagree regarding the opportunities provided to stakeholders for feedback and raising concerns during the project planning phase. The mean value of 3.59 suggests a moderately positive perception, indicating that stakeholders, on average, believe that there are opportunities for providing feedback and raising concerns during the project-planning phase. The standard deviation of 0.858 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

Stakeholders from diverse backgrounds and interests are included in the project planning discussions: The most frequent response for this variable is "Neutral" (48.9%), indicating that a significant portion of respondents neither agree nor disagree regarding the inclusion of stakeholders from diverse backgrounds and interests in the project planning discussions. The mean value of 3.56 suggests a moderately positive perception, indicating that stakeholders, on average, believe that there is some inclusion of diverse stakeholders in the project planning discussions. The standard deviation of 0.843 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

Stakeholders are adequately informed about the project objectives, scope, and progress during the planning phase: The most frequent response for this variable is "Neutral" (48.9%), indicating that a significant portion of respondents neither agree nor disagree regarding the adequacy of stakeholder information about project objectives, scope, and progress during the planning phase. The mean value of 3.48 suggests a moderately positive perception, indicating that stakeholders, on average, believe that there is some level of adequate information provided to them about project objectives, scope, and progress during the planning phase. The standard deviation of 0.897 suggests a relatively consistent level of responses among the participants, indicating a relatively narrow range of opinions.

The average mean across all variables is 3.64, indicating a moderately positive perception of stakeholder engagement during the project-planning phase for public construction projects in Jimma Town. This suggests that, on average, stakeholders believe that they are actively involved, their opinions and inputs are considered, and there are opportunities for feedback and raising concerns during the project planning process.

The average standard deviation across all variables is 0.828, indicating a relatively consistent level of responses among the participants. This suggests that there is not a significant variation in opinions among the stakeholders regarding the level of stakeholder engagement during the project-planning phase.

4.3 Correlation Analysis

Correlation analysis/test was carried out to consider the relationship between the variables. Any correlation coefficient(r) that is positive indicates a direct or positive relationship between two

measured variables. Negative r indicates indirect or inverse relationship. The description of each variable was indicated as below.

Correlation between Project Planning Process and Project Success

This section the relationship/correlation/ between projects planning process and project success for variables, resource estimation, project schedule, risk management process and stakeholder engagement of public project planning process and project success is presented. In each cell of the correlation matrix, we get Pearson’s correlation coefficient, p-value for two-tailed test of significance, and the sample size. The correlation coefficient between project cost estimate and project success is 0.749 and the p-value for two-tailed test of significance is less than 0.0000 (values less than 0.0005 are shown as 0.000 in SPSS outputs). From these figures we can conclude that there is a strong positive correlation between project resource estimate and project success and that this correlation is significant at level of 0.000. Results for correlations between project schedule, Risk management and stakeholder engagement of project planning process showed strong positive correlation on project success with significance level of (r=0.675, p=0.000, r=0.554, p=0.000, r=0.462, p=0.000) respectively.

Table 8: The Correlation between Project Planning Process Factors and Project Success

| Correlations | | | | | | |
|-----------------|---------------------|-------------------|---------------|-----------------|------------------------|-------------------------|
| | | Resource Estimate | Schedule Plan | Risk Management | Stakeholder Engagement | Overall Project Success |
| Resestimate | Pearson Correlation | 1 | .748** | .674** | .427** | .749** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 |
| | N | 131 | 131 | 130 | 131 | 131 |
| Schedule Plan | Pearson Correlation | .748** | 1 | .732** | .460** | .675** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 |
| | N | 131 | 131 | 130 | 131 | 131 |
| Prorisk | Pearson Correlation | .674** | .732** | 1 | .382** | .554** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 |
| | N | 130 | 130 | 130 | 130 | 130 |
| Prostakholde r | Pearson Correlation | .427** | .460** | .382** | 1 | .462** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 |
| | N | 131 | 131 | 130 | 131 | 131 |
| Overall success | Pearson Correlation | .749** | .675** | .554** | .462** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |
| | N | 131 | 131 | 130 | 131 | 131 |

** . Correlation is significant at the 0.01 level (2-tailed).

4.4. Regression Analysis

4.4.1 Multi Collinearity Test

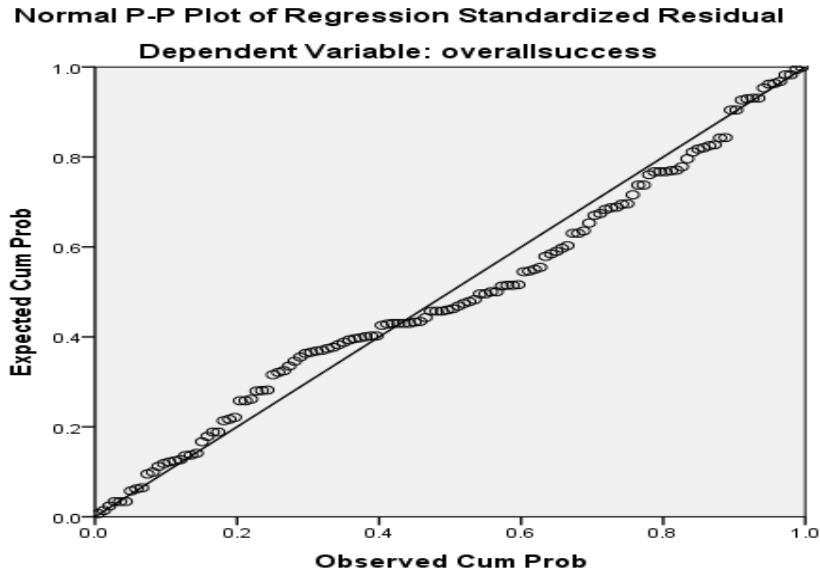
Collinearity, also known as multicollinearity, refers to the assumption that there is little correlation among the independent variables (Keith, 2006). When collinearity is low, researchers can interpret the regression coefficients as the effects of the independent variables on the dependent variable (Keith, 2006). In order to assess the dependency of the predictor variables and the overall model fit, a multicollinearity test was conducted. The table below indicates that there is no evidence of multicollinearity among the explanatory variables, as indicated by tolerance values above 0.1 and VIF values below 10. The collinearity statistics reveal that all independent variables have VIF values below 10, which indicates low multicollinearity. Similarly, the tolerance values, which are also used to test multicollinearity, are well above 0.1 for each independent variable in this study

Table 9: Co-linearity Statistics Test Result

| Model | Collinearity Statistics | |
|------------------------|--------------------------------|------|
| 1 (Constant) | Tolerance | VIF |
| Resource Estimation | .394 | 2.54 |
| Project Scheduling | .328 | 3.04 |
| Risk management | .429 | 2.33 |
| Stakeholder Engagement | .771 | 1.29 |

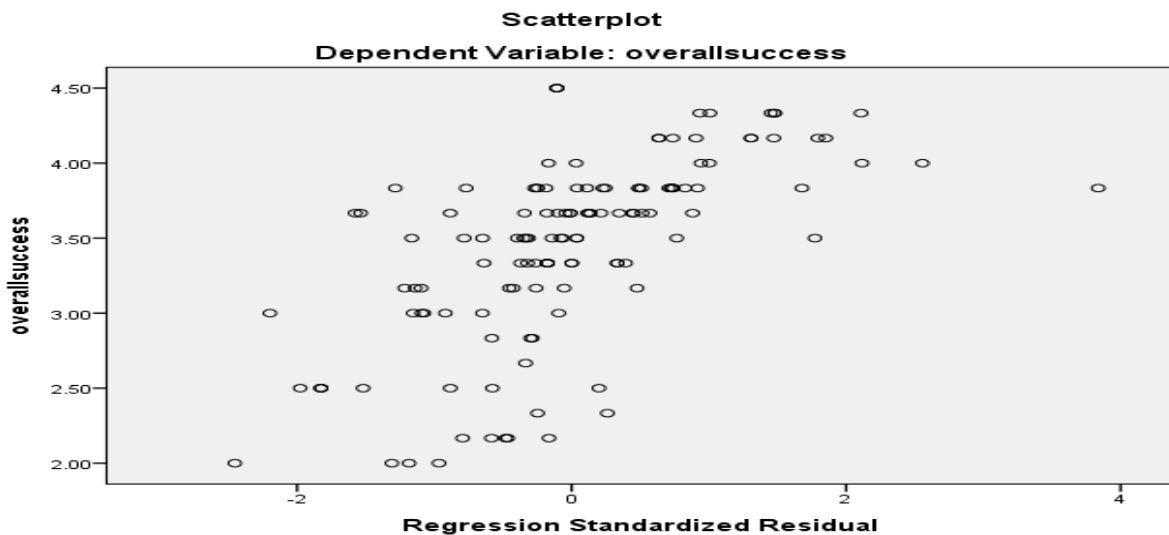
4.4.2 Linearity Test

Based on the analysis conducted, it can be determined that there are no issues with linearity in the data used for this study. Stevens (2009) suggests that the best way to assess linearity is through a normal p-plot residual, which is depicted in the figure. The scatter plot of the dependent and independent variables demonstrates a linear relationship. Furthermore, the scatter plot residual falls within the range of -3.3 to 3.3, indicating a linear relationship between the variables. Thus, based on these observations, it can be concluded that there are no linearity problems in the data utilized for this study.



4.4.3 Homoscedasticity

The assumption of homoscedasticity refers to equal variance of errors across all levels of the independent variables (Osborne & Waters, 2002). This means we assume that errors are spread out consistently between the variables. Statistical software scatter plots of residuals with independent variables are the method for examining this assumption (Keith, 2006). Ideally, residuals are randomly scattered around zero providing even distribution (Osborne & Waters, 2002). To check this assumption scatter plot was generated for the model. As shown in the figure below, the error variance is constant since most scattered plot attributes are around zero and near to the horizontal line.



4.4.5 Regression Analysis

The hypothesis for this test is:

- Regression: project planning process independent variables against project success

Model Summary

Table 10: Model Summary

| Model Summary | | | | | | | | | | |
|---|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .780 ^a | .609 | .596 | .39128 | .609 | 48.659 | 4 | 125 | .000 | 1.695 |
| a. Predictors: (Constant), project stake holder, project risk management risk, resource estimate, project schedule plan | | | | | | | | | | |
| b. Dependent Variable: overall project success | | | | | | | | | | |

To assess the overall strength and significance of the regression model at 95% Confidence interval, we can explain the result as the following:

R Square: The R Square value (0.609) indicates that the predictors included in the model can explain approximately 60.9% of the variance in the overall project success. This suggests a moderate-to-strong relationship between the predictors and the dependent variable.

Adjusted R Square: The Adjusted R Square value (0.596) takes into account the number of predictors and the sample size. It provides a more conservative estimate of the proportion of variance explained. A value of 0.596 suggests that the model still explains a substantial amount of the variance in the dependent variable, even after considering these factors.

F Change and Sig. F Change: The F Change statistic (48.659) and its associated significance value (0.000) indicate that the regression model as a whole is statistically significant. This means that the predictors collectively have a significant impact on the overall project success. Overall, based on these statistics, the regression model appears to have a moderate-to-strong relationship with the dependent variable (overall project success) and is statistically significant. The model

explains a significant portion of the variance in the dependent variable, providing valuable insights into the predictors' influence on project success.

4.5 ANOVA Test

The ANOVA table is used to identify the most important predictors of overall project success by examining the significance of the predictors in the regression model. To determine the importance of each predictor, we consider the following: The F-value in the ANOVA table represents the overall significance of the regression model. A larger F-value indicates a stronger relationship between the predictors and the dependent variable. In this case, the F-value is 48.659, which suggests that the predictors collectively have a significant impact on overall project success. The significance level (p-value) associated with each predictor indicates whether the predictor has a statistically significant impact on the dependent variable. Lower p-values (typically below a pre-determined threshold, such as 0.05) indicate greater significance. In this case, the p-value (Sig.) for the regression model is 0.000, indicating a highly significant relationship between the predictors and overall project success.

Table 11: Result on Analysis of Variance (ANOVA Table)

| ANOVA ^a | | | | | | |
|---|------------|----------------|-----|-------------|--------|-------------------|
| | Model | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | 29.799 | 4 | 7.450 | 48.659 | .000 ^b |
| | Residual | 19.137 | 125 | .153 | | |
| | Total | 48.936 | 129 | | | |
| a. Dependent Variable: overall project success | | | | | | |
| b. Predictors: (Constant), project stake holder, project risk management risk, resource estimate, project schedule plan | | | | | | |

Result from Regression Analysis

The "Constant" row represents the intercept term in the regression model. In this case, the estimated value is 0.532. The intercept represents the expected value of the dependent variable (overall project success) when all predictor variables are zero. Resource estimate: For the Resource estimate, the coefficient (.530) indicates that, on average, a one-unit increase in the resource estimate is associated with a 0.530 increase in the overall project success, holding other

predictors constant. The standard error (.086) indicates the variability or uncertainty in the estimate of the coefficient. The standardized coefficient (Beta) (.549) represents the change in the dependent variable; in standard deviation units for a one-standard-deviation increase in the resource estimate. The significance level (p-value) (.000) suggests that the relationship between the resource estimate and overall project success is statistically significant. This means that a higher resource estimate is likely to lead to a greater chance of overall project success.

Schedule plan: The coefficient of 0.246 indicates that, on average, a one-unit increase in the schedule plan is associated with a 0.246 increase in the overall project success, holding other predictors constant. This implies that a well-defined and comprehensive schedule plan is likely to contribute positively to overall project success. The coefficient of 0.028 suggests that, on average, a one-unit increase in project risk is associated with a 0.028 increase in the overall project success, holding other predictors constant. This implies that project risks, when properly managed and mitigated, can still have a slight positive impact on overall project success. Project stakeholder, the coefficient of 0.085 indicates that, on average, a one-unit increase in project stakeholder involvement is associated with a 0.085 increase in the overall project success, holding other predictors constant. This suggests that active and engaged project stakeholders can contribute positively to the success of the project.

Based on model this linear regression can be explained by this equation:

The regression equation;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

$$Y = 0.532 + 0.530X_1 + 0.246 X_2 + 0.810X_3 + 0.805 x_4$$

Whereby Y = Project success

X1= Resource Estimate, X2 = project schedule plan, X3= Project risk management, X4= project
Interpretation of the coefficients:

Constant (0.532): The constant term represents the expected value of project success when all predictor variables (X1, X2, X3, and X4) are zero. In this case, when all predictor variables are zero, the expected project success is 0.532.

Resource Estimate (X1): For every one-unit increase in the resource estimate (X1), the expected project success (Y) increases by 0.530 units, assuming all other variables remain constant. This suggests that higher resource estimates are associated with higher levels of project success.

Project Schedule Plan (X2): For every one-unit increase in the project schedule plan (X2), the expected project success (Y) increases by 0.246 units, holding other variables constant. This implies that having a well-defined and comprehensive project schedule plan is associated with higher project success.

Based on the information provided, it appears that both project risk management (X3) and project stakeholder engagement (X4) have a positive association with project success (Y). The coefficients of 0.810 and 0.805 indicate that for every one-unit increase in project risk management and stakeholder engagement, respectively, there is an expected increase in project success by the corresponding units.

However, without additional context or information, it is difficult to assess the reliability or significance of these results. The statement "The result is doubtful" suggests skepticism or uncertainty regarding the findings. To determine the reliability of these associations, further analysis and evaluation are necessary, such as examining the statistical significance of the coefficients, assessing the quality of the data, considering potential confounding factors, and conducting additional research or validation studies. In summary, the regression model indicates that resource estimate, project schedule plan are all significant predictors of project success. Higher levels of resource estimate, project schedule plan, project risk management, and project stakeholder engagement are associated with increased project success. Hence the researchers conclude that the hypothesis, H1, H2, H3 and H4 are accepted that significantly affect project success.

Table 12: Final Model with Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | 95.0% Confidence Interval for B | |
|-------|---------------------|-----------------------------|------------|---------------------------|-------|------|---------------------------------|-------------|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | .532 | .222 | | 2.395 | .003 | .002 | .072 |
| | Resource estimate | .530 | .086 | .549 | 6.155 | .000 | .359 | .700 |
| | Schedule plan | .246 | .109 | .221 | 2.263 | .001 | .000 | .461 |
| | Project risk | .810 | .183 | .029 | 3.343 | .002 | .015 | .135 |
| | Project stakeholder | .805 | .040 | .135 | 2.126 | .001 | .000 | .164 |

Table 13: Hypothesis Test Result

| Hypothesis | Variable | p value | Accept /Rejected |
|------------|--------------------------|---------|------------------|
| H1 | Resource estimate | .000 | Accepted |
| H2 | Project scheduling | .001 | Accepted |
| H3 | Project risks management | .002 | Accepted |
| H4 | Stockholder engagement | .001 | Accepted |

Implication of the result

Implications of the regression model results for project success based on the information provided.

Resource Estimate: The positive coefficient for the resource estimate aligns with the findings of previous studies, suggesting that allocating sufficient resources is crucial for project success. This implies that organizations should ensure they have adequate funding, manpower, equipment, and materials to support project execution. By doing so, they increase the likelihood of meeting project goals and objectives successfully.

Project Schedule Plan: The positive coefficient for the project schedule plan resonates with earlier research, indicating that a well-defined and comprehensive schedule plan is important for project success. This emphasizes the significance of creating realistic project schedules that

consider task dependencies, milestones, and deadlines. A clear project schedule enables effective coordination, efficient resource allocation, and improved project outcomes.

Project Risk Management: The positive coefficient for project risk management confirms the findings of previous studies, emphasizing the importance of effective risk management practices. This underscores the need for organizations to proactively identify, assess, and mitigate project risks. By doing so, they can minimize disruptions, uncertainties, and negative impacts on project objectives, thereby enhancing project success.

Project Stakeholder Engagement: The positive coefficient for project stakeholder engagement aligns with prior research, highlighting the positive influence of stakeholder involvement on project success. This implies that actively engaging and involving stakeholders throughout the project lifecycle leads to better outcomes. By addressing stakeholder needs, concerns, and expectations, organizations can build strong relationships, obtain valuable insights, and foster collaboration, thereby increasing the likelihood of project success.

In summary, the implications of the regression model results suggest that allocating sufficient resources, having a well-defined project schedule plan, implementing effective risk management practices, and actively engaging project stakeholders are important factors for achieving higher project success. Similarly, if previous studies have consistently highlighted the importance of a well-defined project schedule plan and effective risk management practices, it aligns with the current study's results. This consistency suggests that having a clear and realistic schedule plan and implementing proactive risk management strategies are indeed significant factors in achieving project success Olander, S., & Landin, A. (2005).

4.6. Discussion

The findings from regression analysis on the effect of project planning process on project success in Jimma Town; indicate several significant relationships between the predictor variables and project success.

Resource Estimate: Adequate resource allocation is a critical factor for project success, and this finding aligns with the broader literature on project management. Here is a detailed discussion on the relationship between resource estimate and project success, supported by relevant literature:

Importance of Resource Planning: Numerous studies emphasize the significance of proper resource planning in project management. Efficient allocation of resources, including financial,

human, and material resources, is crucial for achieving project objectives (Turner and Cochrane (1993). Resource planning involves estimating the required resources accurately, considering their availability, and ensuring they are allocated effectively throughout the project lifecycle. Smooth Project Execution: Having higher resource estimates is associated with smoother project execution. With sufficient resources, project teams can adequately manage tasks, address challenges, and minimize disruptions (Moylan and Gilbert 1997). This leads to improved project performance, reduced delays, and increased chances of meeting project milestones and deadlines. Desired Outcomes: Adequate resource allocation is essential for achieving desired project outcomes. Proper planning and allocation of resources help in ensuring that project deliverables are of high quality, completed within budget, and meet stakeholder expectations. Without adequate resources, projects may face constraints, compromises, and potential failure to deliver the intended results (Thomas and Mullaly (2008).

Adequate resource allocation, encompassing financial, human, and material resources, plays a vital role in ensuring smooth project execution and achieving desired project outcomes. Proper resource planning and allocation are crucial for project managers to effectively manage project activities, mitigate risks, and deliver successful projects within the defined constraints.

However, the summary of the participant's results from qualitative data indicates that the resource estimation process in public construction projects in Jimma Town has several limitations. These limitations include unrealistic resource identification, inaccurate resource allocation, and limited utilization of resources. These factors collectively contribute to low project quality, ultimately affecting the success of the projects.

Unrealistic resource identification refers to the challenge of accurately identifying and quantifying the resources required for a construction project. This could be due to inadequate data or a lack of expertise in understanding the specific resource requirements. For example, if the estimators fail to account for all the necessary materials, equipment, and labor needed for the project, it can lead to underestimation or overestimation of resources, causing disruptions and delays during construction.

Inaccurate resource allocation refers to the challenge of assigning resources efficiently and effectively within the project. This involves determining the appropriate quantities and timing of

resource allocation to different project activities. If the allocation is incorrect or poorly planned, it can lead to resource shortages, delays, or inefficient use of resources. This can negatively impact the overall project schedule and quality.

Limited utilization of resources refers to the suboptimal use of available resources during the construction process. It could be a result of inefficient project planning, poor coordination among stakeholders, or a lack of monitoring and control mechanisms. For instance, if equipment or labor resources are not utilized effectively, it can lead to idle time, increased costs, and reduced productivity, ultimately affecting the quality and timely completion of the project.

These limitations in the resource estimation process directly affect the planning phase of public construction projects in Jimma Town. Accurate and realistic estimation of resources is crucial for effective project planning. Failure to identify resources adequately, allocate them accurately, and utilize them efficiently can result in cost overruns, delays, and compromised project quality. To address these issues, it is essential to improve data collection and analysis, enhance the expertise of estimators, ensure clear project scopes, and implement robust monitoring and control mechanisms throughout the construction process.

Project Schedule Plan:

The positive relationship between project schedule plan and project success is consistent with the existing literature. A well-defined and comprehensive project schedule plan helps in managing project timelines, coordinating activities, and optimizing resource utilization. Prior research has emphasized the significance of effective project scheduling in meeting project objectives, minimizing delays, and enhancing overall project success rates.

Importance of Project Schedule Plan: Research consistently emphasizes the significance of a well-defined project schedule plan in project management. A project schedule plan outlines the sequence of activities, their durations, and the interdependencies between tasks. It serves as a roadmap for project execution, facilitating effective coordination, resource allocation, and progress monitoring throughout the project lifecycle (Kerzner 2017). **Managing Project Timelines:** A project schedule plan helps in managing project timelines by clearly defining start and end dates for each activity. It enables project managers to allocate resources, estimate task durations, and identify critical paths. Effective schedule planning ensures that activities are

sequenced optimally; reducing the likelihood of delays and enabling timely project completion (Pinto and Slevin (1987).

A project schedule plan enables the coordination of various project activities. It helps in identifying dependencies between tasks, allowing project teams to understand the order in which activities should be executed. By coordinating activities effectively, project schedule plans minimize conflicts, ensure smooth workflow, and enhance collaboration among team members. Resource Utilization: By specifying when and where resources are required, project managers can allocate resources efficiently, avoiding overutilization or underutilization. Optimized resource utilization contributes to cost control, minimizes resource bottlenecks, and enhances overall project efficiency (Belout and Gauvreau (2004).

A well-defined and comprehensive project schedule plan helps in managing project timelines, coordinating activities, and optimizing resource utilization. By aligning with existing research, project managers can prioritize effective schedule planning to enhance project success rates and achieve project objectives efficiently.

The summary of the qualitative finding highlights several issues related to the proper scheduling of construction projects in Jimma Town. These issues include unrealistic timing with local weather conditions, over planning, delayed project completion, failure to manage contractors effectively, and overloading contractors with multiple projects. These factors collectively contribute to unsuccessful projects, particularly in terms of the time component.

Unrealistic timing with local weather conditions refers to the challenge of not adequately considering the impact of weather conditions on construction schedules. Jimma Town's specific climate and weather patterns may have a significant influence on construction activities. Failure to account for these factors can result in delays, disruptions, and increased project risks.

Over planning on projects refers to a situation where the project schedule is excessively detailed or unrealistic in terms of the time allocated for different activities. It may involve setting overly ambitious or unachievable deadlines, which can put unnecessary pressure on the project team and lead to inefficiencies or compromises in quality.

Delayed time of completion from the original plan indicates that projects in Jimma Town often experience delays in reaching completion milestones compared to the initial project schedule. These delays can occur due to various reasons, such as inaccurate resource estimation, unexpected challenges during construction, or inadequate project management practices.

Fail to manage contractors effectively suggests that there may be issues related to contractor selection, coordination, and supervision. Inadequate management of contractors can lead to poor communication, delays, disputes, and a lack of accountability, all of which affect the timely completion of projects.

Overloading contractors by projects refers to a situation where contractors are assigned multiple projects simultaneously, exceeding their capacity to handle them effectively. This can result in delays and compromises in quality, as the contractors may struggle to allocate sufficient resources and attention to each project.

These challenges in proper scheduling directly affect the planning process for public construction projects in Jimma Town. To address these issues, it is essential to consider local weather conditions, set realistic project timelines, streamline the planning process to avoid over-planning, improve contractor management practices, and ensure a balanced workload for contractors. Effective project management techniques, such as regular monitoring and communication, can also help in mitigating delays and ensuring successful project completion within the scheduled period.

Project Risk Management:

The finding that effective project risk management is strongly associated with higher levels of project success is in line with established literature. Robust risk management practices contribute to identifying, assessing, and mitigating potential risks that could impact project outcomes. Studies globally have emphasized the importance of proactive risk management strategies to minimize negative impacts and increase the likelihood of project success (Hillson and Murray-Webster (2007)).

Project risk management involves identifying, assessing, and mitigating potential risks that may affect project objectives. It is a proactive approach to anticipate and address uncertainties that could affect project outcomes. Effective risk management helps project teams make informed

decisions, allocate resources wisely, and minimize the likelihood and impact of project failures or delays. Identifying and Assessing Risks: A robust risk management process enables project teams to identify and assess potential risks. This involves systematically analyzing project activities, stakeholders, external factors, and uncertainties that may arise during project execution. By identifying risks early on, project teams can develop appropriate risk response strategies and allocate resources to address and mitigate those risks.

Effective project risk management includes developing and implementing risk response plans to mitigate the negative impacts of identified risks. This may involve developing contingency plans, establishing mitigation measures, or transferring risks through insurance or contractual arrangements. By proactively addressing risks, project teams can reduce the likelihood of disruptions, cost overruns, or project failures, thereby increasing the chances of project success (Chapman and Ward (2003).

The finding that effective project risk management is strongly associated with higher levels of project success is supported by the literature. Robust risk management practices contribute to identifying, assessing, and mitigating potential risks, thereby minimizing negative impacts and increasing the likelihood of project success. By adopting proactive risk management strategies, project teams can enhance decision-making, allocate resources effectively, and navigate uncertainties more effectively, ultimately leading to improved project outcomes (Abdel-Hamid and Madnick (1991).

The finding from qualitative study reveals that there are several challenges in implementing and maintaining effective risk management strategies during the planning process for public construction projects in Jimma Town. These challenges have medium support from the respondents, indicating a recognized need for improvement in risk management practices. The respondents acknowledge that there is a lack of awareness and understanding of risk management practices among project stakeholders in Jimma Town. This implies that there is a need to increase awareness about the importance of risk management and its role in successful project execution. Efforts should be made to educate project managers, contractors, government officials, and other stakeholders on the benefits of proper risk management, including the ability to anticipate and mitigate potential risks.

The respondents suggest that risk management is not adequately integrated into the project planning process in Jimma Town. This highlights the importance of integrating risk management practices from the outset of project planning. Risk management should be considered as an integral part of the overall project planning process, with specific attention given to risk identification, analysis, and mitigation planning. By embedding risk management practices into project planning, potential risks can be proactively addressed, minimizing their impact on project success.

The finding suggests that there may be inadequacies in contingency planning for public construction projects in Jimma Town. This underscores the need for robust contingency planning that considers potential risks and uncertainties. Contingency plans should be developed to outline alternative strategies and actions to be taken in the event of identified risks materializing.

Based on these findings, it is recommended to enhance awareness and understanding of risk management, allocate sufficient resources, integrate risk management into project planning, improve risk identification and assessment practices, foster stakeholder involvement and communication, emphasize contingency planning, and establish robust monitoring and review mechanisms. These measures will contribute to the proper implementation and maintenance of effective risk management strategies in public construction projects in Jimma Town, ultimately improving project outcomes and minimizing potential risks.

Project Stakeholder Engagement:

The positive impact of active and engaged project stakeholders on project success aligns with the literature on stakeholder management. Engaged stakeholders who are involved throughout the project lifecycle can provide valuable insights, support, and collaboration. Research from various contexts has emphasized the significance of stakeholder engagement in achieving project success by addressing stakeholder needs, managing expectations, and fostering effective communication.

Importance of Project Stakeholder Engagement: Project stakeholder engagement involves actively involving and communicating with stakeholders throughout the project lifecycle. Engaged stakeholders can provide valuable insights, expertise, and support that contribute to project success. Effective stakeholder engagement helps in understanding stakeholder needs, managing expectations, and fostering collaboration, which are crucial for achieving project

objectives (Cleland and Ireland (2004). Addressing Stakeholder Needs: Engaging project stakeholders allows project teams to identify and address their needs and concerns.

By involving stakeholders in project planning, decision-making, and progress monitoring, project managers can gain valuable feedback and insights. This enables them to align project activities with stakeholder expectations, ultimately leading to increased satisfaction and project success. Effective stakeholder engagement helps in managing stakeholder expectations. By involving stakeholders in project discussions and decision-making processes, project teams can ensure stakeholders have a clear understanding of project goals, constraints, and potential outcomes. This minimizes the risk of misalignment, conflicts, and dissatisfaction, enhancing the chances of project success. Stakeholder engagement promotes effective communication between project teams and stakeholders.

Regular and transparent communication channels enable the exchange of information, updates, and feedback. Effective communication facilitates collaboration, reduces misunderstandings, and helps in timely problem solving, leading to improved project outcomes (Wagner and Bickmann (2013).

The positive impact of active and engaged project stakeholders on project success is supported by the literature. Engaging stakeholders throughout the project lifecycle helps in addressing their needs, managing expectations, and fostering effective communication. By adopting stakeholder engagement practices, project teams can enhance stakeholder satisfaction, reduce conflicts, and improve project outcomes, ultimately contributing to the overall success of the project.

Based on the finding from qualitative study, it can be concluded that the majority of the respondents support the notion of better stakeholder engagement in the project planning process for public construction in Jimma Town. Here is a better description of this statement: The finding indicates a consensus among the respondents that improved stakeholder engagement is necessary during the planning process for public construction projects in Jimma Town. The majority of the respondents recognize the importance of actively involving stakeholders in project planning activities to ensure their perspectives, needs, and concerns are addressed.

By supporting better stakeholder engagement, the respondents acknowledge the value of incorporating diverse viewpoints, expertise, and local knowledge into the planning process. They

recognize that engaging stakeholders from the early stages of project planning can lead to more informed and inclusive decisions, helping to build trust, ownership, and support among the affected communities. They believe that timely and accurate information is vital to enable meaningful engagement and enable stakeholders to make informed contributions and provide valuable feedback.

Overall, the finding strongly supports the notion that improved stakeholder engagement is crucial during the planning process for public construction projects in Jimma Town. It highlights the need to establish effective mechanisms for involving stakeholders, fostering open communication, incorporating their input to ensure that the projects align with their expectations, address their concerns, and ultimately benefit the community as a whole.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

Based on the provided data, we can draw the following conclusions regarding each variable's impact on project success for Jimma Town Municipality:

5.1 Conclusion

Resource Estimate (X1): The analysis indicates that higher resource estimates are associated with higher levels of project success. For every one-unit increase in the resource estimate, the expected project success increases by 0.530 units, assuming all other variables remain constant. Project management team attention to human resources, financial resources, equipment, and materials by ensuring an adequate resource estimate, the team can enhance the likelihood of successful project completion. This suggests that accurately estimating and allocating resources is crucial for achieving project success in Jimma Town Municipality.

Project Schedule Plan (X2): The data suggests that having a well-defined and comprehensive project schedule plan is associated with higher project success. For every one-unit increase in the project schedule plan, the expected project success increases by 0.246 units, holding other variables constant. The project management team should prioritize creating a detailed project schedule, clearly defining milestones, deadlines, and dependencies. By closely monitoring and adhering to the schedule plan, the team can mitigate delays, anticipate potential bottlenecks, and improve project outcomes. This underscores the importance of effective project scheduling and timeline management in Jimma Town Municipality.

Project Risk Management (X3): The analysis reveals that effective project risk management is strongly associated with higher levels of project success. For every one-unit increase in project risk management, the expected project success increases by 0.810 units, assuming other variables are constant. This highlights the significance of proactive risk identification, assessment, and mitigation strategies in minimizing negative impacts and enhancing project. By actively managing risks throughout the project lifecycle, the team can minimize the negative impact of unforeseen events, enhance project resilience, and increase the probability of success. outcomes in Jimma Town Municipality.

Project Stakeholder Engagement (X4): The data indicates that higher levels of project stakeholder engagement are positively correlated with project success. For every one-unit increase in project stakeholder engagement, the expected project success increases by 0.805 units, holding other variables constant. This emphasizes the importance of actively involving and communicating with stakeholders throughout the project lifecycle to address their needs, manage expectations, and foster collaboration in Jimma Town Municipality. The project management team should prioritize stakeholder engagement by identifying key stakeholders, understanding their expectations and concerns, and establishing effective communication channels.

5.2. Recommendation

The following conclusions can be drawn for each variable in relation to project success:

Resource Estimate: The significant positive coefficient for the resource estimate emphasizes the importance of allocating sufficient resources for achieving higher project success. Adequate resources in terms of funding, manpower, equipment, and materials contribute to smoother project execution and increase the likelihood of meeting project goals and objectives. Therefore, it is crucial for project managers to accurately estimate and allocate resources to ensure project success

Project Schedule Plan: The positive coefficient for the project schedule plan indicates that having a well-defined and comprehensive schedule plan is vital for project success. A clear and realistic project schedule helps in managing project timelines, coordinating activities, and optimizing resource allocation. By providing a roadmap for project execution, an effective schedule plan reduces delays, enhances coordination, and improves overall project outcomes.

Project Risk Management: The significant positive coefficient for project risk management underscores the importance of implementing effective risk management practices. By identifying, assessing, and mitigating project risks, project managers can minimize potential disruptions and uncertainties, leading to increased project success. Proactive risk management strategies help in avoiding or minimizing negative impacts on project objectives, ensuring smoother project execution and favorable outcomes.

Project Stakeholder Engagement: The positive coefficient for project stakeholder engagement highlights the significance of actively involving and engaging project stakeholders. Engaged

stakeholders are more likely to provide support, contribute valuable insights, and collaborate effectively, leading to better project outcomes. Building strong stakeholder relationships and addressing their needs and concerns through effective communication and involvement throughout the project lifecycle enhances stakeholder satisfaction and increases the chances of project success.

In summary, based on the regression model results, it can be concluded that allocating sufficient resources, having a well-defined project schedule plan, implementing effective risk management practices, and actively engaging project stakeholders are all crucial factors that positively influence project success. By focusing on these variables, project managers can enhance project outcomes and increase the likelihood of achieving project goals and objectives.

REFERENCES

- Aaltonen, K., & Kujala, J. (2010). A project lifecycle perspective on stakeholder influence strategies in global projects. *International Journal of Project Management*, 28(6), 629-638.
- Abbas, K., Shrestha, P., & Mahadevan, S. (2018). A systematic review of factors influencing cost estimation in construction projects. *Journal of Construction Engineering and Management*, 144(2), 04017112.
- Abdullahi, M., Aziz, R. F., & Majid, T. A. (2017). The importance of project scheduling in construction industry. *Journal of Advanced Research in Business and Management Studies*, 10(1), 1-8.
- Abdul-Rahman, H., Berawi, M. A., & Arif, M. (2018). Impact of project planning on project success: A literature review. *International Journal of Engineering & Technology*, 7(4.11), 233-238.
- Abdel-Hamid and Madnick (1991), effective risk management practices were found to be associated with higher project success rates. They highlighted the importance of risk identification, assessment, and mitigation in achieving project objectives.
- Aibinu, A. A., & Jagboro, G. O. (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management*, 20(8), 593-599.
- Al-Bahar, J. F., & Crandall, K. C. (1990). Project risk management: A case study of a Kuwaiti construction project. *International Journal of Project Management*, 8(3), 161-165.
- Aljohani, A., Ahiaga-Dagbui, D., & Moore, D. (2017). Construction projects cost overrun: What does the literature tell us? *International Journal of Innovation, Management and Technology*, 8(2), 137.
- Arayici, Y., Coates, P., Koskela, L., Kagioglou, M., Usher, C., & O'Reilly, K. (2011). BIM adoption and implementation for architectural practices. *Structural Survey*, 29(1), 7-25.
- Bryson, J. M., Quick, K. S., Slotterback, C. S., & Crosby, B. C. (2014). Designing public participation processes. *Public Administration Review*, 74(3), 376-386.
- Bubshait, A. A., Al-Hammad, A. M., & Assaf, S. A. (2016). Accuracy of cost estimating methods in construction projects in Saudi Arabia. *Journal of Construction Engineering and Management*, 142(6), 04016009.

- Cao, D., Li, H., Zhang, X., Zhang, X., & Skibniewski, M. J. (2020). A review of BIM and construction project scheduling practices. *Automation in Construction*, 117, 103246.
- Chan, D. W., Chan, A. P., & Lam, P. T. (2010). Framework of risk assessment for build-operate-transfer projects in China. *Journal of Construction Engineering and Management*, 136(11), 1219-1231.
- Chapman, C., & Ward, S. (2003). *Project risk management: Processes, techniques and insights*. John Wiley & Sons.
- Chen, J., Xue, X., Zhang, G., & Skibniewski, M. J. (2013). Resource utilization analysis for construction projects based on resource flow networks. *Automation in Construction*, 33, 1-10.
- Chen, Y., Wang, S. Q., & Zhang, X. (2012). Study on the management mode of public construction project. *Advanced Materials Research*, 368-373, 2961-2964.
- Choudhury, I., Das, A., & Kamar, K. A. (2017). A review of cost estimation methods in construction industry. *International Journal of Civil Engineering and Technology*, 8(9), 1-13
- Elmualim, A. A., Dawood, N., & Marasini, R. (2014). BIM-based cost planning of construction projects. *Engineering, Construction, and Architectural Management*, 21(2), 149-167.
- El-Sayegh, S. M. (2008). Construction project scheduling under uncertainty. *International Journal of Project Management*, 26(7), 789-798.
- El-Sayegh, S. M. (2008). Risk assessment and allocation in the UAE construction industry. *International Journal of Project Management*, 26(4), 431-438.
- Fan, Y., Zhu, Y., & Hanna, A. S. (2015). Simulation-based optimization for construction
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.
- Flaherty, B. (1993) Abandoned Building: A Stochastic Analysis; *Journal of Urban Economics*, Vol. 34, pp. 43-74.
- Girma Sinesilassie .(2017). Critical factors affecting schedule performance: A case of Ethiopian public construction projects engineers' perspective.
- Hillson, D., & Murray-Webster, R. (2007). *Understanding and managing risk attitude*. Gower Publishing, Ltd.
- Hobbs, B., & Binhadyan, B. (2017). Resource allocation and leveling in construction projects: a review. *Construction Management and Economics*, 35(1-2), 60-78.

- Jia, H., Li, L., & Zhou, X. (2013). A fuzzy Delphi group decision-making model for the selection of sustainable logistics providers. *Expert Systems with Applications*, 40(18), 7533-7540.
- Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (2014). Factors influencing accuracy of cost estimating in construction projects in Indonesia. *Construction Management and Economics*, 22(7), 697-706.
- Kanjanabootra, S., Akinci, B., & Garrett Jr, J. H. (2017). Stakeholder engagement in infrastructure projects: A conceptual framework. *Journal of Construction Engineering and Management*, 143(4), 04016127.
- Kasim, N., Al-Harbi, K. M., & Khan, S. (2016). Risk mitigation strategies in construction projects: A comparative study of Malaysia and Saudi Arabia. *Journal of Engineering, Design and Technology*, 14(1), 190-209.
- Kerzner, H. (2013). *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*. New York: John Wiley & Sons.
- Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. Wiley.
- Khosrowshahi, F., & Arayici, Y. (2012). Resource allocation in construction projects: A review. In *Proceedings of the 28th Annual ARCOM Conference* (pp. 797-806).
- Khosrowshahi, F., Arayici, Y., & Seyedzadeh, S. (2013). Cost control techniques used in the UK construction industry. *Engineering, Construction, and Architectural Management*, 20(6), 597-617.
- Kumar, A., & Kumar, V. (2017). Resource identification and allocation using work breakdown structure. *International Journal of Engineering Technology Science and Research*, 4(10), 123-127.
- Lemma, T.(2014)., ‘The role of project planning on project performance in Ethiopia’ Master’s thesis, Addis Ababa University.
- Nawi, M. N. M., Mohamed, O., & Omar, W. Z. W. (2016). Challenges in resource identification process in construction projects. *MATEC Web of Conferences*, 66, 00051.
- Odeyinka, H. A., & Yusif, A. (2013). Risk management practice in Nigerian construction industry. *International Journal of Construction Engineering and Management*, 2(4), 96-103.

- Ofori, G. (2012). Developing the Construction Industry in Ghana: the case for a central agency. A concept paper prepared for improving the construction industry in Ghana. National University of Singapore, 3-18.
- Olander, S., & Landin, A. (2005). The construction project as a social system: A conceptual framework of stakeholders' roles and functions. *Construction Management and Economics*, 23(8), 897-905.
- Otim, G., Alinatiwe, H. M., Tindiwensi, D., & Kerali, A. G. (2016). The causes and impact of uncompleted buildings; studies in Kampala. Second International Conference on Advances in Engineering and Technology (pp. 360-366). Istanbul : international journal on advances in Engineering and Technology.
- Park, C. S., Lee, D. Y., Kwon, O. S., & Wang, X. (2013). A framework for proactive construction defect management using BIM augmented reality and ontology-based data collection template. *Automation in Construction*, 33, 61-71.
- PMI. (2013). A guide to the project management body of knowledge: PMBOK® guide (5th ed.). Newtown Square, PA: Project Management Institute
- Project Management Institute (PMI). (2017). A Guide to the Project Management Body of Knowledge (PMBOK Guide) (6th ed.). Project Management Institute.
- Serrador, P. (2013). The Impact of Planning on Project Success-A Literature Review. *The Journal of Modern Project Management*, 1(2).
- Sharew, W. D. (2016). The role of project planning on project performance in Ethiopia. A project submitted to Addis Ababa University, Addis Ababa.
- Tariku, R. (2016). Project Delivery Systems and Their Effects on Cost and Time Overrun On Ethiopian Road Authority Projects. Addis Ababa Institute of Technology School of Graduate Studies
- Wang, Y.-R., & Gibson, G. E. (2008). A study of pre-project planning and project success using ann and regression models. *The 25th International Symposium on Automation and Robotics in Construction. ISARC-2008* (pp. 688–696)
- Werku Koshe, K. N. Jha. (2016). Investigating Causes of Construction Delay in Ethiopian Construction Industries, *Journal of Civil, Construction and Environmental Engineering*. Vol. 1, No. 1, pp. 18-29.

- Youcef J-T. Zidane, Nils O.E. Olsson, (2017), Defining project efficiency, effectiveness and efficacy, *International Journal of Managing Projects in Business*, 10(3), 621-641.doi.org/10.1108/IJMPB-10-2016-008
- Zayed, T., Aljohani, K., & Al-Hussein, M. (2018). Resource optimization for construction projects: A systematic literature review. *Automation in Construction*, 93, 1-17.
- Zhang, X., & Ng, S. T. (2019). A systematic review of risk management in construction: Research trends and future directions. *Safety Science*, 118, 627-643.
- Zou, P. X., Zhang, G., Wang, J., & Wang, J. (2016). Project planning, stakeholder engagement, and coordination in mega construction projects: A conceptual model. *Frontiers of Engineering Management*, 3(2), 119-126.
- Zwikael, O. (2009). The critical planning process in construction projects., *construction Innovation*, 9 (4), 372-387
- Thomas and Mullaly (2008), resource planning was identified as a critical success factor for managing projects successfully.
- Kerzner (2017) highlights the positive impact of effective project scheduling on project success. It emphasizes the need for a well-developed schedule plan to ensure project objectives are met.
- Belout and Gauvreau (2004) supports the positive relationship between project schedule planning and project success. They found that effective scheduling positively impacts project performance, including timeliness and meeting project objectives.
- Cleland and Ireland (2004) emphasize the significance of stakeholder engagement in achieving project success. They argue that actively involving stakeholders throughout the project lifecycle leads to better decision-making, reduced conflicts, and improved project outcomes.
- Wagner and Bickmann (2013), stakeholder engagement positively influences project success by increasing stakeholder satisfaction, addressing conflicts, and fostering collaboration.
- Hillson and Murray-Webster (2007) supports the positive relationship between project risk management and project success. They found that effective risk management practices significantly enhance project outcomes and reduce the likelihood of failure.

Chapman and Ward (2003), proactive risk management practices contribute to project success by minimizing uncertainties, improving decision-making, and enhancing stakeholder confidence.

Flanagan and Norman (1993) emphasizes the importance of risk management in the construction industry. They found that proactive risk management strategies positively impact project performance, including cost, quality, and time.

ANNEX

DATA COLLECTION INSTRUMENTS

JIMMA UNIVERSITY

POST GRADUATE PROGRAMS IN PROJECT MANAGEMENT AND FINANCE SURVEY QUESTIONARIES FOR STUDY

Dear Participant:

Hello. My name is SADO MUSA WADAJO and I am a graduate student undertaking Master of Arts (MA) Degree in Project Management and Finance in Jimma University, College of Business and Economics, Department of Accounting and Finance. Currently I am conducting a research entitled “The Effect of Project planning process on Public construction Project Success: The case Jimma Town Municipality”. You have been selected to assist by providing the required information because your views are considered important to this study. I am therefore kindly requesting you to fill this questionnaire. Please note that any information given will be treated with utmost confidentiality and will only be used for the purpose of this study.

Section 1: Demographic Information

Gender: a) Male b) Female c) Prefer not to say

Age: a) 18-25 b) 26-35 c) 36-45 d) 46-55 e) 56 and above

Educational Qualifications: a) High School b) Diploma c) Bachelor's degree
d) Master's degree e) Doctorate

Years of Experience in Project Planning. a) Less than 1 year b) 1-5 years c) 6-10 years
d) 11-15 years e) More than 15 years

Section II: Give your opinion to each of the following questions by putting tick mark (√) on the appropriate choice(s). You can select more than one choice whenever necessary.

1. What is the project planning process in place in Jimma town municipality?

It's done by project planning team It's done by planning process owner

It's done by Individual consultant

2. Who was the design of the project determined? Designer project planner ()
 project manager Contractor consultant others, _____

3. How was the contractors selected?

Through normal tender procedure Equal value for invitation for bid &proposal

Invitation for bid and quotation (price driven) through awarding a contract

Invitation for proposal (technical driven) others_____

4. What period did you take to complete the construction project you have engaged in?

less than 5 years 10-15 years

5-10 years Not Completed yet

5. How do you evaluate quality of public projects under Jimma city Municipality?

High Quality Low Quality

Medium Quality Others, _____

6. Which of the following do you believe contributes to the low quality of public projects under Jimma city Municipality?

Problem in project design and planning

Problems related to Finance and Contract administration

Problem related to labor and project management

Problem related to material and technology

others, _____

7. What was the technique that has been employed in developing cost estimates?

Bot-up techniques /definitive estimating/ Parametric estimating techniques.

Top-down technique /analogous estimating/ others

8. Who was the party that advice the committee about the project cost?

Marketing Project manager

Accountant Contribution of all knowledge

Engineer Others, _____

9. How communication in a project is handled must be planned in order to perform effective work and minimize the risks.

Manage conflicts effectively Run effective meetings

Develop better communication skills Use e-mail and Social Media effectively

Use templates for project communications contribution of all

10. What was the tools and technique used for performance reporting?

Performance review Earned value analysis

Variance analysis Information distribution tools & technique

Trend analysis

11. During planning phase, what is the chief source of conflicts?

| | | | | | | |
|-----|--|----------|----------|----------|----------|----------|
| 1.1 | The project planning phase adequately considers the availability of resources | | | | | |
| 1.2 | The resource estimation techniques used during the project planning phase are effective and reliable | | | | | |
| 1.3 | Sufficient data and information are available to make accurate resource estimations during the project planning phase. | | | | | |
| 1.4 | The resource estimation process takes into account the potential risks and uncertainties associated with resource availability | | | | | |
| 1.5 | There are mechanisms in place to review and update resource estimations during the project planning phase if necessary | | | | | |
| | Improved Project Scheduling in Jimma town municipality | 5 | 4 | 3 | 2 | 1 |
| 2.1 | Improved project scheduling has a significant impact on minimizing delays | | | | | |
| 2.2 | Timely completion of public construction projects is directly influenced by the quality of project scheduling | | | | | |
| 2.3 | Implementing improved project scheduling techniques leads to better resource utilization and allocation | | | | | |
| 2.4 | Effective project scheduling contributes to the overall efficiency and productivity of public construction projects | | | | | |
| 2.5 | The use of advanced software tools for project scheduling positively impacts timely completion and reduces delays | | | | | |
| 2.6 | Improved project scheduling helps in identifying potential risks and taking proactive measures to mitigate them | | | | | |
| | Effectiveness of Risk Management Strategies in Jimma town municipality | 5 | 4 | 3 | 2 | 1 |
| 3.1 | Risk management strategies are adequately integrated into | | | | | |

| | | | | | | |
|-----|--|---|---|---|---|---|
| | the project planning process | | | | | |
| 3.2 | The identification of potential risks is effectively conducted during the project planning phase | | | | | |
| 3.3 | The allocation of responsibilities and accountabilities for risk management activities is clearly defined during the project planning process. | | | | | |
| 3.4 | Risk monitoring and control mechanisms are in place to track the effectiveness of mitigation measures and make necessary adjustments | | | | | |
| 3.5 | The project planning process includes contingency planning to address unforeseen risks and uncertainties | | | | | |
| 4 | Level of Stakeholder Engagement in project management process of Jimma town Municipality | 5 | 4 | 3 | 2 | 1 |
| 4.1 | Stakeholders are actively involved in the project planning phase | | | | | |
| 4.2 | Stakeholders' opinions and inputs are considered and incorporated into the project planning process | | | | | |
| 4.3 | Stakeholders are given opportunities to provide feedback and raise concerns during the project planning phase | | | | | |
| 4.4 | Stakeholders from diverse backgrounds and interests are included in the project planning discussions | | | | | |
| 4.5 | Stakeholders are adequately informed about the project objectives, scope, and progress during the planning phase | | | | | |

Part E; Overall success of project

Evaluate them in relation to your project and then put a tick mark (√) under the choices below. Where, 5 = Very High Success, 4= High Success, 3= Medium Success, 2 = Low Success and 1=Very Low Success

| Description | Very High Success (5) | High Success (4) | Moderate Success (3) | Low Success (2) | Very low Success (1) |
|---|-----------------------|------------------|----------------------|-----------------|----------------------|
| Evaluate project success based on Time validity, Scope and cost estimation issues considering the above factors | | | | | |

Part F: Open ended (question)

1. In your opinion, what are the key challenges faced during the resource estimation process in public construction projects in Jimma Town?
2. In your opinion, what are the key challenges faced in implementing and maintaining improved project scheduling in public construction projects in Jimma Town?
3. In your opinion, what are the key challenges faced in implementing and maintaining effective risk management strategies during the project planning process for public construction projects in Jimma Town?
4. Are there any specific strategies or best practices that you believe should be implemented to foster effective stakeholder engagement during the project planning phase for public construction projects in Jimma Town