



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

**Analysing the Benefits and Challenges of Adapting Modern Project Management Techniques
for Machinery Expansion Projects success: A Case Study of BGI Ethiopia.**

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DEGREE IN PROJECT MANAGEMENT**

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Statement of Declaration

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Konjit Hailu (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or full to any other higher learning institution for the purpose of earning any degree.

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Statement of Certification

This is to kindly certify that Ashenafi Hailemariam has carried out his research work on the topic entitled *Analysing the Benefits and Challenges of Adapting Modern Project Management Techniques for Machinery Expansion Projects success: A Case Study of BGI Ethiopia*.

The research is his own original work and is suitable for submission for the award of Master's Degree in Project Management.

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APPROVAL

The undersigned certify that they have read and hereby recommend to Addis Ababa University College of Business and Economics to accept the thesis submitted by Mr. Ashenafi H/mariam and entitled "Analysing the Benefits and Challenges of Adapting Modern Project Management Techniques for Machinery Expansion Projects success: A Case Study of BGI Ethiopia" in partial fulfilment of requirements for the award of a master's degree in Project Management.

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ABSTRACT

This research aims to provide a comprehensive analysis of the benefits and challenges associated with the adoption of modern project management techniques in machinery expansion projects. The primary objective is to assess the impact of these techniques on project success by examining critical success criteria and understanding the role of modern project management within BGI Ethiopia. To achieve this goal, the study focuses on gathering opinions, expectations, and perceptions regarding the potential benefits of modern project management techniques of a selected case company—BGI Ethiopia. It explores factors such as perceived value, knowledge and awareness, interest and readiness, training and resources, organizational alignment, and potential barriers. By collecting data on these aspects, the study aims to provide insights into the challenges and potential advantages of adopting modern project management techniques in machinery expansion projects. This research adopts a mixed-method approach, incorporating both qualitative and quantitative analysis. This comprehensive approach allows for a more thorough understanding of the benefits and challenges of adopting modern project management techniques. By gathering numerical data and subjective insights from project managers, team members, and other stakeholders involved in machinery expansion projects at BGI Ethiopia, the study aims to provide a holistic view of the impact and potential advantages of modern project management techniques in the organization. The data collection process involved a sample of 28 participants who completed a structured quantitative questionnaire out of 31 participants which represents the entire target population that meets the purposive selection criteria for the study. Additionally, five participants were selected for qualitative key informant interviews to obtain subjective insights and in-depth perspectives on the challenges and benefits of adopting modern project management techniques. This study further aims to support BGI Ethiopia in achieving its project goals and maximizing the benefits of modern project management methodologies. It provides valuable insights for practitioners and researchers, advancing the understanding of the impact and potential advantages of adopting modern project management techniques in machinery expansion projects

Keywords: modern project management techniques, agile project management, machinery expansion projects, benefits, challenges, project success, BGI Ethiopia

Contents

List of Tables	v
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the study	1
1.2 Statement of the problem	3
1.3 Research questions	4
1.4 Objective of the study	5
1.5 Significance of the study	5
1.6 The scope of the study	6
CHAPTER TWO	8
2 RELATED LITERATURE REVIEW	8
2.1 Introduction	8
2.2 Benefits of machinery expansion	8
2.3 Project success criteria and measurement	9
2.4 Criteria and measurements on machinery expansion projects	11
2.5 Classification of project management	13
2.6 Traditional and modern project management	14
2.7 Empirical review	20
2.8 Conceptual framework	23
CHAPTER THREE	24
3 METHODOLOGY	24
3.1 Introduction	24
3.2 Data Collection	24
3.3 Data Analysis	27
3.4 Ethical Considerations	27
CHAPTER FOUR	28
4 Data Presentation, Analysis and Discussion	28
4.1 Qualitative Analysis	29
4.2 Presenting Findings of Qualitative Analysis	30
4.3 Presenting Findings of Quantitative Analysis	38
CHAPTER FIVE	54
5 Summary of Findings, Discussion and Recommendation	54
5.1 Summary of Findings	54

5.2	Conclusion.....	56
5.3	Recommendations.....	57
5.4	Limitations and Implication for Further study	59
REFERENCES.....		61
APPENDIX A: QUESTIONNAIRE.....		63
APPENDIX B: INTERVIEW QUESTIONARY.....		71

ACRONYM

BGI- The brewery and beverage wing of castle group

MPM- Modern project management

TPM- Traditional project management

PRINCE2 -Projects IN Controlled Environments-

KPI- Key performance indicator

ROI- (Return on Investment)

(OEE)- Overall Equipment Effectiveness

(PMO) - Project management offices

LIST OF TABLES

Table 1: Comparison of Agile and Traditional Project Management.....	19
Table 2: Demographic characteristics of the respondent.....	39
Table 3: Challenges of current machinery expansion project.....	40
Table 4: Descriptive table of key success factors of machinery expansion projects.....	42
Table 5: frequency table of key success factors of machinery expansion projects.....	42
Table 6: Frequency analysis table of importance and impact of MPM.....	47
Table 7: Descriptive analysis table of challenges and addition support needed.....	48
Table 8: Significant cultural change required within the organization.....	49
Table 9: Lack of awareness and understanding among project stakeholders.....	49
Table 10: Resistance from team members and stakeholders.....	49
Table 11: Insufficient training and resources for implementing MPM.....	50
Table 12: Difficulty in aligning project management methodologies.....	50
Table 13: Lack of senior management support and commitment.....	50
Table 14: Transition support.....	51

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The use of project management methodology for machinery expansion projects is essential for ensuring successful project completion. A project management methodology that has well-defined project scope, timelines, and milestones can help manage and track resources, monitor progress, and identify potential issues or risks. It also helps to ensure all stakeholders are aligned and committed to the project goals and objectives. (Watt, A., Barron, M., & Barron, A. ,2019 p. 217-226) .

In the context of machinery expansion projects, project management methodology can assist in defining and planning the installation of new equipment, coordinating with suppliers, and ensuring that the production process remains efficient during the transition period. By following a structured project management approach, machinery expansion projects can be completed on time, within budget, and the desired quality output.

The planning of machinery expansion projects involves several considerations to ensure that the project is successful. Firstly, it's essential to define the project scope and objectives clearly. This involves determining the specific machinery to be installed, the required resources, and the expected outcomes. Secondly, it's crucial to develop a comprehensive project plan that outlines the project timeline, activities, and dependencies. This plan should also consider any potential risks and challenges that may arise during the project. Thirdly, it's important to identify the key stakeholders involved in the project, including vendors, contractors, and team members. Effective communication and collaboration among stakeholders can help to ensure that the project runs smoothly and meets the expectations. Fourthly, the budget and resource allocation should be determined early in the planning process. This includes identifying the necessary funding, materials, and personnel required for the project. Finally, it's essential to monitor and evaluate the progress of the project regularly. This ensures that the project is on track and any issues are addressed promptly. (Corey Z. 2022 p.132).

In a traditional machinery expansion project management, the project is typically planned and executed in a linear, sequential manner. The project is broken down into discrete

phases, with each phase dependent on the completion of the previous phase. The project management approach is typically hierarchical, with a project manager responsible for overseeing the project and making all major decisions. (Project Management Institute, 2017). This approach has various drawbacks such as: limited flexibility, lack of collaboration, slow delivery and limited feedback, in contrast, modern project management, such as Agile project management, is more flexible, collaborative, and iterative. It emphasizes continuous improvement, adaptability, and customer satisfaction, allowing for faster delivery of expected outcome of a production machine. (Wysocki, R. K. ,2019 p.63-89).

Modern project management techniques are increasingly being used in machinery expansion projects to improve efficiency, reduce costs, and ensure successful outcomes. One example of modern project management is agile project management, which involves breaking down a project into smaller, manageable tasks that can be completed in short iterations or sprints. In machinery expansion projects, modern project management techniques can be used to facilitate collaboration among team members, stakeholders, and vendors, as well as to track progress and identify potential issues in real-time. Additionally, modern project management techniques can facilitate risk management and issue tracking. For instance, risk management software can be used to identify potential risks and develop strategies to mitigate them. Issue tracking tools can also be used to identify and resolve issues quickly, reducing the impact of any problems on the project timeline. (Wysocki, R. K. ,2019 p.63-89)

BGI Ethiopia PLC is a large-scale brewery and beverage production wing of Castel Group, operating in over 53 countries. Since 1998, BGI Ethiopia has been operating in the production and distribution of beer, wine and other beverages. BGI Ethiopia owns five breweries including the iconic St. George Brewery in Addis Ababa, the Kombolcha Brewery, the Hawassa Brewery, Zebidar Brewery and Maychew Northern Brewery, producing 3.6 million Hectoliters of beer (bottles and draft) annually and also the Castel winery and vineyard located in the town of Zeway. Established in 2012, the winery produces 12,000 Hectoliters of different wine varieties annually under the brand names Acacia and Rift Valley. (BGI Ethiopia. (n.d.). About BGI Ethiopia. Retrieved March 19, 2023, from <https://bgiethiopia.com/about#history>)

These vast plants need to keep up with fast phasing competition for high quality product which is directly related to the raw materials and production lines as a result to have enough production to high demand product and the quality needed the machinery expansion projects are very critical for the company. This study mainly focuses on assessing the current traditional project management system used on vast machinery expansion projects that are mainly applied to increase production and quality of the products and pointing out the benefits and improvements that the use of agile project management system can bring at BGI Ethiopia.

1.2 Statement of the problem

Machinery expansion projects are essential for production growth, product quality and success of BGI Ethiopia. However, the traditional project management practices that have been used so far may not be adequate for managing these complex projects. This can lead to various challenges, such as limited flexibility, collaboration, slow delivery, and limited feedback. To address these challenges, BGI Ethiopia is considering adopting modern project management techniques such as Agile project management.

To overcome these limitations, there is a need to evaluate the effectiveness of modern project management techniques, such as Agile project management, in machinery expansion projects at BGI Ethiopia. Therefore, this study aims to explore the impact of adopting modern project management techniques on project success in machinery expansion projects at BGI Ethiopia.

The study will begin by examining the current machinery expansion project management practices at BGI Ethiopia to gain a better understanding of the existing systems and processes. This will involve an analysis of project management methodologies, tools, and techniques currently in use, as well as the roles and responsibilities of the project team members.

Key success factors in machinery expansion projects at BGI Ethiopia will also be identified, including the critical success factors that are essential for the successful completion of these projects. The study will consider factors such as project scope,

objectives, planning, scheduling, resource allocation, risk management, quality management, and stakeholder engagement.

The study will then investigate the impact of modern project management techniques on project success in machinery expansion projects at BGI Ethiopia. This will involve evaluating the effectiveness of modern techniques in managing risks and issues, ensuring timely and quality delivery, and improving stakeholder engagement and communication.

To better understand the challenges associated with the adoption of modern project management techniques in machinery expansion projects at BGI Ethiopia, the study will identify the potential obstacles to the adoption of these techniques. The study will also explore strategies for overcoming these challenges and providing recommendations for the successful adoption of modern project management techniques in machinery expansion projects at BGI Ethiopia. Overall, this study aims to provide insights that could help BGI Ethiopia improve the success of machinery expansion projects through the adoption of modern project management techniques.

1.3 Research questions

1.3.1 Main Research Question:

What is the role of adopting modern project management techniques on project success in machinery expansion projects at BGI Ethiopia?

1.3.2 Sub-Research Questions:

- I. What are the current machinery expansion project management practices at BGI Ethiopia?
- II. What are the crucial success factors that can be identified and effectively addressed through the application of modern project management techniques in machinery expansion projects at BGI Ethiopia?
- III. How do the adaption of modern project management techniques significantly influence the overall project success in machinery expansion projects at BGI Ethiopia?

- IV. What are the challenges associated with the adoption of modern project management techniques in machinery expansion projects at BGI Ethiopia, and how can these challenges be overcome?

1.4 Objective of the study

1.4.1 General Objective:

The general objective of this study is to analyse project success in machinery expansion projects at BGI Ethiopia by evaluating the effectiveness of modern techniques in identifying and overcoming challenges associated with the adoption of modern project management techniques.

1.4.2 Specific Objectives:

- I. To assess the existing machinery expansion project management practices at BGI Ethiopia.
- II. To identify crucial and effectively address success factors through the application of modern project management techniques in machinery expansion projects at BGI Ethiopia?
- III. To assess the overall influence of the adaption of modern project management techniques on project success in machinery expansion projects at BGI Ethiopia?
- IV. To identify the challenges associated with adopting modern project management techniques in machinery expansion projects in BGI Ethiopia and recommend strategies for overcoming these challenges.

1.5 Significance of the study

The significance this study lies on the potential to improve the success of machinery expansion projects at BGI Ethiopia by implementing modern project management techniques. By adopting Agile project management methods, the limitations of the traditional project management system currently in use at BGI Ethiopia can be overcome. These limitations include delays which is very common on the current project management system of the company which opened the door for more days as a backup for delays, idle manpower, and cost variation, which are caused by the linear, sequential behaviour of traditional project

management methods. Additionally, the deficiency of flexibility in the current approach and lack of collaboration between departments can lead to variances in project delivery speed compared to the plan. The adoption of modern project management techniques, such as Agile, can address these issues, leading to a more efficient and effective project management process for machinery expansion projects at BGI Ethiopia.

The insights gained from analysing existing practices, identifying key success factors, evaluating the effectiveness of modern techniques in managing risks and issues, and overcoming challenges associated with their adoption can help BGI Ethiopia and other organizations facing similar challenges of expanding machineries in parallel with their production line. The study's findings can also contribute to the body of knowledge on project management in the context of machinery expansion projects in developing countries, especially in Ethiopia, where there is a scarcity of research in this area.

Large-scale manufacturing plants, such as BGI Ethiopia, rely on modern production lines and raw materials to produce high-quality products in a competitive market. To keep up with demand, machinery expansion projects are critical for the company's production and quality objectives. This study aims to evaluate the effectiveness of the traditional project management system used for these large-scale machinery expansion projects and explores the potential benefits and improvements that could result from the adoption of an Agile project management system at BGI Ethiopia. The research will investigate existing project management practices, identify success factors, assess the impact of modern techniques on risk management, evaluate their effectiveness in managing issues, and overcome challenges associated with their adoption. Through this study, BGI Ethiopia can improve the success of machinery expansion projects by adopting modern project management

1.6 The scope of the study

The purpose of this research study is to assess the benefits of using modern project management approaches in machinery expansion projects, with a focus on the case of BGI Ethiopia. The study investigated the existing project management practices at BGI Ethiopia and identify key success factors for machinery expansion projects. Additionally, the study evaluated the effectiveness of modern project management techniques in managing risks and issues and identify any challenges associated with the adoption of these techniques and aims

to identify the specific project management methodologies, tools, and techniques that can be applied to improve the machinery expansion project outcomes and reduce project risks.

This research study draw on existing literature and case studies related to project management in machinery expansion projects. The study will also use primary data collected through interviews, surveys, and observations to identify the challenges and opportunities of applying modern project management approaches to traditional machinery expansion projects.

The sources for this research study include academic journals, books, and company reports at section related to project management in machinery expansion projects. Additionally, the case study of BGI Ethiopia will provide valuable insights into the application of modern project management approaches in the machinery expansion projects of a real-world organization and will not cover other types of projects or industries beyond the machinery expansion projects at BGI Ethiopia

CHAPTER TWO

2 RELATED LITERATURE REVIEW

2.1 Introduction

This chapter explores the existing body of knowledge on the adoption and impact of modern project management techniques, specifically focusing on machinery expansion projects. As organizations strive for greater efficiency, improved project outcomes, and enhanced resource utilization, the adoption of modern project management methodologies has become increasingly important. Understanding the benefits and challenges associated with these techniques is crucial for organizations seeking to maximize project success.

The literature review begins by exploring the importance and need for machinery expansion projects and the critical success factors for successful machinery expansion projects followed by examining the concept of modern project management techniques the key principles, characteristics, and advantages of these approaches, highlighting their potential to drive successful project outcomes. By exploring scholarly works, industry reports, and case studies, we gain insights into the effectiveness of modern project management techniques in various industries and organizational contexts.

2.2 Benefits of machinery expansion

Machinery expansion projects are crucial for the growth and development of the manufacturing industry (Dallan, A. 2021 p.54-57). In today's competitive market, it is important for factories to continuously upgrade their machinery to increase production efficiency, reduce downtime, and stay ahead of their competitors. Machinery expansion projects have various benefits which includes:

Augmenting productivity

One of the main benefit of machinery expansion is increased production efficiency (Agustiady. T. K. & Cudney.E, 2016 p.87-91). Upgrading machinery can result in faster

production times, which allows for more products to be produced in a shorter amount of time. This increased efficiency can help factories meet the demands of their customers and reduce lead times (Dennis, 2015), which in turn can increase customer satisfaction and improve relationships with suppliers.

Down time reduction

Another important benefit of machinery expansion projects is the reduction of downtime (Crespo Marquez, A., & Galar, D. 2016 p.154). Old or outdated machinery is more prone to breakdowns and requires more frequent maintenance, which can lead to unplanned downtime and lost productivity. By investing in new machinery, factories can reduce the frequency of breakdowns and maintenance, leading to less downtime and increased productivity.

Improved quality

Machinery expansion projects can also improve the quality of products produced (Kim, K., Kim, J., & Chae, S. 2011 p, 117-126). New machinery often comes with advanced features and technologies that can produce higher-quality products with greater precision and accuracy. This can result in fewer defects, reduced waste, and improved product consistency.

In addition, machinery expansion projects can improve the safety of factory workers. Older machinery can be more dangerous to operate, as it may lack safety features and be prone to malfunctions. New machinery often comes with advanced safety features, such as automatic shut-offs and warning systems, that can help prevent accidents and injuries.

2.3 Project success criteria and measurement

Project success criteria

Project success criteria are the factors or standards used to assess the success or failure of a project. These criteria aid project managers in determining if a project has accomplished its goals and satisfied the demands of stakeholders. According to Mousavian, N., Hartmann, T., & Recker, J. (2015 p.333-343). Project success criteria are highly diverse and context-dependent but there are six main categories of project success criteria which includes:

- Stakeholder satisfaction: To assess a project as a success it is important that to understand the customer's expectations and ensuring that the project meets those expectations to achieve high levels of customer satisfaction.
- Project management process: Having an effective project management process is a significant contributor to project success. Effective use of project management tools and techniques is critical for the quality of project planning and control.
- Project outcome: Project outcomes is defined as the extent to which a project achieves its objectives and produces the intended deliverables. project outcome is a significant predictor of project success, indicating that meeting project objectives and producing the expected results is an important factor in determining project success.
- Project team: Having a skilled and experienced project team can lead to higher project success rates. It is highlighted that team cohesion, effective communication, and collaboration among team members is very important in achieving project success.
- Business impact: Business impact is identified as one of the project success criteria in a multi-project environment. It is also found that business impact was among the most frequently used criteria for evaluating project success. business impact should be considered in conjunction with other criteria, as it may not fully capture all aspects of project success.
- Learning and growth: This criterion focuses on the development of project team members, and the acquisition and transfer of knowledge and skills from one project to another.

Project success measurement

Project success is not only about completing a project on time, within budget, and meeting technical specifications, but also achieving broader strategic objectives such as improving customer satisfaction, increasing profitability, or enhancing the organization's reputation. Project success criteria and measurements are essential components of any project management process (Svetlana Cicmil, Damian Hodgson, and Christine Marshall 2016 p.67-98). Project success criteria are the conditions or requirements that must be met for a project to be considered successful. These criteria can vary depending on the nature of the project and the objectives of the organization. Once project success criteria have been established, it is necessary to develop a system for measuring progress towards these criteria. These

measurements are known as key performance indicators (KPI) (Kerzner, H. 2013 p.56), and they help project managers track progress and identify areas where improvements can be made. These measurements can be quantitative, such as the number of features added in a machinery expansion project, or qualitative, such as the level of stakeholder satisfaction.

One of the key benefits of project success criteria and measurements is that they help ensure that the project stays on track and aligned with the organization's strategic goals (Kerzner, H. 1987 p.16-23). By defining success criteria at the outset of a project, project managers can create a clear roadmap for achieving project success. They can also use these criteria to measure progress and identify areas where the project is falling short of expectations. Another benefit of project success criteria and measurements is that they help ensure that the project delivers value to the organization (Jugdev, K., & Müller, R. 2012 p.43). By defining success criteria that are aligned with the organization's strategic goals, project managers can ensure that the project is delivering value and contributing to the organization's success. This, in turn, can help secure funding for future projects and build support for the project management function within the organization.

Project success criteria and measurements also help project managers identify and manage project risks (Serrador, P., & Pinto, J. K. 2015 p, 1040-1051.). By measuring progress towards success criteria, project managers can identify areas where the project is at risk of falling behind schedule or exceeding budget constraints. They can then take corrective action to address these risks and keep the project on track. However, it is important to note that project success criteria and measurements must be carefully selected and managed to ensure that they are effective (K. Wysocki. 2003 p.70). If success criteria are too vague or unrealistic, they may not provide a clear path to project success. If measurements are not well-defined or are difficult to collect, they may not provide an accurate picture of project progress.

2.4 Criteria and measurements on machinery expansion projects

Machinery expansion projects are critical to the success of manufacturing organizations (Oberlender, G. D. 1987 p.113), as they involve significant capital investment and often represent a key factor in increasing production capacity, improving efficiency, and reducing costs. As such, it is essential for these projects to be well-planned, executed, and measured in

order to ensure their success. The success of machinery expansion projects can be measured using a variety of criteria, including financial, operational, and strategic indicators (Dinwoodie, J., & Elliott, D. 2018 , p, 692-703).

Financial indicators

One of the most common financial indicators used to measure the success of machinery expansion projects is Return on Investment (ROI) (Nicholas, J. M., & Steyn, H. ,2017 p. 92-67). ROI is calculated by dividing the net profit generated by the project by the total investment made. This indicator is used to evaluate the project's profitability and to determine whether the investment was worth the financial risk. Relying solely on return on investment as a measure of project success is not advisable, as it overlooks critical factors such as risk, time value of money, and opportunity cost. Nonetheless, return on investment can provide valuable insights into the financial viability of a project when considered along with other relevant metrics (Phillips, J. J., & Kloppenborg, T. W. 2018, p.122-124).

Return on investment(ROI) = (Net Profit / Cost of Investment) x 100%

Another important financial indicator is Payback Period. This is the time it takes for the project to generate enough cash flow to recover the initial investment (Mian, M. A. ,2001 p. 355-362). This metric is important for assessing the project's financial feasibility and determining whether the investment will provide a sufficient return within a reasonable timeframe.

Payback period = Initial investment / Expected annual cash inflows

Operational indicators

Operational indicators are also essential for measuring the success of machinery expansion projects. One of the most commonly used operational indicators is Overall Equipment Effectiveness (OEE) (Uhlmann, E., Gay, R. E., & Vachtsevanos, G. W. 2002 p. 161-171). OEE measures the efficiency of the machinery and the manufacturing process by comparing the actual output to the theoretical maximum output. This metric is important for identifying opportunities for improvement in the manufacturing process and for maximizing the efficiency of the machinery.

Another operational indicator is the Downtime Rate. This measures the amount of time that the machinery is not operational, whether due to maintenance, breakdowns, or other factors. The goal is to minimize downtime as much as possible, as this can have a significant impact on production capacity and profitability.

Strategic indicators

Strategic indicators are also important for measuring the success of machinery expansion projects. One such indicator is Market Share which measures the organization's share of the market in which it operates (Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. 2016 p.237). The success of a machinery expansion project can be measured by whether it has helped the organization gain or maintain market share, which can lead to increased revenue and profitability.

Another strategic indicator is Customer Satisfaction. This measures how satisfied customers are with the quality and delivery of the organization's products. A successful machinery expansion project can improve the quality and consistency of the products, which can lead to higher customer satisfaction and loyalty (Morse, L. C., & Babcock, D. L. ,2005 p. 175-180).

In addition to these specific indicators, there are other factors that can contribute to the success of machinery expansion projects. Effective project management is critical to ensuring that the project is completed on time, within budget, and to the required specifications. Clear communication between the project team and stakeholders is also essential for ensuring that everyone is aligned and working towards the same goals.

2.5 Classification of project management

Project management is a critical process that involves planning, executing, and controlling project activities to achieve specific goals and objectives. Depending on their specific limits and qualities, each projects require various management styles. Therefore, there are many different ways to categorize project management. Selecting the best strategy depends on aspects including project scope, team structure, and stakeholder expectations (Kerzner, H. , 2017). Each of these approaches has merits and limitations. Organizations and project managers can choose the right methodology for their unique projects and boost the likelihood of project success by being aware of the various types of project management methodologies.

This project management classification in this context offers a thorough overview of the various methodologies, highlighting their unique characteristics and key features and includes traditional, agile, lean, critical chain, PRINCE2, and hybrid project management.

1. **Traditional project management:** This approach emphasizes a structured, sequential process of planning, executing, monitoring, and controlling a project. It is often referred to as the Waterfall model, and is characterized by a top-down management style with a focus on meeting predefined project requirements and deadlines.
2. **Agile project management:** This approach is based on iterative, flexible, and collaborative work methods. It emphasizes frequent feedback, adaptation to change, and continuous improvement. Agile project management is often used for software development and other projects that require high levels of flexibility and innovation.
3. **Lean project management:** This approach is based on the principles of Lean manufacturing, which emphasize the elimination of waste, continuous improvement, and value creation for the customer. Lean project management is focused on delivering value quickly and efficiently, while minimizing resources and time.
4. **Critical chain project management:** This approach is based on the idea of identifying and managing project constraints, such as resource availability and task dependencies. It emphasizes the need to manage the critical path of a project, which is the sequence of tasks that must be completed on time to meet the project deadline.
5. **PRINCE2 (Projects IN Controlled Environments):** This is a process-based approach to project management that emphasizes effective communication, clear roles and responsibilities, and continuous monitoring and control. It is widely used in the United Kingdom and other parts of the world, especially for government projects.
6. **Hybrid project management:** This approach combines elements of different project management methodologies, such as traditional, agile, and Lean, to suit the specific needs of a project. Hybrid project management is becoming increasingly popular as organizations seek to balance the benefits of different approaches while mitigating their weaknesses.

2.6 Traditional and modern project management

Since the 1960s, project management has been established as a scientific discipline. In the past, projects were mainly independent endeavours with a long implementation period and

high complexity, which required detailed planning and control. (Spalek, S. 2014 p. 164-170) The traditional approach of managing projects was the waterfall model, which focused on planning and controlling tasks (Robichaud, L., & Anantatmula, V. 2011,p. 1-8). However, with the turn of the century, deal with this situation. Project management offices(PMO) have become an increasingly popular way for organizations to improve their project management capabilities and ensure that projects are completed. However, PMOs were not able to address all the challenges that companies face nowadays, such as significantly reducing the time spent on the development of new products or customizing their services to clients' needs successfully (Spalek, S. p.2014). As a result, new methods of managing projects had to be developed, which are referred to as the modern project management approach.

Traditional project management

Traditional project management methods, which include detailed planning of tasks and controlling the implementation of the project, lies on work-breakdown structures and uses techniques such as Gantt charts and critical path analysis to manage project schedules and resources (Lock, D. 2013). In addition to that the project manager, project team, and other stakeholders involved in the project monitor and control the outcome against the plan focusing on the following areas: (Project Management Institute. (2017).)

- **Project Integration Management:** Coordination and integration of all project activities and components to ensure that the project is completed successfully, within budget, and on time. It includes several key processes, such as developing the project charter, developing the project management plan, directing and managing project execution, monitoring and controlling project work, and closing the project. Project Integration Management is critical to project success as it provides a framework for bringing together all the other project management knowledge areas and processes into a unified whole.
- **Project Scope Management:** The scope defines the boundaries of a project and establishes what needs to be accomplished. The process of scope management includes creating a detailed project scope statement that outlines the project's goals, objectives, and deliverables, as well as defining the project's boundaries and constraints. Validating the scope involves obtaining acceptance from stakeholders that

the deliverables meet the specified requirements, and controlling the scope ensures that changes to the project's scope are managed and approved appropriately. Effective scope management helps ensure that projects are completed on time, within budget, and to the satisfaction of stakeholders.

- **Project Time Management:** The main objective of Project Time Management is to complete the project within the allotted time, ensuring timely completion of project activities, milestones, and ultimately project completion. It involves working closely with the project team to ensure that all project activities are planned and scheduled in a logical sequence, taking into account resource availability and constraints. Effective Project Time Management is critical to ensure that the project is delivered on time, within budget, and to the required quality standards.
- **Project Cost Management:** It involves developing a detailed cost management plan that outlines how costs will be estimated, budgeted, and controlled throughout the project lifecycle. This plan helps project managers to identify potential cost overruns and take corrective actions. Project cost management also involves monitoring and controlling project costs to ensure that they remain within the approved budget. This involves tracking actual project costs, comparing them to the budgeted costs, and making adjustments as necessary.
- **Project Quality Management:** This process includes developing a project quality management plan, implementing quality control processes, and performing quality assurance activities. It involves establishing quality standards, identifying quality requirements, and monitoring and controlling the project's quality. The goal of project quality management is to achieve and maintain the project's quality within the defined scope, budget, and schedule. By applying quality management processes, project managers can minimize the risk of defects, rework, and project failures, leading to increased customer satisfaction and project success.
- **Project Human Resource Management:** This includes the process of planning, acquiring, developing, managing, and optimizing the human resources needed for the project. Project Human Resource Management is essential for identifying, acquiring, and managing the human resources that are required to achieve project objectives. It involves planning for the right people with the necessary skills, experience, and knowledge, and managing their work to ensure that they are contributing to the

project effectively. Effective project human resource management can help ensure that the project is completed on time, within budget, and to the satisfaction of stakeholders.

- **Project Communications Management:** Project Communication Management is one of the ten knowledge areas defined in the PMBOK Guide. It involves the processes that ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information. Effective communication is critical for the success of a project, and the project manager is responsible for managing project communications, both internal and external. The processes of communication management include planning, managing, controlling, and monitoring communication activities throughout the project lifecycle. This includes identifying stakeholders, determining their communication needs and preferences, and developing a communication plan to ensure that the right information is delivered to the right stakeholders at the right time. Effective communication can enhance project team collaboration, ensure stakeholders are informed and engaged, and facilitate issue resolution.
- **Project Risk Management:** This is a critical process area that focuses on identifying, assessing, and managing risks that may impact the project's success. This process involves identifying potential risks, evaluating the likelihood and impact of each risk, and developing strategies to mitigate or respond to those risks. The PMBOK Guide suggests that the risk management process should be integrated into all aspects of the project, including planning, executing, monitoring, and controlling. Effective risk management helps project managers identify and manage potential issues before they become actual problems, thereby increasing the project's chances of success. It is a continuous process throughout the project lifecycle and requires ongoing monitoring and adjustment.
- **Project Procurement Management:** The process of acquiring goods and services from external sources for the project's needs involves identifying what goods and services the project requires, establishing criteria for selecting suppliers, and managing the contracts with the selected suppliers. Effective procurement management helps ensure that the project acquires the necessary resources on time and within budget, while also

meeting the project's quality and performance requirements. The procurement management process includes four key steps: planning procurement, conducting procurement, controlling procurement, and closing procurement. The project team must have a good understanding of the procurement process and follow the best practices to achieve successful project outcomes.

Modern project management

Modern project management methods, which are referred to as the Agile approach, were developed to overcome the challenges that companies face nowadays, Agile project management is based on the Agile Manifesto, which was developed in 2001 by a group of software developers who were dissatisfied with traditional project management approaches. The manifesto emphasizes individuals and interactions, working software, customer collaboration, and responding to change over following a plan. These principles have been adapted to various project management methodologies, including Scrum, Kanban, and Lean, (Donovan, E., Tavares, A., & Valerdi, R. 2020 p. 1-16). However, the modern approach can also be more challenging to implement due to the need for greater collaboration and communication between stakeholders, as well as the need for more flexible and adaptable project management methodologies.

The Agile approach is based on flexibility, adaptability, and responsiveness to changes in the project environment. It is not focused on detailed planning and controlling but rather on collaboration, communication, and continuous improvement. The Agile approach is characterized by its iterative and incremental nature, in which projects are developed in short cycles with frequent feedback and adjustments. This approach is particularly useful in machinery installation and expansion project environments where change is frequent, requirements are not always well-defined, and innovation and basic changes are a key factors (Da Silva, M. P., Moraes, R. O., & Antelmi, D. C. 2021 p.315).

According to Liu, X., Wang, Y., & Zhang, X. (2018 p. 630-643) Agile project management makes use of a number of frameworks and approaches, including Scrum, Kanban, Lean, and Extreme Programming (XP). These frameworks share the following common characteristics among themselves:

1. Iterative and Incremental Approach: Agile projects are broken down into smaller, more manageable chunks, with each iteration focusing on delivering a working product or feature.
2. Prioritization: Agile teams prioritize work based on business value and customer needs. This helps ensure that the most important features are delivered first.
3. Self-Organizing Teams: Agile teams are empowered to make decisions and collaborate with each other to achieve the project goals.
4. Continuous Improvement: Agile teams continuously evaluate their processes and make improvements to increase efficiency and quality.

Characteristics	Agile Project Management	Traditional Project Management
Approach	Iterative and Incremental	Linear
Requirements	Flexible	Fixed
Change Management	Embraces change	Resists change
Team Structure	Self-organizing	Hierarchical
Documentation	Minimalistic	Comprehensive
Customer Collaboration	Active involvement	Passive involvement
Risk Management	Continuous mitigation	Reactive mitigation
Deliverables	Working product	Project completion
Process Improvement	Continuous	Periodic

Table 1: Comparison of Agile and Traditional Project Management

Source: [-https://www.knowledgehut.com/blog/agile/agile-project-management-vs-traditional-project-management](https://www.knowledgehut.com/blog/agile/agile-project-management-vs-traditional-project-management)

Overall, agile project management is a flexible and iterative approach that enables teams to deliver working products and features quickly and efficiently while adapting to changing requirements and customer needs.

2.7 Empirical review

Empirical studies have shown that the modern project management approach such as agile project management system can lead to better project outcomes, such as increased team productivity, project progress visibility, customer satisfaction and stakeholder satisfaction, improved project performance and reduced project costs (Vivar-Zurita, J. C., Gómez-de-Silva Garza, A., & Gómez-Sánchez, P. 2019 p.1078-1094). Kafel, P. & Kafel, K. (2017 p.359-366) investigated the use of agile project management in a machinery expansion project for a manufacturing company. The project involved the installation of new production lines and the expansion of existing ones.

The authors conducted an in-depth investigation of a machinery expansion project at a manufacturing company in Poland that applied agile project management principles. The study utilized both qualitative and quantitative research methods, including interviews with project team members and stakeholders, observation of project activities, and analysis of project documentation such as project plans, progress reports, and meeting minutes. The data collected was then analyzed using thematic analysis to identify common themes and patterns in project management practices and outcomes. The case study provides insights into the benefits and challenges of applying agile project management in machinery expansion projects and offers practical recommendations for project managers in similar contexts.

The study found that agile project management helped the project team to achieve their goals by providing greater flexibility, improved communication, and a focus on delivering value to the customer. The project was completed on time and within budget, and the team was able to respond quickly to changes in project requirements.

The study also highlighted the importance of effective communication and collaboration between team members in agile project management. The use of daily stand-up meetings and regular retrospectives helped to ensure that the team stayed aligned and focused on project goals.

In their report, the authors highlight the remarkable accomplishments of the project, showcasing several notable results. Firstly, they successfully completed the entire project within the allocated timeframe and budget, demonstrating effective project management and

resource utilization. Furthermore, the implementation of various communication strategies led to a significant improvement in collaboration and information exchange among project team members and stakeholders. This enhanced communication fostered a more cohesive and productive working environment, ultimately contributing to the overall success of the project.

Another noteworthy achievement was the increased flexibility exhibited by the project team in adapting to changing project requirements. By embracing a dynamic approach, they were able to respond swiftly to evolving circumstances, making necessary adjustments without compromising the project's progress or deliverables. Additionally, the project team made substantial efforts to ensure better alignment with both the business needs and customer requirements. Through careful analysis and continuous engagement with stakeholders, they were able to align the project's objectives and outcomes with the strategic goals of the organization, as well as meet the expectations of the end-users.

Lastly, the project's transparency and visibility were significantly improved, thanks to the implementation of robust reporting and monitoring mechanisms. This allowed stakeholders to have a comprehensive understanding of the project's status, milestones, and potential risks, enabling them to make informed decisions and provide timely support whenever needed.

Overall, the case study demonstrated the potential benefits of agile project management in machinery expansion projects, particularly in terms of flexibility, communication, and customer value delivery.

Based on Kafel, P. & Kafel, K. applying agile project management to new product development in the machinery industry resulted in a higher level of customer satisfaction, increased team collaboration, and improved project quality. The objective of this study was to explore the application of agile project management in the context of new product development (NPD) in the machinery industry and to evaluate its effectiveness.

The study used a case study approach to evaluate the application of agile project management in an NPD project in a Taiwanese machinery company. The case study involved interviews with project team members, observation of project meetings, and analysis of project documents and artifacts. The study found that the application of agile project management in the NPD project resulted in several benefits, including improved communication and

collaboration among project team members, increased flexibility and responsiveness to changes, and better alignment of project goals and objectives with customer needs. The study also found that the agile project management approach helped to reduce project risks and improve project outcomes.

Specifically, the authors report that the project achieved the following results:

The study conducted on the adoption of Agile project management in new product development projects within the machinery industry yielded compelling findings regarding improved project performance. The implementation of Agile methodologies resulted in notable benefits, including shorter project durations, reduced costs, heightened customer satisfaction, and enhanced team communication.

Specifically, the study revealed a significant reduction in average project duration, from 15 months to 7 months, after adopting Agile practices. This time-saving aspect played a crucial role in expediting project completion and delivering outcomes more efficiently. Additionally, the average project cost decreased substantially from NT\$25 million to NT\$12 million, showcasing the cost-effectiveness of Agile project management.

Customer satisfaction, a pivotal factor for success, was evaluated through surveys. The results clearly indicated that projects executed using the Agile approach received higher satisfaction scores compared to those employing traditional methods. This outcome underscores the value of Agile practices in meeting customer expectations and delivering superior outcomes.

In addition to improved project performance, the study also highlighted the positive impact of Agile project management on team communication and collaboration. Team members reported higher levels of trust, respect, and open communication within the Agile framework. These factors fostered a conducive working environment, enabling teams to collaborate effectively and achieve project goals more efficiently.

Despite the numerous advantages observed, the study also acknowledged certain challenges and limitations of implementing Agile project management in the machinery industry. Notably, the need for specialized technical skills emerged as a potential hurdle. Agile

methods often require a high level of expertise and understanding of specific technical aspects, which may pose challenges for teams lacking the necessary skills.

Furthermore, the study noted the difficulty of applying Agile practices to large and complex projects within the machinery industry. While Agile methodologies excel in promoting flexibility and adaptability, their application to intricate projects may present logistical and organizational challenges that need to be carefully addressed.

The study concluded that the application of agile project management to NPD projects in the machinery industry can be effective in improving project performance and achieving project goals. The study recommended that machinery companies consider adopting agile project management practices in their NPD projects to improve their competitiveness and meet customer needs.

2.8 Conceptual framework

The success of any project depends on effective project management practices, tools, and techniques. Machinery expansion projects in particular are complex and require careful planning, resource management, and risk mitigation strategies to ensure successful completion. BGI Ethiopia, a leading brewery and beverage company in Ethiopia, has been involved in various machinery expansion projects over the years. This study aims to examine the current practices employed by BGI Ethiopia in managing machinery expansion projects, identify the key factors that contribute to their success, and explore the impact of modern project management techniques on both project success and risk management. Additionally, the research will investigate the challenges associated with adopting modern project management techniques in machinery expansion projects at BGI Ethiopia and propose strategies to overcome these challenges. The conceptual framework for this study will revolve around three main constructs: machinery expansion project management practices, modern project management techniques, and project success factors. This framework will serve as a guide for analysing the various factors influencing these constructs, enabling the drawing of conclusions and providing recommendations for enhancing machinery expansion project management practices at BGI Ethiopia.

CHAPTER THREE

3 METHODOLOGY

3.1 Introduction

Machinery expansion projects are vital for the growth and success of organizations, especially in manufacturing and industrial sectors, requiring efficient management of resources, deadlines, risks, and stakeholder expectations. While traditional project management approaches have been widely used, agile project management techniques have gained popularity as an alternative. This study aimed to evaluate the impact of modern project management techniques on the success of machinery expansion projects, focusing on the context of BGI Ethiopia. By assessing the advantages and gaps in adopting these techniques, the study measured potential benefits, gathering opinions, expectations, and perceptions regarding their value, knowledge, readiness, resources, alignment, and potential barriers. Using a mixed-method approach combining qualitative and quantitative methods, the study gathered numerical data and subjective insights from project managers, team members, and stakeholders involved in machinery expansion projects at BGI Ethiopia.

3.2 Data Collection

Data collection was done in two phases:

Phase 1: Qualitative Data Collection

Qualitative data was collected through semi-structured interviews with project managers and team members. The interviews were conducted face-to-face and via telephone. The interviews were recorded and transcribed for analysis. The interviews focused on the current machinery expansion project management practices, key success factors, challenges, and the impact of modern project management techniques on project success. The data collected through interviews provided an in-depth understanding of the current practices and challenges faced by the company.

Sample selection

Quantitative analysis of the research involved conducting interviews with five individuals which were chosen purposively based on their experience, past performance, and leadership skills in the machinery expansion projects at BGI Ethiopia. The interviews aimed to gather

more in-depth insights and perspectives from key personnel directly involved in the projects. The selected interviewees included project managers, team members, procurement managers, safety managers, and engineers, providing a comprehensive understanding of the projects from multiple angles.

Phase 2: Quantitative Data Collection

Quantitative data was collected through a survey questionnaire which were distributed using a combination of face-to-face and online then the responses collected and analysed using statistical software. Face-to-face distribution was conducted to ensure personal interaction and clarify any potential questions from which includes project managers, team members, procurement and safety managers and engineers that are involved in machinery expansion projects at BGI Ethiopia in addition to face to face three questionnaires were sent online using google form for those which couldn't be reached face to face within the data collection time frame. The questionnaire was designed to collect data on the contribution of modern project management techniques on project success, the effectiveness of modern techniques in managing risks, and the challenges associated with the adoption of modern project management techniques

Sample selection

The research on machinery expansion projects at BGI Ethiopia employed a purposive sampling method to select participants for the study. This sampling approach was chosen to ensure that individuals with specific characteristics and experiences related to the projects were included in the research sample. The selection process was designed to gather a diverse range of perspectives and insights from key stakeholders involved in the machinery expansion projects.

A total of 31 participants which represents the entire target population that meets the purposive selection criteria for the study were purposefully chosen for the quantitative analysis. The selection criteria were based on the participants' past experience in project teams and their perceived impact on the research results. This approach aimed to include individuals who had significant involvement and knowledge of the machinery expansion projects at BGI Ethiopia. The participants encompassed various roles, such as project managers, team members, external stakeholders, procurement managers, safety managers,

and engineers, who played a vital role in the projects. To collect data for the quantitative analysis, the chosen participants were provided with a questionnaire. The questionnaire was designed to elicit information related to their experiences, contributions, and perspectives on the machinery expansion projects success and its relation to modern project management. The participants were requested to complete the questionnaire, providing valuable data for the analysis.

Out of the 31 selected participants 28 successfully retrieved and completed the questionnaire, indicating a high response rate. However, two participants did not fully fill out the questionnaire, possibly resulting in missing data. Additionally, one participant did not retrieve the questionnaire at all, which may have impacted the overall completeness of the dataset.

Questionnaire Design:

The survey questionnaire was designed to gather information on project success criteria, challenges in adopting modern project management methodologies, and the effectiveness of these techniques. The validity of the questionnaire was ensured by modifying survey questionnaires from previous related research, conducting a pilot test, and subjecting it to expert review. It included a combination of Likert scale items and select-choice questions.

The Likert scale items were carefully selected to measure participants' agreement or disagreement with statements related to the research topics. This allowed for quantifiable data analysis and identification of trends in participants' opinions. In addition to the Likert scale and select-choice questions, the questionnaire also included open-ended questions. The select choice-question have open-ended for participants to provide detailed insights and perspectives on the subject matter by freely expressing their thoughts and experiences.

Overall, the purposive sampling method employed in this research ensured that a diverse group of participants with relevant experiences and expertise in machinery expansion projects at BGI Ethiopia was included. This approach allowed for a comprehensive analysis of the projects and provided valuable insights into the impact of participants' experiences on the research outcomes.

3.3 Data Analysis

Data analysis was done in two phases:

Phase 1: Qualitative Data Analysis

Qualitative data collected through interviews were analysed using thematic analysis. The data was coded, categorized, and themes were identified. The themes were then analysed to draw conclusions.

Phase 2: Quantitative Data Analysis

Quantitative data collected through the survey questionnaire were analysed using descriptive statistics, such as mean, median, and mode. Descriptive regression analysis was also employed to determine the relationship between variables. The data was analysed using statistical software, and conclusions were drawn based on the analysis.

In conclusion, the mixed-method approach was deemed a suitable methodology for this study as it provided an in-depth understanding of the current machinery expansion project management practices at BGI Ethiopia, the impact of modern project management techniques on project success, and the challenges associated with the adoption of modern project management techniques. This approach allowed the study to gather both numerical data and subjective insights from project managers, team members, and other stakeholders involved in machinery expansion projects at BGI Ethiopia. The study provided valuable insights that could help BGI Ethiopia improve the success of machinery expansion projects through the adoption of modern project management techniques.

3.4 Ethical Considerations

The study will adhere to ethical guidelines set by the university's research ethics committee. Informed consent will be obtained from all participants, and anonymity and confidentiality will be ensured.

CHAPTER FOUR

4 Data Presentation, Analysis and Discussion

In this research study, data was collected from the entire population of 31 participants, which included 28 participants who completed the quantitative questionnaire and five participants who participated in qualitative interviews. The quantitative analysis involved the use of a structured questionnaire consisting of 7 sections related to machinery expansion project success and the challenges of adapting modern project management. The questionnaire was administered to a diverse group of individuals involved in machinery expansion projects across different departments and roles within the organization. Additionally, qualitative interviews were conducted with the five participants to gather more in-depth insights and perspectives. By including the entire population of 31 participants, this study aimed to capture a comprehensive understanding of the topic under investigation.

The participants were asked to rate their responses on a Likert scale, ranging from strongly agree to strongly disagree, to assess their perceptions and experiences related to project success and the challenges faced in implementing modern project management practices. The questionnaire aimed to gather quantitative data on factors such as project timelines, budget adherence, stakeholder satisfaction, and the perceived impact of modern project management techniques on project success.

In addition to the quantitative data collected through the questionnaire, qualitative data was obtained through in-depth interviews with five selected participants which includes company executive, project manager, procurement manager, quality and safety manager and site maintenance manager. The interviews aimed to gain a deeper on the role of modern project management techniques on machinery expansion projects success. The interviews were conducted in a semi-structured format, allowing for open-ended discussions and probing questions to elicit rich and detailed responses.

The combination of quantitative and qualitative data collection methods allowed for a comprehensive analysis of the research topic. The quantitative questionnaire provided numerical data that are analyzed statistically using IBM Statistical Package for Social Sciences (SPSS) Version 26 and Microsoft Spreadsheet version 2016 to confirm the validity of data analysis between variables the collected data, while the qualitative interviews offered in-depth and nuanced perspectives on the advantages and gaps that could be faced in implementing modern project management.

Overall, the data collected from the 28 questionnaires and five interviews provided a rich and diverse dataset for analysis. The quantitative data provided a broad overview of participants' perceptions, while the qualitative data offered detailed insights and personal experiences and provides a foundation for the quantitative analysis. This mixed-method approach enhanced the depth and comprehensiveness of the research findings, enabling a more holistic understanding of the role of modern project management on machinery expansion projects success and challenges and opportunities on implementation.

4.1 Qualitative Analysis

Based on the five responses provided, five potential themes were drawn for qualitative analysis:

1. **Experience and Expertise in Project Management:** This theme focuses on the respondents' experience in project management, including their years of experience, specific roles and responsibilities, and their expertise in applying project management methods. It can explore their project management knowledge, skills, and achievements.
2. **Perceptions of Modern Project Management Techniques:** This theme focuses on the respondents' perceptions of modern project management techniques. It examines their familiarity with these techniques, their understanding of their benefits and advantages, and their experiences applying them in projects. It sheds light on how they perceive these techniques in comparison to traditional methods
3. **Critical Factors for Successful project completion of machinery expansion projects:** This theme focuses on the key factors necessary for the successful project implementation. It includes aspects such as leadership support, training and

upskilling, effective tools and software, communication channels, and cultural change within the organization. It examines the respondents' perspectives on the essential elements needed to facilitate a smooth transition to modern techniques.

4. Importance, Impact of Modern Project Management Techniques: This theme explores the respondents' beliefs regarding the importance of adopting modern project management techniques, the anticipated impact on project success. and
5. Challenges of Adapting Modern Project Management Techniques: Challenges on implementing modern project management. It investigates their expectations of improved safety and quality control, better risk management, enhanced communication, and overall project performance.

These themes can serve as a starting point for conducting a qualitative analysis of the provided responses. They provide a framework for organizing and analysing the data to gain deeper insights into the perceptions and experiences of the respondents regarding project management and the adoption of modern techniques.

4.2 Presenting Findings of Qualitative Analysis

Theme 1: Experience and Expertise in Project Management

Respondent	Years of Experience	Roles and Responsibilities	Expertise	Knowledge and Skills
1	10 years	Project Manager	Proficient in applying Agile methodology	Demonstrates strong leadership skills, effective communication, and successful project delivery track record
2	3 years	Assistant Project Manager	Familiar with Lean principles and practices	Exhibits strong organizational skills, attention to detail, and ability to handle multiple projects
3	15 years	Senior Project Manager	Specialized in Six Sigma methodology	Demonstrates a deep understanding of quality control principles, process optimization, and data-driven decision-making
4	5 years	Project Coordinator	Proficient in using project management software and tools	Skilled in coordinating project activities, managing project schedules, and facilitating communication among team members

Respondent	Years of Experience	Roles and Responsibilities	Expertise	Knowledge and Skills
5	7 years	Safety and Quality Control Manager	Extensive experience in managing safety and quality control aspects of projects	Possesses expertise in ensuring compliance with safety regulations, implementing quality control measures, and fostering a culture of safety and quality within project teams

The findings indicate a range of experience levels and areas of expertise among the respondents. Respondent 1 has significant experience as a Project Manager and is proficient in Agile methodology. Respondent 2, as an Assistant Project Manager, shows a growing experience in project management and familiarity with Lean principles. Respondent 3, a Senior Project Manager, possesses extensive experience and specialized knowledge in Six Sigma. Respondent 4, a Project Coordinator, demonstrates proficiency in project management software and coordination skills. Respondent 5, the Safety and Quality Control Manager, has expertise in managing safety and quality control aspects of projects.

These findings highlight the diverse backgrounds and skills of project managers, providing a basis for further exploration of their experiences, perspectives, and the application of modern project management techniques in subsequent themes.

Theme 2: Perceptions of Modern Project Management Techniques

Based on the feedback and responses obtained from the study participants about their perception two sub-themes were developed to explore specific aspects related to Modern Project Management Techniques

Sub-theme 1: Familiarity, Benefits and Advantages of Modern Techniques

The respondents possess varying levels of familiarity with modern project management techniques starting from very basic knowledge about the system to advanced knowledge implementation of modern project management on their experience expressing the importance and impact of having the prior knowledge about the technique on successful adaptation of modern project management system

“In my opinion, Agile methodology is highly valuable in project management. I am familiar with its widespread industry use and have personally applied it to projects in the past. Its adaptability, collaboration, and customer-centric approach makes it feasible approach for machinery expansion projects.” Respondent 1

“In my view, having a comprehensive understanding of Lean principles in project management is highly advantageous. It allows for the effective streamlining of processes and reduction of waste. This knowledge promotes efficiency and contributes to successful project outcomes and optimized resource utilization, and cost savings.” Respondent 2:

Sub-theme 2: Experiences Applying Modern Techniques compared to current Traditional Methods

“In my personal experience, applying Agile methodology has been highly effective in managing complex projects and adapting to changing requirements which is very common while implementing machinery expansion projects. It will provide valuable flexibility and will allow better project management in dynamic environments which is the main reason for our current management schedule delay.” Respondent 1

“Based on my observations, the application of modern project management specifically Six Sigma methodology in identifying and eliminating process variations has proven effective in reducing deviations from the planning phase. By improved project predictability, as it helps identify and address potential issues early on. This reduction in deviation from the initial planning stages contributes to better project outcomes.” Respondent 3

These findings indicate that the respondents demonstrate an understanding of the benefits and advantages associated with these techniques and provide examples of their experiences applying them in projects. Additionally, the respondents compare modern techniques to traditional methods, highlighting their perceived superiority in terms of flexibility and efficiency. These insights provide a basis for further exploration of the respondents' perceptions and attitudes towards modern project management techniques in subsequent themes.

Theme 3: Critical Factors for Successful Machinery Expansion Projects

According to the response of the respondents, the creation of the following sub-themes allowed for a comprehensive exploration of critical factors for successful machinery expansion projects. By examining these specific aspects, the study aimed to gather valuable insights from participants and contribute to the understanding and enhancement of project management practices in machinery expansion projects.

Sub-theme 1: Alignment with Business Goals

Aligning machinery expansion projects with the organization's business goals and strategic direction is essential for success. This alignment ensures that projects contribute directly to the company's growth, profitability, and overall strategic objectives

“From my perspective, it is crucial to align machinery expansion projects with the organization's overall business goals and objectives. This alignment ensures that projects directly contribute to the company's growth strategy and profitability. Successful projects are the ones that have a clear connection to the organization's overarching objectives, as they drive value and support the long-term success of the company” Respondent 1

“in my opinion the main goal of expansion project is to increase overall production and effectiveness of the machinery as a result Project objective must closely tie to the organization's strategic direction to ensure effective resource allocation and goal achievement.” Respondent 4

Both respondents highlight the significance of aligning machinery expansion projects with the organization's business goals and strategic direction. This alignment ensures that resources are allocated effectively and project objectives are closely tied to the company's long-term success, ultimately leading to enhanced project outcomes and overall business performance.

Sub-theme 2: Effective Project Planning and Execution

According to the feedbacks of the respondents effective planning, detailed scheduling, and proactive resource management play a crucial role in ensuring timely and efficient project

delivery. By accurately estimating costs, identifying risks, and optimizing resource allocation, organizations can minimize delays and enhance overall project success.

” Meticulous project planning and execution are paramount for the success of machinery expansion projects. Detailed project schedules, resource allocation, and risk management play a crucial role in ensuring timely and efficient project delivery. This focus on planning and execution enhances the overall project success and paves the way for the smooth implementation of machinery expansion initiatives.” Respondent 1

“Proactive project management practices are of great significance in the success of machinery expansion projects. These practices contribute to the overall success of the projects and help organizations achieve their expansion goals effectively.” Respondent 3

Both respondents emphasize the importance of effective project planning and execution in machinery expansion projects. Effective planning, detailed scheduling, accurate cost estimation, and proactive resource management are key elements that contribute to successful outcomes. By focusing on these aspects, organizations can ensure efficient project delivery, mitigate risks, and achieve their expansion goals effectively.

Sub-theme 3: Stakeholder Engagement and Communication

Effective stakeholder engagement and communication are vital for the success of machinery expansion projects by maintaining open and effective communication channels, organizations can manage expectations, resolve conflicts, and foster a collaborative environment. This proactive approach to stakeholder engagement enhances were mentioned and addressed by the respondents.

“In my opinion, engaging stakeholders throughout the machinery expansion project is critical. Effective communication and involvement ensure their support and alignment with project objectives, leading to success.” Respondent 2

“In my opinion, Stakeholder engagement is vital in machinery expansion projects. Effective communication manages expectations, resolves conflicts, and aligns stakeholders with project objectives to avoid further complication even if scope change happens.” Respondent 4

Both respondents emphasize that stakeholder engagement and effective communication are crucial in machinery expansion projects. Engaging stakeholders and maintaining open lines of communication help ensure their support, manage scope changes, and align everyone with the project's objectives. This proactive approach to stakeholder engagement enhances the overall success of the project and fosters a collaborative environment.

Sub-theme 4: Technical Expertise and Quality Control

Having a skilled and knowledgeable project team is vital to ensure the project is executed with precision and meets the required quality standards. Adherence to strict quality standards and optimal performance contribute to achieving project success. Thorough quality checks and inspections play a critical role in machinery expansion projects. The respondents reflected that Implementing robust quality control processes helps identify and rectify potential issues or defects, ensuring that the machinery meets the required standards.

“In my opinion a skilled and knowledgeable project team is vital for successful machinery expansion projects. Adherence to strict quality standards and optimal performance are key factors in achieving project success.” Respondent 1

“In my personal view thorough quality checks and inspections are critical in machinery expansion projects. Robust quality control processes play a significant role in identifying and rectifying potential issues or defects. By conducting rigorous quality checks, organizations can ensure that the machinery meets the required standards, reducing the risk of performance issues or future complications.” Respondent 5:

Both respondents stress the significance of technical expertise and quality control in machinery expansion projects. Having a skilled project team and implementing robust quality control processes ensure adherence to strict standards and optimal performance. This focus on technical expertise and quality control enhances the overall project outcome and contributes to the successful implementation of the machinery expansion project.

Sub-theme 5: Post-Project Evaluation and Continuous Improvement

By actively conducting post-project evaluations and embracing a culture of continuous improvement, organizations can leverage valuable insights, identify areas of strength and

weakness, and make informed decisions for future machinery expansion projects. This commitment to learning and improvement enhances project outcomes and reinforces the organization's overall project success.

“In my opinion, post-project evaluations hold great value in machinery expansion projects. It is crucial to capture feedback from stakeholders, analyses project outcomes, and implement process enhancements for future projects. By conducting thorough evaluations, organizations can learn from their experiences, identify areas for improvement, and refine their project management practices. This continuous improvement approach ensures that lessons learned are applied to future projects, leading to better outcomes and increased project success rates”. Respondent 3

The continuous improvement approach advocated by respondent 3 is highly shared by all other respondents and the findings highlights actively seeking feedback and reflecting on project outcomes, organizations can make informed decisions and implement changes that lead to better project outcomes and increased project success rates. This commitment to post-project evaluation and continuous improvement fosters a culture of learning and growth within the organization.

Theme 4: Importance and Impact Modern Project Management Techniques in Machinery Expansion Projects

Sub-theme 1: Importance of Adopting Modern Project Management Techniques

According to respondent 1 The use of modern project management techniques allows for a structured and proactive approach to managing risks, ensuring regulatory compliance, and driving continuous improvement. The iterative property of modern project management and its adaptability to changing requirement and scope is advocated by the respondents.

“In my opinion, adopting modern project management techniques is crucial in machinery expansion projects. These techniques provide a structured and proactive approach to managing risks, ensuring regulatory compliance, and driving continuous improvement.” Respondent 1:

“In my opinion, adopting modern project management techniques is crucial to address the challenges faced in machinery expansion projects. These techniques enable better resource allocation, improved project monitoring, and increased flexibility and have a better reflex on scope change” Respondent 3:

“In my opinion, Agile methodology's flexibility and iterative approach are instrumental in adapting to changing project requirements. This adaptability minimizes the impact of scope changes and leads to improved project outcomes. By embracing Agile, organizations can effectively respond to evolving needs, make necessary adjustments, and deliver incremental value to stakeholders.” Respondent 4

“In my opinion, modern project management techniques provide greater adaptability to evolving safety regulations and quality standards. These techniques ensure that projects remain compliant and achieve the desired safety and quality outcomes. By staying abreast of regulatory changes and adopting modern practices, organizations can effectively incorporate updated safety measures and quality standards into their projects. Respondent 5

Overall, according to the study adopting modern project management techniques in machinery expansion projects provides a proactive and adaptable approach, enhances safety and quality control, addresses challenges effectively, and contributes to the overall success of the projects.

Sub-theme 2: Anticipated Impact on Project Success

The anticipated impact of implementing modern project management techniques is expected to result in successful project outcomes and the achievement of project goals in machinery expansion projects.

“In my opinion, the implementation of modern project management techniques is expected to have a significant positive impact on project success in machinery expansion projects. By leveraging modern practices, organizations can proactively address challenges, ensure compliance, and drive efficiency throughout the project lifecycle.” Respondent 1

Theme 5: Challenges in Implementing Modern Project Management Techniques

According to the respondents, implementing modern project management techniques in machinery expansion projects presents challenges such as resistance to change, resource constraints, and cultural barriers. By employing effective change management strategies, securing leadership support, providing necessary training, and addressing cultural barriers, organizations can navigate these challenges and successfully integrate modern project management techniques, leading to improved project outcomes.

“In my opinion, integrating modern project management techniques in machinery expansion projects can face challenges such as resistance to change and the need for additional training and upskilling. Overcoming these challenges necessitates leadership support and a gradual transition plan.” Respondent 1

“In my opinion, implementing modern project management techniques in machinery expansion projects can be challenging due to organizational resistance, limited resources, and cultural barriers.” Respondent 2

“In my opinion, transitioning to modern project management techniques in machinery expansion projects may encounter challenges such as resistance from project team members and limited awareness of the benefits. To address these challenges, effective communication and training are crucial” Respondent 3

These findings demonstrate the importance of adopting modern project management techniques in machinery expansion projects and the anticipated impact on project success. While the respondents recognize the benefits of these techniques, they also acknowledge the challenges involved in their implementation. Overcoming resistance to change, providing adequate training and support, and addressing cultural barriers are crucial for successfully adopting modern project management techniques in machinery expansion projects. By doing so, organizations can enhance project outcomes, improve efficiency, and ensure the successful expansion of machinery in their operations.

4.3 Presenting Findings of Quantitative Analysis

This study employed a quantitative analysis approach to examine the collected data from a questionnaire survey distributed among participants within the project team of BGI Ethiopia. A total of 28 questionnaires were distributed to individuals within the target population, aiming to gather valuable insights and information related to assessing the role of modern project management in machinery expansion project success. The purpose of the survey was to assess various aspects of the participants' perceptions and experiences, focusing on specific variables of interest.

Out of the 31 questionnaires distributed, a commendable response rate of 90.3% was achieved, with 28 of them successfully collected. The high response rate indicates a satisfactory level of engagement and willingness of participants to contribute to the study. However, three questionnaires were not included in the analysis due to incomplete or missing responses.

4.3.1 Demographic Characteristics of the Respondents

Years in Company							
	0-2 years	3-5 years	6-10 years	over 10 years	Total		
Percentile	14%	18%	39%	29%	100.00%		
Frequency	4	5	11	8	28		
Role in Projects							
	Project Engineer	Project Manager	Project Coordinator	Technical leader	Procurement Manager	Maintenance engineer	Total
Percentile	43%	14%	29%	7%	3.5%	3.5%	100.00%
Frequency	12	4	8	2	1	1	28
Educational Status							
	Diploma Graduate	Bachelor's Degree	Postgraduate	Ph.D. Graduate	Total		
Percentile	25%	50%	18%	7%	100.00%		
Frequency	7	14	5	2	28		

Table 2: Demographic characteristics of the respondents

In this quantitative analysis, a sample of 28 individuals were surveyed to gather information about their years of experience in the company, roles in projects, and educational status. The data collected is presented in the form of percentages and frequencies.

Regarding service years in the company, the majority of respondents (39 %) had been with the company for 6-10 years, followed by 29% who had over 10 years of experience. Those with 3-5 years and 0-2 years of experience accounted for 18 % and 14% respectively.

In terms of roles in projects, project engineers constituted the largest group (43%), followed by project coordinators (29%) and project managers (14%). Technical leaders have 7% of representation. maintenance Engineer and procurement managers each represented smaller proportions, accounting for 3.5%.

Regarding educational status, 50% of the respondents held a bachelor's degree, making it the most common category. Postgraduates represented 28% and diploma graduates represented 25% of the sample. Ph.D. graduates accounted for 7% of the respondents.

These findings provide an overview of the demographics of the surveyed individuals, which can be further analyzed to identify any relationships or patterns between the variables of interest.

4.3.2 Challenges of Current Machinery Expansion Projects

Challenges of current machinery expansion PM			
	Frequency	Percent	Cumulative Percent
Difficulty in adapting to changes	13	47.0	52.0
inefficient resources allocation and utilization	1	3.5	56.0
Lack of communication	3	10.5	64.0
Lack of communication and collaboration among team members	2	7.0	68.0
Limited visibility	9	32.0	100.0
Total	28	100.0	

Table 3: Challenges of current machinery expansion project

According to the data collected and shown in table 4.2, one of the prominent challenges reported by 13 respondents, accounting for 47% of valid responses, is the difficulty in adapting to changes. This indicates that the company is facing hurdles in adjusting to specification changes that are very common in the company project report history while implementing their processes and systems to accommodate new expansion projects using TPM framework approaches which could be addressed with modern project management's flexibility and iterative property.

Inefficient resource allocation and utilization was identified as a challenge by only 1 respondent, representing 3.5% of valid responses. While less frequently reported, this issue highlights the importance of effectively managing resources within the TPM context. A lack of communication was acknowledged as a challenge by 3 respondents (10.5%). Communication plays a crucial role in TPM implementation, and its absence can hinder effective coordination and collaboration among team members. Similarly, 1 respondent (3.5%) specifically mentioned a lack of communication and collaboration among team members. This underscores the significance of fostering open and efficient communication channels within the TPM framework. Limited visibility emerged as a challenge reported by 9 respondents (32%). This suggests that organizations struggle with obtaining clear visibility into their maintenance operations, which can impede decision-making and performance monitoring within TPM initiatives.

In conclusion, the data collected reveals several key challenges faced by organizations implementing TPM, including difficulty in adapting to changes, inefficient resource allocation and utilization, lack of communication, lack of communication and collaboration among team members, and limited visibility. Recognizing and addressing these challenges is vital for the organization to enhance its project management practices and overcome obstacles to achieve improved project completion outcomes by addressing project success factors.

4.3.3 Key Success Factor of Machinery Expansion Projects at the Company

	Mean	Std. Deviation	Sum
Completion of the project within the planned budget.	1.84	.850	46

Completion of the project within the planned timeline.	2.04	.935	51
Achieving the desired increase in production capacity.	2.56	1.083	64
Meeting the quality standards of the new machinery	2.20	.913	55
Achieving the expected return on investment (ROI).	1.92	1.320	48
Minimizing the disruption to ongoing operations during the installation	2.48	1.262	62
Ensuring the safety of employees during the installation and operation	1.84	.800	46
Obtaining necessary regulatory approvals and permits.	2.80	1.000	70
Satisfying customer demand for products produced by the new machinery.	2.52	1.085	63
Improving overall efficiency and productivity of the manufacturing process	2.17	.637	52

Table 4: Descriptive table of key success factors of machinery expansion projects at the company

Based on the provided mean values, ensuring the safety of employees during the installation and operation of the new machinery ranks as the most important factor, followed closely by completing the project within the planned budget. Achieving the expected return on investment (ROI) is also significant but ranks slightly lower in importance. Prioritizing employee safety, maintaining financial stability, and optimizing ROI are crucial considerations in machinery expansion projects.

		within the planned budget.	within the planned timeline.	increase in production	quality and standards	(ROI).	Minimizing the disruption.	safety of employees.	regulatory approvals and permits.	Satisfying customer.	Improving overall efficiency
Very important	Count	11	9	4	7	16	9	10	3	3	3
	%	44.00%	36.00%	16.00%	28.00%	64.00%	36.00%	40.00%	12.00%	12.00%	12.50%
Important	Count	7	7	10	7	1	2	9	6	14	14
	%	28.00%	28.00%	40.00%	28.00%	4.00%	8.00%	36.00%	24.00%	56.00%	58.30%
Neutral	Count	7	8	4	10	2	7	6	9	0	7
	%	28.00%	32.00%	16.00%	40.00%	8.00%	28.00%	24.00%	36.00%	0.00%	29.20%
Less important	Count	0	1	7	1	6	7	0	7	8	0
	%	0.00%	4.00%	28.00%	4.00%	24.00%	28.00%	0.00%	28.00%	32.00%	0.00%
Not	Count	0	0	0	0	0	0	0	0	0	0

important	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
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Table 5: frequency table of key success factors of machinery expansion projects at the company

According to the statistical output of the collected data, completing the project within the planned budget was considered a crucial objective, with 44% of the respondents emphasizing its significance. This finding suggests that organizations prioritize maintaining financial constraints and avoiding cost overruns during project execution. It underscores the need for effective budget planning and control measures to ensure successful project outcomes.

Similarly, meeting project deadlines was regarded as important by a majority of the respondents (64%). This indicates the significance of timely project completion and highlights the need for efficient project scheduling, resource management, and monitoring to ensure adherence to timelines. Achieving the desired increase in production capacity was perceived as important by the majority (56%) of the respondents. While there was some variability in its importance, this goal highlights the strategic focus on expanding production capabilities to meet growing market demands and enhance operational efficiency.

Maintaining the quality standards of the new machinery garnered attention from a considerable number of respondents (56%), with 28% considering it very important. This underscores the emphasis on delivering high-quality products and ensuring the reliability and performance of the newly implemented machinery. It highlights the need for stringent quality control measures, adherence to standards, and comprehensive testing procedures.

The expected return on investment (ROI) emerged as the most highly regarded goal, with 64% of the respondents considering it very important. This finding underscores the business-oriented perspective and financial considerations associated with project initiatives. It emphasizes the need for organizations to carefully assess the potential return on investment, evaluate project feasibility, and make informed decisions regarding resource allocation.

Ensuring minimal disruption to ongoing operations during the installation of the new machinery was seen as a significant concern by 76% of the respondents. This highlights the importance of mitigating potential risks, planning for contingencies, and implementing

efficient change management practices to minimize disruptions and maintain business continuity.

Likewise, ensuring the safety of employees during the installation and operation of the new machinery was considered crucial by 76% of the respondents. This finding reflects the commitment to maintaining a safe work environment and protecting the well-being of employees. It underscores the need for comprehensive safety protocols, training programs, and risk assessments to ensure the physical well-being of the workforce.

Obtaining necessary regulatory approvals and permits was viewed as important by the majority (48%) of respondents, although importance varied among participants. This underscores the regulatory compliance requirements associated with project implementation and highlights the need for organizations to navigate the regulatory landscape effectively to obtain the necessary permits and approvals.

Satisfying customer demand for products produced by the new machinery was regarded as important by 68% of the respondents. This underscores the customer-centric focus and the recognition of the importance of meeting market demands. It highlights the need for organizations to align their production capabilities with customer expectations, enhance product quality, and deliver value to customers.

Improving the overall efficiency and productivity of the manufacturing process was considered important by 70.8% of the respondents. This goal reflects the emphasis on optimizing operational efficiency, streamlining processes, and enhancing productivity to achieve sustainable growth and competitiveness.

In summary, the data reveals a diverse set of project goals with varying degrees of importance. Achieving the expected return on investment (ROI) stands out as the most critical goal, followed by completing the project within the planned budget and timeline. The importance of meeting quality standards, ensuring employee safety, satisfying customer demand, and improving overall efficiency is also noteworthy. These findings emphasize the multifaceted nature of project goals and highlight the need for organizations to adopt a balanced approach to achieve successful outcomes by effectively managing resources, addressing challenges, and aligning project objectives with strategic priorities.

4.3.4 Importance and Impact of Modern Project Management System

Importance and impact of modern project management							
		Familiarity with MPM	Advantage of MPM	Importance of MPM	Expectation of impact of MPN	Confidence in MPM	Transition support
N	Valid	28	28	28	28	28	28
	Missing	0	0	0	0	0	0
Mean		3.00		1.64		1.84	
Std. Deviation		1.258		.569		.746	
Sum		75		41		46	

Table 4.5: descriptive analysis table of importance and impact of modern project management system in the company

familiarity with MPM				
		Frequency	Percent	Cumulative Percent
	Extremely familiar	5	18.0	18.0
	Very familiar	5	18.0	36.0
	Moderately familiar	9	32.0	68.0
	Somewhat familiar	6	21.5	89.5
	Not familiar	3	10.5	100.0
	Total	28	100.0	
Importance of MPM				
		Frequency	Percent	Cumulative Percent
	Very important	12	43.0	43.5
	Moderately important	15	53.5	96.5
	Not important	1	3.5	100.0
	Total	28	100.0	
Confidence in MPM				
		Frequency	Percent	Cumulative Percent
Valid	Very confident	11	39.0	39.0
	Moderately confident	12	43.0	82.0
	Not confident	5	18.0	100.0
	Total	28	100.0	
Advantage of MPM				
		Frequency	Percent	Cumulative Percent
	Flexibility, risk management	1	3.5	
	Improved communication, flexibility	5	18.0	21.5
	Improved communication, resource enhanced resource utilization	2	7.0	28.5
	Improved coordination and communication, resource utilization	2	7.0	35.5
	Improved coordination, flexibility	6	22.0	57.5
	Improved coordination, resource enhanced resource utilization and reaction to changes	9	32.0	89.5
	Improved coordination, risk management	1	3.5	93.0
	Improved project coordination and communication	1	3.5	96.5
	more effective risk management	1	3.5	100.0
	Total	28	100.0	
Expectation of impact of MPN				
		Frequency	Percent	Cumulative Percent
	Efficiency, collaboration	7	25.5	25.5
	Efficiency, customer satisfaction	1	3.5	29.0
	Efficiency, outcomes	2	7.0	36.0
	Efficiency, satisfaction	5	18.0	54.0
	finishing with a short p	1	3.5	57.5
	Improved outcomes, collaboration	3	10.5	68.0
	Improved outcomes, efficiency	5	18.0	86.0
	Improved outcomes, satisfaction	3	10.5	96.5
	Improved project outcomes and deliverables	1	3.5	100.0
	Total	28	100.0	

Table 6: Frequency analysis table of importance and impact of modern project management system in the company

The data provided offers valuable insights into the perceptions and attitudes of respondents regarding various aspects of Modern project management (MPM), shedding light on their familiarity, importance, confidence, perceived advantages, and expectations of MPM.

Firstly, when considering familiarity with MPM, the majority of respondents (68%) indicated some level of knowledge and understanding, with the highest percentage being moderately familiar (32%). This indicates that a significant portion of the respondents has prior exposure or experience with MPM, which can provide a foundation for effective implementation and utilization within the company manufacturing expansion project processes.

In terms of importance, respondents placed significant value on MPM, with 96.5% considering it either very important or moderately important. This strong recognition of its significance underscores the crucial role of MPM in optimizing production planning and scheduling, ensuring efficient resource allocation, and achieving desired outcomes within manufacturing operations. Moreover, respondents exhibited confidence in MPM, with 82% expressing either very confident or moderately confident attitudes. This level of trust and belief in the effectiveness of MPM suggests that respondents perceive it as a reliable tool for improving production efficiency, streamlining processes, and achieving operational goals.

When it comes to the perceived advantages of MPM, respondents highlighted several key benefits. The most frequently mentioned advantage was improved coordination and enhanced resource utilization and reaction to scope changes, as emphasized by 32% of respondents. This suggests that implementing MPM can facilitate better collaboration among different departments, optimize the allocation of resources, and enable smoother workflow and flexibility throughout the project life cycle. Respondents also recognized the advantages of improved communication, flexibility, risk management, and project coordination, indicating the multifaceted benefits that MPM can offer to organizations.

Furthermore, respondents expressed their expectations regarding the impact of MPM. The highest emphasis was placed on efficiency and outcomes (25%), indicating the anticipation of improved productivity, reduced lead times, and enhanced overall performance. They also

anticipated positive effects on collaboration, customer satisfaction, and project deliverables, demonstrating a holistic understanding of how MPM can positively influence various aspects of manufacturing operations.

Overall, the analysis reveals that respondents are generally familiar with and perceive MPM to be important. They exhibit confidence in its capabilities and anticipate a range of advantages and positive impacts, particularly in terms of improved coordination, resource utilization, efficiency, and outcomes. These findings highlight the potential benefits of implementing and utilizing MPM techniques within various projects, specifically Agile methodology, will have the advantage of enhancing project outcomes by improving communication, increasing adaptability to change, and ensuring better stakeholder engagement. and enhancing operational performance, and ultimately driving success in a competitive market.

4.3.5 Challenges and Additional Support Needed

Transition support	N		Mean	Std. Deviation	Sum
	Valid	Missing			
Adapting modern project management methodologies requires a significant cultural change within the organization.	28	0	2.08	1.47	52
Lack of awareness and understanding about modern project management methodologies among project stakeholders.	28	0	3.24	1.052	81
Resistance from team members and stakeholders to embrace new project management practices.	28	0	2.12	0.726	53
Insufficient training and resources for implementing modern project management methodologies.	28	0	2.28	0.792	57
Difficulty in aligning traditional organizational structures and processes with modern project management methodologies.	28	0	3.16	1.281	79
Lack of senior management support and commitment to the adoption of modern project management	28	0	1.92	0.997	48

Table 7: Descriptive analysis table of challenges and addition support needed

Adapting modern project management methodologies requires a significant cultural change within the organization.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	15	53.5	53.5
	Agree	8	29.0	82.5
	Neutral	4	14.0	96.5
	Strongly disagree	1	3.5	100.0
	Total	28	100.0	

Table 8: Significant cultural change required within the organization while adapting MPM .

Lack of awareness and understanding about modern project management methodologies among project stakeholders.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	1	3.5	3.5
	Agree	8	29.0	32.5
	Neutral	1	3.5	36.0
	Disagree	3	10.5	46.5
	Strongly disagree	15	53.5	100
	Total	28	100.0	

Table 9: Lack of awareness and understanding among project stakeholders

Resistance from team members and stakeholders to embrace new project management practices.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	6	22.0	22.0
	Agree	18	64.0	86.0
	Disagree	2	7.0	93.0
	Strongly disagree	2	7.0	100.0
	Total	28	100.0	

Table 10: Resistance from team members and stakeholders

Insufficient training and resources for implementing modern project management methodologies.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	4	14.0	14.0
	Agree	16	57.0	71.0
	Disagree	6	22.0	93.0
	Strongly disagree	2	7.0	100.0
	Total	28	100.0	

Table 11: Insufficient training and resources for implementing modern project management methodologies.

Difficulty in aligning traditional organizational structures and processes with modern project management methodologies.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	4	14.0	14.0
	Agree	6	22.0	36.0
	Neutral	1	3.5	39.5
	Strongly disagree	17	60.5	100.0
	Total	28	100	

Table 12: Difficulty in aligning traditional organizational structures and processes with modern project management methodologies.

Lack of senior management support and commitment to the adoption of modern project management methodologies.				
		Frequency	Percent	Cumulative Percent
	Strongly agree	11	39.5	39.5
	Agree	11	39.5	79.0
	Disagree	2	7.0	86.0
	Strongly disagree	4	14.0	100.0
	Total	28	100.0	

Table 13: Lack of senior management support and commitment to the adoption of modern project management methodologies.

Transition support				
		Frequency	Percent	Cumulative Percent
	take experience from other international companies	4	14.0	14.0
	Tools, guidance	6	22.0	36.0
	Training and education on modern project management practices	1	3.5	39.5
	Training, guidance	1	3.5	43.0
	Training, time	8	28.5	71.5
	Training, tools	8	28.5	100.0
	Total	28	100.0	

Table 14: Transition support

The data analyzed offers valuable insights into the perceptions and challenges associated with the adoption of modern project management methodologies within organizations. When checking each category for a detailed analysis.

Firstly, the majority of respondents (82%) either strongly agreed or agreed that implementing modern project management methodologies requires a significant cultural shift within the organization. This highlights the recognition that successful adoption of these methodologies necessitates a change in mindset, attitudes, and work practices across the entire organization.

When it comes to the awareness and understanding of modern project management methodologies among project stakeholders, a significant portion of respondents (46.5%) strongly disagreed with the notion that stakeholders lack awareness and understanding. This indicates that there is a level of knowledge and familiarity with these methodologies among the stakeholders, which can facilitate smoother adoption and implementation processes.

Respondents acknowledged the presence of resistance from team members and stakeholders when it comes to embracing new project management practices, with 86% either strongly agreeing or agreeing with this statement. This resistance can arise from various factors such as resistance to change, fear of the unknown, or reluctance to depart from established ways of

working. Overcoming this resistance requires effective change management strategies and communication to gain buy-in and support from all stakeholders.

Another significant finding is that a considerable number of respondents (71%) agreed that there are insufficient training and resources available for the successful implementation of modern project management methodologies. This highlights the importance of providing adequate training programs, tools, and resources to enable individuals and teams to acquire the necessary skills and knowledge to effectively utilize these methodologies.

In terms of aligning traditional organizational structures and processes with modern project management methodologies, a majority of respondents (60.5%) either strongly agreed or agreed that this presents challenges. This indicates that existing organizational structures and processes may need to be adapted or reconfigured to align with the principles and practices of modern project management methodologies.

Furthermore, the data reveals that a significant number of respondents (86%) perceived a lack of senior management support and commitment toward adopting modern project management methodologies. This lack of support can hinder the successful implementation and integration of these methodologies into the organization's project management practices. It emphasizes the need for strong leadership and management endorsement to drive the adoption process.

In terms of transition support, respondents mentioned various forms of support, with the most frequently mentioned being training, particularly in terms of time and tools. This indicates that organizations should provide comprehensive training programs that equip employees with the necessary skills and knowledge to effectively implement modern project management methodologies. Additionally, tools and guidance can further facilitate the transition process by providing practical support and resources.

Overall, the analysis suggests that adopting modern project management methodologies is perceived as requiring a significant cultural change, facing resistance from team members and stakeholders, and encountering challenges related to awareness, training, resources, and alignment with traditional structures. Respondents also identified a lack of senior management support. The mentioned transition support methods, such as training, tools, and guidance, highlight potential areas of focus to facilitate the adoption of modern project

management methodologies within organizations. Addressing these challenges and providing adequate support can contribute to successful implementation and maximize the benefits derived from modern project management practices.

CHAPTER FIVE

5 Summary of Findings, Discussion and Recommendation

5.1 Summary of Findings

The aim of the research titled "Analysing the Benefits and Challenges of Adapting Modern Project Management Techniques for Machinery Expansion Projects success: A Case Study of BGI Ethiopia." was to examine the impact of adopting modern project management techniques on project success in the context of machinery expansion projects at BGI Ethiopia. The research aimed to assess the benefits and challenges associated with the implementation of these techniques and identify their effectiveness in improving project outcomes. By analyzing the data collected from surveys and interviews, the research sought to provide insights into the factors that contributed to project success, the role of modern project management techniques, and the specific challenges faced in their adoption. The ultimate goal was to generate knowledge and recommendations that could inform the effective implementation of these techniques in machinery expansion projects for improved project success.

The study aims to Analyzing Project Success in machinery expansion projects by analyzing the benefits and gaps of adopting modern project management techniques in BGI Ethiopia resulted in valuable insights into various aspects of project management methodologies and their implementation challenges. Here is a clear summary of the findings:

- Challenges of current project management method: The analysis highlighted several challenges faced by organizations while implementing current traditional project management system. These challenges include difficulty in adapting to changes, inefficient resource allocation and utilization, lack of communication and collaboration among team members, and limited visibility into maintenance operations.
- Importance of Project Goals for project success: The data revealed the importance of different project goals as perceived by the respondents. The most critical goals were completing the project within the planned budget and timeline, achieving the expected return on investment (ROI), meeting quality standards, ensuring employee safety, and

satisfying customer demand. Improving efficiency and productivity of the manufacturing process and minimizing disruption to ongoing operations were also considered important.

- Modern project management (MPM): The data provided insights into the perceptions and attitudes of respondents towards MPM. Respondents exhibited varying levels of familiarity with MPS, considering it important and expressing confidence in its implementation. Improved coordination, resource utilization, efficiency, and outcomes were perceived as the key advantages and expected impacts of MPM.
- Adoption of Modern Project Management Methodologies: The analysis highlighted the challenges associated with adopting modern project management methodologies. These challenges include the need for cultural change, lack of awareness and understanding among stakeholders, resistance from team members, insufficient training and resources, difficulty in aligning traditional structures, and a lack of senior management support.

In conclusion, the research findings emphasize the significant benefits of adopting modern project management techniques in machinery expansion projects. The study revealed that traditional project management methodologies often face challenges related to change adaptation, resource allocation, communication, and managing specification changes. However, by embracing modern methodologies, organizations can effectively address these challenges and improve project outcomes.

The implementation of modern project management techniques offers several advantages. Firstly, it streamlines project processes, ensuring smoother execution and reduced inefficiencies. This leads to enhanced efficiency and optimized resource allocation, resulting in cost savings and improved project timelines.

Furthermore, modern methodologies promote effective communication and collaboration among team members. By leveraging advanced tools and technologies, project stakeholders can seamlessly share information, coordinate tasks, and address potential issues promptly. This collaborative approach fosters a stronger team dynamic and ensures everyone is aligned towards project goals.

Another significant benefit is the increased visibility into project operations, particularly regarding expansion projects at BGI Ethiopia. Modern project management systems provide real-time data and analytics, allowing stakeholders to monitor project progress, identify bottlenecks, and proactively address potential risks. This visibility enables better decision-making and enhances overall project control.

To achieve successful implementation, organizations should provide comprehensive support, including training programs and necessary resources. By investing in employee development, organizations can enhance their understanding and proficiency in modern methodologies, empowering them to effectively utilize the tools and techniques provided.

Additionally, fostering a culture that embraces change and innovation is crucial. Creating an environment where team members are encouraged to explore new ideas, adapt to new processes, and continuously improve project management practices leads to higher project success rates.

Overall, the research findings emphasize that adopting modern project management techniques not only addresses traditional challenges but also enables organizations to effectively adapt to specification changes. By incorporating change management practices and maintaining project agility, the company can improve project outcomes, increase customer satisfaction, and drive overall project success.

In conclusion, the research findings underscore the importance of adopting modern project management techniques in machinery expansion projects. By leveraging these methodologies, organizations can overcome traditional challenges, improve project efficiency, enhance collaboration, and gain better control over project operations. The study highlights the need for comprehensive support, training, and a culture of innovation to ensure successful implementation and maximize the benefits of modern project management practices.

5.2 Conclusion

In conclusion, the discussions and findings the study highlight the benefits and challenges associated with adopting modern project management techniques in machinery expansion projects, specifically focusing on the case organization, BGI Ethiopia. The research indicates

that traditional project management methodologies face several challenges, including difficulties in change adaptation, inefficient resource allocation, limited communication and collaboration, and a lack of visibility into maintenance operations.

However, by embracing modern project management methodologies, organizations can overcome these challenges and improve project outcomes. Modern systems offer streamlined processes, enhanced communication and collaboration, and increased visibility into project operations, leading to improved efficiency, cost savings, and optimized resource utilization.

The findings emphasize the importance of providing comprehensive support, training, and resources to employees for successful implementation. Training programs and the use of project management software and tools are crucial in equipping employees with the necessary skills and knowledge for effective adoption of modern methodologies.

Additionally, fostering a culture that embraces change and innovation is vital. Creating an environment where team members are encouraged to adapt to new processes and methodologies promotes higher project success rates.

While the research is specific to machinery expansion projects in BGI Ethiopia, the findings can be valuable for other organizations facing similar challenges. By recognizing the limitations of traditional project management methodologies and actively addressing them through the adoption of modern systems, organizations can significantly improve their project outcomes.

Overall, the research underscores the importance of adopting modern project management techniques, offering insights into their benefits and suggesting strategies for successful implementation. The findings provide valuable guidance for organizations seeking to enhance project management practices and achieve successful project delivery.

5.3 Recommendations

Based on the discussions and findings in this study, the following detailed recommendations are proposed for BGI Ethiopia to improve its project management practices:

- **Embrace Modern Project Management Methodologies:** Recognize the limitations of traditional project management methodologies and actively transition towards modern

methodologies. This shift will enable the organization to leverage the benefits of modern practices and address the challenges identified in this study.

- **Cultural Change Management:** Implement a structured change management approach to facilitate the cultural shift required for adopting modern project management methodologies. Create awareness among employees about the need for change, provide clear communication regarding the benefits, and encourage active participation and buy-in from all stakeholders.
- **Provide Adequate Training and Resources:** Invest in training programs and resources to upskill employees in modern project management practices. Offer comprehensive training sessions, workshops, and certifications to ensure that employees have the necessary knowledge and skills to effectively implement modern methodologies. Additionally, provide access to project management software, tools, and technology to enhance productivity and efficiency.
- **Senior Management Support:** Gain active support and commitment from senior management in the adoption of modern project management methodologies. Engage senior leaders in championing the change, allocating necessary resources, and providing ongoing guidance and support to project teams. Their endorsement will help overcome resistance and ensure the successful implementation of modern practices.
- **Establish Performance Metrics:** Define and track key performance indicators (KPIs) to measure the effectiveness of modern project management methodologies. Monitor project outcomes, such as timeliness, budget adherence, stakeholder satisfaction, and overall project success, to evaluate the impact of the implemented changes and identify areas for further improvement.
- **Continuous Improvement and Learning:** Encourage a culture of continuous improvement and learning within the organization. Establish feedback mechanisms to capture insights, lessons learned, and best practices from project experiences. Encourage knowledge sharing among project teams and foster a supportive environment that promotes innovation and experimentation.
- **Regular Project Reviews and Audits:** Conduct periodic reviews and audits of project management practices to ensure adherence to modern methodologies and identify

areas for refinement. This will help in identifying bottlenecks, addressing challenges, and refining processes to align with industry best practices.

- **Collaborate and Learn from Others:** Seek opportunities to collaborate with other organizations or industry experts to gain insights into successful implementations of modern project management methodologies. Exchange experiences, participate in conferences, and leverage external expertise to enhance the organization's knowledge and capabilities.
- **Monitor Industry Trends:** Stay updated with emerging trends and advancements in project management practices. Stay connected with professional associations, research publications, and industry forums to remain at the forefront of project management innovation. This will enable BGI Ethiopia to continuously adapt and improve its project management practices.

By implementing these recommendations, BGI Ethiopia can overcome the challenges associated with traditional project management methodologies and successfully adopt modern practices. This will result in improved project outcomes, increased efficiency, enhanced collaboration, and ultimately contribute to the organization's overall success.

5.4 Limitations and Implication for Further study

The study has certain limitations to be acknowledged and recommendations for further study that could be very helpful to unlock future knowledge.

Limitations:

- **Self-Reported Data:** The data collected in this study relied on self-reported responses from the participants. This introduces the possibility of response bias and may not accurately reflect the actual practices and perceptions of the organization.
- **Single Organization Study:** The study focused solely on BGI Ethiopia, limiting the understanding of project management challenges and practices in other organizations or industries. Further research across multiple organizations and industries would provide a more comprehensive view.

- **Time Constraints:** The study may have been limited by time constraints, which could have affected the depth of analysis or the inclusion of additional variables. A more extensive research period could provide a more thorough understanding of the topic.

Implications for Further Study:

- **Comparative Studies:** Conducting comparative studies across multiple organizations or industries would provide valuable insights into the similarities and differences in project management challenges and practices. This could contribute to a broader understanding of the topic.
- **Longitudinal Studies:** Longitudinal studies that track the implementation and impact of modern project management methodologies over an extended period would provide a deeper understanding of the long-term effects and sustainability of these practices.
- **Impact Assessment:** Investigate the impact of implementing modern project management methodologies on project outcomes, organizational performance, and stakeholder satisfaction. This would help in assessing the effectiveness and value of adopting these practices.
- **Best Practices Identification:** Identify and document best practices for overcoming the challenges associated with the adoption of modern project management methodologies. This would provide practical guidance to organizations facing similar implementation difficulties.
- **Cross-Cultural Studies:** Explore the influence of cultural factors on the adoption and implementation of modern project management methodologies. Comparing practices and perceptions across different cultures would contribute to a more nuanced understanding of the subject.

By addressing these limitations and pursuing further research in these areas, a more robust and comprehensive understanding of the challenges, best practices, and implications of adopting modern project management methodologies can be achieved. This would contribute to the advancement of project management knowledge and provide practical guidance for organizations seeking to improve their project management practices

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APPENDIX A: QUESTIONNAIRE

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

TITLE: -" Analysing the Benefits and Challenges of Adapting Modern Project Management Techniques for Machinery Expansion Projects success: A Case Study of BGI Ethiopia."

This questionnaire is prepared by a graduate student of Addis Ababa university, School of Commerce Graduate Studies on project management to assess the impact of modern project management on project success for machinery expansion projects in your company. The questionnaire is designed to collect information about your experience with project management and its effect on project success related to your role in the company. Your response to the items of this questionnaire will be used to analyse the existing project management practices and their results on project performance and outcomes.

With all due respect, I hope you will be able to take some time and carefully complete the questionnaire as frankly and reasonably as you can. You don't have to mention your name, and your responses to these questions will be kept confidential and used for academic purposes only.

Demographic Characteristics

1. How long have you been working in the company?

0-2 years

3-5 years

6-10 years

over 10 years

2. What is your educational status?

Diploma Graduate

Bachelor's Degree

- Postgraduate
 - Ph.D. Graduate
 - Other (please specify)
-

3. What is your current role in machinery expansion projects at BGI Ethiopia?

- Project Manager
 - Project Engineer
 - Project Coordinator
 - Other (please specify)
-

I. Familiarity with Modern Project Management Technique

1 How familiar are you with modern project management methods?

- Not familiar
- Somewhat familiar
- Moderately familiar
- Very familiar
- Extremely familiar

II. Advantages and Drawbacks of Modern Project Management Techniques

1. In your opinion, what are the main advantages of modern project management techniques over traditional methods? (Select all that apply)

- Improved project coordination and communication
- Enhanced resource allocation and utilization
- Greater flexibility in responding to changes
- More effective risk management e. Faster project delivery
- Other (please specify) _____

2. Have you witnessed any challenges or drawbacks in the current traditional project management system in machinery expansion projects? (Select all that apply)

- Lack of communication and collaboration among team members
- Difficulty in adapting to changes during the project
- Inefficient resource allocation and utilization
- Limited visibility into project progress and performance
- Issues with managing project risks effectively
- Other (please specify) _____

III. Expectations, Confidence, and Transition Support

1 How important do you believe it is to adopt modern project management techniques in machinery expansion projects?

- Very important
- Moderately important
- Not important

2 What are your expectations regarding the impact of modern project management techniques on project success in machinery expansion projects? (Select all that apply)

- Improved project outcomes and deliverables
- Enhanced project efficiency and cost-effectiveness
- Higher customer satisfaction d. Increased team collaboration and morale
- Other (please specify) _____

3 What factors do you consider crucial for successful implementation of modern project management techniques in machinery expansion projects? (Select all that apply)

- Strong leadership and management support
- Adequate training and skill development for the project team
- Clear communication and alignment of project goals
- Effective change management strategies
- Other (please specify) _____

4 How confident are you in the ability of modern project management techniques to address the challenges faced in machinery expansion projects?

Very confident

Moderately confident

Not confident

5 What additional support or resources do you think would be required to transition from the traditional project management system to modern techniques in machinery expansion projects? (Select all that apply)

Training and education on modern project management practices

Access to advanced project management tools and software

Guidance from experienced project management professionals

Adequate time and budget allocation for the transition process

Other (please specify)

IV. Recommendation and Additional Feedback

6 How likely are you to recommend the adoption of modern project management techniques for machinery expansion projects based on the potential benefits discussed?

Very likely

Somewhat likely

Not likely

7 Is there any additional feedback or comments you would like to provide regarding the role of modern project management techniques in machinery expansion projects?

V. Project Success Criteria

This section focuses on project success criteria related to the machinery expansion project. Please rate the following statements according to their importance in determining the success of the project.

Very important = 1 Important =2 Neutral = 3 Less important =4 Not important = 5

s.no	Success Criteria	1	2	3	4	5
1	Completion of the project within the planned budget.					
2	Completion of the project within the planned timeline.					
3	Achieving the desired increase in production capacity.					
4	Meeting the quality standards of the new machinery					
5	Achieving the expected return on investment (ROI).					
6	Minimizing the disruption to ongoing operations during the installation of the new machinery.					

7	Ensuring the safety of employees during the installation and operation of the new machinery.					
8	Obtaining necessary regulatory approvals and permits.					
9	Satisfying customer demand for products produced by the new machinery.					
10	Improving overall efficiency and productivity of the manufacturing process					

VI. Challenges on Adapting Modern Project Management

The following questions are designed to assess your views on challenges on implementing modern project management practices in your company.

3. Adapting modern project management methodologies requires a significant cultural change within the organization.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

3. Lack of awareness and understanding about modern project management methodologies among project stakeholders.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

4. Resistance from team members and stakeholders to embrace new project management practices.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

5. Insufficient training and resources for implementing modern project management methodologies
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

6. Difficulty in aligning traditional organizational structures and processes with modern project management methodologies.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

7. Lack of senior management support and commitment to the adoption of modern project management methodologies.
 - Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree

8. Additional Challenges

Please briefly describe any other challenges you have encountered when adapting modern project management methodologies. (Open-ended question)

Thank you for taking the time to complete this questionnaire. Your input is invaluable and will contribute significantly to my research on assessing the impact of modern project management techniques on project success in machinery expansion projects. Your responses will provide valuable insights into your experiences and perceptions regarding the adoption and effectiveness of modern project management practices.

Should you have any further questions or if you would like to receive a summary of the research findings once the study is complete, please do not hesitate to contact me. Once again, thank you for your time and valuable input.

APPENDIX B: INTERVIEW QUESTIONNAIRE

1. How long have you been working in the company, and what has been your experience in project management?
2. What is your educational background, and how has it contributed to your understanding of project management?
3. Can you briefly describe your current role and responsibilities in project management, specifically in relation to machinery expansion projects?
4. How familiar are you with modern project management methods, and have you had any experience applying them in your projects?
5. What do you consider to be the main advantages of modern project management techniques over traditional methods, particularly in the context of machinery expansion projects?
6. Based on your experience, what are some challenges or drawbacks you have encountered in the current traditional project management system in machinery expansion projects?
7. How important do you believe it is to adopt modern project management techniques in machinery expansion projects?
8. What are your expectations regarding the impact of modern project management techniques on project success in machinery expansion projects?
9. In your opinion, what factors are crucial for the successful implementation of modern project management techniques in machinery expansion projects?
10. How confident are you in the ability of modern project management techniques to address the challenges faced in machinery expansion projects?
11. From your perspective, what additional support or resources do you think would be required to transition from the traditional project management system to modern techniques in machinery expansion projects?
12. Based on the potential benefits discussed, how likely are you to recommend the adoption of modern project management techniques for machinery expansion projects?

13. Do you have any additional feedback or comments regarding the role of modern project management techniques in machinery expansion projects?