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Business and Economics School of Commerce  
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Assessing factors causing total project schedule delay in design and  
implementation of student information system in the case of AM & BF  
software design PLC

By

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# Declaration

I hereby declare that this thesis entitled “Assessing factors causing total project schedule delay in design and implementation of student information system in the case of AM & BF software design PLC” has been carried out by student researcher under the guidance and supervision of Dr. Teklegiorgis. Therefore, the thesis is original and has not been submitted for the award of any degree or diploma to any university or institution.

Name

Date

Signature

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# Approval Sheet

This thesis/dissertation entitled “Assessing factors causing total project schedule delay in design and implementation of student information system in the case of AM & BF software design PLC” was prepared by Ablene Melese and submitted in partial fulfillment of the requirements for the degree of Master of Art in “Project Management” at Addis Ababa University: School of Commerce.

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## **Abstract**

This study assessed the main factors that contributed to the design and implementation delays in the AM & BF PLC project to develop a student information system. The census method was used to distribute questionnaires to respondents because the population was manageable and small overall. On a Likert scale, the respondents were asked to rank the delay factors according to the severity of their impact. In order to categorize respondents, the questionnaire also asks about the respondent's experiences and other additional demographic details. The analysis of these data revealed that four of the six major causes were customer-related, which included changes in customer requirements, late or incomplete customer feedback, and customers requesting extra features; testing-related, which included a lack of testing resources and a delay in test environment delivery; deployment-related, which included a lack of deployment planning, a delay in the discovery of defects, and a lack of documentation; and constraints-related, which included a lack of testing resources and a delay in test environment delivery. To address the main delay factors, it is recommended to prioritize clear communication with customers, plan deployments thoroughly, allocate resources adequately, and ensure well-documented testing procedures, implementing this will help to shorten delays on comparable projects, and future researchers may examine the problem from a broader point of view.

Key Words: Project delays, causes of delays, customers related, testing related, deployment related

# Chapter One: Introduction

## *1.1 Background of the study*

The use of information technology (IT) in higher education has transformed many facets of how students learn and how universities run. IT has made it possible for universities to give a lot of student's affordable, effective access to information and resources, promoting individualized, self-paced learning. Over 70% of degree-granting postsecondary institutions offer distance education courses in one way or another, according to a National Center for Education Statistics report. Additionally, technology-based teaching aids like learning management systems (LMS), instructional videos, online libraries, and interactive software have greatly enhanced educational quality. Additionally, IT handles crucial communication and administrative tasks like managing student records, enrolling students in courses, and processing financial aid, resulting in smooth administrative procedures and enhanced services. Overall, IT plays a crucial role in the development of higher education, providing incoming students with the knowledge and skills they need to succeed in the digital era.

Engineering project delays have become common in the field of information technology. Despite significant technological advancements, IT projects continue to face challenges associated with project delays and their potential consequences. As Jones and Smith (2020) point out, IT project delays can result in significant economic losses because they "can cause project costs to spiral out of control." This is especially concerning given the IT industry's rapid growth, which is today one of the fastest-growing areas of engineering. According to Brown and Lee (2017), "time is money" in the IT industry, and "delays have the potential to severely impact project success." As a result, it is critical for organizations to prioritize effective project management and reduce the risks of IT project delays.

Bonga University is an Ethiopian 4th Generation University that aspires to be the top among Africa's premier higher education institutions in Resource Management and Usage by 2030. To do this, the institution developed SIS-IMS and engaged a development firm to assist with the

process. Almost 5,000 students are presently enrolled at the institution, which provides professional training for high-level employment as well as education for the development of the personality. Bonga is a rising institution that is extending its educational offerings. To reach its goals, the institution has launched a digital automation project in collaboration with AMBF trading PLC to achieve student information systems, assessments, processes, and research. With its three components: students, academic staff, and administrative support personnel, the university's aim is to develop educational services and contribute to national successes. The software project will assist the university in meeting these goals. Mengistu (2022).

Automation systems and Linux system services are becoming increasingly common in all kinds of industries, as they help improve efficiency and reduce costs. However, these technology projects are vulnerable to schedule delays that can cause negative consequences. AM & BF software Design PLC, a software development company in Ethiopia, has faced project delays in the design and implementation of automation systems and Linux system services. These delays have resulted in increased project costs, decreased customer satisfaction, and decreased productivity. Therefore, it is essential to evaluate the factors of schedule delays in these types of projects, particularly in the case of AM&BF software Design PLC, to identify ways to prevent or mitigate these delays.

In the context of Ethiopia, limited research has focused on the factors of project delays in automation systems and Linux system service projects, a study by Zenebe & Awoke (2019) aims to address this gap by assessing the factors of project schedule delays in the design and implementation of automation systems and Linux system services in AM & BF software design PLC. By doing so, the study will provide valuable insights into ways to prevent or mitigate project delays in automation systems and Linux system services in Ethiopia, ultimately contributing to the improvement of project management practices in this industry.

## ***1.2 Statement of the problem***

The development and implementation of a student information system (SIS) is no exception to the rule that software development projects are notorious for running behind schedule. Such delays may have a negative effect on a project's success, the satisfaction of stakeholders, and cause organizations to suffer significant financial losses. Software development projects, including the implementation of the SIS, are particularly prone to delays, failures, and investment losses in Ethiopia. For instance, a study by Lu and Liu (2012) found that delays in the software development project schedule have a significant negative impact on the success of the project and stakeholder satisfaction. Similar to this, Hailemariam (2015) conducted a study to identify the factors that contribute to the challenges of software development in Ethiopia. According to the study, software development project delays are a significant issue in Ethiopia due to a variety of factors such as a lack of skilled personnel, poor communication, insufficient project planning and management, and insufficient resources. These delays can result in missed deadlines, increased costs, and lower final product quality, which can lead to dissatisfied stakeholders and harm the project's overall success.

An important project for educational institutions like AM & BF Software Design PLC is the design and implementation of a SIS. Majorly it will cost the organization money and also the stakeholders will suffer as a result of the system's delayed implementation, which. Therefore, it is crucial to identify the causes of overall project schedule delays and consider strategies for mitigating them when designing and implementing a SIS at AM & BF Software Design PLC. The timely delivery of software development projects depends on effective project management, and a delay in implementation can have a negative impact on project costs, customer satisfaction, and productivity, among other things.

Additionally, Ahmed and Al-Shaikh's (2015) research revealed that software development project schedule delays can have serious negative effects, including a loss of market share, decreased productivity, increased costs, a delayed return on investment, and dissatisfied customers. Therefore, it's crucial to pinpoint the primary reasons behind schedule delays in software development projects like AM & BF Software Design PLC's design and implementation of a SIS. The goal of the study is to assess the causes of the issue and give

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recommendations on how to address those factors which can assist organizations in streamlining their software development procedures, cutting down on implementation delays, and raising the effectiveness of their project management..

The problem of project schedule delays in software development projects is a pervasive one. According to Standish Group's 2018 CHAOS report, 54% of software development projects failed to achieve their initial business objectives as a result of scope creep, inadequate planning, and other problems, demonstrating the pervasiveness of the problem of project schedule delays in these projects (Standish Group, 2018). According to a 2017 study by AppDynamics, 59% of IT decision-makers surveyed said that delays in software development and a lack of visibility into app performance were the biggest roadblocks to their organization's digital transformation.

Effective project management is therefore essential to guaranteeing on-time delivery and stakeholder satisfaction. Delivery on time is crucial, like AM & BF Software Design PLC where a postponed implementation may have several negative impacts. Therefore, research is required to pinpoint the root causes for project schedule delays and discover workable solutions.

## ***1.3 Research Questions***

### **1.3.1 Main Question**

1. What are the factors of total project schedule delay in the design and implementation of automation system and Linux system service in the case of AM & BF software design PLC?

### **1.3.2 Specific Questions**

1. How have project planning and scheduling been practiced for the design and implementation of the "Automation System and Linux System Service" project?
2. What were the causes of the project schedule delay?
3. What were the effects of the total project schedule delay on project stakeholders?

## ***1.4 Objective of the research***

### **1.4.1 General Objective**

The primary objective of this project is to analyze the reason for project delay for design and implementation of automation systems and Linux system service project and its influence on the stakeholders so as to develop a solution for future similar difficulties.

### **1.4.2 Specific objectives**

1. To Assess the planning and scheduling practice for design and implementation of the automation system and linux system service project.
2. To Assess the causes for project schedule delay.
3. To Assess the effects of the total project schedule delay on the project stakeholders.

## ***1.5. Significance of the study***

The significance of the study "Assessing the Cause and Effect of Total Project Schedule Delay in Student Information System Projects" lies in its potential to enhance project management procedures, lessen project delays, and guarantee the effective completion of projects. This study helps The software developer company(Contractor), Bonga University (clients), and other parties involved in Project Schedule management by creating the awareness about the importance of good Project schedule management practices and ways of tackling their challenges. Additionally, technology can improve operations, streamline procedures, increase institutional performance, and improve student experience. The timely completion of the SIS project can also benefit society by improving educational standards, presenting students with better employment options, and advancing a country's development.

After completing this research, the result is important for to show the planning and scheduling practices exercised by AM&BF Software Design PLC and to what extent they are applied To show the cause of the project schedule delay To show the effect of the total project schedule delay on the project stakeholders

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## ***1.6 Limitations of the study***

Self-reported responses were used to collect the data, which introduced the possibility of response bias and possible inaccuracies. Furthermore, it was not possible to conduct interviews and case studies as planned because the respondents' locations at the time of data collection were far from the data collector. Because of this, the study's data collection phase had limitations and could have been biased.

The research was limited to AM&BF software developing PLC, limiting its applicability to other organizations and industries. More research across multiple organizations and industries is needed to gain a more comprehensive understanding. Furthermore, the study could have been constrained by time constraints, which could have influenced the depth of analysis and inclusion of additional variables. Despite its limitations, this study provides valuable insights, and future research could build on these findings by employing more diverse data collection methods and taking into account broader organizational contexts.

## ***1.7 Scope of the study***

The study, titled "Assessing the Cause and Impact of Overall Project Schedule Delay in Student Information System Project," would look at the elements that contribute to schedule delays in SIS projects undertaken by educational institutions. The study will include project managers, team members, and SIS project stakeholders, and will take place in a specified geographic location, such as the AMBF headquarters. The research will look at many project-related issues such as inadequate communication, a lack of project planning, insufficient resources, and inaccurate project schedule projection. Data will be gathered and analyzed utilizing a variety of research approaches and tools, including questionnaires, interviews, and case studies.

## ***1.8 Organization of the study***

The research project will be divided into five chapters to ensure a clear and coherent discussion. The first chapter will provide an introduction that covers the history of the study, the organization's history, the problem statement, research questions, research goals, the study's scope, limitations, relevance, and organization. The second chapter will focus on how the study fits into the existing body of knowledge and literature.

The third chapter will cover the methodology and techniques employed in the study. This chapter will present the study's methodology, data gathering methods, methods used for data analysis, and the instruments used to gather relevant data.

The fourth chapter will discuss the study's findings and attempt to answer the problem statement raised in the first chapter using the data and facts presented. Finally, the fifth chapter will present the study's findings and recommendations, which will be divided into two sections. This chapter will address the problem statement outlined in the first chapter and provide recommendations for future research in the field. Overall, the five-chapter format provides a clear structure for the research project and ensures that the findings and recommendations are presented in an organized-manner.

## **Chapter Two: Review of Related Literature**

### ***2.1 Introduction***

The literature review, which offers a thorough and critical analysis of the existing literature related to the research question, is a crucial part of any research paper or thesis. The theoretical and empirical foundation of the study is the primary focus of this chapter. The goal of this review is to establish a conceptual framework for the study that will direct the research and analysis, as well as to give an overview of the theoretical ideas on which the research is based. The review addresses issues like scheduling and planning software projects, classifying delays, causes and effects of delays, and related studies in Ethiopia. The review aims to show the researcher's comprehension of the existing theoretical knowledge and how it relates to the current study by analyzing the body of literature that already exists on these topics. More importantly, it concentrates on the concepts' applicability to the research question in order to identify knowledge gaps that can be filled by this study. The theoretical review outlines these fundamental theoretical ideas on which the research is predicated in detail and emphasizes their applicability to the research question. This section is essential because it establishes the foundation for creating a research methodology and data analysis. Additionally, the reader is able to assess the relevance and validity of the research's findings thanks to the critical analysis of the literature review. In this way, the theoretical review is vital in determining the general caliber and significance of the study.

### ***2.2 Theoretical Review***

#### **2.2.1 Software development projects**

The rapid advancement of technology and the evolving needs of stakeholders have made software development projects increasingly complex and challenging to manage. In recent

literature, several key considerations have emerged, including the adoption of agile methodologies, the identification and mitigation of project risks, effective stakeholder engagement, and the use of appropriate tools and frameworks to support project management, (Heeks, 2019).

Despite the adoption of best practice in software development project management, several challenges remain. These challenges include inadequate resource allocation, changing requirements, and difficulty in estimating project scope and duration, (Dhameja et al., 2015). Moreover, compared to other project management domains, managing software development projects has its complexities, such as managing software defects, managing software configuration, and fulfilling the need for adaptability to evolving software requirements.

### **2.2.2 Software project planning**

Software project planning is an essential activity in the software development process that involves the identification, estimation, and scheduling of project tasks and resources. According to Pressman & Maxim (2014), software project planning is the process of defining a software project's objectives, scope, and effort; identifying project risks and constraints, and developing strategies to address them. The authors emphasized that an effective project plan should include the project's scope, deliverables, work breakdown structures, schedules, and milestones, as well as the estimation of cost, effort, and risk.

To ensure the success of a software development project, (Hughes et al., 2011), suggest adopting an iterative and incremental approach to software project planning. This approach involves breaking down the software development process into smaller increments or iterations, each with well-defined goals and objectives that can be achieved within a specific time frame. The authors argue that this approach allows software developers to adapt to changes in customer requirements, technologies, and market conditions, which is essential in today's rapidly changing software development environment.

Software project planning is a process of defining "what" will be done, "how" things will be done, "who" will oversee a certain function, and "how much" it will cost. In this view, planning does not include scheduling, which addresses the "when" to accomplish anything, yet scheduling will be done once planning is complete. A comprehensive project plan serves as the foundation for creating a well-organized project schedule.

Effective software project planning requires the involvement of all stakeholders, including customers, project sponsors, project managers, software developers, and users, among others. According to Boehm & Turner, (2005), the involvement of stakeholders in the project planning process can help ensure that the project's objectives are clearly defined, and the project risks and constraints are identified and addressed appropriately. They argue that stakeholder involvement can promote collaboration, communication, and understanding, which are vital ingredients for successful software project planning.

### **2.2.3 Stages of Planning**

Software project planning is a crucial process that sets the stage for the successful execution of a software project. Generally, planning for software projects is divided into four stages: project initiation, project planning, project execution, and project closure. These stages of software project planning provide a structured approach to manage the project from inception to completion.

#### **2.2.3.1 Project initiation**

Project initiation involves defining the initial scope and objectives of the software project. According to (Roeder et al., 2008), project initiation sets the tone for the rest of the project, and it is critical to get it right. They note that this stage involves identifying the stakeholders, determining the project's feasibility, and establishing the goals and objectives of the project.

### **2.2.3.2 Project planning**

Project planning involves the detailed planning and development of the project plan, which includes the definition of the project scope, work breakdown structure, scheduling, and budgeting. (Pressman & Maxim, 2014) outlined that the project planning stage is instrumental in gauging the project's feasibility, determining the resources needed for the project, and estimating essential factors such as budget and schedule.

### **2.2.3.3 Project execution**

Project execution involves the implementation of the project plan developed in the previous stage. This stage requires careful attention to detail and the efficient management of project resources to achieve the project's objectives. According to (Hughes et al., 2011), project execution involves meeting the customer's requirements and delivering the product on time, within budget, and with a high degree of quality.

### **2.2.3.4 Project closure**

Project closure involves wrapping up the project and assessing its outcomes. This includes evaluating the project's success, documenting the project's lessons learned, and closing out contracts and other financial obligations. According to (Boehm & Turner, 2005), this stage is critical to identify best practices to improve future projects and to provide justification for future budget requests.

## **2.2.4 Software project scheduling**

The success of a software project depends heavily on project scheduling. A thorough timetable for project activities, sequences, and associated characteristics, such as the amount of work needed, risk management, and length, are created by scheduling. A carefully constructed schedule helps maintain the project on track by giving an accurate representation of its timetable. Project schedules may be managed and optimized using methods like the critical path method (CPM) & programme evaluation and review technique (PERT).

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Nandi and Chakraborty (2015) claim that the critical path method (CPM) is a project management strategy that entails determining the sequence of project tasks that must be finished on time in order to assure the project's timely completion. Finding the project's critical route and the tasks that may be postponed without having an influence on the project's total completion time can be done with the use of CPM. PERT, on the other hand, is a scheduling method that is statistically based and used to predict how long a task in a project would take. This method takes statistical variation into consideration when estimating the anticipated length of time a task will take, making it particularly helpful when the project's result might vary. PERT is useful for monitoring anticipated delays, identifying the most delicate areas of the project, and figuring out the best resource allocation for each task, according to (Roshan & Ali, 2017).

Additionally, agile project management techniques like Scrum are growing in acceptance for planning software projects. Scrum's adaptable and iterative character enables teams to prioritize their work in response to stakeholder feedback, changing priorities, and technological advancements. This flexibility in scheduling is made possible. (Schwaber & Sutherland, 2017) assert that Scrum places a strong emphasis on transparency, inspection, and adaptation, which gives excellent control over project scheduling and, ultimately, results in project completion on schedule.

### **2.2.5 Definition of delay**

Like any other project, software projects can have delays, albeit the definition of a delay might vary. Software initiatives are generally distinctive because they incorporate measurable intangibles like code, languages, and user interfaces. The term "delay" in the context of software projects refers to the departure from the anticipated and scheduled completion time of a specific work, which has an immediate influence on the project's timetable, project objectives, and potential financial impact.

In software development, "delay is defined as the length of time that passes between the actual finishing of the task and the date of completion planned or anticipated by the stakeholders," according to research by Murtaza & Abbasi (2015). Software development delays can occur for a

number of reasons, including incorrect projections, a lack of resources, ambiguous requirements, size creep, and technological difficulties. Project managers and research teams must plan for anticipated delays and spot them as soon as they arise. The likelihood of a software project's success may be increased by employing efficient risk assessment and reduction tactics, management of time, and scheduling approaches.

### **2.2.6 Classification of delay**

The classification of delays in software projects is essential for efficient project management since it makes it easier to pinpoint their causes and place blame. Research by (Saied and Elshamy, 2017) found that there are two types of delays in software projects: internal and external. Project team dynamics, such as organizational culture, a lack of communication, skills, or resources, can cause internal delays. On the other hand, external delays, such changes in rules or government action, are outside the project team's control.

Internal delays, for example, may be further broken down into staffing, development, testing, and deployment delays, whilst external delays can be broken down into regulatory, technological, and environmental delays. Delays in staffing may be caused by a lack of qualified resources or an arbitrary timeline. When there is inadequate documentation, ambiguous requirements, or scope creep, development delays may happen. Insufficient testing conditions or an absence of resources for testing might cause testing delays. Deployment delays can be brought on by problems with the tools used for the deployment, a lack of resources, or a failure to adhere to security standards.

Law changes may cause regulatory delays, whereas changes in technology needs may cause technological delays. unexpected incidents like catastrophes caused by nature or other calamities might cause environmental delays. The project team must be aware of the nature of the delays and put effective mitigation measures in place to lessen their effects.

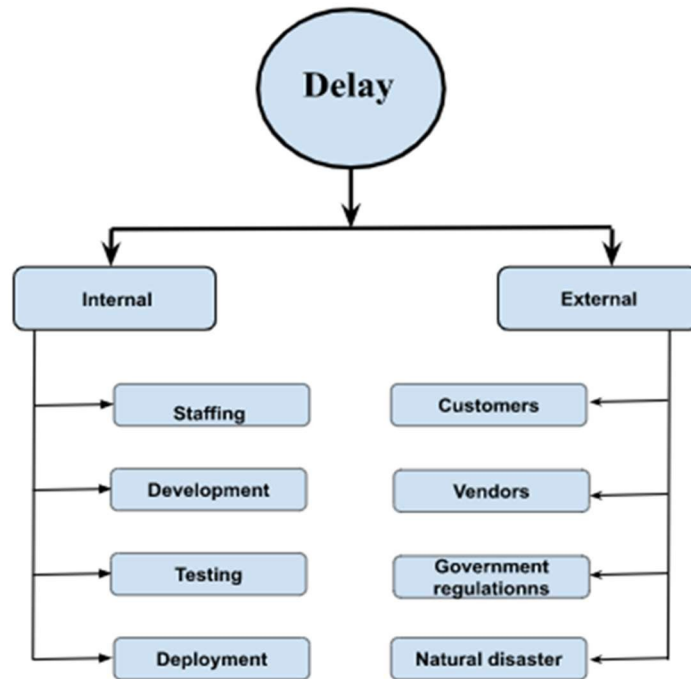


Fig 2.1 Classification of Delays (Saied and Elshamy, 2017) (source: own survey, 2023)

### 2.2.6.1 Internal Delays

These delays, as the name implies, occur inside the project team for a variety of causes. Staffing, development, testing, and deployment delays are examples of internal delays. Internal delays can have a big influence on the project's overall time frame; thus, project managers need to spot them as soon as they appear.

Staffing delays happen when there are not enough qualified resources available or when the timeline is unreasonable, according to research by (Saied and Elshamy, 2017). Similar to this, inadequate documentation, murky requirements, or scope creep can cause developmental delays. An insufficient testing environment or a lack of testing resources might cause testing to take longer than expected. Deployment delays can be caused by problems with the tools used for the deployment, a lack of resources, or a failure to adhere to security standards. It is advised that project managers understand internal delays well and take the appropriate steps to minimize or reduce them.

### **2.2.6.2 External Delays**

External delays are those that come from sources other than the project team. Customers, suppliers, or external causes like governmental rules, natural catastrophes, the state of the economy, etc. may be to blame for these delays. The duration, price, and scope of a project can all be significantly impacted by external delays. It is crucial for project managers to anticipate any external delays and have backup strategies to lessen their effects.

According to a research by Sher and Lee (2016), external delays may be divided into four groups: those connected to customers, vendors, markets, and regulations. Customer-related delays might happen as a result of shifting priorities, delayed feedback, or altered needs. Delays resulting from vendors might be brought about by poor performance, slow delivery, or modifications to vendor standards.

Market factors or demand shifts may result in market-related delays. Government regulation changes or legal challenges may cause delays in the regulatory process. To avoid and lessen external delays, it is advised that project managers create efficient risk management plans. A thorough risk assessment, regular external factor monitoring, collaborative customer and vendor relationships, and the existence of backup plans should all be part of these initiatives.

### **2.2.7 Causes of delay**

There are several things that might delay a software project, but bad project management is the most common one. According to a 2015 analysis by the Standish Group, inadequate project management is to fault for 29% of software development project failures. This entails failing to meet deadlines, communicating ineffectively, setting vague objectives, and abdicating responsibility. Without open communication and outlined objectives, software projects may soon become disorganized and aimless, which impedes their progress.

Another factor contributing to the longer-than-expected duration of software projects is unexpected technological problems. These problems could arise as a result of erroneous coding, system integration problems, or technical developments. Over half of every software project

failure, according to a 2017 poll by the Institute of Project Management, were due to technical difficulties. Due to the high degree of complexity of modern software systems and the continuously evolving technological landscape, it is challenging to anticipate and promptly handle technical challenges, which results in project delays.

Finally, scope modifications to software projects might cause delays. Scope creep occurs when a project's requirements go beyond its original intent without corresponding increases in the budget or timeline. This may be due to unclear project objectives or expectations from stakeholders. According to studies from the Project Management Institute, 47% of projects that encounter scope creep also experience timetable delays. If project scope changes are not controlled, there might be delays and greater development costs.

Several factors, including poor project management, technical difficulties, and modifications to the project scope, can cause software projects to be delayed. Project managers have to maintain effective communication, set precise goals, and control scope modifications if they are to avoid delays. A rigorous planning and testing process, as well as keeping up with the most recent technology developments, can help to minimize technical difficulties. Software projects may be finished on time and under budget by addressing these reasons of delay, improving the success of the software development industry.

### **2.2.8 Effect of delay**

Software development projects may be challenging and time-consuming, with many challenges and delays. The success of the project and the organizations involved might both suffer significantly as a result of these delays. Studies have shown that delays in software development tasks negatively affect project costs, timetables, customer satisfaction, and the overall achievement of the project. This essay will look into the effects of software project inefficiencies and their potential bearing on business outcomes.

The impact on money is one of the most important effects of software project delays. Erroneous expense estimates are one of the main reasons projects fail, according to the Project Management

Institute data from 2018. Due to increasing people, equipment, and infrastructure costs, software project delays usually result in cost increases. Cost overruns can quickly become out of control, making it hard to complete the project by the deadline and putting it in jeopardy.

The impact on project timescales is a further consequence of software project delays. Setting further dates increases the likelihood of additional delays, which complicates the problem even more. Lower team morale, less motivation, and more annoyance might arise from this. The typical software project delay, according to (Lal & Kant, 2019), is around 20%, which can have a significant impact on the project's stability and success.

The potential for decreased project success is another consequence of software project delays. Project goals and objectives may not be achieved or may be reached with subpar results when initiatives are delayed or go over budget. According to (Neely & Spencer, 2016), attributes including performance, reliability, usability, and client retention are frequently used to assess the success of software projects.

The complexities of software development continue to provide substantial problems to both project managers and developers. Software project delays emerge as a regular and significant worry in this scenario. The many elements that lead to these delays and their implications on project results have been explored by researchers. According to Aranda et al. (2016), project complexity, team size, and project scope are important factors that contribute to software project delays. Other research, such as Satyanarayana and Deshpande (2018), has found cost overruns, schedule slippages, and decreased customer satisfaction as frequent outcomes of software project delays. These issues can have a significant influence on project outcomes, jeopardizing an organization's capacity to accomplish its objectives. Furthermore, the study done by Shukla et al. (2019) validated the bidirectional association between delay causes and the consequences on project results. This suggests that the repercussions of software project delays are not confined to the immediate effects of schedule slippages, but can also lead to further issues, such as lowered project quality. As a result, project managers must be watchful and recognize the interplay between delay sources and their consequences. Only by having a thorough grasp of these

dynamics can risks be reduced and projects managed effectively, allowing organizations to meet their software development goals.

### ***2.3 Empirical Review***

In the software business, project delays are a common and well-researched problem. To gain a better understanding of the factors that lead to the development of software delays, extensive research has been conducted. This study contains an empirical assessment of software project delays based on.

In German, a study of the Impact of a Delayed Software Project on Product Launch Time and Costs has been conducted by Dönges et al. (2019). This empirical study looks at how long and how much it costs to launch a product after a software project is delayed. Data gathered from numerous software projects carried out by a German software development company served as the study's data source. The study discovered that launching a product takes longer and costs more money when software projects are delayed. The delay in software project completion causes a delay in the release of the product, which, in turn, results in higher costs because the project takes longer to complete and needs more resources. Incomplete requirements, unclear project goals, and an underestimation of software complexity are just a few of the factors that the study identified as contributing to software project delays. The authors contend that effective stakeholder management, communication, and project planning can help to mitigate these issues and lessen the likelihood of project delays.

In Albania, Berisha et al. (2019) conducted a study on the variables influencing software development project delays in the country. This study, which was empirical in nature, set out to find and examine the causes of delays in Albanian software development projects. The study is based on a poll of 121 software developers and engineers from various Albanian software development companies. According to the study, inadequate project management, a lack of technical know-how, and a lack of resources are the main causes of project delays. Over 50% of respondents identified poor project management as the primary reason for delays in their

organization, which was found to be the main cause of software project delays in Albania. The study also discovered that a lack of distinct project goals and objectives can cause team members to lack direction and miscommunicate, which can delay project completion. Another significant finding of the study is that project delays were significantly influenced by the level of technical expertise and experience of team members. When the project team lacked the necessary expertise and knowledge, it was challenging to finish the work on schedule, which led to delays. Insufficient funding, hardware, and software, as well as other resources, the study discovered, can also cause project delays.

## ***2.4 Related Studies in Ethiopia***

Ethiopia is becoming more and more dependent on the software development industry, thus a holdup in these projects might have a significant effect on the regional economy. To address the issue. To examine Ethiopian projects for software development delays and provide workable solutions, many investigations have been conducted.

According to research by (Hailu & Briuk, 2020), inadequate project management approaches, a lack of resources and infrastructure, and delays in requirements gathering and analysis are the main causes of software development task delays in Ethiopia. The study also found that poor project managers and software engineers cause delays in project completion. The researchers believe that programs for project management as well as software development educational and training programs may be helpful in tackling these issues.

In different research (Abate et al., 2019), the causes of software development holdups in the Ethiopian educational industry were discussed. The study found that the primary causes of delays were a lack of resources, poor teamwork, and unclear the project's goals and needs. The researchers also found that using agile methods might be useful in resolving these issues.

Additionally, a study by Tsadik and Redda (2018) looked at the delays in software development projects for Ethiopia's banking sector. The study found that the main causes of delays were poor project management and planning, a lack of technical expertise, and insufficient testing

procedures. The researchers encourage project managers to employ agile methodologies, build effective risk management tactics, and improve communication and coordination among team members to ensure that projects related to software development are completed on schedule and within budget.

## ***2.5. Conceptual Framework***

The conceptual framework has emphasized a number of factors that influence the velocity of the project's conception and completion in relation to the literature study. It described the features of a student computer system creation project that affect the effectiveness of software development. While investigating the factors of delay, it is essential to develop a comprehensive conceptual framework that unites the many components of the research. The conceptual framework for project delay factors is provided here.

This scenario's variable is the delay in Bonga University's system development project's execution, and the effects include delays with time and expense overruns, disputes between stakeholders, and underutilization, among other things.

The identification and investigation of the many causes of project delays constitutes the conceptual framework's initial element. A literature review and case studies may be used to establish the factors that contribute to project delays, such as staffing, development, testing, and deployment, as the basis for the questionnaire for the current study.

The effects of project delays make up the second element. Budgets, project timeframes, customer satisfaction, and project success are just a few of the negative effects of delays. These variables may directly or indirectly affect how well a project performs, but their combined effect will ultimately affect how quickly it is completed.

The following categories of delay factor and effect have been defined for this investigation. based on prior research that was done on the topic of tackling the factors of delays in the domain of software development projects. As can be seen in the example below, the conceptual

framework included the causes, effects, and outcomes of project delays in execution that were discussed in the literature review.

Table 2.1 Conceptual Framework

	Identifying student information system development delays factors	Ranking The Causes and Effects
	Staffing	Cc1: R1, R2, R3...
	Development	Cc2: R1, R2, R3...
	Testing	Cc3: R1, R2, R3...
	Deployment	Cc4: R1, R2, R3...
	Deployment	Cc5: R1, R2, R3...
<b>Literature Review</b>	Identifying student information system development delays effect on stakeholder	
	Influence on finances	Ce1: R1, R2, R3...
	Influence on project timeframes	Ce2: R1, R2, R3...
	Customer satisfaction	Ce3: R1, R2, R3...
	Lower project success	Ce4: R1, R2, R3...
	Note that: Cc (Cause Category) 1,2,3,4,5 Ce (Effect Category) 1,2,3,4 R1,2,3,4... = 1st, 2nd, 3rd, 4th,... Rank	

(Source: own survey, 2023)

## **Chapter Three: Research Methodology**

### ***3.1 Introduction***

This chapter discusses the study's research design, target population, sampling design, sample, and data collecting tools, methodologies, and data processing techniques.

### ***3.2 Research Design***

A descriptive research approach will be used for the study, assessing factors causing total project schedule delay in design and implementation of student information system in the case of AM & BF software design PLC. Descriptive research designs, according to (Babbie, 2016), are useful when the researcher wants to characterize the current occurrences, circumstances, or situations. The study will be able to present the variables and their interactions truthfully while also being able to spot any potential patterns and trends. Finding patterns, trends, and reasons for project delays can eventually help present and future project managers to enhance project management procedures.

A flexible data collecting approach in a descriptive study design enables the researcher to gather qualitative and quantitative data from a variety of sources. For this study, the researcher will use both primary and secondary sources of information. While secondary data will include already published literature and project records, primary data will come from surveys and observation of the organization's activities. The researcher will compile thorough information to precisely characterize the whole project delay phenomena utilizing mixed-methods data collecting strategies (Babbie, 2016).

### ***3.3 Type and Source of data***

The development of a student information system for AMBF Trading PLC is the subject of the study's investigation of the factors of total project delay. Both primary and secondary data were used in the analysis. Delivering questionnaires that are self-administered to the research

participants and afterwards collecting responses from the study respondents will be used to gather primary data.

By examining essential papers such project reports, update reports, personnel profiles, and contract agreements, secondary data will be acquired. Using a Checklist, main and secondary data will be gathered. Primary data will be collected from project workers and clients engaged in project planning, implementation, and monitoring using pre-tested standardized questionnaires.

### ***3.4 Target Population***

In a research study, the group of people or things which the research is focused on is referred to as the targeted population. The firm AMBF Trading PLC, which is engaged in the creation of a student information system, is the study's target audience. The project's stakeholders and staff are included in the 50-person target population. The targeted population is a crucial component of research, claim (Gravetter & Forzano, 2018), since it ensures that the findings are pertinent and helpful to the target audience.

The study's findings will be able to offer important insights into the deployment of the information system for students and how it can be modified to meet the demands of the firm by concentrating on AMBF Trading PLC. The study findings are thorough and reflect the many viewpoints of individuals who have an immediate stake in the project thanks to the participation of stakeholders and project-related staff.

### ***3.5 Sample Design***

The population of AMBF Trading PLC that will be the subject of this study will be chosen using a census sample approach with just 50 people as the target population, a census sample approach will be workable and practicable. The sample will comprise all parties and workers engaged in the creation of the student system of information at AMBF Trading PLC. This will guarantee that the study results are thorough and accurately reflect the full population under investigation.

By ensuring that the number of participants is representative of the population under study, the census sampling approach improves the validity and reliability of the research results. The research will be able to offer precise and thorough insights on the deployment of the student information system at AMBF Trading PLC by conducting a comprehensive population survey.. However, utilizing a census sample approach may have drawbacks, such as expensive costs and lengthy data gathering and processing times. Additionally, the findings might not apply to different people or situations. Despite these drawbacks, census sampling is a suitable approach for this study's application given the population's modest size and the demand for thorough and in-depth insights into the deployment of the student information system at AMBF Trading PLC.

### ***3.6 Data Collection***

The questionnaire is a typical data gathering tool used in research and studies. A self-administered survey on a Likert scale was used to gather data in this study. A Likert scale is a form of rating scale that allows participants to indicate their agreement or disagreement with items on a scale that typically ranges from "strongly agree" to "strongly disagree" (Burns & Grove, 2011).

The questionnaire was handed out to 50 people. On a 5-point Likert scale, participants were asked to score their agreement with a series of statements pertaining to the study issue. The use of a Likert scale in data collecting has been proven to offer various advantages, including ease of use, the capacity to capture a wide variety of attitudes or opinions, and the possibility for producing quantitative data that is easily analyzed (Winter, Dodou, & Wieringa, 2009). Overall, the Likert scale questionnaire was a useful and successful data collecting approach for this study, offering significant insights into the attitudes and opinions of the participants towards the research issue.

### ***3.7 Data analysis***

When analyzing data to determine the relative significance of various elements that contribute to the causes and consequences of student information development project delays, the use of the

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Relative significance Index (RII) and ranking of components in each category based on the RII is an effective tool. Project managers may identify the most important reasons for delays and take remedial steps to alleviate them by weighing each element and calculating its relevance index. It is simpler to pinpoint the responsible party and take the relevant action when the reason for the delay is additionally highlighted in the factor or category column.

To give a clear and simple image of the outcomes, the analysis' conclusions can subsequently be displayed using various diagrammatic tools, such as bar graphs or pie charts. In general, the use of RII and factor ranking is an efficient method for analyzing data and locating important variables that cause the student information development project to be delayed.

$$RII = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + \dots + xn_x}{AN}$$

Where,

RII = Relative Importance Index.  
 $1n_1 + 2n_2 + 3n_3 + 4n_4 + \dots + xn_x$  = Number of

respondents answer each factor.

1, 2, 3, 4, 5 = weight given for each factor (ranging from 1 to 5).

A = highest weight (i.e. 5 in our case).

N = total number of respondents.

### ***3.8 Data Quality Assurance***

#### **3.8.1 Validity**

The degree to which a study measures what it is meant to assess is of the highest relevance in any research study. For the study titled "Assessing the Causes and Effects of Total Project

Timetable Delay in the Development and Delivery of Automat System and Linux Systems Service in the Case of AM & BF Software Design PLC," three metrics were used to increase the study's validity. In order to verify that the sample was impartial and properly reflected the target community, a representative sample was first selected from the population of interest using tight inclusion criteria. Second, information was gathered from a variety of sources, including surveys, interviews, and research.

The study improved the validity of its findings by adopting a triangulation technique to data collecting, which decreased the possibility of bias. The degree to which a study's content appropriately covers the phenomena it intends to assess is referred to as the study's content validity. Finally, a validated measuring instrument was used to collect data. The data was gathered properly and reflected what the study was trying to measure thanks to the use of established measuring techniques. Together, these steps improved the study's findings' validity and made sure that they correctly depicted the phenomena being studied.

### **3.8.2 Reliability test**

Any research study must have reliability, which relates to the results' consistency and stability throughout time. For the study titled "Assessing the Cause and Effect of the Whole Project Schedule Delayed in Design and Implementation of Automation System and Linux System Service in the Case of AM & BF Software Design PLC," a number of safeguards were used to assure the study's validity. In order to minimize sources of bias and boost the reliability of the study, a standardized research procedure was followed, ensuring that every participant in the study was subjected to the identical research settings. In order to verify that the results were consistent over time, the study performed repeated measurements. By assuring the stability and consistency of the data and lowering the possibility of random error, these methods improved the study's dependability. Overall, the research's metrics, such as the Cronbach's alpha coefficient, which is Personnel were included to test the questionnaires prior to distribution. The research did not include this pilot experiment. This predicts strong internal consistency dependability (Cronbach's alpha value of 0.75), which was the outcome. improved the validity of the study's conclusions, guaranteeing that they fairly represented the phenomena that was being studied.

### ***3.9 Ethical Considerations***

In order to conduct research, it is essential to get participants' informed permission, which requires outlining the study's goals, its methods, and any potential risks or benefits. This enables people to decide for themselves whether or not they wish to join. The researcher must also make sure that the participants' anonymity and confidentiality are upheld to preserve their privacy. The use of pseudonyms or the anonymization of data may be necessary to achieve this. The researcher must also perform the study in accordance with ethical standards, which may entail following institutional review board or professional organization policies. This guarantees that the study is carried out in a responsible, respectful way that puts the participants' rights and well-being first.

## **Chapter Four: Findings and Discussion**

### ***4.1 Introduction***

The critical phase of data analysis and discussion is covered in depth in this chapter. The survey questionnaire distribution and response rates by respondents' designation, job experience distribution, and the gathering of the replies, among other aspects, are all on-depth studied in this part. The chapter's objective is to convey the study's conclusions based on the opinions of experts who work for the client, consultant, and contractor, the project's three stakeholders. Effective data analysis enables researchers to identify, analyze, and comprehend the data collected during the study process. The purpose of this chapter is to provide the results of data analysis conducted during the study to examine the reasons behind and effects of delays in projects involving student information systems. It also makes suggestions in light of the findings. The chapter does a statistical analysis to look at the magnitude of the reasons for and impacts of delays on projects involving student information systems.

### ***4.2 Basic Information of the Respondents***

The study wanted to find out the basic information on the respondents, including their bio-data, age, and educational level, to provide a better understanding of the characteristics of the participants. As shown below

#### **4.2.1 Characteristics of the respondents**

Out of the 50 research questions distributed, 40 were collected, representing an 80% response rate. The percentage of collected data was highest among contractors at 44%, followed by both clients and consultants at 14%. Of those respondents, 12 were Bonga University staff who work in AM & BF as part of the software development programme crew as mentors; 29 were from AM & BF Designing & Development PLC; and the remaining 9 were consultants from the client side. In terms of designation, 12 were clients, 29 were contractors, and 9 were consultants.

Table 4.1: Characteristics of the respondents

Type of Organization	Designation	Qr. Distributed	Qr. Collected	Percentage of Collected
Bonga University	Client	12	9	18
	Consultant	9	9	18
AM & BF PLC	Contractor	29	22	44
<b>Total</b>		<b>50</b>	<b>40</b>	<b>80%</b>

(source : own survey, 2023)

The data presented in the table below are the responses of the AM & BF Company. The designations of the respondents include Junior S.D., Senior S.D., and Client. The company issued a total of 29 questionnaires, out of which 22 were collected, amounting to 75.86% of the total responses. The responses collected among the junior and senior SD had a 34.48% return rate for each category. However, the respondents in the company's G.M. (general manager) and P.M. (project manager) categories had a significantly higher return rate of 100%. This data is essential for analyzing the response rates vis-à-vis the different designations, providing insights into the level of participation from each designation, and identifying the most responsive and least responsive groups.

Table 4.2: Characteristics of the AM&BF Company respondents

AM & BF Company	Designation	Qr. Distributed	Qr. Collected	Percentage of Collected
AM & BF Company	Junior.S.D	11	10	34.48
	Senior.S.D	16	10	34.48
Respondent in the company	G.M	1	1	3.44
	P.M	1	1	3.44
		29	22	75.86%

## 4.2.2 Gender Distribution

The data provided in the table below is the representation of the distribution of respondents by sex, out of the 40 respondents with 15 females representing 37.5% of the total respondents, and 25 males representing 62.5% of the total respondents. Which means during this study most respondents are Males.

Table 4.3: Gender distribution

Sex	Frequency	Percentage
F	15	37.5
M	25	62.5
Total	40	100

(source : own survey, 2023)

## 4.2.3 Educational Level

Table 4.4: Educational level

Education	Frequency	Percentage
BSc	22	55
MSc	15	37.5
PhD	3	7.5
Total	40	100

(source: own survey, 2023)

The above table shows the distribution of respondents based on their educational level: Out of the 40 respondents, 55% had a BSc degree, 37.5% had an MSc degree, and 7.5% had a PhD degree.

#### 4.2.4 Work Experience Description

The following table shows the distribution of respondents based on their work experience:

Table 4;5 Work experience

Work Experience	Frequency	Percentage
1 - 5 yrs	10	25
6 -10 yrs	29	72.5
11 - 15 yrs	0	0
16 - 20 yrs	1	2.5
Total	40	100

(Source: own survey, 2023)

Out of the 40 respondents, 25% had 1-5 years of work experience, 72.5% had 6-10 years of work experience, and 2.5% had 16-20 years of work experience. The data shows that most of the respondents had 6-10 years of work experience.

### 4.3 Project related factors for the project delay

#### 4.3.1 Staffing related

Table 4.6: staffing related

Items	RII	Mean	Rank
Staff turnover leading to loss of experience and additional training time B1	0.818605	4.093023	1
Hiring delays due to a shortage of qualified candidates leading to extended recruitment processes C1	0.8	4	2

Poor communication and coordination among team members leading to misunderstandings, duplication of effort, and delays in project delivery D1	0.762791	3.813953	3
Staff members being assigned to multiple projects resulting in splitting attention and delays in completion E1	0.75814	3.790698	4
Inadequate skilled staff leading to delays in tasks A1	0.748837	3.744186	5

(source: own survey, 2023)

Staff turnover causes experience to be lost and requires more training time. This component is the most significant contributor to project completion delays since it has the greatest RII, mean, and rank. Hiring delays brought on by lengthy recruiting procedures owing to a lack of competent applicants. According to the data, this is the second biggest reason for project completion delays. Lack of coordination and communication among team members causes misunderstandings, double work, and delays in project completion. In the table, this component has the third highest RII, mean, and rank. Multiple tasks being allocated to one employee causes attention to be divided, which slows completion. This factor's RII, mean, and rank are all among the highest. Task delays caused by a lack of qualified workers. In the table, this component has the fifth highest RII, mean, and rank.

Overall, this table emphasizes how crucial it is to have a reliable team when it comes to project management.

### 4.3.2 Development related.

Table 4.7: Development related.

Items	RII	Mean	Rank
Poorly defined project requirements leading to confusion and ambiguity, resulting in rework and delays A2	0.918605	4.273023	1
Inefficient coding practices leading to errors and bugs that need fixing, resulting in delays C2	0.718605	3.55814	2
Scope creep leading to additional development work and ultimately delays in project delivery E2	0.618605	2.9.06302	3
Technical issues arising from new technologies or third-party systems causing delays B2	0.467442	2.417209	4
Limited access to development tools and resources leading to delays in the development process D2	0.467442	2.417209	4

(source: own survey, 2023)

The data is a table that lists several elements along with their RII (Relative Importance Index), Mean, and Rank values. The top five variables that affect project completion time are shown in the table.

The specifics for each element are as follows:

Poorly specified project requirements cause rework and delays due to misunderstanding and ambiguity. The analysis concludes that this factor—which has the greatest RII, mean, and rank—is the most significant one. Delays are caused by ineffective coding techniques that produce errors and problems that need to be fixed. The second most significant aspect is this one. Scope creep causes more work to be done on the project's development and eventually causes delivery delays. According to the survey, this is the third biggest reason why projects are delayed from being completed. Lack of coordination and communication among team members causes misunderstandings, double work, and delays in project completion. In the table, this component has the third highest RII, mean, and rank. Multiple tasks being allocated to one employee causes attention to be divided, which slows completion. This factor has the fourth RII, mean, and rank. Task delays caused by a lack of qualified workers. In the table, this component has the fifth highest RII, mean, and rank.

Overall, this table emphasizes how crucial it is to have a reliable team when it comes to project management.

### 4.3.3 Testing Related

Table 4.8: Testing related.

Items	RII	Mean	Rank
Insufficient testing resources leading to delays in the testing process A3	0.818605	4.093023	1
Late delivery of test environments or data leading to delays in executing test cases and identifying defects C3	0.711628	3.55814	2

Inability to reproduce defects or issues leading to delays in resolving issues and completing testing activities E2	0.618605	3.093023	3
Poor communication between development and testing teams leading to delays in resolving defects and completing testing activities D3	0.544186	2.72093	4
Inadequate test planning and preparation leading to delays in identifying and resolving defects and errors B3	0.502326	2.511628	5

(source: own survey, 2023)

Testing process delays caused by a lack of testing resources. According to the data gathered and analyzed, with the highest RII, mean, and rank, this is the main cause of testing delays. Delays in executing test cases and finding bugs are caused by late supply of test environments or data. This is the second biggest reason for testing to take longer. failure to recreate errors or problems, which causes delays in fixing problems and finishing testing tasks. The table places this aspect third in terms of relevance. Ineffective communication between the development and testing teams causes delays in fixing bugs and finishing testing tasks. Fourth in significance is this. inadequate test preparation and planning, which causes delays in finding and fixing faults and problems. The fifth and last component shown in the table is this one.

Overall, this table emphasizes how crucial it is to have enough testing resources, as well as timely supply of testing environments or data, excellent communication between the development and testing teams, and proper test planning, to support effective testing operations.

### 4.3.4 Deployment related.

Table 4.9: Deployment related.

Items	RII	Mean	Rank
Incomplete or inadequate deployment planning leading to delays in the deployment process A4	0.82381	4.119048	1
Late discovery of defects or issues requiring additional development and testing work, ultimately delaying deployment C4	0.637209	3.186047	2
Inadequate documentation or training for deployment personnel leading to errors and delays in the deployment process E4	0.632558	3.162791	3
Complex deployment	0.562791	2.813953	4
processes leading to delays in the deployment process D4			
Insufficient deployment resources	0.525581	2.627907	5

(source: own survey, 2023)

Delays in the deployment process caused by incomplete or insufficient deployment planning. The study found that this factor—which has the greatest RII, mean, and rank—is the most significant one for prolonging the deployment process. Deployment is eventually delayed due to the late identification of bugs or problems requiring more development and testing work. The second most significant aspect is this one. Inadequate documentation or training for those involved in the deployment process, which causes mistakes and delays. The table places this aspect third in terms of relevance. Deployment delays are caused by complex deployment methods. In terms of importance, this comes in at number four. Delays in the deployment process are caused by insufficient deployment resources. The fifth and last component shown in the table is this one.

This table emphasizes the need of having sufficient deployment planning, early defect or issue discovery and resolution, appropriate documentation and people training, and sufficient deployment resources to enable timely deployment.

### 4.3.5 Customers related

Table 4.10: Customer related

Items	RII	Mean	Rank
Changes in customer requirements or priorities leading to delays in the development process.	0.818605	4.093023	1
Late or incomplete feedback from customers leading to delays in the development process B5	0.712260	3.713023	2
Customers requesting additional features or functionalities leading to delays in the development process C5	0.712260	3.713023	2
Disagreement among customers or stakeholders on project scope or requirements leading to delays in the development process E5	0.818605	4.093023	4
Customers being unavailable for meetings or reviews leading to delays in the development process D5	0.814286	4.071429	5

(Source: own survey, 2023)

Delays in the deployment process caused by incomplete or insufficient deployment planning. The study found that this factor—which has the greatest RII, mean, and rank—is the most significant one for prolonging the deployment process. Deployment is eventually delayed due to the late identification of bugs or problems requiring more development and testing work. The second most significant aspect is this one. Inadequate documentation or training for those involved in the deployment process, which causes mistakes and delays. The table places this aspect third in terms of relevance. Customer or stakeholder disagreement about the project's specifications or scope, which causes delays in the development process. Fourth in significance is this. Inability of customers to attend meetings or evaluations causes delays in the development process.

Overall, this table emphasizes how crucial it is to have precise and consistent client needs and objectives, fast and thorough customer feedback, and excellent customer communication to enable efficient development operations. It also emphasizes the effects of delays brought on by client requests.

#### 4.3.6. Vendors related.

Table 4.11: Vendors related.

Items	RII	Mean	Rank
Late delivery of vendor-provided components or services leading to delays in the development process A6	0.818605	4.093023	1
Quality issues with vendor-provided components or services requiring additional development and testing work, ultimately delaying the project B6	0.818605	4.093023	1
Misaligned expectations between	0.632558	3.162791	3
the project team and the vendor leading to delays in the development process C6			
Difficulty integrating vendor-provided components into the overall system leading to delays in the development process D6	0.601558	3.082791	4
Inadequate communication or collaboration with the vendor leading to delays in the development process E6	0.502326	2.511628	5

(Source: own survey, 2023)

Various elements that might cause delays in the development process are included in this table along with their respective RII, Mean, and Rank. The specifics for each element are as follows: The development process is delayed by late deliveries of parts or services from vendors. With a high RII and mean, this is the most significant component and is ranked the first one in significance.

Issues with the quality of the components or services that the vendor provides need more development and testing effort, eventually causing the project to be delayed. Additionally ranked top is this coupled with a high RII and mean, late delivery of components or services from vendors causes delays in the development process. The project team and the vendor's misaligned expectations caused delays in the development process. This component is rated. Integration issues can cause delays in the development process when used with vendor-provided components. In terms of importance, this comes in at number four. Inadequate vendor participation or communication causing development process delays. This is the least important item and is placed fifth. Overall, this table emphasizes the need of achieving alignment and efficient communication with suppliers to prevent delays in the development process, as well as having dependable and prompt delivery of vendor-provided components and services. It also emphasizes the effects of poor-quality vendor-provided components and the challenges associated with integrating them into the whole system.

#### 4.3.7 Government regulation related.

Table 4.12: Government regulation related.

Items	RII	Mean	Rank
Delayed or incomplete approvals or certifications from government agencies leading to delays in the project schedule C7	0.576193	2.880952	1
Changes in government regulations or standards requiring additional development and testing work, ultimately delaying the project A7	0.572093	2.860465	2
Difficulty interpreting	0.486431	2.371324	3
or understanding complex or ambiguous government regulations leading to delays in the development process B7			
Unexpected legal or compliance issues arising during the development process leading to delays or suspension of the project D7	0.452341	2.287623	4
Increased bureaucratic processes and procedures leading to delays in the development process E7	0.272093	1.744312	5

(Source: own survey, 2023)

This table lists several variables that may cause schedule delays for a project along with their accompanying RII, Mean, and Rank. The specifics for each element are as follows:

Government agency certifications or approvals that are delayed or insufficient might cause scheduling delays for projects. With a reasonably high RII and mean, this element is the most crucial one and is ranked number one in significance. Governmental standards or rule changes that necessitate more testing and development effort, eventually causing the project to be delayed. The second most significant aspect is this one. Complex or ambiguous government rules that are difficult to read or understand, which causes delays in the development process. In terms of importance, this comes in third place. Unexpected legal or regulatory concerns that crop up throughout the development process that cause delays or the project's discontinuation. Fourth in significance is this. Delays in the development process due to increased bureaucratic procedures and processes. This is the least important item and is placed fifth.

The many aspects of government laws and compliance are highlighted in this table overall, along with how they may affect the project timetable. Additionally, it emphasizes how crucial timely certifications and approvals are, as well as how rules and standards should be interpreted in order to prevent delays in the development process. It also emphasizes the effects of unanticipated legal or compliance difficulties during project development.

#### 4.3.8 Constraint

Table 4.13: Constraint

Items	RII	Mean	Rank
Limited resources, such as staffing or budget, leading to delays in the development process A8	0.831264	4.091243	1
Dependencies on external systems or teams leading to delays if not met or if there are communication issues D8	0.762791	3.813953	2
Technical constraints, such as compatibility issues or hardware limitations, leading to delays in the development process C8	0.711628	3.55814	3
Tight deadlines or delivery schedules leading to rushed	0.502326	2.511628	4

development work and potential quality issues, which can ultimately delay the project B8			
Organizational constraints, such as company policies or cultural issues, leading to delays in the development process E8	0.367442	1.837209	5

(Source: own survey, 2023)

Delays in the development process are caused by a lack of resources, such as manpower or funding. With a high RII and mean, this is the most significant component and is ranked number one in significance. Dependencies on outside teams or systems that, if not satisfied or if there are communication problems, might cause delays. The second most significant aspect is this one; Technical limits, such as hardware limitations or compatibility problems, cause delays in the development process. In terms of importance, this comes in third place. The project may eventually be delayed by hasty development effort and potential quality flaws caused by deadline or delivery pressure. Fourth in significance is this. Organizational limitations, such as corporate regulations or cultural challenges, may cause development process delays. This is the least important item and is placed fifth. This table summarizes the numerous reasons that might affect development and cause delays, such as a lack of resources, reliance on outside variables, technological limitations, strict deadlines, and organizational restrictions. To ensure the timely and effective completion of the project, it is critical to be aware of these elements and to prevent any possible problems.

### 4.3.9 Weighted mean of the major causes

After calculating the weighted mean of the major causes with the highest value of total mean four major causes are identified which are; customer related causes, Testing related causes, Deployment related causes and constraint related causes with 68.3% of higher portion and the number indicates that this factors played significant role in the overall project delay.

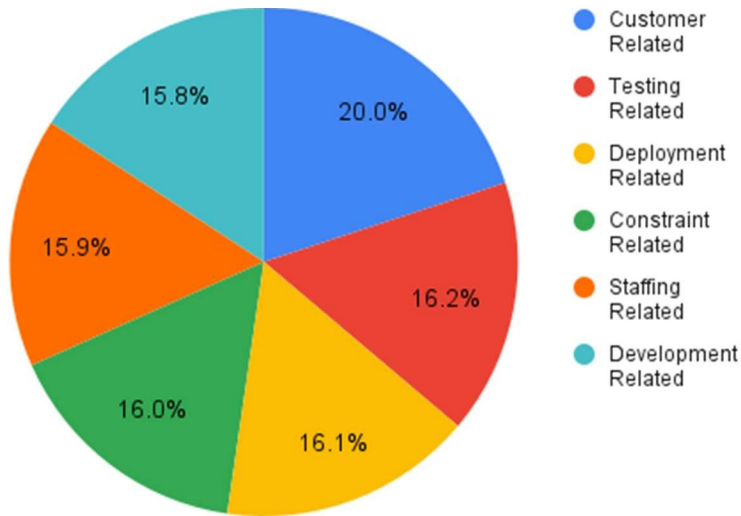


Fig 4.1 weighted mean of major causes percentage

### 4.4 Effects of Delay in the project

Table 4.14: Effects of delays in the project

Items	RII	Mean	Rank
Increased costs due to higher personnel, equipment, and infrastructure expenses A	0.814286	4.071429	1
Risk of project failure due to erroneous cost estimates and cost overruns B	0.781395	3.906977	2

Lower project success due to delayed or over-budget projects leading to unsatisfactory outcomes and unaccomplished goals H	0.613953	3.069767	3
Delayed project timeframes leading to lower team morale, diminished motivation, and greater irritation C	0.572093	2.860465	4
Possibility of future delays further complicating the situation D	0.571429	2.857143	5
Negative influence on the organization's reputation resulting in decreased business and significant income loss G	0.509524	2.547619	6
Lower customer satisfaction due to delays, leading to loss of faith in the project F	0.493023	2.465116	7
Negative impact on project characteristics such as functionality, performance, usability, and customer satisfaction. I	0.47907	2.395349	8
Negative impact on project success and stability E	0.330233	1.651163	9

(Source: own survey, 2023)

cost increases brought on by greater expenditures for labor, infrastructure, and equipment. With a high RII and mean, this is the most significant component and is ranked #1 in significance. Risk of project failure as a result of inaccurate cost projections and cost overruns. The second most significant aspect is this one. Lower project success as a result of delayed or over budgeted initiatives that result in subpar results and unmet objectives. In terms of importance, this comes in third place. Project timeline delays can cause team morale to decline, motivation to decline, and annoyance to increase. Fourth in significance is this. Future delays might complicate the matter even more. The importance of this is placed fifth. Negatively affecting the organization's reputation, which hurts sales and costs the company a lot of money. This is the sixth most crucial item. Due to delays, customers are less satisfied, which causes them to lose trust in the project and think it's of low quality. The significance of this is placed eighth detrimental effect on

project attributes including usability, performance, functionality, and client satisfaction. The importance of this is placed at eight. negative effects on the stability and success of the project. This is the least important item and is ranked ninth.

Overall, this chart highlights the different elements that might harm a project's success and conclusion, such as budget overruns, schedule delays, depleted team morale, and reputational harm.

## **Chapter Five: Conclusion and Recommendation**

### ***5.1 Introduction***

In the last chapter of this study, the findings are often summarized, discussions of the study's significance for the area are presented, conclusions are drawn, and suggestions for further study are made. In order to build on the existing findings, it is also typical to include a section emphasizing areas where more relevant investigations are required.

The main goals of this chapter are to give a succinct summary of the research that has been done and to make sure that readers grasp the main conclusions from the study. Readers can understand the relevance of the findings and how they fit into the field's larger context by emphasizing the research's key aspects.

### ***5.2 Summary***

#### **5.2.1 The Causes of Delays**

The following paragraphs will summarize all the findings of this research in detail as follows. Staff turnover causes experience loss and additional training time, hiring delays due to a lack of qualified prospective employees, poor communication and coordination among teammates, staff members being assigned to numerous tasks resulting in split attention and delays in completion, insufficient skilled staff causing task delays, poorly defined project requirements causing confusion and ambiguity, inefficient coding practices causing errors and bugs. These factors have the greatest RII, mean, and rank, indicating that they are the most significant influence in project completion delays. In addition, the study emphasizes the detrimental impact of scope creep and technical difficulties on project completion time. According to the study, the most important issue in testing process delays is insufficient testing resources, which leads to testing

delays, with the highest RII, mean, and rank. The second most critical reason is late delivery of test environments or data, which causes delays in executing test cases and finding errors.

The third most critical problem is the inability to duplicate faults or difficulties, which causes delays in addressing issues and completing testing procedures. The fourth most critical reason is poor communication between development and testing teams, which causes delays in resolving faults and completing testing tasks. The fifth and final problem is insufficient test planning and preparation, which causes delays in discovering and addressing faults and mistakes. According to the study, the most important element in delaying the deployment process is incomplete or poor deployment planning, which results in deployment delays, with the highest RII, mean, and rank.

Late discovery of defects or issues necessitating additional development and testing work, inadequate documentation or training for deployment personnel resulting in errors and delays in the deployment process, complex deployment processes resulting in deployment delays, and insufficient deployment resources resulting in deployment delays are all factors that can cause deployment delays.

According to the study, changes in client needs or priorities that cause delays in the development process are the most critical variables in prolonging the process, with the highest RII, mean, and rank. Customers providing late or incomplete input, customers seeking extra features or functions, dispute among customers or stakeholders on project scope or requirements, and customers being unavailable for meetings or reviews are all reasons that contribute to delays. Delays in delivering vendor-supplied components or services, quality concerns with vendor-supplied components or services, mismatched expectations between the project team and the vendor, and trouble integrating vendor-supplied components into the overall system are all significant considerations.

To prevent delays in the development process, it is critical to have dependable and timely delivery of vendor-provided components and services, as well as to ensure alignment and effective communication with suppliers. It is also crucial to consider the impact of quality concerns with vendor-supplied components and the difficulties in integrating them into the overall system.

### **5.2.2 The effect of the delay**

The most essential issue, with a high RII and mean, is increased expenditures owing to greater labor, equipment, and infrastructure requirements. The risk of project failure owing to incorrect cost estimates and cost overruns is placed second and third in significance. Delayed project timelines are ranked fourth in significance, resulting in reduced team morale, less motivation, and increased frustration. The possibility of further delays complicating matters is placed sixth in significance. The sixth most important factor is a negative impact on the organization's reputation, which leads to decreased business and severe financial loss. Lower customer satisfaction as a result of delays ranks eighth in significance. The eighth most important factor is the negative influence on project attributes such as functionality, performance, usability, and customer satisfaction. The negative influence on project success and stability is placed ninth and last in priority.

### ***5.3 Conclusion***

Finally, the study discovered that delays in projects involving student information systems are driven by a range of issues, including insufficient or inadequate deployment planning, changes in customer needs or priorities, and late or incomplete customer feedback. The company AM & BF can work on improving by giving more focus on deployment planning, providing proper documentation and training, assigning adequate resources, enhancing communication and test preparation, and monitoring and analyzing performance will make the project development effective and efficient.

### ***5.4 Recommendations***

Based on the study's findings, the following recommendations are given to decrease project delays involving student information systems:

Enhance deployment planning: To guarantee that the project is finished on time, businesses should create a detailed deployment strategy that includes schedules, milestones, and contingency plans.

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offer proper documentation and training: Businesses should offer extensive documentation and training to all project stakeholders to ensure that they have the essential skills and knowledge to accomplish their duties efficiently.

Provide adequate resources: Companies should provide adequate resources, such as staff, equipment, and financing, to guarantee that the project is finished on time and within budget.

Enhance stakeholder communication and test planning: Organizations should create a thorough test plan and enhance stakeholder communication to make sure the system is operating as intended.

Monitoring and evaluating system performance is important for businesses because it allows them to see problems early and make the required corrections.

Companies could reduce the impact of delays on their projects and guarantee the success of their student information system efforts by putting these ideas into exercise.

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# Appendix

Dear respondent,

I want to start by thanking you for agreeing to assist my endeavor by answering this questionnaire. This survey is intended to gather accurate data on the reasons for project schedule delays and how they affect project stakeholders. To ensure the validity and reliability of the research, answers to the questions will be crucial.

This questionnaire's primary goal is to gather information for a study titled “Assessing factors causing total project schedule delay in design and implementation of student information system in the case of AM & BF software design PLC” that is being conducted solely to satisfy the requirements for the Master of Project Management degree offered by Addis Ababa University. Thanking you in advance for your assistance, I hereby promise you that all information collected from you will be used solely for research purposes and will remain private, with the exception of the abovementioned uses. You don't have to write your name down. I sincerely appreciate it.

## Part 1: Demographic characteristics of the project manager/leader

1. Age \_\_\_\_
  2. Sex \_\_\_\_
  3. Educational background \_\_\_\_\_
  4. Which organization do you represent?  
Client [Owner] \_\_\_\_\_ Consultant \_\_\_\_\_  
Contractor \_\_\_\_\_ Other \_\_\_\_\_
-

5. Respondent Designation in the Company?

Client \_\_\_\_\_ Project Manager \_\_\_\_\_

Designer \_\_\_\_\_

Junior Software Developer \_\_\_\_\_

Senior Software Developer \_\_\_\_\_

6. Years of Work Experience (General) ?

0 to 5 years

6 to 10 years

11 to 15 years

16 to 20 years

Above 20 years

7. Years of Work Experience (building Construction projects)

0 to 5 years

6 to 10 years

11 to 15 years

above 15 years

## Part 2: Project related factors

Please rate the following statements concerning the selected project you participated in based on the following rating scales.

1= Strongly Disagree, 2= Disagree, 3= Not decided, 4= Agree, 5= Strongly Agree

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No	Variables		Rating				
	Delay Causes		1	2	3	4	5
1	Staffing related	Inadequate number of skilled staff members allocated to the project. leading to delays in the completion of tasks. (A1)					
		Staff turnover resulting in the loss of experienced team members and the need for additional time to train new personnel. (B1)					
		Hiring delays due to a shortage of qualified candidates, leading to extended recruitment processes and ultimately impacting project timelines. (c1)					
		Poor communication and coordination among team members leading to misunderstandings, duplication of effort, and delays in project delivery. (D1)					
		Staff members being assigned to multiple projects simultaneously, resulting in the splitting of their attention and the inability to fully focus on any given project, leading to delays in completion. (E1)					
2	Development related	Poorly defined project requirements leading to confusion and ambiguity in the development process, resulting in rework and delays.					

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		Technical issues arising from the implementation of new technologies or the integration of third-party systems, causing delays in development.					
		Inefficient coding practices leading to errors and bugs that need to be fixed, resulting in delays in the project timeline.					
		Limited access to development tools and resources, such as hardware or software, leading to delays in the development process.					
		Scope creep, where the project requirements expand beyond the initial scope, leading to additional development work and ultimately delays in project delivery.					
3	Testing related	Insufficient testing resources, such as personnel or testing tools, leading to delays in the testing process.					
		Inadequate test planning and preparation, leading to delays in the identification and resolution of defects and errors.					
		Late delivery of test environments or data, leading to delays in the execution of test cases and the identification of defects.					
		Poor communication between development and testing teams, leading to delays in the resolution of defects and the completion of testing activities.					
		Inability to reproduce defects or issues, leading to delays in the resolution of issues and the completion of testing activities.					

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4	Deployment related	Incomplete or inadequate deployment planning, leading to delays in the deployment process.						
		Insufficient deployment resources, such as personnel or hardware, leading to delays in the deployment process.						
		Late discovery of defects or issues, requiring additional development and testing work and ultimately delaying the deployment.						
		Complex deployment processes, especially for large or distributed systems, leading to delays in the deployment process.						
		Inadequate documentation or training for deployment personnel, leading to errors and delays in the deployment process.						
5	Customers related	Changes in customer requirements or priorities, leading to delays in the development process as the team adapts to the new requirements.						
		Late or incomplete feedback from customers on the software being developed, leading to delays in the development process.						
		Customers requesting additional features or functionalities, leading to delays in the development process as the team adapts to the new requirements.						
		Customers being unavailable for meetings or reviews, leading to delays in the development process as the team waits for feedback or clarification.						

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		Disagreement among customers or stakeholders on the project scope or requirements, leading to delays in the development process as the team works to resolve the conflict.						
6	Vendors related	Late delivery of vendor-provided components or services, leading to delays in the development process.						
		Quality issues with vendor-provided components or services, requiring additional development and testing work and ultimately delaying the project.						
		Misaligned expectations between the project team and the vendor, leading to delays in the development process as the team works to resolve the differences.						
		Difficulty integrating vendor-provided components into the overall system, leading to delays in the development process.						
		Inadequate communication or collaboration with the vendor, leading to delays in the development process as the team waits for feedback or clarification.						
7	Government regulation related	Changes in government regulations or standards, requiring additional development and testing work and ultimately delaying the project.						
		Difficulty interpreting or understanding complex or ambiguous government regulations, leading to delays in the development process as the team seeks clarification.						

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		Delayed or incomplete approvals or certifications from government agencies, leading to delays in the project schedule.						
		Unexpected legal or compliance issues arising during the development process, leading to delays or even suspension of the project.						
		Increased bureaucratic processes and procedures, such as additional documentation or testing requirements, leading to delays in the development process.						
8	Constraint	Limited resources, such as staffing or budget, leading to delays in the development process.						
		Tight deadlines or delivery schedules, leading to rushed development work and potential quality issues, which can ultimately delay the project.						
		Technical constraints, such as compatibility issues with existing systems or hardware limitations, leading to delays in the development process as the team works to resolve the issues.						
		Dependencies on external systems or teams, such as third-party APIs or contractors, leading to delays if those dependencies are not met or if there are communication issues.						
		Organizational constraints, such as company policies or cultural issues, leading to delays in the development process as the team works within those constraints.						

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9. Any other opinion \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### Part 3: Effects of Delay in the project

Please rate the following delays' effects in order of which one you believe to be the most significant.

The 5-point scale has a range of 1 to 5.

1= Strongly Disagree

2= Disagree

3= Slightly Disagree

4= Agree

5= Strongly Agree

10.	1	2	3	4	5
Effects	S. Disagree	Disagree	Sl. Disagree	Agree	Str. Agree
Increased costs due to higher personnel, equipment, and infrastructure expenses.(A)					
Risk of project failure due to erroneous cost estimates and cost overruns.(B)					
Delayed project timeframes, leading to lower team morale, diminished motivation, and greater irritation.(C)					
Possibility of future delays, further complicating the situation.(D)					

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Negative impact on the project's success and stability.(E)					
Lower customer satisfaction due to delays, leading to loss of faith in the project and the impression of poor quality.(F)					
Negative influence on the organization's reputation, resulting in decreased business and significant income loss.(G)					
Lower project success due to delayed or over-budget projects, leading to unsatisfactory outcomes and unaccomplished goals.(H)					
Negative impact on project characteristics such as functionality, performance, usability, and customer satisfaction.(I)					

11. Any other opinion \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_