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EVALUATING THE INFLUENCE OF TECHNOLOGY ON PROJECT DEVELOPMENT AND ADMINISTRATION IN ETHIOPIA

By

Yosef Asefa

September, 2024

Addis Ababa, Ethiopia

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ID. No. SGS/0068/2015B

Advisor: Temesgen B. (PhD)

A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIALFULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ART IN PROJECT MANAGEMENT

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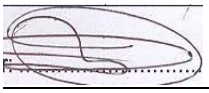
APPROVED BY BOARD OF EXAMINERS

_____	_____
Dean, Graduate Studies	Signature
_____	_____
Advisor	Signature
Desta Mulugeta (PHD)	
External Examiner	Signature
Dejene Mamo (PhD)	 11/02/2025
Internal Examiner	Signature

DECLARATION

I, the undersigned, hereby declare that the work entitled "Evaluating the Influence of Technology on Project Development and Administration in Ethiopia'' is the outcome of my effort and study and that all source of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestion of my research advisor.

This study has not been submitted for any degree in this University or any other university

Declared by Yosef Asefa

Name of Advisor: Temesgen Belayneh (PhD)

St. Mary's University, Addis Ababa Signature _____

September, 2024

LETTER OF CERTIFICATION

This is to certify that Yosef Asefa has conducted this project work entitled “Evaluating the Influence of Technology on Project Development and Administration in Ethiopia’’ under my supervision. This project work is original and suitable for submission in partial fulfillment of the requirement for the award of a Master of Arts Degree in Project Management.

Name: Yosef Asefa

St. Mary’s University, Addis Ababa Signature _____

September, 2024

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List of Acronyms

PM	Project Management
PMBOK	Project Management Body of Knowledge
PMP	Project Management Professional
SDLC	Software Development Life Cycle
Agile	A methodology focused on iterative development and flexibility
SCRUM	A framework for Agile project management
KPIs	Key Performance Indicators
ROI	Return on Investment
Gantt	Gantt Chart, a visual project timeline
WBS	Work Breakdown Structure
RACI	Responsible, Accountable, Consulted, Informed matrix
SOW	Statement of Work
AI	Artificial Intelligence
ML	Machine Learning
CRM	Customer Relationship Management
DMS	Document Management System

ABSTRACT

This study evaluates the influence of technology on project development and administration in Ethiopia, focusing on the integration of technological tools within various project management practices. Utilizing a mixed-method approach, the researcher collected data from 156 respondents through structured questionnaires and interviews. The findings reveal a significant gender imbalance in the project workforce, with 63% of participants being male. Notably, 46.4% of respondents reported not using any technology, highlighting barriers such as inadequate training and infrastructure. Despite a general satisfaction with available technologies (65.4%), a substantial portion of respondents (62.8%) have not received necessary training, indicating that satisfaction does not equate to optimal usage. Analysis of project outcomes showed that most projects (51.3%) were completed within budget, yet only 43.6% of deliverables were rated as satisfactory, suggesting room for improvement in quality management. Correlation and regression analyses demonstrated strong positive relationships between technology utilization and key performance indicators, including budget adherence and communication efficiency. The results indicate that technology explains 76.0% of the variance in project success. The study concludes that while technology has the potential to enhance project outcomes, significant challenges related to training, infrastructure, and stakeholder engagement remain. Recommendations include implementing targeted training programs, investing in technological infrastructure, and promoting diversity within project teams to foster a more effective project management environment.

Key Words: Project development, Project Administration, Technology

CHAPTER ONE INTRODUCTION

This chapter includes background of the study, statement of the problem, objective of the study both general and specific objectives, research question, scope and limitation of the study and the significance of this study to evaluate the influence of technology on project development and administration.

1.1. Background of the study

Technology has revolutionized project management globally, enabling improved planning, execution, monitoring, and evaluation of projects. Tools such as project management software, communication platforms, and data analytics have been shown to enhance productivity and efficiency (Kerzner, 2017). In the context of Ethiopia, the adoption of technology can potentially address critical issues such as communication barriers, resource allocation inefficiencies, and project tracking challenges.

Project development and administration are crucial for achieving national development goals in Ethiopia. Projects in sectors such as infrastructure, health, and education are essential for enhancing the quality of life for citizens and driving economic growth (Federal Democratic Republic of Ethiopia, 2020). Effective project administration ensures that resources are used efficiently, timelines are adhered to, and stakeholder engagement is maximized.

The adoption of technology in project management involves various factors, including organizational readiness, the perceived benefits of technology, and user acceptance (Davis, 1989). In Ethiopia, the successful integration of technology into project management practices can lead to improved project outcomes, such as reduced costs, enhanced collaboration, and better risk management (Alemayehu & Yitayew, 2022).

Ethiopia, a country located in the Horn of Africa, has been undergoing significant transformations in its socio-economic landscape. As one of the fastest-growing economies in Africa, Ethiopia has made substantial strides in various sectors, including agriculture, manufacturing, and services (World Bank, 2021). However, managing projects effectively in this rapidly changing environment remains a challenge. This study seeks to evaluate the influence of technology on project development and administration in Ethiopia, focusing on how technological advancements can enhance project outcomes.

The introduction of technology into project management can be traced back to the late 20th century when various development projects aimed at modernizing the economy began to leverage contemporary tools and methodologies. Despite these efforts, the integration of technology into project management has been uneven, often hindered by factors such as limited access to digital resources, inadequate training, and cultural resistance (Molla, 2018).

The current technological landscape in Ethiopia is characterized by increasing internet penetration and mobile phone usage. According to the Ethiopian Communication Authority (2022), mobile phone subscriptions reached over 60 million, and internet penetration stands at approximately 22%. However, despite these advancements, there remain significant challenges, including infrastructural inadequacies and a lack of technical expertise (Tadesse et al., 2020).

Despite the potential benefits, several barriers hinder the adoption of technology in project management in Ethiopia. These include: Infrastructural Limitations: Inadequate technological infrastructure, especially in rural areas, limits access to essential tools. Skill Gaps: A lack of trained personnel proficient in technology use poses significant challenges (Mekonnen, 2019). Cultural Resistance: Traditional project management practices may impede the acceptance of new technologies (Hailu, 2021).

As Ethiopia continues to pursue its development goals, understanding the influence of technology on project development and administration becomes increasingly critical. By evaluating how technology can enhance project management practices, this study aims to provide valuable insights for policymakers, project managers, and stakeholders in Ethiopia.

1.2. Statement of the Problem

Technology has the potential to transform project management practices by improving planning, execution, and monitoring processes. However, the adoption of technology in project management in Ethiopia is not uniform. Many organizations struggle to integrate available technologies into their workflows effectively, leading to underutilization of resources that could enhance project outcomes (Molla, 2018).

Despite Ethiopia's rapid economic growth and significant investments in various sectors, the effectiveness of project management practices remains a critical concern. The country faces numerous challenges in managing projects efficiently, leading to delays, cost overruns, and suboptimal outcomes. As Ethiopia strives to achieve its ambitious development goals,

understanding the factors influencing project success, particularly the role of technology, is essential (Ethiopian Development Research Institute, 2020).

Many projects in Ethiopia suffer from inefficient resource allocation, resulting in wastage and delays. According to the Ethiopian Development Research Institute (2020), approximately 40% of public projects exceed their budgets and timelines. This inefficiency can be attributed to inadequate planning and the lack of real-time data, which technology could help address.

Effective project development and administration are crucial for achieving Ethiopia's developmental goals. However, the integration of technology in project management remains inconsistent and under-researched in the Ethiopian context. While various studies have identified the importance of technology in enhancing project efficiency and effectiveness, there is a lack of comprehensive analysis specifically focused on the types of technologies utilized in Ethiopia and their actual influence on project outcomes.

Previous research has indicated that technology can significantly impact project completion times and budget adherence; however, these studies often overlook the specific technologies employed in Ethiopian projects and their effectiveness. For instance, while Hailu (2021) discusses the role of communication technologies, it does not delve into how these technologies are integrated into project management practices or the perceptions of stakeholders regarding their use.

Additionally, cultural resistance to adopting new methodologies, as highlighted by Mekonnen (2019), poses challenges to the effective integration of technology. This resistance, combined with infrastructural limitations noted by the Ethiopian Communications Authority (2022), creates a complex environment for technology adoption in project management.

Despite the existing literature, there remains a significant research gap in understanding the specific types of technology that are commonly used in project management in Ethiopia, their influence on project completion and budget adherence, and the perceptions of various stakeholders. In light of these challenges, this study aimed to evaluate the influence of technology on project development and administration in Ethiopia. By identifying the barriers to technology adoption and exploring the potential benefits of technological integration, this

research seeks to provide actionable insights that can enhance project management practices and contribute to the successful realization of Ethiopia's development objectives.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study was to evaluating the influence of technology on project development and administration in Ethiopia.

1.3.2 Specific Objectives

- ❖ To assess types of technology that are commonly used in project management.
- ❖ To evaluate the influence of technology on project development and administration.
- ❖ To investigate the perceptions of project stakeholders regarding technology use.

1.4. Hypotheses of the study

H1: There is a significant variety of technologies commonly used in project management in Ethiopia, including but not limited to project management software, communication tools, and mobile applications.

H2: The use of technology has a positive influence on project development and administration in Ethiopia, leading to improved project completion times and better adherence to budgets.

H3: There are significant differences in the perceptions of project stakeholders regarding the effectiveness and utility of technology in project management, influenced by factors such as project type, experience, and region.

1.5. Significance of the Study

The purpose of the study was to contribute something in the use of technology to improve project development and administration. Thus, this study has the following significant contributions.

- → It may help to promote the understanding of stakeholders of selected projects regarding to the influence of technology on project development and administration.
- → The study has great rationality in enhancing my skill in conducting research.
- → It may help to initiate further study on the study area.
- → To provide an input for policy makers.

1.6. Scope of the Study

The focus of this research was delimited on evaluating the influence of technology on project development and administration in Addis Ababa, Ethiopia. Thus, the conceptual framework of the study was utilization of technology as independent variable and project development and administration dependent variable. The geographical delimitation of the study was in Addis Ababa City, three selected projects. The time schedule was from August up to October / 2024.

1.7. Limitation of the Study

Despite its comprehensive approach, this study has several limitations that may impact the findings. Firstly, the use of convenience and purposive sampling techniques may introduce bias, as the selected participants may not fully represent the broader population of project stakeholders in Addis Ababa. This can limit the generalizability of the results to other contexts or regions. Additionally, the reliance on self-reported data from interviews may lead to response biases, where participants provide answers they believe are more favorable or socially acceptable. Furthermore, the dynamic nature of project development and administration, influenced by various external factors such as economic conditions and governmental policies, may not be fully captured within the scope of this study. These limitations suggest that while the findings provide valuable insights, the extra variables should be consideration on project management in Ethiopia.

1.8. Organization of the Thesis

The research was reported by organizing in to five chapters. The first chapter focused on the problem and its approach while the second chapter contains the review of related literature. The third chapter contains research design and methodology. The fourth chapter also contains data analysis and interpretation whereas the fifth chapter is about summary, conclusion and recommendations of the study.

CHAPTER TWO: LITERATURE REVIEW

This chapter presents key concepts, theoretical explanations and empirical review and their findings on the related topics to this study. The chapter tries to give the general concepts of research topic and selectively review the theoretical as well as the empirical aspects of the investigation.

2.1. Theoretical Review

2.1.1. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) proposed by Davis (1989) posits that perceived usefulness and perceived ease of use significantly influence users' acceptance of technology. In the context of project management, understanding how these factors affect the adoption of project management tools is crucial. Studies indicate that when project managers perceive technology as beneficial and easy to use, they are more likely to integrate it into their workflows (Alemayehu & Yitayew, 2022).

2.1.2. Project Management Theory

Project management theory encompasses various frameworks that guide the planning, execution, and evaluation of projects. Kerzner (2017) emphasizes the importance of structured methodologies in achieving project success. In Ethiopia, where project management practices are still developing, applying established project management theories can help improve efficiency and effectiveness.

2.1.2.1. Systems Theory

Systems theory suggests that organizations operate as complex systems with interrelated components. This perspective is valuable in understanding how different project management elements—such as resources, stakeholders, and technology—interact and impact project success. In Ethiopia, recognizing these interrelationships can help project managers identify potential bottlenecks and optimize processes (Molla, 2018).

2.1.2.2. Project Management Methodologies

Project management methodologies provide structured approaches to managing projects. The most prominent methodologies include:

Waterfall Model: A linear and sequential approach where each phase must be completed before the next begins. It is best suited for projects with well-defined requirements. The Waterfall model is often criticized for its rigidity, but it remains popular in industries such as construction and manufacturing where changes are costly (Wysocki, 2014).

Agile Methodology: An iterative approach that promotes flexibility and customer collaboration. Agile is particularly effective in dynamic environments where requirements may evolve. It emphasizes adaptive planning, evolutionary development, early delivery, and continual improvement. Agile methodologies, such as Scrum and Kanban, have gained traction in software development and project management due to their responsiveness to change (Highsmith, 2009).

Lean Project Management: Focuses on maximizing value by minimizing waste. This methodology is often applied in manufacturing and service industries to enhance efficiency. Lean principles encourage continuous improvement and respect for people, aiming to create more value for customers with fewer resources.

2.1.2.3. Project Life Cycle

The project life cycle is a critical concept in project management, consisting of distinct phases:

Initiation: Defining the project scope and objectives. This phase often includes feasibility studies and stakeholder identification. Planning: Developing a detailed project plan, including timelines, resources, and budgets. This phase is crucial for setting clear expectations and establishing a roadmap for execution. Execution: Implementing the project plan and managing team performance. Effective communication and leadership are vital during this phase to ensure that the project stays on track. Monitoring and Controlling: Tracking project progress and making necessary adjustments. This phase involves performance measurement and risk management to ensure that the project remains aligned with its objectives. Closure: Finalizing all project activities and evaluating project outcomes. This phase includes post-project reviews and documentation of lessons learned (Kerzner, 2017).

2.1.2.4. Risk Management in Projects

Risk management is a vital aspect of project management that involves identifying, assessing, and mitigating risks that could impact project success. Key components include:

Risk Identification: Recognizing potential risks that may affect the project. Techniques such as brainstorming, interviews, and checklists are commonly used. Risk Analysis: Evaluating the likelihood and impact of identified risks. Qualitative and quantitative analysis methods help prioritize risks based on their potential effect on project objectives. Risk Response Planning: Developing strategies to address risks, including avoidance, mitigation, transfer, or acceptance. Effective risk management contributes to project success by minimizing uncertainties and enhancing decision-making processes (Hillson, 2017).

2.1.2.5. Stakeholder Management

Stakeholder management involves identifying and engaging individuals or groups that have an interest in the project. Key aspects include:

Stakeholder Identification: Recognizing all stakeholders and understanding their interests and influence. This process often involves stakeholder mapping to visualize relationships and impacts. Stakeholder Engagement: Developing strategies to communicate and collaborate with stakeholders throughout the project life cycle. Effective engagement fosters trust and support, which are critical for project success. Stakeholder Satisfaction: Measuring and managing stakeholder expectations to ensure project alignment with their needs. Regular feedback and communication are essential to maintain stakeholder satisfaction (Bourne, 2016).

2.1.2.6. Emerging Trends in Project Management

Recent trends in project management reflect the evolving nature of the field (PMI, 2021). Notable trends include:

-Digital Transformation: The integration of digital tools and technologies to enhance project management processes. Technologies such as artificial intelligence, machine learning, and big data analytics are increasingly being utilized to improve decision-making and efficiency.

-Sustainability in Project Management: Incorporating environmental and social considerations into project planning and execution. Sustainable project management practices aim to minimize negative impacts on the environment and promote social responsibility.

-Remote Project Management: Adapting project management practices to accommodate remote teams and virtual collaboration. The rise of remote work has necessitated the use of collaboration tools and techniques to maintain productivity and communication.

2.1.2.7. Key Features of Successful Project Development and Administration

1. Clear Objectives and Scope

Project Management Software (e.g., Microsoft Project, Asana, Trello): These tools help define project scope and objectives clearly, enabling teams to set milestones and track progress.

2. Comprehensive Planning

Gantt Chart Software (e.g., Smartsheet, TeamGantt): Tools that facilitate detailed project planning through visual timelines, helping project managers allocate resources and schedule tasks effectively.

3. Effective Communication

Collaboration Tools (e.g., Slack, Microsoft Teams): Platforms that enhance team communication through instant messaging, file sharing, and video conferencing, ensuring everyone is on the same page.

4. Stakeholder Engagement

Stakeholder Management Software (e.g., Stakeholder Circle, Engaging Plans): Tools designed to identify, analyze, and manage stakeholder relationships, ensuring their needs and expectations are met.

5. Strong Leadership and Team Management

Performance Management Tools (e.g., 15Five, Lattice): Software that helps leaders set goals, provide feedback, and facilitate performance reviews, fostering accountability and motivation within teams.

6. Resource Management

Resource Management Software (e.g., Resource Guru, Float): Tools that streamline the allocation and tracking of resources across projects, ensuring optimal utilization.

7. Risk Management

Risk Management Tools (e.g., RiskWatch, Riskalyze): Software that helps identify, assess, and mitigate risks through structured frameworks and reporting functionalities.

8. Monitoring and Evaluation

Project Tracking Software (e.g., Monday.com, ClickUp): Tools that provide real-time tracking of project progress against KPIs, enabling quick adjustments and evaluations.

9. Adaptability and Flexibility

Agile Project Management Tools (e.g., Jira, Kanbanize): Platforms that support Agile methodologies, allowing teams to adapt quickly to changes and continuously improve processes.

10. Quality Control

Quality Management Software (e.g., Qualio, MasterControl): Tools that facilitate the implementation of quality assurance processes, document control, and compliance tracking.

11. Post-Project Review

Survey Tools (e.g., SurveyMonkey, Google Forms): Platforms for conducting post-project evaluations and collecting feedback from team members and stakeholders to identify lessons learned.

These technologies collectively enhance project management practices, ensuring that projects are executed efficiently and effectively while meeting stakeholder expectations. By incorporating these tools, organizations can significantly improve their project development and administration processes.

2.1.2.8. The integration of technologies into project development and administration

In the realm of project development and administration, various technologies have emerged to enhance efficiency, collaboration, and overall project success. Here's an overview of some key technologies currently being utilized, along with their applications and benefits. (https://www.replicon.com/blog/project-management-trends/)

In the realm of project development and administration, various technologies have emerged to enhance efficiency, collaboration, and overall project success. These technologies play a vital role in streamlining processes and ensuring that projects are completed on time and within budget. Below is an overview of some key technologies currently being utilized, along with their applications and benefits.

Project Management Software has become indispensable for teams, with platforms such as Microsoft Project, Asana, Trello, Smartsheet, Monday.com, ClickUp, and Jira. These tools facilitate task assignment, progress tracking, and collaborative planning, enabling teams to stay organized and aligned throughout the project lifecycle.

Collaboration and Communication Tools like Slack, Microsoft Teams, and Zoom have transformed the way teams interact, especially in remote work environments. These platforms enable real-time communication, file sharing, and virtual meetings, fostering a culture of teamwork and transparency.

For managing resources effectively, **Resource Management Tools** such as Resource Guru and Float help project managers allocate resources based on availability and skills, optimizing team performance. Similarly, **Risk Management Tools** like RiskWatch and Riskalyze assist in identifying and mitigating potential risks, contributing to more stable project outcomes.

Quality Management Tools such as Qualio and MasterControl ensure that projects meet required standards and regulations, while **Survey and Feedback Tools** like SurveyMonkey and Google Forms gather valuable input from stakeholders, driving continuous improvement.

In the domain of **Document Management**, tools like Google Drive and Dropbox facilitate easy access and sharing of project documents, ensuring that all team members are on the same page. **Time Tracking Tools** such as Toggl and Harvest help in monitoring project hours and productivity, enabling accurate billing and resource allocation.

For financial oversight, **Financial Management Tools** like QuickBooks and FreshBooks provide insights into project budgets and expenses, while **Data Analysis and Reporting Tools** like Microsoft Excel and Tableau empower project managers to visualize data and make informed decisions.

Agile Project Management Tools such as Kanbanize and Targetprocess support adaptive planning and iterative progress, which are crucial in dynamic project environments. In technical fields, **Integrated Development Environments (IDEs)** like Eclipse and Visual Studio enhance coding efficiency and software development.

In construction and engineering, technologies like **Building Information Modeling (BIM)** with tools such as Revit and Navisworks allow for detailed project visualizations, improving coordination and reducing errors. Additionally, various types of heavy machinery, including excavators, dump trucks, cranes, and paving equipment, play a crucial role in executing physical project tasks.

Emerging technologies such as **Artificial Intelligence (AI)** and **Virtual Reality (VR)** are starting to make significant impacts on project management by enabling predictive analysis and immersive project simulations. Furthermore, **Predictive Analytics** helps forecast project trends and outcomes, while **Blockchain** enhances data integrity and transparency in transactions.

The integration of these technologies into project development and administration not only streamlines processes but also enhances collaboration and decision-making. As project management continues to evolve, staying updated on these tools will be crucial for success (Netflix, 2024).

2.1.2.9. Key measuring criteria of technology influences on the success of project

1. Performance Metrics

A. Project Completion Time

Time taken to complete the project compared to the planned schedule. Track project timelines using project management software (e.g., Gantt charts) and analyze delays attributed to technology integration.

B. Budget Adherence

Comparison of actual project costs to the budgeted costs. Use financial tracking tools to monitor expenditures and identify savings or overruns linked to technological efficiencies.

C. Resource Utilization

Efficiency in using human, financial, and material resources. Evaluate resource management tools that show allocation rates and productivity levels.

2. Quality Metrics

a. Quality of Deliverables

Assessment of project outputs against quality standards. Use quality management software to track defects, rework rates, and compliance with project specifications.

b. Stakeholder Satisfaction

Level of satisfaction among stakeholders (clients, team members, and sponsors) with project outcomes. Conduct surveys or interviews post-project to gather feedback on deliverables and overall satisfaction.

3. User Experience Metrics

I. Ease of Use

How user-friendly the technology is for project team members. Use user experience (UX) surveys to assess the perceived ease of use of project management tools.

II. Training and Support Effectiveness

Adequacy of training and resources provided to users for effective technology adoption. Evaluate participant feedback from training sessions and the subsequent ease of technology integration.

4. Adoption Metrics

a) Technology Adoption Rate

Percentage of project team members actively using the technology. Track usage statistics through log-ins, completed tasks, or interactions within the software.

b) Change Management Success

Effectiveness of strategies implemented to facilitate technology adoption. Assess the smoothness of the transition to new technologies through feedback and resistance levels.

5. Impact on Collaboration

A. Communication Efficiency

Effectiveness of communication among team members facilitated by technology. Monitor response times, message clarity, and the number of communication breakdowns pre- and post-technology implementation.

B. Team Collaboration

Level of collaboration and teamwork fostered by technology tools. Use collaboration tools' analytics to assess participation rates in discussions, shared documents, and project updates.

6. Overall Project Outcomes

a. Return on Investment (ROI)

Financial return achieved from the investment in technology relative to the costs. Calculate ROI by comparing the financial benefits derived from project efficiencies against the costs of implementing and maintaining technology.

b. Overall Project Success Rate

The percentage of projects completed successfully within scope, time, and budget. Analyze historical project data to determine the success rates before and after technology adoption.

2.2. Empirical Review

2.2.1. Review of International studies

Studies on Technology and Project Management

Numerous international studies have examined the relationship between technology and project management, revealing significant insights into how technological integration enhances project outcomes. For instance, a study by Kerzner (2018) explored the impact of advanced project management software on global project success rates. The findings indicated that organizations utilizing sophisticated tools such as Microsoft Project and Asana not only improved task allocation and resource management but also achieved higher levels of stakeholder satisfaction and project completion rates. This aligns with findings from a meta-analysis by Lee and Kim (2020), which demonstrated that technology adoption in project management leads to enhanced communication, real-time collaboration, and overall project efficiency across various industries.

Furthermore, research by PMI (2021) emphasized the role of artificial intelligence (AI) in project management. The study found that AI-driven tools enabled project managers to make data-informed decisions, optimize resource allocation, and predict project risks more accurately. This reflects a broader trend in which organizations are increasingly relying on AI technologies to streamline processes and improve project outcomes, particularly in sectors like construction and IT.

Challenges in Project Management

Despite the benefits of technological integration, numerous challenges persist in project management on an international scale. A comprehensive study by KPMG (2020) identified key barriers such as inadequate technological infrastructure, resistance to change, and a skills gap among project personnel. These challenges often hinder organizations from fully leveraging the potential of new technologies.

Additionally, a survey conducted by McKinsey (2021) revealed that many organizations face difficulties in aligning their technology strategies with overall business objectives. The study highlighted that a lack of clear vision and leadership support often results in fragmented technology adoption efforts, ultimately leading to project delays and budget overruns. Addressing these challenges requires organizations to develop robust change management strategies and invest in both technological infrastructure and employee training.

Impact of Training and Skills Development

The importance of training and skills development in technology adoption has been widely acknowledged in international research. A study by Turner and Müller (2019) found that organizations that invested in comprehensive training programs for their project managers and teams reported significantly better project outcomes. Participants in these programs exhibited improved competencies in using project management software and tools, which translated into enhanced team collaboration and productivity.

Moreover, a report by PwC (2022) emphasized the necessity for continuous learning in the face of rapidly evolving technological landscapes. The findings suggested that organizations that foster a culture of lifelong learning and provide access to ongoing training opportunities are

better positioned to adapt to new tools and methodologies. This not only enhances project performance but also contributes to higher employee engagement and retention rates.

In summary, the empirical evidence from international contexts highlights the critical role of technology in enhancing project management practices, while also acknowledging the various challenges and the importance of training. Future research could focus on comparative studies across different regions to understand how cultural and organizational differences influence technology adoption and project management effectiveness.

2.2.2. Ethiopian studies related to the title of this research

Studies on Technology and Project Management

Various empirical studies have examined the relationship between technology and project management in Ethiopia. For instance, Molla (2018) investigated the role of technology in enhancing project planning and execution. The study found that organizations that integrated technology into their project management practices experienced improved communication and collaboration, leading to timely project completion. This aligns with global findings that technology adoption facilitates better information sharing and stakeholder engagement, which are critical for project success. Additionally, further research by Abebe (2021) corroborated these findings, indicating that the use of project management software not only streamlined processes but also enhanced accountability among team members.

Moreover, studies have explored the impact of specific technologies on project outcomes. For example, Tesfaye (2020) focused on the use of cloud-based project management tools, noting that they enabled real-time updates and remote collaboration, which are particularly beneficial in the context of Ethiopia's diverse geographical landscape. These studies collectively underscore the transformative potential of technology in improving project delivery and stakeholder satisfaction.

Challenges in Project Management

Research conducted by Tadesse et al. (2020) identified several challenges that hinder effective project management in Ethiopia. Key barriers include insufficient technological infrastructure, lack of skilled personnel, and cultural resistance to change. The study highlighted that many

organizations struggle with outdated systems and inadequate internet access, which severely limits their ability to adopt modern project management tools.

Furthermore, cultural factors play a significant role in the acceptance of new technologies. According to a survey by Mekonnen (2019), there is a notable reluctance among some project managers to embrace digital solutions, stemming from a preference for traditional methodologies. This resistance can impede the implementation of innovative practices that could enhance project efficiency. Addressing these challenges requires targeted interventions, such as investments in infrastructure and fostering a culture of innovation through leadership support and change management strategies.

Impact of Training and Skills Development

Alemayehu and Yitayew (2022) highlighted the importance of training in technology adoption. Their study revealed that organizations investing in training programs for project managers and team members significantly improved their project outcomes. This finding emphasizes the need for continuous professional development in the context of evolving technologies. The study also indicated that organizations that prioritized skills development were more likely to adapt to technological changes and leverage them effectively in their project management processes.

Moreover, a related study by Zewdie (2021) explored the correlation between training and employee performance in project management roles. The findings suggested that ongoing education and hands-on training in new technologies not only enhance individual competencies but also contribute to higher team productivity and morale. These insights underscore the necessity for companies to implement structured training programs that address both technical skills and soft skills, ensuring that project teams are well-equipped to navigate the complexities of modern project management landscapes.

In conclusion, the empirical evidence points to a growing recognition of the critical role that technology, coupled with effective training and awareness of challenges, plays in improving project management practices in Ethiopia. Future research could focus on longitudinal studies to further understand the long-term impacts of technology adoption and training on project success rates.

2.3. Conceptual Framework

The conceptual framework for this study is designed to explore the influence of technology on project development and administration in Ethiopia. It identifies key variables and their interrelationships, providing a structured approach to understanding how technology impacts project management practices.

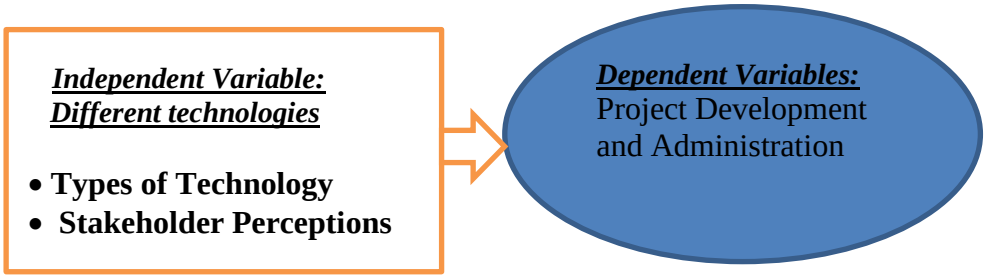
Key Components

1. **Technology Adoption**: This component encompasses the types of technologies employed in project management, including project management software, collaboration tools, resource management systems, and data analytics tools. The adoption of these technologies is influenced by organizational culture, infrastructure, and training.
2. **Project Development and Administration**: This refers to the processes involved in planning, executing, monitoring, and closing projects. Effective project development relies on efficient communication, resource allocation, risk management, and stakeholder engagement.
3. **Influence of Technology**: This element examines how the integration of technology affects project outcomes, including efficiency, timeliness, budget adherence, and quality of deliverables. It also considers how technology facilitates better decision-making and enhances collaboration among project stakeholders.
4. **Stakeholder Perceptions**: This component investigates the attitudes and beliefs of various stakeholders (e.g., project managers, team members, clients) regarding the use of technology in project management. Understanding these perceptions is crucial for successful technology adoption and implementation.
5. **Challenges to Technology Integration**: This includes barriers such as insufficient technological infrastructure, lack of skilled personnel, and resistance to change. Identifying these challenges is essential for developing strategies to enhance technology adoption in project management.

Relationships

- **Technology Adoption ↔ Project Development**: The level of technology adoption directly influences the efficiency and effectiveness of project development processes. Higher adoption rates are expected to lead to improved project outcomes.
- **Influence of Technology ↔ Project Outcomes**: The integration of advanced technologies is hypothesized to result in positive project outcomes, such as improved communication, faster completion times, and better budget management.
- **Stakeholder Perceptions ↔ Technology Adoption**: Positive perceptions of technology among stakeholders are likely to enhance its adoption. Conversely, negative perceptions may hinder successful implementation.
- **Challenges ↔ Technology Adoption**: Identifying and addressing challenges is critical for promoting technology adoption. Organizations that effectively manage these challenges are more likely to integrate technology successfully.

Figure 1: Conceptual Framework



Source: Adopted from literature, Kerzner (2017)

In research, the independent variable (IV), dependent variable (DV), and mediating variable (MV) are fundamental components that help establish causal relationships. The independent variable is the factor that researchers manipulate to observe its effect on the dependent variable. Thus, in this study "evaluating the influence of technology on project development and administration in Ethiopia", influence of technology is (IV) on project development and administration (DV). The dependent variable is the outcome that is measured, which in this case would be the success of project development and administration. Understanding the relationship between these variables is crucial for drawing valid conclusions from research findings.

Mediating variables play a significant role in explaining the mechanisms through which the independent variable affects the dependent variable. They act as intermediaries that clarify how or why an effect occurs (*Alemayehu, & Yitayew, 2022)*. In this study, the Mediating Variables are: Clear Objectives and Scope**,** Comprehensive Planning**,** Effective Communication**,** Stakeholder Engagement**,** Strong Leadership and Team Management**,** Resource Management**,** Risk Management**,** Monitoring and Evaluation**,** Adaptability and Flexibility**,** Quality Control, Post-Project Review, etc.

CHAPTER THREE: RESEARCH METHODOLOGY

In this chapter, Research design, Research approach, Sampling design, Source and data collection methodology, and Model specification are discussed. All these parts of the chapter are included for fulfilling the necessary steps to conduct the research on evaluating the influence of technology on project development and administration in Ethiopia.

3.1. Description of the study area

The study focuses on Addis Ababa, the capital city of Ethiopia, which serves as a pivotal hub for economic, political, and cultural activities in the country. As one of the fastest-growing cities in Africa, Addis Ababa has witnessed significant technological advancements that impact various sectors, including project development and administration. Addis Ababa is strategically located in the central part of Ethiopia, at an elevation of approximately 2,355 meters above sea level. This unique geographic setting influences its climate, infrastructure development, and urban planning initiatives. The city is home to numerous governmental institutions, international organizations, and private enterprises. The growing emphasis on technology in these sectors has transformed traditional project management practices, leading to enhanced efficiency and productivity (Tadesse & Hailu, 2023).

Addis Ababa has made strides in improving its technological infrastructure, including internet connectivity, mobile communication, and digital services. These advancements are crucial for facilitating project development and administration by streamlining processes and enhancing collaboration among stakeholders. The population of Addis Ababa is diverse, comprising various ethnic groups and socio-economic backgrounds. This diversity presents both opportunities and challenges for project implementation, particularly in how technology is leveraged to meet the needs of different communities. Understanding the influence of technology on project development and administration in Addis Ababa is essential for policymakers, project managers, and stakeholders. This study aims to provide insights into how technological integration can improve project outcomes and contribute to sustainable urban development in the city (Tadesse & Hailu, 2023).

3.2. Research Design

In this study descriptive and explanatory research designs have been utilized Descriptive Research Design: This design employed to provide a comprehensive overview of how

technology is currently integrated into project development and administration. It facilitates the collection of quantitative data regarding the frequency and types of technology used, user satisfaction, and the perceived effects of these technologies on project outcomes. Descriptive statistics such as mean, median, and mode could be used to summarize the data collected from the questionnaires.

Explanatory Research Design: This research design is utilized to explain the relationships between technology use and project outcomes. It is used to identify causal links and understand how specific technologies influence various dimensions of project management, such as efficiency, stakeholder engagement, and risk management. By incorporating this design, the study can delve deeper into the mechanisms by which technology impacts project success (Creswell, 2012).

3.3. Research Approach

In this study a mixed research method was employed for collecting, analyzing, and "mixing" both quantitative and qualitative methods in a single study or a series of studies to understand a research problem. The basic assumption was that the uses of both quantitative and qualitative methods, in combination, provide a better understanding of the research problem and question than either methods (Creswell, 2011).

Mixed method research combines quantitative and qualitative approaches by including both quantitative and qualitative data in a single study. The purpose of mixed methods research was to build on the synergy and strength that exists between quantitative and qualitative research methods to understand a phenomenon more fully than is possible using either quantitative or qualitative methods alone.

3.4. Population and Sample size

The target population is said to be a specified group of people or object for which questions can be asked or observed to develop required data structures and information. Since the scope of this study is delimited to Addis Ababa City Administration's Office of the Mayor, Addis Ababa Plan and Development Commission (AAPDC) and Addis Ababa Housing Development Project Office, the target populations were stakeholders of these selected projects i.e. employees, project managers and coordinators, and users of the projects.

Because of the target population of the study was all stakeholders of the selected projects, the population is infinite or too large. Hence, in order to determine sample size of stakeholders of the projects, the researcher might need to use Cochran's formula for calculating sample size when the population is infinite or too large. Sample size calculation for a large population is formulated by Cochran (1977, as cited in Pourhoseingholi et. al., 2013).

$$n_2 = \frac{z^2\, pq}{e^2}$$

Where:

n is the sample size,

z is the selected critical value of desired confidence level,

p is the estimated proportion of an attribute that is present in the population,

q = 1− p and e is the desired level of precision

To calculate a sample size of a large population whose degree of variability is not known, it was assumed the maximum variability which is equal to 5% (p=0.5) and taking 99% confidence level with ±10% precision. The calculation for required sample size was as follows

p = 0.5 and hence q =1-0.5 = 0.5; e = 0.1; z =2.58

$$n = \frac{(2.58)^2\,(0.5)(0.5)}{(0.1)^2} = 166$$

Hence, the researcher took equally 83 employees and 83 users of the selected projects using available sampling technique for the questionnaire. The researcher also selected 3 project coordinators (managers) from these three selected projects for the interview.

3.5. Sampling Technique

For the purpose of this study, the researcher selected Addis Ababa using availability sampling due to the city's current peace and stability, which facilitates easy access to participants involved in various projects. Availability sampling is advantageous for explanatory research, as it provides initial insights into the opinions and experiences of participants without the need for extensive resources or complex logistics (Trost, 2017). Furthermore, this approach can help researchers gauge the general sentiment regarding project implementation and technology use in a rapidly evolving urban environment like Addis Ababa, where immediate feedback is crucial for effective decision-making.

The researcher also employed purposive sampling technique to select the Addis Ababa City Administration's Office of the Mayor, the Addis Ababa Plan and Development Commission (AAPDC), and the Addis Ababa Housing Development Project Office due to their significant roles in addressing a wide range of stakeholders and large user groups within the city's development initiatives. This technique allows for the intentional selection of these key organizations, which are central to the urban development landscape in Addis Ababa, ensuring that the study captures the perspectives and experiences of those most directly involved in major projects. By focusing on these entities, the research can provide in-depth insights into how technology influences project development and administration, as these offices interact with diverse community members, government agencies, and private sector partners. This targeted approach enhances the relevance and richness of the data collected, as it draws from organizations that are pivotal to understanding the broader impacts of urban development efforts in a rapidly changing environment (Palinkas et al., 2015).

In addition to that, convenience sampling technique was employed to select three project coordinators from the selected three projects. Employing convenience or judgmental sampling to select the project coordinators of the three chosen projects for interviews is justified by the need to gather insights from individuals who are readily accessible and possess specific expertise relevant to the study. These coordinators are likely to have firsthand experience and knowledge about the implementation and administration of their respective projects, making them valuable sources of information regarding the influence of technology on project management. This sampling technique allows for targeted data collection from key informants who can provide in-depth perspectives without the logistical challenges associated with reaching a broader sample (Kelly, 2010).

3.6. Data Gathering Tools and Source of Data

The study used primary data which was collected from employees, managers and users of the selected projects. The questionnaires were distributed to stakeholders. Beside to that, the researcher made interview with project coordinators.

The secondary data acquired from document analysis. With this data gathering tool, relevant document was reviewed and gathered. This data gathering tool was to enrich the data which is obtained through questionnaire method.

3.7. Methods of Data Analysis

After the data collected and plausible checks was conducted appropriately. Then coded to the system so as to make the data usefully and relevant to analysis. Data processing and analysis was done by using statistical package for social science (SPSS) to display findings and it was helpful to make it easier by processing all variable and cases.

In order to achieve the findings and results for the thesis, the researcher used descriptive analysis to summarize the data. Tables were used to outline the responses received. The reasons for using this procedure are to make it easier for the reader to compare and understand the findings by presenting the data using frequency, mean, and standard deviation. The study also utilized correlation analysis, and multiple repression models to examine the degree of relationship of independent variable, which is technology utilization and dependent variable (project development and administration).

Model Specification, Description, and Measurement of Variables

1. Model Specification

The model for evaluating the influence of technology on project development and administration in Ethiopia can be expressed as follows:

Dependent Variable (DV):

- Project Development and Administration (PDA)

Independent Variables (IVs):

- Types of Technology (TT)
- Stakeholder Perceptions (SP)

Hypothesized Model:

$PDA=\beta0+\beta1TT+\beta2SP+\epsilon$

Where:

- β0\beta_0β0 is the intercept
- β1\beta_1β1 and β2\beta_2β2 are coefficients representing the influence of the independent variables on the dependent variable

- ϵ\epsilon is the error term

2. Description of Variables

- **Project Development and Administration (PDA)**:
  - **Description**: This variable encompasses the efficiency and effectiveness of managing projects, including completion times, budget adherence, and overall project quality.
  - **Measurement**: Measured through quantitative indicators such as on-time delivery rates, budget variance percentages, and qualitative assessments through surveys.
- **Types of Technology (TT)**:
  - **Description**: Refers to the various technological tools and systems employed in project management, such as software for planning, scheduling, and communication.
  - **Measurement**: Assessed through a survey that captures the frequency of use of different technologies (e.g., project management software, collaboration tools), rated on a scale (e.g., 1 to 5, where 1 = not used, 5 = used extensively).
- **Stakeholder Perceptions (SP)**:
  - **Description**: Represents the attitudes, beliefs, and satisfaction levels of project stakeholders regarding the use of technology in project management.
  - **Measurement**: Measured through a Likert scale survey (e.g., 1 to 5) assessing perceptions of technology effectiveness, ease of use, and overall satisfaction with technological tools.

3. Measurement Techniques

1. **Quantitative Methods**:
   - Surveys with questionnaires to gather data on technology use and project outcomes.
   - Statistical analysis to evaluate relationships and impacts, using software such as SPSS or R.
2. **Qualitative Methods**:
   - Interviews or focus groups with project stakeholders to gain insights into perceptions and experiences with technology in project management.
   - Thematic analysis to identify common themes and patterns in qualitative data.

3.7. Reliability and Validity

However, the researcher used instruments which were designed by scholars, and their validity and reliability are proofed, it was necessary to insure validity and reliability issues with different mechanism in this study. Beside to that the data were triangulated from different respondents using different data gathering tools, the validity and reliability test was conducted as follows:

Validity refers to the degree to which a test measures what it is supposed to measure and consequently permits appropriate interpretation of scores. Validity is the most fundamental consideration in developing and evaluating tests.

The instruments of this study were validated by participating 10 panelists who are subject matter experts identified from project management. The identification process was based on their expertise, qualification, and experiences. Therefore, the panelists have high-level expertise, master's degree holders, and have at least ≥5 years work experience in the project sector.

A draft of hard copy data collection instruments were given to the 10 panelists and briefed about how to judge the adequacy, appropriateness, and non-ambiguity or clarity of each item and directions of the instruments.

Therefore, the panalists rated each item using a three poit scale *(1 = not essential, 2 = useful, but not essential, and 3 = essential)*. As Lewashe (1975) suggested, *'essential'* items best represent good content validity. Fortunately, all the items were rated as essential.

Reliability: refers to the consistency and stability of a measurement instrument. It indicates how trustworthy the results are when the same test is administered multiple times under similar conditions. High reliability means that the instrument yields consistent results, making it a valuable tool for researchers.

Measuring Reliability

To assess the reliability of a research instrument, various methods can be employed, one of which is the Split-Half Reliability Method. This technique evaluates how consistently the instrument measures the intended construct by dividing the test items into two halves and correlating the scores from each half.

Application of Split-Half Reliability

In this approach, the researcher separates the items (in this case, questions from a Likert scale questionnaire) into two groups. Since there are ten questions, they were split into two halves: one group containing questions with odd numbers and the other with even numbers. This division allows for a straightforward comparison of the scores from both halves.

Calculation of Reliability

To calculate reliability using the Spearman-Brown formula, the following steps are taken:

1. **Calculate the Total Scores**: The total score for each half is computed separately.
2. **Correlation Calculation**: The relationship between the two halves is quantified using the formula:

$$r_{xy} = \frac{\Sigma\,(X - \bar{X})(Y - \bar{Y})}{\sqrt{\Sigma\,(X - \bar{X})^2 . \Sigma (Y - \bar{Y})^2}}$$

In this case,

r_{xy} = represents the correlation coefficient between the two halves.

X and Y are the scores from the first and second halves respectively.

$\bar{X}$ and $\bar{Y}$ are the mean scores of the respective halves.

3. **Spearman-Brown Adjustment**: Once r_{xy} is calculated, the Spearman-Brown formula is used to adjust for the split:

$$r_{sb} = \frac{2r_{hh}}{1 + r_{hh}}$$

Where r_{hh} is the reliability coefficient from the split-half method.

Calculation

In a hypothetical scenario:

- The score for the first half totals to 9,582.45, and the variance calculations yield a correlation of r_{xy} =0.989.
- Utilizing the Spearman-Brown formula:

$$r_{sb} = \frac{2*0.989}{1+0.989} = 0.994$$

This calculation indicates a very strong relationship between the two halves, reflecting a reliability of 99%.

Conclusion on Reliability Assessment

The high reliability coefficient suggests that the measurement instrument is indeed consistent and trustworthy for research purposes. A reliability score of 0.994 indicates that the instrument can be relied upon to produce stable and consistent results, which is crucial for the validity of the research findings.

3.8. Ethical Consideration

Ethical considerations play a role in all studies, and all researchers must be aware of and attend to the ethical considerations related to their studies. Therefore, a number of ethical considerations made. The first was asking permission to the selected projects officially personally by giving letter that was given from the university to encourage voluntary participation of respondents. The researcher explained the objectives and significance of the study to the respondents and allowed them to exercise their right to voluntary participation. To avoid any psychological harm, questionnaires were framed in a manner that are not offensive and disturb their personality. The participants consent was kept secured ahead of time. Their identities kept confidential. Questions of deception have not been used during the entire data collection process.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1. Introduction

The purpose of this study was to evaluating the influence of technology on project development and administration in Ethiopia. This section deals with the analysis and interpretation of data collected from the survey questionnaire. Responses for the measures on the questionnaire are summarized and presented using tables to facilitate easy understanding.

4.2. Questionnaire return rate

Table-1: Questionnaire return rate

Population	Size			
	Target Population	Sample	Return	Return rate %
Employees and users (Stakeholders) of the selected projects	Infinitive	166	156	93.97%

Source: Own Survey, 2024

Of the 166 questionnaires distributed, 156 (93.97%) filled questionnaires were collected. According to Mugenda (2003) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% is excellent and it is over excellent; therefore, this response rate is adequate for analysis and reporting. Among these 156 participants, 78 were employees and the remaining 78 were users of the projects selected. To analyze the collected data with that of the objective set for this research, Statistical procedures were carried out using SPSS Statistics version 26.

4.3. General Information

Below is a presentation of the gender, age, educational level, work experience and type of the project of the survey questionnaire respondents.

Regarding to Gender of the respondents of project users, the majority of participants are male (63%), indicating a gender imbalance in the project workforce. Most respondents are between

35-44 years old (35%) and above 55 years (25%), suggesting a mature workforce. Younger age groups (18-24 and 25-34) are underrepresented.

Table-2: Demographic characteristics of respondents (Users)

Demographic Information		Employees of the projects	
		Frequency	Percentage (%)
Gender	Male	49	63
	Female	29	37
	Total	78	100
Age	Below 18	0	0
	18-24	7	10
	25-34	8	11
	35-44	27	35
	45-54	16	20
	Above 55	20	25
	Total	78	100
Educational Background	Primary	2	2
	Secondary	4	5
	Diploma	25	32
	Bachelor's Degree	22	29
	Postgraduate	10	13
	Others	15	19
	Total	78	100
Occupation	Student	7	10
	Employed	35	45
	Self-Employed	11	14
	Unemployed	16	20
	Retired	8	11
	Total	78	100
Type of the project	Addis Ababa City Administration's Office of the Mayor	29	37
	Addis Ababa Plan and Development Commission	16	20
	Addis Ababa Housing Development Project Office	33	43
	Total	78	100
Experience	Less than 6 months	22	29
	6 months to 1 year	14	18
	1-2 years	20	25
	More than 2 years	22	29
	Total	78	100
Primary role in the project	User/Beneficiary	32	40
	Project Manager	0	0
	Stakeholder	28	36
	Contractor	7	10
	Other	11	14
	Total	78	100

Source: Own Survey, 2024

The respondents' educational background showed a significant portion holds a diploma (32%) or a bachelor's degree (29%), reflecting a reasonably educated workforce, but a notable number (2% primary and 5% secondary) points to potential gaps in qualifications. Occupation: Most respondents are employed (45%), with a considerable number being self-employed or unemployed. This diversity may impact project perspectives.

Type of Project: The highest representation is from the Addis Ababa Housing Development Project Office (43%), indicating a focus on housing projects in your study. Experience: A mix of experience levels is present, with 29% having less than 6 months and another 29% having more than 2 years. This may affect the depth of insights into technology usage. Primary Role: Users/beneficiaries make up 41%, indicating a substantial focus on those directly impacted by project outcomes.

Table-3: Background of the respondent (Employees)

		Frequency	Percent	Valid Percent	Cumulative Percent
Role in the organization	Management	3	3.8	3.8	3.8
	Team Leader	9	11.5	11.5	15.4
	Staff	59	75.6	75.6	91.0
	Other	7	9.0	9.0	100.0
	Total	78	100.0	100.0	
Years of experience in the project	Less than 1 year	6	7.7	7.7	7.7
	1-3 years	19	24.4	24.4	32.1
	4-6 years	41	52.6	52.6	84.6
	More than 6 years	12	15.4	15.4	100.0
	Total	78	100.0	100.0	
Type of Projects Managed	City Initiative Development	29	37.2	37.2	37.2
	AAPDC	19	24.4	24.4	61.5
	Housing	30	38.5	38.5	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

Upon the data in the above table, role of the employees, who participated in this study were staff (75.6%) in the organization**.** Majority of the employees (68%) had more than 3 years of experience in the project. The three selected projects i.e. City Initiative Development, AAPDC and Housing projects were represented by the respondents of this study.

The predominance of male respondents and a mature workforce may suggest gender and age biases in project management roles. This imbalance can affect team dynamics and decision-making processes, as diverse teams often outperform homogenous ones (Page, 2007). The educational background indicates a reasonably skilled workforce, but the representation of lower education levels suggests a potential gap in expertise that could impact project outcomes (Davis, 1989).

4.4. Types of technology that are commonly used in project management in Ethiopia

Table-4: Technologies used by users in relation to this project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mobile Applications	3	3.6	3.6	3.6
	Online Portals	5	6.0	6.0	9.5
	Project Management Software	13	16.7	16.7	26.2
	I don't use	36	46.4	46.4	72.6
	Others	21	27.4	27.4	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

Towards technology usage of the stakeholders, significant portion (46.4%) don't use any technology, suggesting barriers to adoption. Project management software (16.7%) is the most utilized, highlighting a need for broader implementation. This implied that the low usage of technology among respondents indicates potential challenges in project efficiency and effectiveness, warranting further investigation into barriers.

The high percentage of respondents not using any technology (46.4%) highlights significant barriers to technology adoption, such as lack of training or inadequate infrastructure (Molla, 2018). The reliance on project management software and communication tools suggests that while some technology is being utilized, there is an opportunity to expand the use of advanced tools for better project management outcomes (Kerzner, 2017).

On the other hand, regarding the frequency of technology utilization by the employees of the project, project management software and communication tools are frequently used. A notable number of employees used them weekly or daily.

Table-5: Technologies used by employees in relation to this project

Technologies		Daily	Weekly	Monthly	As necessary	Never	Total
Project Management Software	Frequency			16	37	25	78
	Percent			20.5	47.4	32.1	100
Collaboration and Communication Tools	Frequency				4	74	78
	Percent				5.1	94.9	100
Resource Management Tools	Frequency			22	13	43	78
	Percent			28.2	16.7	55.1	100
Risk Management Tools	Frequency				1	77	78
	Percent				1.3	98.7	100
Quality Management Tools	Frequency				6	72	78
	Percent				7.7	92.3	100
Survey and Feedback Tools	Frequency			7	50	21	78
	Percent			9.0	64.1	26.9	100
Document Management Tools	Frequency	8	29	23	11	7	78
	Percent	10.3	37.2	29.5	14.1	9.0	100
Time Tracking Tools	Frequency				16	62	78
	Percent				20.5	79.5	100
Financial Management Tools	Frequency			18	10	50	78
	Percent			23.1	12.8	64.1	100
Data Analysis and Reporting Tools	Frequency	4	13	26	22	13	78
	Percent	5.1	16.7	33.3	28.2	16.7	100
Agile Project Management Tools	Frequency				2	76	78
	Percent				2.6	97.4	100
Integrated Development: Environments (IDEs)	Frequency					78	78
	Percent					100	100
Building Information Modeling (BIM)	Frequency				37	41	78
	Percent				47.4	52.6	100
Excavation Equipment	Frequency				38	40	78
	Percent				48.7	51.3	100
Construction Vehicles	Frequency				39	39	78
	Percent				50.0	50.0	100
Lifting Equipment	Frequency				22	56	78
	Percent				28.2	71.8	100
Compaction Equipment	Frequency				25	53	78
	Percent				32.1	67.9	100
Paving Equipment	Frequency				20	58	78
	Percent				25.6	74.4	100
Drilling and Boring Machines	Frequency				8	70	78
	Percent				10.3	89.7	100
Surveying Equipment	Frequency			8	50	20	78
	Percent			10.3	64.1	25.6	100
Power Tools	Frequency				8	70	78
	Percent				10.3	89.7	100
Telehandlers and Skid Steer Loaders	Frequency					78	78
	Percent					100	100
Environmental Management Software	Frequency				4	74	78
	Percent				5.1	94.9	100
Artificial Intelligence (AI)	Frequency		1	2	5	70	78
	Percent		1.3	2.6	6.4	89.7	100
Virtual Reality (VR)	Frequency					78	78
	Percent					100	100
Predictive Analytics	Frequency				11	67	78
	Percent				14.1	85.9	100
Blockchain	Frequency					78	78
	Percent					100	100

Source: Own Survey, 2024

However, tools like risk management and quality management tools are used less frequently, indicating possible areas for improvement. The reliance on certain tools shows a need for training and awareness to enhance the utilization of a wider range of technologies.

Upon the employees' response, 69.9% used project management software monthly and as necessary while document management tools were utilized most frequently (91%) daily, weekly, monthly and when necessary. Data analysis and reporting tools were also employed more (83%).

The employees were asked to list down specify other technologies if they were using in project development and administration. Thus, they mentioned that they use total station (survey machine), eagle point, software, auto card, excel, schedule, machineries, Microsoft word and others.

> *I'm project coordinator in Addis Ababa City Administration's Office of the Mayor, and it's been more than two years since I was assigned as the project coordinator for this project. Utilization of technology in managing this project is depend on the necessity of the technology. Commonly, we use different machines like survey, software and different machineries in this city initiative project and roadside corridor development. (Respondent 1, interviewed, city administration, September/2024).*

Other interviewees, who are coordinators of the project i.e. Addis Ababa Plan and Development Commission and Addis Ababa Housing Development Project Office, also confirmed this.

The varied frequency of use of different technologies indicates that while some tools are regularly utilized, others are underused. This disparity suggests a need for targeted training and awareness programs to ensure all tools, especially those related to risk and quality management, are effectively leveraged (Alemayehu & Yitayew, 2022).

4.5. The influence of technology on project success

4.5.1. Adequacy of technology utilization

As satisfaction levels of the employees, majorities (65.4%) of them were satisfied or very satisfied with the technology used, but 62.8% have not received training, which may limit effective use. This implied that while satisfaction is high, the lack of training could hinder optimal technology utilization, suggesting a need for capacity-building initiatives.

Table-6: Adequacy of technology utilization

		Frequency	Percent	Valid Percent	Cumulative Percent
Satisfaction with the technology you use	Unsatisfied	8	10.3	10.3	10.3
	Neutral	19	24.4	24.4	34.6
	Satisfied	26	33.3	33.3	67.9
	Very Satisfied	25	32.1	32.1	100.0
	Total	78	100.0	100.0	
Training on the technologies you use	Yes	29	37.2	37.2	37.2
	No	49	62.8	62.8	100.0
	Total	78	100.0	100.0	
Adequacy of the training	Inadequate	6	7.7	7.7	7.7
	Neutral	13	16.7	16.7	24.4
	Adequate	42	53.8	53.8	78.2
	Very Adequate	17	21.8	21.8	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

The high satisfaction levels among users indicate a positive perception of technology's role in project management. However, the lack of training for 62.8% of respondents suggests that even with positive attitudes, the full potential of technology is not being realized (Davis, 1989). This points to a critical need for training programs to enhance user competence and confidence in using technology (Alshammari et al., 2014).

4.5.2. Project Development

According to the data in table-7, most projects (51.3%) were completed within 51-75% of the budget, indicating a moderate level of budget adherence. The quality of deliverables was predominantly satisfactory (43.6%). This suggests that while technology is somewhat effective, there is room for improvement in both budget management and deliverable quality.

The researcher included open ended questions about how long a project took to complete it using technology in weeks on average. Upon their response, the projects took completion time depending on the project type and extra variables rather than technology like budget and others. Participants of the study also replied that they have developed three innovative solutions in their projects using technology. This means, one innovative solution has been developed in each project using technology.

Table-7: Technology utilization in project development

		Frequency	Percent	Valid Percent	Cumulative Percent
Percentage of the project completed within budget	26-50%	22	28.2	28.2	28.2
	51-75%	40	51.3	51.3	79.5
	76-100%	16	20.5	20.5	100.0
	Total	78	100.0	100.0	
The quality of project deliverables	Poor	7	9.0	9.0	9.0
	Satisfactory	34	43.6	43.6	52.6
	Good	23	29.5	29.5	82.1
	Excellent	14	17.9	17.9	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

4.5.3. Project Administration

Table-8: Technology utilization in project administration

		Frequency	Percent	Valid Percent	Cumulative Percent
Efficiency of communication in the projects	Very Inefficient	3	3.8	3.8	3.8
	Inefficient	9	11.5	11.5	15.4
	Medium	22	28.2	28.2	43.6
	Efficient	26	33.3	33.3	76.9
	Very Efficient	18	23.1	23.1	100.0
	Total	78	100.0	100.0	
Stakeholders' engagement in the project process	Rarely Engaged	4	5.1	5.1	5.1
	Neutral	19	24.4	24.4	29.5
	Engaged	29	37.2	37.2	66.7
	Very Engaged	26	33.3	33.3	100.0
	Total	78	100.0	100.0	
Effectiveness of resource allocation	Inefficient	11	14.1	14.1	14.1
	Medium	21	26.9	26.9	41.0
	Efficient	30	38.5	38.5	79.5
	Very Efficient	16	20.5	20.5	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

Regarding to project administration; communication efficiency had significant portion (56.4%) reported Efficient to very efficient communication, indicating that technology is positively impacting stakeholder engagement. However, resource allocation efficiency shows areas for improvement. This means, enhanced communication through technology is beneficial, but inefficient resource allocation could impede project success.

In addition to the close ended questions, the researcher asked the respondents how long does it take to make key decisions during project administration on average in days. They replied that, it depends on the issue, and sometimes it took more than a week and even more than a month.

4.5.4. Impact of technology on the projects

Table-9: Positive impact of technology on project outcomes

		Frequency	Percent	Valid Percent	Cumulative Percent
Believe of the employees about the influence of technology on project outcomes	Low Influence	19	24.4	24.4	24.4
	Medium	36	46.2	46.2	70.5
	High Influence	23	29.5	29.5	100.0
	Total	78	100.0	100.0	
Improvement of key performance indicators (KPIs) after the implementation of technology	Time to completion	30	38.5	38.5	38.5
	Budget adherence	16	20.5	20.5	59.0
	Quality of deliverables	24	30.8	30.8	89.7
	Stakeholder satisfaction	8	10.3	10.3	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

In perceived influence, a majority (46.2%) believe technology has a medium influence on project outcomes, with time to completion (38.5%) being the most improved KPI. The implication is that the perception of technology's influence suggests that while it has benefits, stakeholders may not fully realize its potential, indicating a need for better integration and education.

The perception of medium to high influence of technology on project outcomes points to an acknowledgment of its benefits, but also indicates that its impact is not uniformly recognized. This suggests a need for better communication about the benefits of technology and its integration into daily project practices (Tadesse et al., 2020).

As per the response of employees about effectiveness of the project, a high percentage (71.4%) remain neutral regarding technology's effectiveness, with only a small percentage (13.1%) deeming it effective. In addition to that, user satisfaction rates were relatively low, suggesting that while technology is present, it may not be meeting user expectations. This highlights a potential disconnect between technology implementation and user satisfaction, suggesting a need for feedback mechanisms to improve technology use.

Table-10: The projects' outcomes in eyes of project users

		Frequency	Percent	Valid Percent	Cumulative Percent
Effectiveness of the technologies in facilitating involvement in the project	Ineffective	6	7.1	7.1	7.1
	Neutral	56	71.4	71.4	78.6
	Effective	10	13.1	13.1	91.7
	Very Effective	7	8.3	8.3	100.0
	Total	78	100.0	100.0	
Satisfaction of project users with the project's outcomes	Very Dissatisfied	9	11.9	11.9	11.9
	Dissatisfied	13	16.7	16.7	28.6
	Neutral	37	47.6	47.6	76.2
	Satisfied	11	14.3	14.3	90.5
	Very satisfied	7	9.5	9.5	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

Beside to the close ended questions, the participants were asked to provide any specific examples whether technology positively or negatively influenced their projects. According to their response, Technology has positive impact on the project and they listed down that technology helped them to save time, it enabled them get the appropriate position, elevation, data collection and analyze. The users or stakeholders also explained that technology impacted positively the communication, plan, design and data collection process of the projects.

As the contextual factors, less technological infrastructure took the highest share; most respondents find the availability of technological infrastructure satisfactory (41%). However, significant portions rated it poor or very poor (29.5%). Cultural attitudes toward technology adoption were also rated as good and below that, with 91%.

4.6. Perceptions of project stakeholders regarding technology use

Towards government policies, a majority (57.7%) of respondents believe there are supportive government policies, which is a positive indicator for future technology integration. This implied that improving infrastructure and addressing cultural attitudes will be crucial for enhancing technology adoption. Government support can aid in overcoming these barriers.

Table-11: Contextual Factors

		Frequency	Percent	Valid Percent	Cumulative Percent
Availability of technological infrastructure in project areas	Very Poor	5	6.4	6.4	6.4
	Poor	18	23.1	23.1	29.5
	Satisfactory	32	41.0	41.0	70.5
	Good	13	16.7	16.7	87.2
	Excellent	10	12.8	12.8	100.0
	Total	78	100.0	100.0	
Cultural attitudes toward technology adoption	Poor	21	26.9	26.9	26.9
	Satisfactory	36	46.2	46.2	73.1
	Good	14	17.9	17.9	91.0
	Excellent	7	9.0	9.0	100.0
	Total	78	100.0	100.0	
Are there any government policies that support technology use in project management?	Yes	45	57.7	57.7	57.7
	No	33	42.3	42.3	100.0
	Total	78	100.0	100.0	

Source: Own Survey, 2024

Respondents of the study i.e. employees of the projects under the study area listed the government policies that support technology use in the project management. Some of these policies are: Growth and Transformation plan (GTP I & II), Digital Ethiopia 2025, E-Government Strategy, Public Financial Management (PFM) Reform, Capacity Building Initiatives, Sustainable Development Goals (SDGs), etc.

For the open ended question that let the respondents add further comments or insights regarding the influence of technology on project development and administration in Ethiopia, they replied that they had no doubt about the use of technology now a days in every aspect. Despite the fact that, technology is very crucial, there were limitations in advancement, availability, training and adoption of the technologies. Upon their response, the factors that delay the deliverability time of the projects and less qualities of the projects are not because of the technologies used in the projects. The big problems are lack of budget, corruption and less transfer of knowledge from the developed countries to Ethiopia.

4.7. Relationship between technology and project management

The main objective of the study was to evaluating the influence of technology on project development and administration in Ethiopia. For this purpose, inferential statistics of correlation & regression analysis have been used & the results are presented in the below sections.

4.7.1. Pearson Correlation analysis

Correlation analysis studies the joint variation of two or more variables for determining

the strength and direction of the relationship among the variables (Kothari 2004). Accordingly, in order to identify whether the dependent variable & independent variables have a joint variation, Pearson's product moment correlation coefficient was computed. Pearson correlation results range between +1 (perfectly linear positive correlation) to -1 (perfectly linear negative correlation). When the correlation value is 0, no relationship exists between the variables understudy and when the correlation value is lies in the middle between 1 & -1 (excluding 0) the below interpretation guide (Table-12) developed by Marczyk, Dematteo, and Festinger (2005) becomes referred. Accordingly, this guide has been used to interpret the results which are summarized in the coming sections.

Table-12: Correlation result interpretation guide

Correlation value in range	Interpretation
0.00 to 0.19	Weak/ very low correlation
0.20 to 0.39	Low correlation
0.40 to 0.59	Moderate correlation
0.60 to 0.79	High correlation
0.8 to 1.0	Very high correlation

Source: Marczyk, DeMatteo, Festinger (2005)

As indicated in the Table-13, The improvement of key performance indicators (KPIs) after the implementation of technology in the relation with percentage of the project completed within budget was ($r = .829$, $n = 78$, $p < .01$), with the quality of project deliverables ($r = .880$, $n = 78$, $p < .01$), with efficiency of communication in the projects ($r = .855$, $n = 78$, $p < .01$), with stakeholders' engagement in the project process ($r = .850$, $n = 78$, $p < .01$), with effectiveness of resource allocation ($r = .879$, $n = 78$, $p < .01$), with believe of the employees about the influence of technology on project outcomes ($r = .786$, $n = 78$, $p < .01$).

Therefore, there is positive and significant relationship between technology utilization and project management (development and administration). Thus, when technology utilization improved, the project success will be also improved.

Table-13: Correlation between Performance Appraisal and Motivation

		budget	deliverables	communication	Stakeholders' engagement	resource allocation	Believe of the employees on technology	Improvement of KPIs
Percentage of the project completed within budget	Pearson C	1						
	Sig. (2-tailed)							
The quality of project deliverables	Pearson C	.843**	1					
	Sig. (2-tailed)	.000						
Efficiency of communication in the projects	Pearson C	.868**	.893**	1				
	Sig. (2-tailed)	.000	.000					
Stakeholders' engagement in the project process	Pearson C	.876**	.844**	.896**	1			
	Sig. (2-tailed)	.000	.000	.000				
Effectiveness of resource allocation	Pearson C	.905**	.895**	.959**	.872**	1		
	Sig. (2-tailed)	.000	.000	.000	.000			
Believe of the employees about the influence of technology on project outcomes	Pearson C	.860**	.850**	.898**	.920**	.878**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000		
Improvement of key performance indicators (KPIs) after the implementation of technology	Pearson C	.829**	.880**	.855**	.850**	.879**	.786**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	

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

Source: Own Survey, 2024

4.7.2. Multiple Regression analysis

Regression is a measure of association between two sets of variables. Thus, in order to determine the statistically significance effect of the independent variables on the dependent variable, multiple regression analysis was used. As an extension of simple regression, the goal of multiple regression is to enable a researcher to assess the relationship between a dependent (predicted) variable and several independent (predictor) variables. The end result of multiple regression is the development of a regression equation (line of best fit) between the dependent and IV (Pallant, 2005).

Table-14: Results of Multiple Regressions Analysis

Model Summary

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.871[a]	.758	.755	.51906	.758	238.439	1	76	.000	.272

a. Predictors: (Constant), Your satisfaction with the technology you use

b. Dependent Variable: Improvement of key performance indicators (KPIs) after the implementation of technology

Source: Own Survey, 2024

The study was aimed to evaluating the influence of technology on project development and administration in Ethiopia. Accordingly, on the correlation analysis section, it is identified that the independent variable had significant and positive correlation with project

development and administration, and this multiple regression has been conducted to know its influence (effect) on the projects. Hence, adjusted R^2 values were referred to indicate the percentage variance in the dependent variable (project development and administration) explained by the independent variable and the statistical significance of this relationship is also tested.

Accordingly the table-14 below, adjusted R^2 value of 0.758 then the independent variable can explain 76.0% of variance on dependent variable i.e. project development and administration is explained by technology utilization. Further, the F-test shows that the model is statistically significant at 95% confidence level ($p<0.01$) which indicates that the variation explained by the variables is not due to chance.

As per the analysis of regression on the above Table 14, the adjusted R square was 0.758 the model estimated shows that there was 76.0 % positive variation in project management as a result of changes in technology utilization. The rest 24 % of the variation in project was explained by other factors other than technology for corruption and lack of budget. In other way, it is noted that 76 % of the changes in the project management variables could be attributed to the combined effect of the predictor variables or there is 76 % of variation in project development and administration due to technology utilization.

Standard Beta Coefficient

Table-15. Beta Coefficient

Model		Coefficients						
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	-1.462	.240		-6.096	.000	-1.940	-.984
	Your satisfaction with the technology you use	.927	.060	.871	15.441	.000	.808	1.047

a. Dependent Variable: Improvement of key performance indicators (KPIs) after the implementation of technology

Source: Own Survey, 20245

The standardized coefficients are the coefficients which can explain the relative importance of explanatory variables. These coefficients are obtained from regression analysis after all the explanatory variables are standardized. Standardized beta values indicate the contribution of the

variables in the model for the prediction of the dependent variables which enables to rank the variables based on their contribution (Pallant, 2005). Therefore, in this case, technology utilization has high influence on project development and administration since it has standardized coefficient beta value of B=0.871, its t-test significance values below 0.01 implied that it is positive significant predictors of project success.

The analysis reveals that the adjusted R^2 value of 0.758 indicates that 76.0% of the variance in project development and administration, linked to technology, is statistically significant at a 95% confidence level ($p<0.01$). Additionally, the regression model shows that 76% of variations in project management are due to technology utilization, while the remaining 24% is attributed to factors like corruption and budget constraints. Standardized coefficients highlight that technology utilization, with a beta value of 0.871, is a strong predictor of project success.

However, the study also identifies demographic imbalances, such as a majority of male respondents and a lack of younger participants, alongside barriers to technology adoption affecting 46.4% of respondents. Despite 65.4% expressing satisfaction with technology, 62.8% have not received necessary training. While most projects stay within budget (51.3% in the 51-75% range), only 43.6% of deliverables are rated satisfactory, and there is room for improvement in communication efficiency, as 56.4% report medium to very efficient communication.

CHAPTER FIVE

FINDING, SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1. Finding

The analysis presented in Chapter 4 reveals critical insights into the demographics, technology usage, and perceptions of project stakeholders in Ethiopia's project management landscape. Key findings include:

Demographic Imbalance: A gender imbalance exists with a majority of male respondents (63.1%) and an underrepresentation of younger age groups.

Technology Utilization: A significant portion (46.4%) of respondents do not utilize technology, indicating barriers to adoption, such as inadequate training and infrastructure.

Satisfaction with Technology: While 65.4% of respondents express satisfaction with technology, 62.8% have not received training, suggesting that satisfaction does not equate to optimal usage.

Budget Adherence: Most projects are completed within budget (51.3% within 51-75%), but quality of deliverables remains a concern, with only 43.6% rated as satisfactory.

Communication Efficiency: Technology positively influences communication efficiency (56.4% report efficient to very efficient communication), yet resource allocation remains an area for improvement.

5.2. Summary

The data indicates a diverse yet imbalanced workforce, with a notable lack of technology adoption that hampers project efficiency. While users report a general satisfaction with the technology available, the absence of adequate training and support limits the effective utilization of these tools. The reliance on basic project management software suggests an opportunity for broader implementation of advanced technologies. Stakeholders generally perceive technology as having a medium influence on project outcomes, yet there is a disconnect between technology implementation and user satisfaction.

5.3. Conclusion

The research underscores the importance of addressing the barriers to technology adoption in project management within Ethiopia. Despite a foundation of technology use, significant challenges remain, particularly regarding training, infrastructure, and stakeholder engagement. The findings point to a cautious optimism about technology's potential, yet indicate a pressing need for comprehensive strategies to improve both the awareness and effectiveness of technology in project management.

5.4. Recommendation

To enhance technology adoption and overall project management success in Ethiopia, the following recommendations are proposed:

1. Training Programs

Implementation of Targeted Training Initiatives

Effective training programs are crucial for bridging the skills gap among project managers and team members. By tailoring training to specific technologies and user experiences, organizations can ensure that employees feel confident and competent in using these tools. Investing in both initial training and ongoing professional development can lead to higher productivity, reduced errors, and better project outcomes. Additionally, fostering a culture of continuous learning encourages adaptability in a rapidly evolving technological landscape.

2. Infrastructure Development

Investment in Technological Infrastructure

Robust technological infrastructure is the backbone of successful technology adoption. Inadequate resources can hinder the effective use of advanced project management tools. By prioritizing investments in internet connectivity, hardware, and software solutions, organizations can create an environment conducive to innovation and efficiency. This infrastructure not only supports project management but also enhances collaboration among team members, ultimately leading to improved project delivery and stakeholder satisfaction.

3. Feedback Mechanisms

Establishment of Regular Feedback Loops

Implementing feedback mechanisms is essential for understanding user experiences and identifying areas for improvement. Regularly collecting input from users can help organizations adapt their technology strategies to meet evolving needs. This proactive approach fosters a sense of ownership among users, encouraging them to engage more with the technology. Moreover, feedback can inform future training initiatives and technological upgrades, ensuring that the tools remain relevant and effective in achieving project goals.

4. Diversity Initiatives

Encouragement of Gender and Age Diversity in Project Teams

Promoting diversity within project teams can significantly enhance decision-making and creativity. Teams composed of individuals with varied backgrounds bring unique perspectives and solutions to challenges. By actively encouraging gender and age diversity, organizations can tap into a broader range of ideas and experiences, leading to more innovative project outcomes. Additionally, diverse teams are often better equipped to understand and meet the needs of a varied client base, increasing overall project success and stakeholder engagement.

5. Government Support

Leveraging Supportive Government Policies

Government support plays a pivotal role in facilitating technology adoption in project management. By creating policies that incentivize technology use, the government can help organizations overcome barriers to adoption, such as financial constraints and cultural resistance. Initiatives that promote technology awareness and education can also shift cultural attitudes, making technology more accepted and valued in project management practices. Collaboration with government agencies can lead to the development of a supportive ecosystem that encourages innovation and enhances project management effectiveness across various sectors.

Implementing these recommendations can significantly enhance technology adoption in project management in Ethiopia. By focusing on training, infrastructure, feedback, diversity, and government support, organizations can create a robust framework for success, leading to improved project outcomes and overall organizational performance.

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Appendices I

SCHOOL OF GRADUATE STUDIES

SCHOOL OF BUSINESS

Employees of _____ Project

Questionnaire to be filled by _____

Dear respondents

The researcher would like to express her appreciation for your generosity in sharing your precious time and honesty respond to this questionnaire. This questionnaire is designed to collect data about evaluating the influence of technology on project development and administration in Ethiopia. Your genuine and correct response will contribute more for my effective work. Your information will be kept confidentially and not used for other purpose. Hence, you are not personally affected since it is to be used only for academic purpose. The questionnaire is prepared to gather relevant information about the influence of technology on project success. For this reason, you are kindly requested to provide the correct information for the following questions.

Thank you in advance!

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at

09 46 94 44 22 or at

Yosefasefa315@gmail.com.

For employees of the project

Instructions: No need of writing your name. Please put (√) for some questions and circle your choice from the given alternatives for others. And lastly, write what you fill without hesitation on the provided space to open ended questions.

Section one: Background of the respondents

1. What is your role in the organization? (Select one)
   Management ☐ Team Leader ☐ Staff ☐ Other: _____
2. How long have you worked in this organization?
   Less than 1 year ☐ 1-3 years ☐ 4-6 years ☐ More than 6 years ☐
3. Type of Projects Managed
   City Initiative Development ☐ AAPDC ☐ Housing ☐

Section 2: Technology

1. Which types of technology do you use in project management? (Select all that apply) and How frequently do you use these technologies?

Types of technology	How frequently				
	Daily	Weekly	Monthly	As necessary	Never
1. Project Management Software: Microsoft Project, Asana, Trello, Smartsheet, Monday.com, ClickUp, Jira					
2. Collaboration and Communication Tools: Slack, Microsoft Teams, Zoom					
3. Resource Management Tools: Resource Guru, Float					
4. Risk Management Tools: RiskWatch, Riskalyze					
5. Quality Management Tools: Qualio, MasterControl					
6. Survey and Feedback Tools: SurveyMonkey, Google Forms					
7. Document Management Tools: Google Drive, Dropbox					
8. Time Tracking Tools: Toggl, Harvest					
9. Financial Management Tools: QuickBooks, FreshBooks					
10. Data Analysis and Reporting Tools: Microsoft Excel, Tableau					
11. Agile Project Management Tools: Kanbanize, Targetprocess					
12. Integrated Development: Environments (IDEs), Eclipse, Visual Studio					
13. Building Information Modeling (BIM), Revit, Naviswork					
14. Excavation Equipment, Excavators, Bulldozers					
15. Construction Vehicles, Dump Trucks, Cement Mixers,					
16. Lifting Equipment: Cranes					
17. Compaction Equipment: Rollers, Plate Compactors					
18. Paving Equipment: Asphalt Pavers, Concrete Pavers					
19. Drilling and Boring Machines: Augers and Directional Drills					
20. Surveying Equipment, Total Stations					
21. Power Tools, Concrete Cutters and Drills					
22. Telehandlers and Skid Steer Loaders					
23. Environmental Management Software & Equipment: Envirosuite, Sustainability Assessment tool, Equipment Dust Suppression Systems					
24. Artificial Intelligence (AI)					
25. Virtual Reality (VR)					
26. Predictive Analytics					
27. Blockchain					

- Other (please specify): _____

2. On a scale of 1 to 5, how satisfied are you with the technology you use?
1(Very Unsatisfied) ☐ 2 (Unsatisfied) ☐ 3 (Neutral) ☐ 4 (Satisfied) ☐ 5 (Very Satisfied) ☐
3. Have you received training on the technologies you use?
Yes ☐ No ☐
4. If yes, how adequate was the training? (1 = Very Inadequate, 5 = Very Adequate)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Section 3: Project Development

1. On average, how long does it take to complete a project using technology? (in weeks) _____
2. What percentage of your projects are completed within budget?
0-25% ☐ 26-50% ☐ 51-75% ☐ 76-100% ☐
3. How would you rate the quality of project deliverables? (1 = Very Poor, 5 = Excellent)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐
4. How many innovative solutions have you developed in your projects using technology? _____

Section 4: Project Administration

1. How would you rate the efficiency of communication in your projects?
(1 = Very Inefficient, 5 = Very Efficient)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐
2. On average, how long does it take to make key decisions during project administration? (in days)_____
3. How do engage your stakeholders in the project process?
(1 = Not Engaged, 5 = Very Engaged)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐
4. How effective is your resource allocation? (1 = Very Ineffective, 5 = Very Effective)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Section 5: Influence of Technology

1. To what extent do you believe technology has influenced project outcomes? (1 = No Influence, 3 = High Influence)
1 ☐ 2 ☐ 3 ☐
2. Please provide any specific examples of how technology has positively or negatively influenced your projects:
_____
3. What key performance indicators (KPIs) have improved since the implementation of technology? (Select all that apply)
Time to completion ☐ Stakeholder satisfaction ☐
Budget adherence ☐ Other (please specify): _____
Quality of deliverables ☐

Section 6: Contextual Factors

1. How would you rate the availability of technological infrastructure in your area? (1 = Poor, 5 = Excellent)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐
2. What are the cultural attitudes toward technology adoption in project management within your organization?
(1 = Poor, 5 = Excellent)
1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐
3. Are there any government policies that support technology use in project management?
Yes ☐ No ☐
If yes, please specify: _____

Section 7: Additional Comments

Please provide any additional comments or insights regarding the influence of technology on project development and administration in Ethiopia:
_____

Questionnaire for the users of the projects

Section 1: Demographic Information

1. Age:
   - ☐ Under 18 ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55 and above
2. Gender:
   - ☐ Male ☐ Female
3. Occupation:
   - ☐ Student ☐ Self-employed ☐ Retired
   - ☐ Employed ☐ Unemployed
4. Educational Background:
   - ☐ Primary Education ☐ Higher Education (Diploma) ☐ Postgraduate Degree
   - ☐ Secondary Education ☐ Bachelor's Degree ☐ Other: _____

Section 2: Project Experience

5. Which project are you involved with? (Select one)
   - ☐ Addis Ababa City Administration's Office of the Mayor
   - ☐ Addis Ababa Plan and Development Commission
   - ☐ Addis Ababa Housing Development Project Office
6. How long have you been involved with this project?
   - ☐ Less than 6 months ☐ 1-2 years
   - ☐ 6 months to 1 year ☐ More than 2 years
7. What is your primary role in the project?
   - ☐ User/Beneficiary ☐ Stakeholder
   - ☐ Project Manager ☐ Contractor ☐ Other: _____

Section 3: Technology Usage

8. Which technologies have you used in relation to this project? (Select all that apply)
   - ☐ Mobile Applications ☐ Project Management Software
   - ☐ Online Portals ☐ Communication Tools (e.g., WhatsApp, Zoom)
   - ☐ Other: _____
9. How would you rate the effectiveness of these technologies in facilitating your involvement in the project?
   - ☐ Very Ineffective ☐ Neutral ☐ Very Effective
   - ☐ Ineffective ☐ Effective
10. Please explain how these technologies have impacted your experience with the project:

    _____

Section 4: Satisfaction and Feedback

11. Overall, how satisfied are you with the project's outcomes?
    - ☐ Very Dissatisfied ☐ Neutral ☐ Very satisfied
    - ☐ Dissatisfied ☐ Satisfied
12. What aspects of the project do you believe are most successful?

    _____

13. What challenges have you encountered while participating in the project?

_____

14. What improvements would you suggest for future projects?

_____

Section 5: Additional Comments

15. Please share any additional comments or feedback regarding your experience with the project:

_____

Interview with project coordinators

Closed-Ended Questions

1. Which project are you coordinating?
   A. Addis Ababa City Administration's Office of the Mayor
   B. Addis Ababa Plan and Development Commission
   C. Addis Ababa Housing Development Project Office
2. How long have you been the project coordinator for this project?
   A. Less than 6 months C. 1-2 years
   B. 6 months to 1 year D. More than 2 years
3. How often do you utilize technology in managing this project?
   A. Daily B. Weekly C. Monthly D. As necessary E. Never
4. On a scale of 1 to 5, how would you rate the effectiveness of the technologies used in this project?
   1 (Very Ineffective) 2 (Ineffective) 3 (Neutral) 4 (Effective) 5 (Very Effective)
5. Have you received adequate training on the technologies used in your project?
   A. Yes B. No

Open-Ended Questions

1. Can you describe your overall experience as a project coordinator for this project? What have been the key successes?

   _____

2. What specific technologies do you use in managing the project, and how do they assist you in your role?

   _____

3. What challenges have you faced in implementing and managing the project? How have you addressed these challenges?

   _____

4. In your opinion, how does technology impact communication and collaboration among project stakeholders?

   _____

5. What feedback have you received from users or beneficiaries of the project regarding its implementation and effectiveness?

   _____

6. What improvements would you suggest for the technologies or processes used in this project?

   _____

7. Is there anything else you would like to add about your experience or suggestions for future projects?

   _____