ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE

Agile project management in Ethiopia public-private partnership: challenges and practices – The case of Ministry of innovation and technology, and Eldix software developer PLC

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Agile Project Management in Ethiopian Public-Private Partnerships: Challenges and Practices - The Case Study of the Ministry of Innovation and Technology (MinT) and Eldix Software Development PLC"

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Statement of Declaration

I, the undersigned, declare that the study entitled, "**Agile Project Management in Ethiopian Public-Private Partnerships: Challenges and Practices – The Case Study of the Ministry of Innovation and Technology (MinT) and Eldix Software Development PLC"**: is the result of my own effort and study that all sources of materials used for the study have been acknowledged. I have conducted the study independently with the guidance and comments of the research advisor. This study has not been submitted for any degree in any university. It is conducted for the partial fulfillment of the Master of Arts Degree in Project Management.

Christian Negese

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Signature and date

Letter of Certification

This is to certify that Christian Negese has conducted this project work entitled "**Agile Project Management in Ethiopian Public-Private Partnerships: Challenges and Practices - The Case Study of the Ministry of Innovation and Technology (MinT) and Eldix Software Development PLC"**" under my supervision.

This project work is original and suitable for the submission in partial fulfilment of the requirement for the award of Master of Arts Degree in ProjectManagement.

Bahran Asrat (Ph.D.)

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Signature and date

Approval Page

Agile project management in Ethiopia public-private partnership: challenges and practices – The case of Ministry of innovation and technology, and Eldix software developer PLC The research project entitled "**.** prepared and submitted by Christian Negese in partial fulfilment of the requirements for the degree of Master of Arts in Project Management, is hereby approved and accepted.

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List of Acronyms

GDAD – Geographically Distributed Agile Development

ICT – Information Communication Technology

IT – Information Technology

ITSM – Information Technology Services Management

PM – Project Manager

PO – Product Owner

SD – Standard Deviation

SLR – Systematic Literature Review

SM – Scrum Master

MinT- Ministry of Innovation and Technology

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Abstract

This research examines the challenges of adopting Agile practices in public-private partnerships, specifically focusing on the Ministry of Innovation and Technology (MinT) and Eldix Software Development PLC in Ethiopia. It aims to identify the challenges of Agile project management and assess current practices at both organizations.

A literature review defines Agile concepts, values, and known problems, while an empirical review covers existing research. The study uses a descriptive research approach, employing questionnaires with Likert scales, interviews, and open-ended questions to collect data from project team members (49 out of 52 responded). The data was analyzed using descriptive statistics.

Findings highlight critical issues such as poor communication, unclear team roles, multiple product owners, low team motivation, and insufficient upper management support. Challenges in customer feedback and scope change management were also noted. Despite successfully delivering products according to specifications, both organizations struggled with project timelines and budgets.

Recommendations include standardizing and enhancing Agile training for all team members, implementing robust communication protocols, ensuring strong upper management support, and fostering a collaborative environment to improve Agile project management practices.

Keywords: *Agile practice, challenges, public-private partnership, project outcome*

Chapter I – Introduction

This chapter introduces the research by covering topics such as background of the study, statement of the problem, research questions and objectives, significance, scope, limitations as well as organization of the study for the rest of the paper.

1.1 Background of the study

According to Dikert et al. (2016), Agile project management methodologies are becoming more prevalent across diverse sectors, such as governmental organizations and private enterprises, with the aim of improving the efficiency and effectiveness of project completion.

Noori (2023, December 17) describes Agile project management as an iterative approach to project delivery, particularly prevalent in software development, aiming to enhance speed and adaptability. From a broader perspective, Cobb (2023) defines Agile as a flexible and adaptive approach for developing and optimizing solutions in uncertain environments, emphasizing its incremental and iterative nature.

Agile is the opposite of traditional project management styles, such as the Waterfall approach and there are key differences between the two (Noori 2023, December 17). The waterfall model has its own drawbacks. Arora (2021) points out that the paradigm lacks flexibility because decisions are made in phase one, limiting adaptation. Gumiński, Dohn, & Oloyede (2023) underline the lack of overlap between stages in the waterfall approach, prohibiting post-completion inspections for enhancements. According to Pargaonkar (2023), the rigidity of the waterfall approach impedes any prospective advancements after phase completion. However, these disadvantages do not mean that the waterfall approach is without advantages. Kannan, Jhanjhari, et al. (October 2014) stated that the waterfall model's key utility is its ability to provide a framework for designing and managing software development projects. Arora (2021) explained that this paradigm provides for the early collection of design specifications and flaws, even before software development begins, resulting in time savings during the development phase.

"Wernham (2012) put forward two primary arguments. Firstly, he contends that agile project management offers a superior approach to conducting most technology projects compared to

waterfall methodologies. Secondly, he asserts that the absence of agile leadership impedes governmental agility."

In Agile challenge management, the methodology takes an iterative technique, with work divided into sprints or cycles. In assessment, Waterfall assignment control takes a linear technique, with work divided into wonderful levels. Agile emphasizes collaboration, communique, and versatility, whilst Waterfall emphasizes making plans, documentation, and adherence to a predefined process. Agile prioritizes handing over running software program quick, whereas Waterfall prioritizes handing over a totally finished mission at the quit. Agile permits for changing requirements throughout the assignment, while Waterfall assumes necessities are constant at the start of the assignment. Agile requires energetic involvement from the customer or product proprietor, even as Waterfall lets in for confined client involvement throughout the improvement process.

Agile methodologies are approaches to project management and software development that emphasize flexibility, cooperation, and incremental progress. Traditional, linear project management systems struggled to adapt to quickly changing requirements and client needs, prompting the development of these methodologies. Common Agile methodologies such as Scrum, Kanban, Extreme Programming (XP), and Lean Software Development are prevalent in the industry. Each methodology is characterized by a distinct set of practices and principles, albeit they collectively uphold fundamental values of flexibility, collaboration, and a customer-centric approach.

Scrum methodology is an agile approach commonly used in software development but increasingly applied in various industries (Fawareh, et.al. 2022, June). It involves structured and iterative stages like backlog, sprint backlog, daily scrum, sprint review, and sprint retrospective (Vitkin, et.al. 2022).

Kanban is a method that revolves around visualizing work, curbing work in progress and routinely delivering by offering a pull system, a prioritized queue and validated learning; Traditional forms are based on Lean principles, but all of the above methods have substantial differences in their implementation (dos Santos, *et.al* 2018).

Extreme Programming – this approach is about implementing practices like writing unit tests before programming, integrating and testing the whole system several times a day, and developing software in pairs it is centered on delivering high-quality software and reducing the cost of change

The Lean methodology is a quality improvement strategy originating from the industrial sector in the 90s, aiming to reduce waste, enhance value, and promote continuous quality enhancement (MJ, N. L., & Monteiro, S. 2023).

Organization Background

The Ministry of Innovation and Technology (MinT) plays a critical role in fostering Ethiopia's Information and Communication Technological, digitalization, innovation and digital economy landscape, as mandated by Proclamation No. 1097/2019 (FDRE Council of People's Representatives, 2019). This proclamation outlines MinT's responsibilities, including:

- Collaborating on technology standards and ensuring their practical implementation.
- Aligning the national curriculum with advancements in innovation and technology.
- Identifying and implementing appropriate technologies for national growth.
- Encouraging research, studies, and mainstreaming of indigenous technologies.
- Establishing a system to recognize and reward individuals and institutions driving innovation and technological development.

The ministry is expected to play a pivotal role by crafting policies and strategies that institutions through which can facilitate the instillations of infrastructure that enables them to provide public service through online systems. In doing so, the ministry identifies, upon formulation of policeis, areas of problems that are of critical advantage for digitalization of public service. To that end, apart leading research and development program, the ministry collaborates with innovators, vendors, and technology product (systems and soft wares) suppliers like Eldix and acts as a link to meet the demands of public originations.

As can be seen form the proclamation No. 1097/2019 the ministry is not mandated to directly develop soft wares by itself. Therefore, after thorough and aligned assessment of public

originations demand with that of the strategic plan it seeks out for service vendors locally and internationally, as a result of which, many technological and innovative projects are conceived.

So far ministry of innovation and technology deploys a traditional approach that entails preparation of terms of reference, floating bid, assessing bid documents, selection and signing of contract with the winner. Right after contract singing and commencement of projects the role of the ministry is to make sure the compliance between project plan and project execution progress which encompass an iterative communication, quality assurance, schedule management, dynamism of project contents, features, purpose, project modules & means of knowledge transfer, product prototype, testing, go live and etc. While the effort to acquire technological products from Eldix enhances shares of private sector involvement in the digitalization process of public institutions, it is highly prone to misconception of product purpose, missing deadlines, lacks interest in iterative correction and inculcation of new product features, having hard time to the dynamic nature of software development, inefficient resource utilization, etc.

Eldix Software Development PLC

360Ground operates as the trademark of Eldix IT Technology PLC, a veteran in the IT sector with over 13 years of experience based in Addis Ababa, Ethiopia. The company is a powerhouse in designing sophisticated solutions ranging from government and enterprise management information systems to national portals, monitoring tools, and banking applications, addressing both national and regional needs.

Within the researcher reach, few studies had been carried out regarding project agility especially in relations to software development. This study, therefore, intends to see the sights of the new approach of project agility management practice by selecting ministry of innovation as it acts as a link between service beneficiaries (public organization) and service providers (Software developers). In doing so, it will focus on timeliness, quality, project purpose, cost, resource utilization, and knowledge transfer. These variables are found ample to discuss the practice and indicate challenges & opportunities associated with it and in turn enable stakeholders to configure way forwards.

1.2 Statement of the problem

Approximately 50% of the challenges faced in implementing Agile project management in the public sector in Ethiopia are related to the Development Approach and Lifecycle, Project Work, Team, Stakeholder, Delivery, Measurement, Planning, and Uncertainty domains (Regassa, Z., Bass, J. M., & Midekso, D. 2017). Agile techniques are an increasing number of being followed in public administrations, such as in IT initiatives, with a growing frame of research helping this trend (Abdullah, et.al 2023). However, the general public quarter in Ethiopia nevertheless grapples with issues consisting of excessive ranges of corruption, lack of transparency, and a shortage of professional manpower within the ICT/IT domain, which hinder the success implementation of Agile practices (Ghimire, D., et.al 2020). Despite these challenges, Agile principles, values, and practices are recognized for their importance in addressing issues with requirements and encouraging user participation in software development projects in Ethiopia (Balaraman, P. (2018).

The inducement of task agility strategies has not but led to the favored efficiency and effectiveness in coping with government projects. Despite the benefits of agility, providers stay reluctant to interact in government tasks due to protracted procurement techniques, regulatory requirements, and bureaucratic systems. Beneficiaries (public institutions) additionally face demanding situations which include common mergers and separations, which have an effect on carrier shipping and the want for gadget alignment. Revisions in carrier requirements and guidelines necessitate infrastructure updates, professional manpower, and financial resources, which can be a limitation to project execution (van der Hoeden, M. 2023, June 23). The Ministry of Innovation and Technology faces challenges in handling more than one tasks simultaneously due to restrained skilled personnel, lack of exposure to agile contract management, and problems in facilitating communication among providers and beneficiaries. Resource mobilization efforts for project fees and adherence to regulatory changes also pose challenges (van der Hoeden, M. 2023, June 23).

The application of agile project management has been a topic of interest in various industries in Ethiopia, including social enterprises, Private Banking Industry, The Case Of M-Birr, banking, of post-tensioning and. Researchers such as (Fekadu, 2021), Feyissa, A. D. (2019)., Amberber, A.

(2018), Tassew, Y. (2021). have investigated the use of agile project management in these industries.

Within the researcher's reach, limited studies have explored project agility, particularly in the context of software development. This study aims to investigate the novel approach of project agility management practices focuses on a private sector company implementing Agile. however, explores Agile in a unique context: **Ethiopian Public-Private Partnerships (PPPs)**. This creates a significant research gap can address by examining the Ministry of Innovation, and the service providers Eldix (software developers). The study will specifically focus on agile practices and challenges as key variables. These variables are deemed sufficient for analyzing the practices, identifying associated challenges. However, there is a lack of research on how government institutions and the private sector collaboratively apply Agile project management practices, especially for digitalization initiatives. For example, limited insight exists into the use of Agile project management at the Ministry of Innovation and Technology. Additionally, there is a scarcity of evidence on how public institutions collaborate with external partners like Eldix Software Development Plc, utilizing Agile methodologies to manage projects from inception to completion. This research gap underscores the necessity to explore the challenges, successes, and implications of Agile project management in government bodies.

1.3 Research questions

1. What does the agile implementation at MinT and Eldix collaboration in terms of time, budget and deliverable?
2. What are the challenges encountered public-private collaboratively working?
3. What strategies can be implemented to address the challenges encountered by both MinT and Eldix in their Agile practices?

1.4 Objectives

- ✓ **General Objectives**

  The general goal of the research is to explore and evaluate the implementation of Agile project management practices in the public-private partnership between the Ministry of Innovation and Technology (MinT) and Eldix Software Developer PLC, focusing on adherence, challenges, and the impact of collaboration on project outcomes.

- ✓ **Specific Objectives**

- ❖ To assess the effectiveness of Agile implementation at MinT and Eldix in terms of time management, budget adherence, and quality of deliverables.
- ❖ To identify and analyze the challenges faced by MinT and Eldix in implementing Agile project management practices in the context of their public-private partnership
- ❖ To propose strategies and recommendations to address the identified challenges and improve Agile project management at both organizations.

1.5 Significance of the study

This study intends to address the existing gap in academic literature concerning the joint utilization of Agile project management methodologies by governmental institutions and private sector organizations in Ethiopia. Currently, there is a scarcity of scholarly research focusing on the application of Agile practices within public-private partnerships (PPPs) in the Ethiopian setting. By delving into the specific scenario involving the Ministry of Innovation and Technology (MinT) and Eldix Software Developer PLC, this investigation offers a distinctive opportunity to examine the dynamics, obstacles, and achievements of such partnerships. The comprehension of these elements is essential for enhancing project management methodologies and promoting more efficient partnerships between the public and private sectors.

The outcomes of this research endeavor will offer valuable insights for policymakers, project leaders, and stakeholders engaged in initiatives for digital transformation. Policymakers can utilize these insights to establish supportive regulatory structures that facilitate the integration of Agile methodologies in public projects. Through the identification and resolution of barriers to Agile

implementation, such as cultural discrepancies and regulatory limitations, policymakers can cultivate a more favorable environment for innovative project management approaches. Moreover, project managers in both public and private domains can profit from practical suggestions on surmounting challenges and optimizing Agile techniques to improve project results and stakeholder contentment.

Moreover, this research contributes to the broader conversation on enhancing the efficiency and efficacy of public service provision through PPPs. As nations worldwide increasingly embrace digital transformation initiatives to streamline governmental operations and enhance service provision, the knowledge acquired from this study will hold relevance beyond Ethiopia. Stakeholders, including international development organizations and other governmental bodies, can draw insights from the experiences of MinT and Eldix to shape their Agile implementation strategies. Ultimately, this study seeks to cultivate a deeper understanding of how Agile project management can be effectively merged into public-private partnerships, propelling innovation and efficiency in public service delivery.

1.6 Scope of the study

The scope of this study focuses on examining the implementation of Agile project management practices within the Ministry of Innovation and Technology (MinT), and its collaboration with Eldix Software Developer Private Company in Ethiopia. This research aimed to explore the dynamics of Agile project management within the context by the Ministry of Innovation and Technology. Specifically, the research investigates agile project practices and challenges for effective project outcomes. The research analyzes these aspects to provide insights into the challenges and opportunities associated with Agile project management in the Ethiopian governmental context, ultimately aiming to inform strategies for optimizing project outcomes and leveraging technology for societal benefit.

The study is focused solely on government sector the Ministry of Innovation and Technology (MinT) and private sector Eldix software developer plc. Geographically, the government and private sectors are located in Addis Ababa, Ethiopia. This research investigated the adoption and effectiveness of Agile project management practices in public-private partnership projects

undertaken by MinT in various public sector locations across Ethiopia, including Addis Ababa. As the research's scope was limited to MinT, and Eldix, data were gathered from all 52 project managers and teams associated with both past and ongoing projects undertaken by MinT and Eldix, determine the research findings.

1.7 limitation of the study

This study on Agile project management within the context of public-private partnerships in Ethiopia, focusing on the Ministry of Innovation and Technology and Eldix Software Developer PLC, encounters several limitations that should be acknowledged. First, the sample size is relatively small, comprising data from only two specific organizations. This narrow scope limits the generalizability of the findings, as the experiences and outcomes observed in these organizations may not accurately reflect those in other sectors or geographical regions within Ethiopia. The unique organizational cultures, resource availability, and management styles of these entities might influence the results, making it challenging to draw broad conclusions applicable to all public-private partnerships in the country.

These limitations encompass several key issues. First, self-reporting bias is a concern, as the study will rely on self-reported data from project managers, professionals, experts, and team members. This data may be subject to biases and inaccuracies, as participants might be inclined to report positively on their experiences with agile project management, potentially skewing the results. Second, cultural and language barriers may pose a challenge, particularly in collecting data through interviews and surveys. Some participants may have difficulty understanding or expressing their thoughts in English, which is the language of the study. Finally, unforeseen challenges or obstacles may arise during the course of the study, potentially impacting the quality and validity of the data collected and the conclusions drawn from the study.

For unforeseen challenges, a flexible and adaptive research plan was developed. This included regular reviews and adjustments to the methodology as needed, allowing the study to respond effectively to any unexpected issues that arose. Moreover, to enhance the generalizability of the findings, efforts were made to contextualize the results within the broader landscape of public-private partnerships in Ethiopia. This involved comparing the findings from the Ministry of

Innovation and Technology and Eldix Software Developer PLC with existing literature and case studies from other sectors and regions. While acknowledging the unique characteristics of the studied organizations, this comparative approach aimed to identify common patterns and insights that could be relevant to a wider audience. Finally, the study's conclusions were framed with an awareness of these limitations, emphasizing the specific context and case examined. This transparency helps readers understand the scope and applicability of the findings, ensuring that they are referenced appropriately within the constraints of the research.

Both the context and the methodology used for this research may limit the ability of this study to be considered generalizable to a wider population. Furthermore, given the project's nature and agile approach, the study predominantly showcases the organization's viewpoint and the specific case being examined. Consequently, the results are portrayed based on their interpretation and perspective. Hence, it is crucial to consider these constraints when referencing the research.

1.8 Organization of the study

The research report is in a standard format. It consists of five major parts. The first chapter which is the introduction contains most of the proposal’s items. It contains the background of the study, statement of the problem, basic research questions, objectives of the study, definition of terms, significance of the study and scope. The second chapter, which is Literature review, consists of an introduction, a theoretical and empirical literature review that is relevant to the research. The fourth item in this chapter is the conceptual framework. The third chapter, namely research methodology, is basically the explanation of data collection methods, the instruments used, procedures and analysis methods in place. The fourth chapter, data presentation, analysis and interpretation, is the stage where results are shared. Links between the literature review and the results found are the topic of the analysis phase. Finally, the fifth chapter that presents the summary, conclusion and recommendation, is where the problem statement is answered and recommendations are given

1.9 Definition of key terms

- **Agile Project Management:** Agile project management refers to an iterative and adaptive approach to managing projects, particularly in software development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams and stakeholders. Agile project management emphasizes collaboration, communication, and responding to change over following a strict plan (Agile Manifesto, 2001).

Innovation: Innovation is a process by which a domain, a product, or a service is renewed and brought up to date by applying new processes, introducing new techniques, or establishing successful ideas to create new value.

Technology: the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment.

Agile methodologies: Agile methodology is project management approach that allows successful and efficient execution of the project while emphasizing the improvement of a project and team collaboration.

Digital Transformation: DT is the process of integrating digital technologies and solutions into all aspects of the activities of an organization, whether public or private. In turn, such an integration, in particular in the Public Sector, implies deep changes in organization and management, in order to account for regulations as well as for a citizen-centric methodology. For those reasons, it can be a complex, never-ending, and often discouraging process. Ciancarini et.al. (2024)

- **Ministry of Innovation and Technology (MinT):** The Ministry of Innovation and Technology is a government body responsible for fostering technological development, innovation, and digitalization within a country. It plays a crucial role in formulating policies, coordinating research and development initiatives, supporting technology institutions, and implementing appropriate technologies for national growth.

• **Project Timeliness:** Project timeliness refers to the ability of a project to be completed within the specified timeframe or schedule. It involves meeting deadlines, delivering milestones, and ensuring that project activities are executed in a timely manner.

• **Iterative Communication:** Iterative communication involves continuous and ongoing communication among project stakeholders throughout the project lifecycle. It emphasizes feedback loops, collaborative decision-making, and adjustments based on evolving requirements and priorities.

• **Flexibility:** Flexibility refers to the ability of stakeholders to adapt to changing circumstances, requirements, or conditions during project execution. It includes the willingness to adjust project plans, processes, and resources to accommodate new information or priorities.

- "**Incremental"** means that the solution is broken up into "chunks" that are developed and tested individually and might also be released individually rather than waiting for the entire solution to be developed, tested, and released as a whole.
- **"Iterative"** means that the solution is progressively optimized and refined based on user feedback and inputs to maximize the value of the solution to the users.

Chapter 2: Literature Review

The rapid advancement of Agile project management frameworks has been particularly notable in the field of software development. Agile methodologies, which emphasize iterative cycles, collaboration among developers, and adaptive planning, have gained widespread acceptance in both private and public sectors globally. This literature review synthesizes existing research on Agile project management practices and challenges, with a focus on the context of public-private partnerships (PPP), specifically examining the Ethiopian innovation contract between the Ministry of Innovation and Technology (MinT) and Eldix Software Developer PLC.

The integration of public and private sectors through PPPs in software development projects presents unique opportunities and challenges for the implementation of Agile approaches. This review aims to describe the practices and features of Agile project management in collaborative environments, identify the problems faced, and explore their consequences. It delves into the theoretical framework of Agile project management, government-private sector collaborations, outsourced software development, and the specific challenges of Agile implementation. Additionally, the review examines the benefits of Agile practices in software development, particularly in terms of quality, timeliness, cost, and scope, and assesses the impact of Agile project management on project outcomes.

The following sections provide a comprehensive exploration of Agile project management, addressing its theoretical foundations, empirical studies, and practical applications in public-private collaborations. Through this analysis, the review seeks to offer valuable insights for practitioners and researchers aiming to enhance the efficacy of Agile methodologies in diverse project environments.

2.1 Theoretical Framework

2.1.1 Agile Project Management

According to (Fernandez, et al. 2008) Agile project management represents a shift from traditional hierarchical approaches to more collaborative, self-directed teams. In the realm of agile methodologies, there are advantages such as enhanced team independence and swift adjustment to changes. However, accompanying these benefits are hurdles like intricacy and the necessity for well-defined roles and duties. The role of an agile manager stands out due to their skill in promoting productive communication, team cohesion, and heightened responsibility within a constantly evolving project setting. All in all, agile project management is viewed as a contemporary, inventive strategy that is becoming increasingly popular in the 21st century, even though it presents challenges when implemented in non-software projects.

The agile Manifesto (2001) outlines four core values that guide agile project management. These values can be translated as:

- Individuals and Interactions: in an agile development, self-organization and motivation are important, as are interactions like co-location and pair programming
- Working Software: working software will be much more useful and welcome than just presenting detailed documents to clients in meetings
- Customer Collaboration: requirements cannot be fully defined at the beginning of the software development cycle, therefore continuous customer involvement is very important
- Responding to Change: agile development is focused on quick responses to change and continuous development, harnessing change for the customer's competitive advantage

(Elielton et al., (2023) explains Agile project management underscores the significance of particular methodologies to effectively navigate the unpredictability and intricacy inherent in software projects. - Agile methodologies give precedence to customer requirements by ensuring consistent software releases and fostering collaboration between developers and business stakeholders.

(Teguh et al.,2023) revealed that Agile methodologies encounter obstacles in the public sector as a result of distinct characteristics when compared to the private sector, including hierarchical authority structures. Difficulties related to the adoption of Agile practices within government

organizations are classified according to the project performance domain outlined in the PMBOK 7th edition. The government views Agile as a viable approach for overseeing innovation and technology initiatives, guaranteeing timely completion of projects with outputs of exceptional quality. Agile methodologies present substantial promise in enhancing project efficiency and providing top-notch results within the public sector. Nevertheless, the integration of Agile methodologies within governmental entities encounters specific obstacles stemming from hierarchical power configurations, procurement procedures, and specialized attributes of the public sector. A thorough comprehension of Agile methodologies and their relevance in the public sector domain, in conjunction with proficient Agile leadership qualities and competencies, proves indispensable for the achievement of a fruitful implementation.

2.1.2 Government-Private Sector Collaborations:

Government-private sector collaborations in the realm of e-government initiatives, particularly in developing countries, have gained significant attention due to their potential for economic development.

An alternative way of infrastructure service provision, making use of private finance, expertise and efficiency and combining public and private sector strengths. The philosophy underlying PPPs is quite appealing. The relative complexity of processes and widely differing objectives and capabilities on public and private sides make the method a challenging endeavor. Not a few of PPP arrangements in developing countries have yielded sub-optimal results Even the developed world has experienced unsatisfactory PPP arrangements. Unsatisfactory PPPs sometimes cast doubt on the rationale of using this method in infrastructure Uzunkaya, M., & Sarmento, E. M. (2016).

Palaco et al. (2019) underscore the importance of public-private partnerships (PPP) in the context of e-government projects and the need for systematic evaluation frameworks in the early planning stages. Their framework, PPP4e-Gov, offers a structured approach to assess the risk and value factors associated with e-government PPP projects. By utilizing a weighted scoring model, this framework enables decision-makers to estimate project risks and potential value, thus aiding in informed decision-making. Furthermore, Gachie (2020) emphasizes the significance of collaboration between government, higher education institutions (HEIs), and the private sector in fostering innovation within the Triple Helix Model. The research advocates for a defined role for the government within this model and proposes a new framework to strengthen collaboration

between HEIs and the private sector. By addressing weaknesses in the current state of the Triple Helix Model, such as research commercialization and strategy realignment, the proposed framework aims to enhance innovation outcomes. Together, these studies highlight the critical role of government-private sector collaborations in driving innovation and economic growth, underscoring the need for robust frameworks to guide and evaluate such partnerships.

2.1.3 Outsourced Software Development:

(Subhasish Dutta) in his blog post "Software Development Outsourcing: Everything You Need to Know" Software development outsourcing means hiring a third-party service provider to handle software development projects. The services can range from developing software for your company to managing business operations or developing and maintaining software for your customers. Investigate the dynamics of outsourced software development projects, particularly in relation to Agile methodologies. Consider how Agile practices can be effectively implemented in the context of outsourcing, addressing challenges such as communication barriers, geographical dispersion, and differing levels of expertise. The increasing demand for e-Government services has created considerable challenges for public administration, not only in terms of expertise and experience that are required in order to run development projects, but also from organizational, cultural and legal perspectives. Yu, T.K. and Cheng, F. (2007)

Table 1 **pros and cons outsourcing**

Pros	Cons
Avoid problems with Recruiting adequately skilled staff	Dependence on contractor
Acceleration of business process	Possible loss of control
Concentration on core (if a know-how transfer has been designed) business	Loss of in-house skills
Adoption of best practices	Controversy between public sector values and the cost-benefit approach
	Confidentiality matters

Summarize the findings Jedd, M. (2004), Rodriguez, A. (2007), Yu, T.K. and Cheng, F. (2007)

Figure 1 software outsourcing process

2.1.4 Challenges in Agile Implementation

Agile methodologies have gained significant traction in software development due to their ability to offer flexibility, adaptability, and expedited delivery of high-quality solutions. These processes empower teams to swiftly accommodate changes in response to evolving customer or business needs. However, while Agile promises numerous benefits, its implementation presents inherent challenges in project governance. Successful execution demands a robust framework encompassing control, responsibility, and accountability (Nyandongo & Khanyile, 2019). Notably, the dynamic nature of Agile necessitates an information and communication technologies (ICT or IT) environment that is both flexible and customizable. Moreover, effective coordination across multiple organizational units is imperative. Additionally, achieving seamless integration between Agile methodologies and organizational processes requires responsive governance mechanisms. These challenges underscore the critical importance of implementing Agile techniques within a

context that enables faster, superior, and more cost-effective value delivery to the business (Alexandre, Kruchten, & de Moura, 2013).

2.1.5 Benefits of Agile Practices in Software Development

Based on the review of various literature, the benefits of agile project management can be summarized as below:

A report by Hooda et al., (2023) Agile practices in software development offer increased project success rates, better risk management, timely delivery of quality content, and adaptability to changing requirements, enhancing overall project outcomes.

Sachin et al., (2023) state that Agile methodologies in software engineering provide benefits such as heightened customer satisfaction, enhanced teamwork, and adaptability, notwithstanding obstacles such as stakeholder coordination and quality assurance.

Woodson et al., (2023) Agile methodologies applied in the realm of software development provide various benefits such as reduced expenses, accelerated development cycles, facilitated access to remote experts, and increased customer engagement via iterative processes. These practices contribute to improved flexibility and higher rates of project success, particularly within the context of Global Software Development.

2.1.6 Agile project management practices encompass Quality, Timeliness, Cost, and Scope,

Timeliness

Agile project management in software development emphasizes adaptability and quick responses to changes (Tong, Liu. 2022). It allows for faster adjustments compared to traditional methodologies, enabling teams to deliver products more efficiently (Mengting et al. (2019).

Quality

(Jyothi et al. 2012) highlight the advantages of adopting an agile software development approach is a considerable raise in software quality. Amazingly there are two kinds of benefits for the customers who try agile. The first one is Quality and the second benefit is lower defect rates

Cost

Bilgaiyan et al. (2017) highlighted that Agile practices in software development require accurate cost estimation to adjust delivery dates and maintain software quality

Scope

(Gabriela, Castro, Flores .2019). Agile practices address software project management challenges by offering solutions for anti-patterns, enhancing adaptability, and promoting efficient scope management in software development projects.

2.1.7 Agile project management practice in public-private collaboration

Agile undertaking management is a collaborative method that emphasizes flexibility, adaptability, and non-stop development. In public-personal collaboration, agile practices can facilitate powerful verbal exchange, coordination, and hassle-solving amongst numerous stakeholders. Here are some key agile practices that can be carried out in public-non-public collaboration:

Collaborative Planning: Involve all stakeholders in the making plans manner to make certain that everyone is aligned and committed to the project goals and targets. This consists of placing clean roles, responsibilities, and expectancies.

Iterative Development: Break down the assignment into smaller, workable responsibilities and recognition on handing over incremental value at every stage. This approach allows for non-stop development and adaptation to changing requirements.

Continuous Communication: Foster open and transparent conversation among stakeholders to make certain that everybody is knowledgeable and engaged at some stage in the venture lifecycle. This includes regular development updates, comments mechanisms, and energetic listening.

Adaptive Problem-Solving: Encourage a way of life of experimentation and learning from disasters. This involves identifying and addressing ability dangers and challenges proactively, and being organized to modify the assignment plan as wanted.

Cross-Functional Teams: Assemble groups with various ability units and information to leverage the strengths of each stakeholder. This promotes collaborative surroundings and allows effective choice-making.

Prioritization: Establish clean priorities and cognizance on the most vital duties and objectives. This ensures that the mission stays on target and that resources are allotted effectively.

Feedback and Improvement: Regularly solicit remarks from stakeholders and use it to improve the project techniques and consequences. This involves continuous monitoring and evaluation to perceive areas for development and put in force changes as needed.

Scalability: Design the undertaking to be scalable and adaptable to changing requirements and stakeholder wishes. This includes building flexibility into the challenge plan and being prepared to adjust as wished.

Risk Management: Identify and mitigate potential dangers and challenges proactively. This involves growing contingency plans and being organized to adapt to sudden activities.

Transparency and Accountability: Ensure that every one stakeholder have get entry to assignment statistics and are held chargeable for their roles and duties. This promotes accept as true with, transparency, and effective collaboration.

2.1.7 Agile Project Management and Project Outcomes

Agile project practices have a significant impact on project outcomes, with the combination of practices playing a crucial role in communication within the team, project requirements, and priorities, leading to better project results (Ghimire, D., & Charters, S. 2022). Specific agile practices like Stand-up meetings and Kanban boards have been identified as contributors to IT project success, along with leadership openness to agile methodologies (Tat'yana, Nikulina. 2020). Transitioning from traditional methodologies like Waterfall to Agile has shown positive results in project outcomes, prompting many organizations to make the switch (Veiga, A. P. 2017). Furthermore, Agile Project Management has proven effective in delivering faster projects, managing uncertainty, improving communication within teams, and achieving high customer satisfaction, even outside the software development industry (dos Reis Sales, A. 2016). While some studies have shown a potential decline in cost and schedule performance after implementing agile practices, there is an overall improvement in project quality, as perceived by clients and internal technical analysts (Suetin, et al .2016).

Based on the above, it will be important to discuss the factors of measure of success with common outing being; time, cost, scope, and quality of a project. It means that in the Agile project management, the largely-held conceptions of project success are reviewed and sometimes revised based on Agile paradigm of operation. In this narrative literature review, the roles and types of project outcomes as explained by the Agile project practice will be discussed and supported by the framework of theories available within project management literature.

Agile project management, characterized by iterative development, incremental delivery, and adaptive planning, aims to enhance flexibility and responsiveness to change. The Agile Manifesto, introduced in 2001, highlights values and principles that prioritize customer satisfaction, collaboration, and responding to change over rigid planning and processes. These principles significantly influence how project outcomes are defined and measured in Agile environments.

1. **Time and Schedule Performance**:
    - **Iterative Development**: Agile frameworks such as Scrum and Kanban promote iterative cycles known as sprints or iterations. Each sprint results in a potentially shippable product increment, enabling continuous delivery and regular feedback. This iterative approach helps in managing and meeting deadlines more effectively compared to traditional project management methods.
    - **Timeboxing**: Agile practices often use timeboxing, where activities are confined to fixed time periods. This ensures that teams remain focused on delivering specific features within set deadlines, enhancing time management and schedule adherence.
2. **Cost and Budget Control**:
    - **Incremental Delivery**: By delivering work in small, manageable increments, Agile allows for early detection of cost overruns. Regular reviews and retrospectives help in adjusting plans and budgets dynamically, thus preventing major financial discrepancies.
    - **Resource Optimization**: Agile emphasizes cross-functional teams and continuous improvement, which can lead to better resource allocation and cost efficiency.
3. **Scope and Requirement Management**:

- **User Stories and Backlogs**: In Agile, project scope is managed through user stories and product backlogs that prioritize features based on value and feedback. This flexible scope management allows teams to adapt to changing requirements without derailing the project.
- **Continuous Feedback**: Regular interaction with stakeholders and customers ensures that the scope remains aligned with user needs and market changes, reducing the risk of scope creep.

4. **Quality Assurance**:
   - **Test-Driven Development (TDD)**: Agile practices often incorporate TDD and continuous integration, ensuring that code quality is maintained through frequent testing and integration.
   - **Regular Retrospectives**: Agile teams conduct regular retrospectives to reflect on processes and outcomes, fostering a culture of continuous improvement and quality enhancement.

2.2 Empirical Review

This empirical review will investigate the application of agile project management practices, the potential benefits of implementing agile project management practices in the Government sector and private sector, examine any potential challenges or limitations to work collaborate and implementing agile project management practices. It will provide insights into how agile project management can help improve project outcomes, reduce risks, and increase efficiencies in the technology industry. It will focus on existing studies and research

(Abdullah, et al,.2023) studied to investigate difficulties and offer remedies for implementing Agile project management in the public sector via a comprehensive literature review .He addressed the challenges that include the hierarchical structure of the public sector hindering Agile application, Issues such as lack of skills, culture, and organizational structure alignment with Agile practices are highlighted, Overcoming problems related to budget, schedule, and project validation are also emphasized in the study. He found that the most issues where in the development approach

and life cycle project work domain categories. The study offers valuable perspectives on the difficulties and resolutions related to the application of Agile project management within the public domain, thereby assisting scholars and professionals in tackling these challenges. The findings underscore the significance of understanding the specific challenges that governmental entities encounter in the implementation of Agile methodologies, thus enhancing the progress of Agile protocols within the public sector.

Aoufi, A., et al. (2021) investigated the perspective of client-side advisors in Agile projects when delivery is outsourced to a third party. Client-side sourcing advisors are an important component of the Agile delivery ecosystem because clients often rely on advisors' experience when scoping out and procuring digital transformation projects. They revealed five key challenges that need to be addressed for successful outsourcing of Agile projects: developing an Agile mindset; understanding the methodology choice; preparing the organization; implementing mutually beneficial contracts; and developing a sustained commitment.

Regarding the development of an Agile mindset, the findings suggest that while Agile is widely understood in the UK's private and public sectors, organizations may overestimate their proficiency in implementing and utilizing Agile practices. There is uncertainty about the effectiveness of Agile in complex environments compared to simpler projects. Many advisors emphasize that Agile is more than just a delivery method—it's a mindset that requires organizational change beyond traditional IT projects. Key changes include valuing Agile projects as business change initiatives, addressing risk-averse management behavior, challenging contractual and procurement practices, and supporting the empowerment of junior staff for Agile delivery.

When it comes to understanding the methodology choice, a significant challenge lies in providing evidence-based guidance on the suitability of Agile methodology for client needs. Clients, particularly larger organizations, often struggle to differentiate between their needs and wants, leading to uncertainty and changes in project requirements. Suppliers currently offer limited support in navigating this process of problem formulation and solution selection, leaving advisors

and clients to assess the suitability of delivery methodology independently. This lack of clarity can result in suboptimal requests for proposals and projects that are less likely to succeed.

The third challenge involves preparing the organization, with observed variations in Agile adoption across different sectors, particularly noting the UK public sector's proactive utilization in procurement frameworks in contrast to the private sector. In the private sector, Agile is predominantly utilized in smaller-scale projects, often alongside traditional project management approaches such as waterfall. Despite the increasing prevalence of Agile implementations, organizations may not fully comprehend its extensive impact beyond IT functions. Key challenges include the necessity for skilled personnel and the development of Agile coaching capabilities, underscoring the essential shift in organizational culture necessary for successful Agile integration. Furthermore, the alignment of conventional testing and integration processes with Agile methodologies presents a significant hurdle, underscoring the imperative of organizational change to effectively support Agile endeavors. The fourth challenge, implementing mutually beneficial contracts, raises concerns about current contracting practices for Agile projects, noting that most contracts are based on traditional waterfall methods, which can hinder collaboration and flexibility. They highlighted challenges such as defining project scope and pricing, leading to an imbalance in power between suppliers and clients. The emergent nature of Agile projects raises questions about measuring success, with advisors suggesting alternatives like user satisfaction metrics. This shift in contracting dynamics can erode trust and create conflict between suppliers and clients, undermining collaboration essential for Agile success.

Regarding the last challenge, developing a sustained commitment, successful delivery of Agile projects hinges on various factors, including clarity in client needs and contract terms, as well as effective execution. Advisors emphasize several key considerations during project delivery:

1. Client organizations must maintain leadership and engagement in Agile initiatives, while suppliers should offer continuous guidance on delivery issues and engage with senior business leaders.
2. Adequate business skills and resources are essential throughout the development process, requiring skilled software developers and organizational change readiness. Team

composition should balance experienced Agile practitioners with newcomers and non-technical members.

3. Both parties must manage the pace of delivery to maintain momentum and ensure smooth integration into live service and business operations.
4. Supplier leadership in Agile initiatives requires skillful influence across the IT supply chain and client stakeholder groups, with delivery leads possessing sufficient seniority and experience.
5. Organizational cultures of both supplier and client should align with Agile principles, avoiding command-and-control approaches that hinder team velocity. Metrics focusing on client satisfaction or net promoter score are preferred over purely financial measures to gauge project success.

The overall conclusion emphasizes that while organizations increasingly embrace Agile delivery to meet evolving business needs, they often lack the requisite skills and capacity. Outsourcing Agile projects can alleviate these challenges, but organizations must not relinquish all responsibility to suppliers. Collaboration between suppliers, advisors, and client organizations is crucial to ensuring the necessary conditions are met before Agile deployment. Key factors such as mindset shift, strategic selection of Agile, readiness assessment, appropriate contracting, and sustained commitment are vital for successful outsourcing of Agile projects. These elements collectively enhance the prospects of success in Agile project delivery.

Challenges and Best Practices Solution of Agile Project Management in Public Sector: A Systematic Literature Review

Teguh, et al. (2023) investigated the challenges and solutions for implementing Agile project management in the public sector through a systematic literature review, addressing 43 issues across different project performance domains. It aims to assist academics and practitioners in navigating the unique obstacles faced in Agile adoption within government organizations, providing a valuable reference for enhancing Agile practices in the public sector. The author mention challenges are issues related to the Development Approach and Lifecycle, Project Work, Team dynamics, Stakeholder engagement, Delivery processes, Measurement practices, Planning

strategies, and Uncertainty management. Challenges include the mismatch between Agile nature and large government structures, lack of familiarity with Agile practices in public organizations, insufficient skills or culture to support Agile development, poor risk management, and ensuring long-term project sustainability.

The paper concludes that Agile project management faces numerous challenges in the public sector, particularly in domains like Development Approach, Lifecycle, Team dynamics, Stakeholder engagement, Delivery processes, Measurement practices, Planning strategies, and Uncertainty management.

Common challenges include issues related to coordination, trust between teams, lack of employee empowerment, and dominance of rule-based approaches in public organizations.

The study emphasizes the importance of aligning the organizational environment and management mindset with Agile principles for successful project outcomes.

By mapping best practice solutions to the identified challenges, the research aims to provide a comprehensive guide for addressing Agile implementation obstacles in government settings

Agile and Software Project Management Antipatterns: Clarifying the Partnership

(Gabriela, et al. 2021) paper discusses how Agile practices can help organizations reduce or avoid software project management antipatterns. It provides insights that can be valuable for organizations transitioning to Agile methodologies.

The results of the paper highlight the significance of Agile practices in addressing software project management antipatterns effectively. Agile methodologies offer solutions to common project management pitfalls, aiding in their reduction or avoidance.

Organizations transitioning to Agile can benefit from understanding how Agile practices can mitigate challenges in software project management. The partnership between Agile and software project management is crucial for enhancing project outcomes and efficiency

Agile Project Management Challenges: Analyzing and Exploring Agile Project Management Challenges from a Practitioner Perspective: A case study on HMS

Aneesha, Mohan. (2018) study on analyzing and exploring Agile Project Management challenges from a practitioner's perspective, specifically in the context of a case study on HMS.

Agile Project Management is a popular approach in software development due to its flexibility and adaptability to changing requirements. The study aims to identify the challenges faced by practitioners implementing Agile Project Management in the HMS project. Understanding these challenges is crucial for improving project management practices and ensuring successful project outcomes. The research delves into the specific hurdles encountered during the implementation of Agile methodologies in the HMS project, providing valuable insights for project managers and practitioners.

Challenges included difficulties in adapting to Agile methodologies, lack of stakeholder involvement, and issues with team communication.

Practitioners also faced challenges related to time constraints, resource allocation, and balancing project scope. The results highlighted the importance of addressing these challenges to enhance project management practices and ensure successful project outcomes. Understanding and overcoming these challenges is crucial for practitioners to effectively implement Agile methodologies in their projects

Modelling the factors of agile practices in project management A case of illumination project organization

(Isabel, et al .2018). investigated the Information Technology (IT) plays a crucial role in enhancing company operations and competitiveness by automating tasks and improving communication. Agile Project Management is proposed as a solution to challenges faced in the IT sector, offering tailored processes like Scrum for effective time, cost, and quality control in projects, as demonstrated in the Glintt case study.By reviewing Glintt's current project management process and recommending a new Agile approach, the study demonstrated the importance of selecting suitable methods and practices to ensure successful project implementation in the IT industry.To remain competitive, companies must have well-structured internal processes tailored to their specific needs, especially in the IT sector where quality certifications and successful projects are crucial. Glintt's IT department, handling diverse software projects, benefited from a tailored Agile project management process, addressing the flexibility required by various technologies and specific project needs.

The study emphasized the significance of internal processes in obtaining quality certifications, accrediting processes, and ensuring project success through well-tailored project management approaches, such as Agile methodologies

2.3 Conceptual frame work

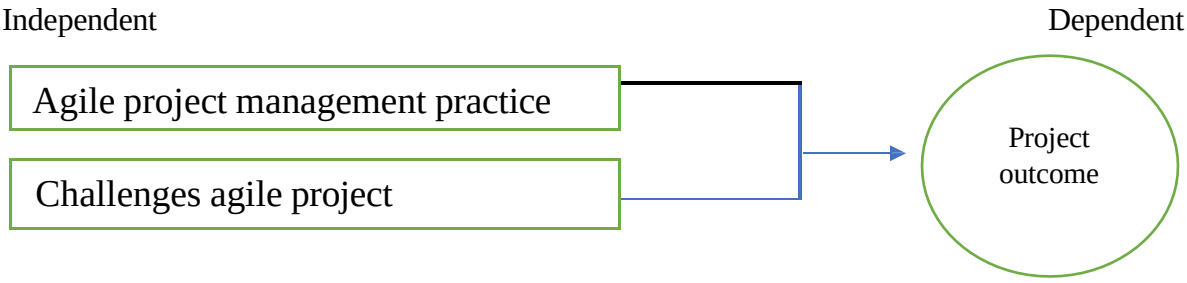

Figure 2 Conceptual frame work

Chapter 3: Research Methodology

This section discusses the methodology used to investigate the Agile project management practices and challenges within the Ministry of Innovation and Technology, Eldix Software Development PLC. It covers the research approach, research design, data collection techniques, data analysis, sampling methods, data validity, data collection procedures and instruments, research approach, and methods of data analysis and interpretation

3.1 Research Approach

The research utilizes a mixed-method design approach to comprehensively investigate the implementation of Agile Project Management (APM) at the Ministry of Innovation and Technology (MinT) and Eldix Software Development PLC. This approach combines both quantitative and qualitative methods to provide a holistic understanding of the subject.

1. **Quantitative Methods:**
    - **Surveys:** Structured questionnaires will be distributed to a broad range of stakeholders, including project managers, team members. The surveys will collect data on project timelines, budget adherence, and the quality of deliverables (project outcome). This method will provide quantifiable insights into the efficiency and effectiveness of Agile practices.
2. **Qualitative Methods:**
    - **Interviews:** In-depth interviews will be conducted with key stakeholders, including senior management, Agile coaches, and team leaders. These interviews aim to gain deeper insights into the challenges and benefits of Agile implementation, as well as the contextual factors influencing its success.

The study aims to describe the use of agile project management in the collaborative setting of the Ministry of Innovation and Technology (Mint) and Eldix Software Developer PLC through a Likert scale questionnaire. Consequently, a quantitative analysis conducted on the data gathered. The focus will be on key indicators that:

- Assess the practice of agile

- Evaluate the challenges associated with agile

These key indicators will help determine the reasons why the project is or is not meeting its outcomes.

3.2 Description of Study Variables

The chosen case involves the public-private sector, which adapted agile project management practices. As such, this case organization fits the profile of the unit of analysis that this research is looking for: the government sector does not have a mandate to develop software and uses outsourced software developers from the private sector with Eldix. This study sought to understand if the important factors stated above in the literature review for supporting the implementation of agile project management practices are indeed practiced in the public-private sector. The independent variables of this study, as explained in the literature above, are summarized as maximizing agile practice and agile challenges. Specific variables under each section are discussed in detail in the literature review part of the study, which include but are not limited to team capability and training, project management communication, team achieve their goal, consistent feedback, as well as effective communication. These variables are believed to independently and collectively catalyze the successful implementation of agile project management practices. The dependent variable for this study is, therefore, the project outcome of the case organization as a result of the practices and challenges of the agile project management method.

3.3 Research Design

The purpose of this study is to describe how agile project management practices are implemented in public-private sector collaborative settings, specifically within the context of Ethiopia's Ministry of Innovation and Technology and Eldix Software Developer PLC. As such, the research is descriptive in nature. This cross-sectional study captures a snapshot of agile project management practices at a specific point in time.

To provide a comprehensive explanation and analysis of the issue, the research employed survey tools to gather data from the entire population within the case organizations. The survey aimed to describe the agile project management practices and identify associated challenges. By examining

the current implementation of agile project management methodologies in the public-private sector, this approach aids in determining the potential for successful adoption. Additionally, the findings from this study will support further research in this field.

The research approach described utilizes a mixed methods strategy, integrating both quantitative and qualitative data. This data is collected directly from every member of the target population using various tools like surveys, interviews, and observation guides. By combining both types of data, the researchers aim to achieve a comprehensive understanding of the research problem through rigorous and detailed analysis

3.4 Target Population

The target population consisted of 52 individuals, total number of the organization o of the MinT and Eldix software developer. It included the project managers, and project team.

The target population was not big in size. Since the total number was below 100, census survey was used. Complete enumeration survey method was implemented where every individual was included in the research.

3.5 Data Analysis

This research followed the process of both qualitative and quantitative methods. The qualitative method followed a content analysis which included identifying significant patterns, and finally drawing meaning from data as well as quantitative data analysis methods which include descriptive and some inferential statistical analysis to summarize the data and describe patterns (Patton, 2002). Through thematic analysis and comparison with findings from the literature review, the consistencies discovered from the primary data collection for this study were analyzed and discussed.

The quantitative analysis involved converting the raw data into meaningful content using descriptive and inferential tools. The descriptive tools of this analysis are part of the descriptive statistics which include Mean and Standard deviation calculator performed on SPSS. The analysis is then presented in relative frequency tables, mean, and standard deviation. This helped in summarizing the data presented in a more meaningful way which allowed a simpler interpretation

of data as can be seen in chapter four below. In addition to descriptive analysis, the collected primary data is analyzed using regression analysis, an inferential statistics tool which is used when the study involves analyzing more than one variable, where the relationship includes a dependent variable and one or more independent variables (Miller, 2019). This analysis has helped in drawing conclusions that explain how the independent variables affect the performance of the dependent variable.

For this study, correlation analysis of the independent and dependent variables was tested using relations with dependent variable with independent variable.

Therefore, this research took the convergence of agreement from both descriptive and inferential statistical results.

3.3 Data types, sources and method of data collection

3.3.1 Data type

The data type for this research is both qualitative and quantitative one. The questionnaire consists of 34 variables. These variables are summarized in two different categories (part 1 and 2) and form the following aggregate variables:

- Agile project management practice
- Agile project management challenges

This questionnaire is adapted from Wondwossen Assefa's research paper entitled "Agile Project Management Practice and Challenges in the Case of CoreIT Project at Starcom Network Solutions PLC." The open-ended and close-ended questions that included.

3.3.2 Data sources

The research utilized a mixed approach, incorporating both quantitative and qualitative data, collected through questionnaires and semi-structured interviews, respectively.

Primary data was mainly used in this research, meaning data collected directly by the researcher to address the research objectives. This primary data was obtained through questionnaires distributed to employees and open-ended interviews held with management-level implementers in

both the Ministry of Innovation and Technology (MinT) and Eldix. To quantitatively assess agile project management practices and challenges in the organization, structured questionnaires containing both open and closed questions were administered, resulting in the collection of thirty-four viable responses. Additionally, the governance department, which is spearheading the implementation and evaluation of agile methods, was interviewed using semi-structured interviews.

For these interviews, project managers and project team members from both MinT and Eldix in the public-private partnership shared their experiences and insights on managing the organization under the new agile methodology.

3.6 Data Validity and Reliability

in order to ensure data reliability, Cronbach's alpha may be used (Pallant, 2001).

Using SPSS, the coefficient alpha is calculated for every identified aggregate variable and the following results are obtained:

	Reliability Statistics	
Variable	Cronbach's Alpha	N of Items
Agile practice	0.723	13
Agile challenges	0.768	15

Table 2 Validity and Reliability

Source: Own survey, 2024

According to Pallant, a Cronbach's alpha that is between 0.7 and 0.9 is considered to be reliable. For the purpose of enhancing the research instrument, for testing the questionnaire for clarity and for providing a coherent research questionnaire, a detailed literature review like the one above has led the process. The indicators, which were then derived from the literature review, have been transformed into direct questions for the interviews and questionnaires.

Both the open and close-ended questionnaires along with the semi-structured interview were employed and validity issues were addressed through triangulation. A comprehensive literature review was also conducted to enhance the research instrument, to test it for clarity, and to provide a logical research questionnaire. The open-ended and closed-ended questionnaires, as well as the

semi-structured interview, were used along with triangulation as a tool for exploring validity and reliability issues. Additionally, triangulation was performed by thematically analyzing qualitative interviews gathered from respondents.

This was done to overcome the limitation of a single case study to provide a general conclusion.

3.7 Ethical Considerations

This study guaranteed ethical considerations through the acquisition of informed consent from all participants, preservation of confidentiality, and ensuring the absence of harm to any participants. The study conformed to the ethical standards established by the research ethics committee of the university.

These ethical issues were considered:

1. Privacy and confidentiality: in the midst of the research journey, a strong emphasis was placed on safeguarding privacy and maintaining confidentiality. The utmost care was taken to guarantee that participants willingly gave their informed consent, and steps were implemented to protect their data through anonymization and secure storage methods.

2. Informed consent: this study guaranteed that participants comprehended the research objectives and the utilization of their data. Participants were duly notified of all conceivable risks and advantages, and were granted the freedom to cease their involvement at any point.

3. Respect for participants: the research ensured that the participants were not harmed physically, psychologically, or socially. The participants' opinions, cultures, and beliefs were respected.

4. Fairness and objectivity: the research was conducted with fairness and objectivity, and favoritism of any particular group or individual didn’t take place.

5. Data integrity and accuracy: data was collected accurately and with integrity. The research study ensured that data wasn’t falsified, fabricated, or manipulated.

6. Conflicts of interest: the research study will declare any conflicts of interest that may arise during the research process. Conflicts of interest can include personal, financial, or professional interests that may affect the research's integrity or validity.

7. Plagiarism: plagiarism is a significant ethical issue, and this research ensured that all sources were cited correctly and that the work is original.

8. Social responsibility: this research hopes that this work benefits society and does not harm it. It was conducted in a manner that is ethical, transparent, and respectful of human dignity.

By considering these ethical issues, the research ensured that the work was conducted with integrity and benefits society. I, Christian Negese, adhered to these ethical standards when conducting this research, especially when dealing with human subjects.

Chapter 4: Data Presentation and Analysis

The analysis was guided by the objectives set out in the first chapter of this study. This research aimed to identify agile practices and challenges in the collaborative efforts between government

and private sectors. Additionally, the analysis sought to determine whether the performance of the public-private partnership improved as a result of adopting agile methodologies, considering factors such as project outcomes, challenges, and staff motivation. This chapter presents the data collected in relation to these objectives, providing a summarized overview of the primary source data.

The data gained for the variables of the research which are directly depicted on the questionnaire were analyzed to look for patterns of the responses from respondents using descriptive and inferential statistics. To confirm the validity of data analysis between variables the data was measured using IBM Statistical Package for Social Sciences (SPSS) version 26.

The total number of employees that were given the chance to fill the questionnaire were fifty-two, out of which forty-nine viable responses were gained; this indicates that 93.6% viable responses were gained and the interview was held with three members of the top-level management. In addition to the general demographic questions and the 5-point Likert scale question items, a total of four open ended questions were devised in the questionnaire in order to gain more insights from the respondents in case they would want to add to points that they believe are not included in the Likert scale questions or needed better expressions.

The first section below presents the demographic characteristics of respondents, the second section portrays the descriptive statistics analysis while the remaining sections present the correlation regression. Further, the findings from the interview that expand on the results of this research are specified under each of the above sections, as well as summaries that should be helpful in this research.

4.1 Demographic Profile of Respondents at MinT

The demography section of the questionnaire presented the gender, age, level of education,

years of experience in the enterprise, role in their organization, previous experience with

agile, and frequency of feedback. Table 4 below summarizes all data at Mint

Demographic variables		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	21	70	70	70
	Female	9	30	30	100
Age	25 years and under	6	20	20	20
	26-35 years	14	46	46	66.7
	36and above years	10	33	33	100
Education Level	Diploma	0	0	0	0
	Degree	10	33	33	33
	MA	14	46	46	80
	PhD	6	20	20	100
Work experience in MinT	Less than a year	10	33	33	33
	Up to 2 years	8	26.7	26.7	60
	Up to 5 years	11	36.7	36.7	96.7
	more than 5 years	1	3.3	3.3	100
Role inMinT	senior management	6	26	26	26
	middle management	11	36.7	36.7	56.7
	Non-managerial	13	43.3	43.3	100

Table 3 **summarize demographic profile at MinT**

4.2 Demographic Profile of Respondents at Eldix

Demographic variables		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	19	68.18	68.18	68.18
	Female	25	31.82	31.82	100
Age	25 years and under	30	22.7	22.7	22.7
	26-35 years	14	50	50	100
Education Level	Diploma	3		6.8	6.8
	Degree	31	45.5	45.5	93.3
	MA	7	36.36	36.36	77..2
	PhD	3	18.18	18.18	100
Work experience in Eldix	Less than a year	14	45.45	45.45	93.3
	Up to 2 years	21	22.73	22.73	22.73
	Up to 5 years	7	22.73	22.73	22.73
	more than 5 years	2	9.09	9.09	100
Role in Eldix	senior management	8	23.81	23.81	18.2
	middle management	15	28.57	28.57	52.3

Table 4 **summarized demography profile at Eldix**

4.3 Descriptive Statistics at MinT

By analyzing the data gathered from the questionnaire in descriptive statistics such as mean and standard deviation, appropriate interpretations were done for each variable/question item that was presented in the questionnaire. The results from the statistics were also supported with the qualitative data gathered and summarized from the open-ended questionnaires and semi-structured interview. This section is divided in terms of the grouped variables; agile practices, and agile challenges, and the Project outcome. For the 5-point Likert scale items, the mean score of 1 is regarded as strongly agree, 2 as agree, 3 as neutral, 4. as disagree, and 5 as strongly disagree.

4.4 Agile project management practices at MinT

This section presents the findings for the first research question that inquired to find out about Agile project management practices of MinT. Based on a 5-point Likert scale, seven questions were designed for this section. The summarized responses can be seen in

	Descriptive Statistics					
		N	Minimum	Maximum	Mean	Std. Deviation
1	MinT uses Agile methodologies for all outsourced software development projects with Eldix.	30	1	4	2.17	1.117
2	The team received training on agile methodology	30	1	3	2.17	.699
3	Team members have good coordination with scrum master	30	2	3	2.33	.479
4	Scrum masters have good communication with Product Owners	30	2	3	2.33	.479
5	Product owners have good communication with project manager	30	2	3	2.33	.479
6	Every team uses the same product backlog	30	2	4	2.67	.758
7	Project backlog is continuously maintained	30	2	3	2.50	.509
8	The sprints of the different teams were synchronized	30	1	3	2.17	.699

9	The project manager has good communication with the client	30	1	3	1.93	.691
10	The software requirements were clearly stated	30	1	4	2.03	1.159
11	You have achieved your goal	30	1	5	2.47	1.196
12	The teams achieved their goal	30	1	3	1.77	.679
13	Agile is better than traditional for software development	30	1	4	1.63	.928
	Valid N (listwise)	30			2.1	0.75

Table 5 **agile practices at MinT**

4.4.1 Relevant single variables

The above table contains 13 variables that describe the agile practice at MinT. According to this table, only three variables, 1,10 and 11, with means of 2.17,2.47 and 2.03 respectively, have a standard deviation greater than 1. These are therefore the variables that obtained the most dispersed responses, and hence show greater team members disagreement than of the rest of the variables. Yet, the mean of 2.03 of variable 11 is closer to 2 (agree) and 2.17 of variable 1 to 2 (agree). Concerning the rest, all 13 variables have a mean closer to 1 and 2 and a standard deviation less than 1. This indicates that most the team members endorse the agile practices

The interview held with representatives from MinT and Eldix, it was highlighted that their collaboration significantly enhances the implementation of Agile practices. They emphasized that their partnership has fostered open communication channels, enabling regular and transparent updates, which are crucial for Agile methodologies. The joint effort has allowed for the effective pooling of resources, including technical expertise and skilled personnel, thereby optimizing resource utilization and facilitating knowledge sharing. Additionally, their collaborative problem-solving approach, through workshops and training sessions, has been pivotal in overcoming challenges and improving Agile competencies within their teams. The cultural alignment between MinT and Eldix, focusing on embracing Agile values and principles, has also been a key factor in the smooth adoption and execution of Agile practices in their projects.

4.4.2 Aggregate agile practice

The means of the questions in the table 4.3-1 are used as input data to compute the mean of the aggregate variable agile practice. Likewise, the standard deviation is computed on the means of the questions. The values obtained are 2.1 and 0.75 respectively. This can be interpreted as follows. When the team members are presented with questions suggesting good agile practice at MinT, they tend to agree with a conclusive majority. On top of that, 13 variables mean fall within one standard deviation (2.1 ± 0.75). That represents 86.5% of the data. This percentage is higher than the one of a Gaussian / normal distribution (68%). In another words, 86.5% of the data is concentrated very closely to the mean. To finalize, 94.25% of the data lies within 1 Sd, and 100% within 2 Sd. This tendency of having uniform responses somehow indicates that MinT has some good agile practices. According to table 4.4-1, it shows the existence of good communication between the client, project manager, scrum masters and team members (variable 3,4,9), that product backlog is maintained (variable 6), and software requirements are clearly stated (variable 10) are indicators of a good agile practice in place (PMI, 2017).

4.5. Agile project management challenges at MinT

	Descriptive Statistics					
		N	Minimum	Maximum	Mean	Std. Deviation
14	The developers have poor programming skill	30	1	5	4.10	1.062
15	Team roles were not clearly defined	30	1	4	1.80	.761
16	Team members have poor communication between them	30	1	5	1.70	1.022
17	Team members have poor coordination with scrum master	30	1	5	4.33	.844
18	Having multiple product owners had a negative impact	30	1	5	4.03	1.159

19	The project manager did not manage well product owners' relation with project priorities	30	1	5	2.67	1.348
20	The team motivation level is low	30	1	5	1.83	1.206
21	Efficient customer feedback does not exist	30	1	5	3.83	.986
22	The fact that the development team was physically in the same location while developing did not help	30	1	5	3.63	.890
23	Upper management did not approve the use of agile	30	1	5	2.17	1.289
24	Scope change was not managed successfully	30	1	5	3.70	1.179
25	The software is intended to solve a problem observed	30	1	4	1.83	.834
26	The software company initiated the project	30	1	5	3.77	1.135
27	Software development process uses agile approach	30	1	5	3.90	1.125
28	The software development process has 6 stages: Concept - Inception -	30	1	5	4.17	1.147
	Valid N (listwise)	30				

Table 6 **agile project practices at Eldix**

4.5.1 Relevant single variables

The above table gathers variables that identify challenges in the MinT project. According to table 4.5-1, variables that have the lowest means in this manner are:

 variable 16 Team members have poor communication between them" with a mean of 1.70.

 variable 15 "Team roles were not clearly defined" with a mean of 1.80.

 variable 25 "The software is intended to solve a problem observed" with a mean of 1.83.

 variable 20 "The team motivation level is low" with a mean of 1.83.

The following observations were made:

- Some challenges were successfully addressed, such as:
    - Variable 15: Team roles were not clearly defined (mean = 1.80, SD = 0.761)
    - Variable 16: Team members have poor communication between them (mean = 1.70, SD = 1.022)
    - Variable 19: the project manager did not manage well product owner (mean=2.67 SD= 1.34
    - Variable 20: team motivation is low (mean= 1.83, SD =1.20)
    - Variable 23: upper management did not approve the use of agile (mean = 2.17 SD =1.289)

  These variables had low standard deviations, indicating uniform responses among team members. However, the following variables had higher standard deviations:

    - Variable 14: The developers have poor programming skills (mean = 4.10, SD = 1.062)
    - Variable 17: Team members have poor coordination with the Scrum master (mean = 4.33, SD = 0.844)
    - Variable 18: Having multiple product owners had a negative impact (mean = 4.03, SD = 1.159)
- Some challenges seriously threaten the project:
    - Variable 20: The team motivation level is low (mean = 1.83, SD = 1.206)

- Variable 23: Upper management did not approve the use of Agile (mean = 2.17, SD = 1.289)

These issues can cause delays and lack of coordination. Additionally:

- Variable 21: Efficient customer feedback does not exist (mean = 3.83, SD = 0.986)
- Variable 24: Scope change was not managed successfully (mean = 3.70, SD = 1.179)

4.4.2 Aggregate agile challenges

When considering the aggregate "agile project management challenges" variable, its mean is less than the previous one, but this time its standard deviation is 1.10 which is much greater. This indicates that variables are much scattered in this aggregate variable than the previous study which is on agile practices. Table 4.4-1 shows how data is scattered across the possible values. Even though the mean is 4.10, the table clearly shows that there is a significant amount of scattered data

with lower scores. This explains the larger amount of 1.10 SD. In fact. 50% of the variables are found within one SD (4.57±1.25), and the other 100% within 2 SD. When compared with a normal distribution, this data is more scattered. The items with low score in the table represent identified challenges by the team members. The ones with high scores represent successfully deal with challenges. According (Abdullah, et al,.2023) studied to investigate difficulties and offer remedies for implementing Agile project management in the public sector via a comprehensive literature review .He addressed the challenges that include the hierarchical structure of the public sector hindering Agile application, Issues such as lack of skills, culture, and organizational structure alignment with Agile practices are highlighted, Overcoming problems related to budget, schedule, and project validation are also emphasized in the study, team members training is one important challenge to look out for ((Abdullah, et al,.2023) Other common challenges can be ineffective product owner, lack of automated testing, lack of transition support, inappropriate physical environment, poor team selection, discipline slips, lack of support for learning, use of a multiple product backlogs.

In an interview held with representatives from MinT and Eldix, they discussed the frequency and challenges of delivering product increments or releases. The team strives to deliver product increments on a bi-weekly basis, adhering to Agile two-week sprint cycle. However, they face several challenges in maintaining this schedule. Regulatory compliance within the public sector often delays releases, as strict standards must be met. Additionally, aligning the diverse expectations and requirements of both public and private stakeholders can be complex and time-consuming. The integration of new increments with existing systems, particularly those entrenched in public sector infrastructure, presents significant hurdles. Lastly, ensuring high-quality releases within these tight timeframes is challenging, given the limited testing resources and the need for thorough quality assurance.

4.6 Project outcome at MinT

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The product was delivered according to specifications	30	1	3	1.60	.563
The project was finished on time	30	1	5	4.00	1.259
The project managed to stay within budget	30	1	5	3.83	1.206
Valid N (listwise)	30				

Table 7 **project outcome at Mint**

The product was delivered according average response is 1.60, which is closer to the minimum value (1). This suggests that on average, respondents tend to agree that the product was delivered according to specifications.

The low standard deviation (0.563) indicates that the responses are relatively close to the mean, showing low variability in opinions about this statement.

The project was finished on time average response is 4.00, suggesting that on average, respondents tend to agree that the project was finished on time. The higher standard deviation (1.259) compared to the first statement indicates more variability in the responses, meaning there is a wider range of opinions about whether the project was finished on time.

The project managed to stay within budget average response is 3.83, suggesting that respondents generally agree that the project managed to stay within budget. Similar to the second statement, the standard deviation (1.206) indicates a moderate level of variability in responses, meaning there is a range of opinions on whether the project stayed within budget.

The respondents generally agree that the product was delivered according to specifications, the project was finished on time, and the project managed to stay within budget. There is low variability in opinions about the product being delivered according to specifications, while there is moderate variability in opinions about the project finishing on time and staying within budget. Agile project practices have a significant impact on project outcomes, with the combination of practices playing a crucial role in communication within the team, project requirements, and priorities, leading to better project results (Ghimire, D., & Charters, S. 2022).

4.7 Correlation at MinT

		Agile practices	Agile challenges	Project outcome
Agile practices	Pearson Correlation	1	.817**	.533**
	Sig. (2-tailed)		0	0
	N	30	30	30
Agile challenges	Pearson Correlation	.817**	1	.521**
	Sig. (2-tailed)	0		0
	N	30	30	30
Project outcome				
	Pearson Correlation	.533**	.521**	1
	Sig. (2-tailed)	0	0	
	N	30	30	30

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

Table 8 **Correlation at MinT**

Source: Own Survey, 2024

Agile practices and Project outcome: There are a moderate positive correlation between Agile practices and project outcome. This correlation is statistically significant ($p < 0.05$), indicating that better Agile practices are associated with better project outcomes.

Agile challenges and Project outcome: There are a moderate positive correlation between Agile challenges and project outcome. This correlation is also statistically significant ($p < 0.05$), suggesting that addressing Agile challenges effectively is associated with better project outcomes.

Agile practices and Agile challenges: There are a strong positive correlation between Agile practices and Agile challenges. This high correlation is statistically significant ($p < 0.05$), indicating that the presence of Agile practices is strongly related to the presence of Agile challenges. This could mean that as Agile practices are implemented, challenges also arise, and managing these challenges is part of the Agile process.

4.9 Descriptive Statistics at Eldix

By analyzing the data gathered from the questionnaire in descriptive statistics such as mean and standard deviation, appropriate interpretations were done for each variable/question item that was presented in the questionnaire. The results from the statistics were also supported with the qualitative data gathered and summarized from the open-ended questionnaires and semi-structured interview. This section is divided in terms of the grouped variables; agile practices, and agile challenges, and the Project outcome. For the 5-point Likert scale items, the mean score of 1 is regarded as strongly agree, 2 as agree, 3 as neutral, 4. as disagree, and 5.0 as strongly disagree.

4.10 Agile project management practices at Eldix

This section presents the findings for the first research question that inquired to find out about Agile project management practices of Eldix. Based on a 5-point Likert scale, seven questions were designed for this section. The summarized responses can be seen in

Descriptive Statistics			
	N	Mean	Std. Deviation
Eldix uses Agile methodologies for all outsourced software development projects with MinT.	22	1.77	.973
The team received training on agile methodology	22	2.73	1.751
Team members have good coordination with scrum master	22	2.23	1.232
Scrum masters have good communication with Product Owners	22	2.32	1.249
Product owners have good communication with project manager	22	2.55	1.405
Every team uses the same product backlog	22	3.36	1.329
Project backlog is continuously maintained	22	3.09	.921
The sprints of the different teams were synchronized	22	2.68	1.129
The project manager has good communication with the client	22	2.27	1.386
The software requirements were clearly stated	22	1.55	.671
You have achieved your goal	22	1.68	.568
The teams achieved their goal	22	1.68	.568
Agile is better than traditional for software development	22	1.55	.671
Valid N (listwise)	22		

Table 9 **Agile project management practices**

Source: Own Survey, 2024

4.10.1 Relevant single variables

The above table contains 15 variables that describe the agile practice at Eldix.

Overview and Key Findings

The descriptive statistics for various survey items related to Agile methodologies in software development reveal overall positive perceptions among respondents. The analysis includes responses from 22 participants who rated statements on a Likert scale, where lower scores generally indicate stronger agreement or more favorable views. Key measures such as the mean and standard deviation provide insights into the central tendency and variability of responses.

Strong Agreement on Agile Practices

Respondents strongly agree with several core Agile practices. For example, the statement "Eldix uses Agile methodologies for all outsourced software development projects with MinT" has a mean of 1.77 and a standard deviation of 0.973, indicating strong agreement and relatively consistent responses. Similarly, items like "The software requirements were clearly stated" (mean = 1.55, SD = 0.671) and "Agile is better than traditional for software development" (mean = 1.55, SD = 0.671) also demonstrate strong consensus among participants. These findings suggest a broad endorsement of Agile methodologies' clarity and effectiveness.

Variability in Training and Coordination

However, there is considerable variability in responses related to Agile training and coordination. For instance, "The team received training on agile methodology" has a higher mean of 2.73 and a notably large standard deviation of 1.751, indicating mixed perceptions about the adequacy of training. Similarly, "Team members have good coordination with scrum master" (mean = 2.23, SD = 1.232) shows moderate agreement but with significant variability. This suggests that while some team members may feel well-coordinated and adequately trained, others might experience gaps in these areas.

Communication Across Roles

Communication between different roles within the Agile framework also shows a range of responses. Statements such as "Scrum masters have good communication with Product Owners" (mean = 2.32, SD = 1.249) and "Product owners have good communication with project manager" (mean = 2.55, SD = 1.405) reflect moderate agreement with some degree of inconsistency. The

variability here could point to occasional breakdowns in communication or differences in how communication practices are implemented across teams.

Goal Achievement and Maintenance of Practices

When it comes to achieving goals, the responses are notably positive and consistent. Both "You have achieved your goal" and "The teams achieved their goal" have means of 1.68 and identical standard deviations of 0.568, reflecting strong agreement and low variability. This indicates a shared perception that goals are being met effectively. In contrast, items related to the maintenance of Agile practices, such as "Project backlog is continuously maintained" (mean = 3.09, SD = 0.921), show more neutral responses, suggesting that while goal achievement is strong, the maintenance of specific practices might require more attention.

Overall, the survey results highlight a strong endorsement of Agile methodologies' core principles, particularly in achieving clearly defined goals and the perceived superiority of Agile over traditional methods. However, areas such as training, coordination, and communication between different roles exhibit more variability, indicating room for improvement. To address these issues, organizations might consider implementing more standardized training programs, enhancing communication protocols, and regularly reviewing Agile practices to ensure consistent application across teams. By focusing on these areas, organizations can further solidify the effectiveness and cohesiveness of their Agile practices.

4.11 Agile project management challenges at Eldix

Descriptive Statistics				
	N	Sum	Mean	Std. Deviation
The developers have poor programming skill	22	75	3.41	1.736
Team roles were not clearly defined	22	74	3.36	1.432
Team members have poor communication between them	22	97	4.41	.734

Team members have poor coordination with scrum master	22	75	3.41	1.532
Having multiple product owners had a negative impact	21	87	4.14	1.153
The project manager did not manage well product owner's relation with project priorities	22	96	4.36	.902
The team motivation level is low	22	90	4.09	1.342
Efficient customer feedback does not exist	22	63	2.86	1.125
The fact that the development team was physically in the same location while developing did not help	22	74	3.36	1.465
Upper management did not approve the use of agile	22	83	3.77	1.232
Scope change was not managed successfully	22	68	3.09	1.342
The software is intended to solve a problem observed	22	69	3.14	1.207
The software company initiated the project	22	55	2.50	1.225
Software development process uses agile approach	22	55	2.50	1.144
The software development process has 6 stages: Concept - Inception -	22	56	2.55	1.143
Valid N (listwise)	21			

Table 10 **Agile project management challenges**

Source: Own Survey, 2024

The provided table presents the descriptive statistics for various challenges faced in the Agile software development process at Starcom. The statistics include the number of responses (N), the sum of responses, the mean, and the standard deviation for each challenge statement. These metrics provide insight into the central tendency and variability of the responses.

Key Findings

1. **High Variability in Perceived Challenges** Several items have high standard deviations, indicating significant variability in responses. For example, "The developers have poor programming skill" (SD = 1.736) and "Team members have poor coordination with scrum master" (SD = 1.532) suggest that perceptions about these issues are quite diverse among respondents. This variability could imply that experiences and views on these challenges differ widely within the team.
2. **Moderate Agreement on Communication Issues** Statements like "Team members have poor communication between them" (mean = 4.41, SD = 0.734) and "The project manager did not manage well product owner's relation with project priorities" (mean = 4.36, SD = 0.902) have relatively high means and moderate standard deviations. This indicates a general consensus that communication issues are significant, but with some variation in the degree of agreement.
3. **Challenges with Motivation and Management Approval** The statements "The team motivation level is low" (mean = 4.09, SD = 1.342) and "Upper management did not approve the use of agile" (mean = 3.77, SD = 1.232) reflect moderate agreement with noticeable variability. This suggests that these are recognized challenges, but experiences vary among team members.
4. **Customer Feedback and Scope Management Issues** Responses to "Efficient customer feedback does not exist" (mean = 2.86, SD = 1.125) and "Scope change was not managed successfully" (mean = 3.09, SD = 1.342) highlight issues related to customer interaction and project scope management. These means, closer to the midpoint of the scale, indicate mixed perceptions about these challenges.
5. **Mixed Perceptions on Development Process Stages** The mean responses for items such as "The software development process has 6 stages: Concept - Inception -" (mean = 2.55, SD = 1.143) suggest a range of views on the clarity and structure of the development process stages. This variability might reflect differing levels of understanding or adherence to the stated process.

The table reveals that while certain challenges like communication issues and project management are generally agreed upon, there is substantial variability in perceptions about other aspects such as team skills, coordination, and motivation. To address these challenges effectively, Eldix could focus on standardizing training and communication practices, enhancing management support for Agile practices, and improving mechanisms for customer feedback and scope management. By addressing these areas, the organization can aim to reduce variability in experiences and improve overall team cohesion and efficiency in Agile practices.

4.12 Project outcome at Eldix

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The product was delivered according to specifications	22	1	3	1.59	.666
The project was finished on time	22	1	5	3.59	1.297
The project managed to stay within budget	22	1	5	3.59	1.436
Valid N (listwise)	22				

Table 11 **Project outcome**

Source: Own Survey, 2024

The table presents descriptive statistics for three key project outcome variables related to the Agile practices at Eldix. The statistics include the number of responses (N), minimum and maximum values, mean, and standard deviation for each statement. These metrics provide insight into the central tendency and variability of the responses, shedding light on the perceived success of the projects in various aspects.

Product Delivery According to Specifications

The low mean score (1.59) and relatively low standard deviation (0.666) indicate that most respondents strongly agree or agree that the product was delivered according to specifications. The responses are clustered closely around the mean, suggesting a strong consensus on this aspect.

Project Completion Time

The mean score of 3.59, which is closer to the midpoint of the scale, indicates mixed perceptions about whether the project was finished on time. The higher standard deviation (1.297) reflects considerable variability in responses, suggesting that experiences with meeting project deadlines vary significantly among team members.

Budget Adherence

Similar to the project completion time, the mean score of 3.59 indicates a mixed view on whether the project managed to stay within budget. The standard deviation of 1.436 is the highest among the three variables, indicating even greater variability in responses. This suggests differing experiences and opinions on budget adherence across the team.

The data reveals strong agreement among team members that the product was delivered according to specifications. However, there are mixed perceptions and significant variability regarding whether the projects were finished on time and stayed within budget.

4.13 Correlation Analysis at Eldix

By summarizing the mean score of the variables, a Pearson correlation test was done. Given the fact that a Pearson correlation value of 0.1 to 0.3 is considered small, 0.3 to 0.5 considered medium, and more than 0.05 to 0.1 is large, interpretations for the strength of associations were done for the variables.

Correlations				
		Agile practices	Agile challenges	Project outcome
Agile practices	Pearson Correlation	1	.795	.431*
	Sig. (2-tailed)		.195	.485
	N	22	22	22
Agile challenges	Pearson Correlation	.795	1	.424*
	Sig. (2-tailed)	0		.0
	N	22	22	22

Project outcome	Pearson Correlation	.431**	.424*	1
	Sig. (2-tailed)	0	0	
	N	22	22	22
*. Correlation is significant at the 0.01 level (2-tailed).				

Table 12 **Correlation Analysis at Eldix**

Source: Own Survey, 2024

As can be seen highlighted in the above table, the significant relationship between improved organizational performance and the variables under Agile practices 79.5%. The correlation value between variables under agile challenges is 43.1%. This indicates that the variables chosen for this analysis show strong associations with the dependent variable. In summary, the data indicates significant positive relationships between both Agile practices and Agile challenges with project outcomes, implying that while Agile practices contribute positively to project success, addressing and overcoming challenges inherent in Agile processes also plays a crucial role in achieving favorable project outcomes.

Chapter 5 Summary, conclusion and recommendations

5.1 Summary

In the study on "Agile Project Management in Ethiopia Public-Private Partnership: Challenges and Practices – A Case of Ministry of Innovation and Technology, and Eldix Software Developer PLC," an analysis was conducted to understand the implementation, challenges, and outcomes of Agile methodologies within these organizations. Data from questionnaires and interviews were used to provide a comprehensive overview, focusing on the effectiveness and difficulties of Agile practices.

The descriptive statistics revealed that both MinT and Eldix largely adopt Agile methodologies, but with varying levels of success. At MinT, moderate agreement was found on the use of Agile practices, with positive feedback on internal communication and coordination. However, there were notable issues in maintaining the product backlog and synchronizing sprints, as well as challenges in project manager-client communication and clarity of software requirements.

At Eldix, the adoption of Agile methodologies also showed strong agreement, especially on the clarity of software requirements and the superiority of Agile over traditional methods. However, significant variability was observed in responses related to Agile training, team coordination, and communication between different roles. These mixed perceptions suggest areas where further improvement is needed.

The analysis of Agile challenges highlighted critical issues at both organizations. Poor communication and coordination, unclear team roles, and multiple product owners negatively impacted the projects as working collaboratively. Furthermore, low team motivation and insufficient upper management support for Agile practices were identified as significant obstacles. Customer feedback and scope change management also posed challenges, indicating areas for enhancement.

The project outcomes showed that both organizations successfully delivered products according to specifications, but faced difficulties in finishing projects on time and staying within budget. The

correlation analysis indicated a significant negative relationship between Agile challenges and project outcomes, emphasizing the importance of addressing these challenges to improve overall project success.

5.2 Conclusion

The study concluded that while Agile practices are being implemented within MinT and Eldix, there are significant areas for improvement to enhance their effectiveness. Both organizations have shown a commitment to Agile methodologies, but inconsistencies in training, communication, and coordination hinder their full potential. Addressing these gaps is crucial for the better alignment of project goals and outcomes.

The challenges identified, such as poor communication, low motivation, and inadequate support from upper management, highlight systemic issues that need to be addressed. Overcoming these challenges is essential for the successful implementation of Agile practices and achieving desired project outcomes. The significant negative correlation between Agile challenges and project outcomes further underscores the critical impact of these issues.

In conclusion, while the adoption of Agile methodologies has brought several benefits to MinT and Eldix, there are clear areas that require strategic focus and improvement. Enhancing training, improving communication protocols, and ensuring better management support are pivotal steps towards more successful Agile project management.

5.3 Recommendations

To improve Agile project management at MinT and Eldix, it is recommended to standardize and enhance Agile training programs for all team members. This will ensure a consistent understanding and application of Agile principles, reducing variability and improving overall coordination and communication within teams.

Additionally, implementing more robust communication protocols between different roles, such as scrum masters, product owners, and project managers, will help address the existing

communication gaps. Regular reviews and feedback sessions can also aid in identifying and mitigating issues promptly, ensuring smoother project execution.

Lastly, it is crucial to secure strong support from upper management for Agile practices. This involves not only approval but also active involvement and commitment to Agile methodologies. Providing the necessary resources and creating an environment that fosters motivation and collaboration will significantly enhance the effectiveness of Agile project management and lead to better project outcomes.

5.4 Research Limitation and Areas of Further Research

Based on the findings of the research, the following limitations and recommendations for

future study is drawn.

5.4.1 Limitation of the Study

One of the primary limitations of this study is the reliance on self-reported data through questionnaires and interviews, which may introduce bias or inaccuracies due to the subjective nature of the responses. Additionally, the study focuses on a specific case involving the Ministry of Innovation and Technology (MinT) and Eldix Software Developer PLC in Ethiopia, which may limit the generalizability of the findings to other organizations or contexts. The relatively small sample size and the specific public-private partnership framework further restrict the applicability of the results to broader Agile project management practices.

5.4.2 Recommendations for Further Study

Future research should consider expanding the scope to include a larger and more diverse sample of organizations, both within Ethiopia and in other regions, to enhance the generalizability of the findings. Comparative studies across different industries and organizational structures could provide deeper insights into how various factors influence the success of Agile methodologies. Additionally, incorporating quantitative performance metrics alongside qualitative data could offer a more comprehensive evaluation of Agile project management effectiveness.

Another area for further study is the long-term impact of Agile practices on project outcomes and organizational performance. Longitudinal studies tracking projects over time could shed light on how sustained Agile implementation affects efficiency, innovation, and team dynamics. Moreover, investigating the role of cultural and organizational change management in the adoption of Agile methodologies could provide valuable guidance for organizations seeking to transition to Agile practices effectively. This would help in developing tailored strategies to overcome resistance and enhance the integration of Agile principles across different organizational contexts.

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APPENDICES

APPENDIX 1

Questionnaire for Employees at Eldix Software Developer PLC

Addis Ababa University

School of Commerce

Master of Arts in Project Management

Agile project management in Ethiopian public-private partnerships: challenges and practices – A case of Ministry of Innovation and Technology, and Eldix Software Developer PLC,"

We kindly request your participation in completing a questionnaire designed to address the research questions presented at the beginning of this study. The questionnaire is structured into three key sections. Therefore, it will consist of three major themes: questions from 1 to 13 try to assess the company's agile practice, questions from 14 to 28 and plus 4 open-end questions address the challenges encountered, questions from 29 to 31 address the project outcome and close-end question for Eldix software developer. We have selected a Likert scale format to make the questionnaire easy to complete, facilitate the collection of quantifiable data, and provide you with a range of options to express your views more precisely than a simple yes or no.

We greatly appreciate your time and insights.

Thank you,

Part 1: General questions

1. Please specify your gender category

a. Male

b. Female

2. Please specify your age category

a. 25 years and under

b. 26-35 years

c. 36 years and above

3. What is your current level of education?

a. Diploma

b. Degree

c. Master's degree

d. PhD

e. Other: _____

4. For how long have you been working in Eldix?

a. Less than a year

b. Up-to 2 years

c. Up-to 5 years

d. More than 5 years

5. Which level is your role at your organization in the traditional sense?

a. Senior management level

b. Middle level management level

c. Non-managerial level

6. Have you been a part of a team that has employed agile project management methods in your previous work experience other than Eldix?

a. Yes

b. No

7. How often do you receive feedback on your performance? From peers or management?

a. Rarely

b. Often

c. Daily

d. Other: _____

Part 2: The below questions have a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree to indicate your agreement or disagreement level on the statements below with regards to your current agile project management methodology practice. Please tick the option that best describes your response for each statement.

Part-1 Agile practice assessment at Eldix						
		Strongly agree	agree	neutral	disagree	strongly disagree
1	Eldix uses Agile methodologies for all outsourced software development projects with MinT.					
2	The team received training on agile methodology					
3	Team members have good coordination with scrum master					
4	Scrum masters have good communication with Product Owners					
5	Product owners have good communication with project					

	manager					
6	Every team uses the same product backlog					
7	Project backlog is continuously maintained					
		Strongly agree	agree	neutral	disagree	strongly disagree
8	The sprints of the different teams were synchronized					
9	The project manager has good communication with the client					
10	The software requirements were clearly stated					
11	You have achieved your goal					
12	The teams achieved their goal					
13	Agile is better than traditional for software development					
Part-2 Encountered agile challenges in Eldix						
		Strongly agree	Agree	Neutral	Disagree	strongly disagree
14	The developers have poor programming skill					
15	Team roles were not clearly					

	defined					
16	Team members have poor communication between them					

		Strongly agree	Agree	Neutral	Disagree	strongly disagree
17	Team members have poor coordination with scrum master					
18	Having multiple product owners had a negative impact					
19	The project manager did not manage well product owners relation with project priorities					
20	The team motivation level is low					
21	Efficient customer feedback does not exist					
22	The fact that the development team was physically in the same location while developing did not help					
23	Upper management did not approve the use of agile					
24	Scope change was not managed successfully					

25	The software is intended to solve a problem observed					
26	The software company initiated the project					
27	Software development process uses agile approach					
28	The software development process has 6 stages: Concept - Inception -					

Part-3 Project outcome at Eldix						
		Strongly agree	agree	neutral	disagree	strongly disagree
29	The product was delivered according to specifications					
30	The project was finished on time					
31	The project managed to stay within budget					

Part 4: Please answer the following open questions

1. How effectively does Eldix Software Developer implement Agile methodologies in its collaboration with MinT compared to traditional methodologies?

_____

_____

2. What specific challenges do you encounter while practicing Agile methodologies in the collaboration projects with MinT?

_____

_____

3 In your opinion, what are the pros and cons of introducing Agile methodologies in the collaborative projects with MinT ?

_____

_____

4 How has the adoption of Agile approaches impacted your department's overall performance and project outcomes?

Part-5 Clothing questions

1. How frequently does your team deliver product increments or releases, and what challenges do you face in doing so?
2. Can you discuss the resource constraints (e.g., budget, personnel, technology) that affect the implementation of Agile practices in your projects?
3. To what extent does the collaboration with MinT enhance the implementation of Agile practices?

   *Note: Additional follow-up questions were asked as appropriate with each interview

APPENDIX-2

Questionnaire for Employees at Ministry of Innovation and Tchnology

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School of Commerce

Master of Arts in Project Management

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b. Up-to 2 years

c. Up-to 5 years

d. More than 5 years

5. Which level is your role at your organization in the traditional sense?

a. Senior management level

b. Middle level management level

c. Non-managerial level

6. Have you been a part of a team that has employed agile project management methods in your previous work experience other than MinT?

a. Yes

b. No

7. How often do you receive feedback on your performance? From peers or management?

a. Rarely

b. Often

c. Daily

d. Other: _____

Part 2: The below questions have a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree to indicate your agreement or disagreement level on the statements below with regards to your current agile project management methodology practice. Please tick the option that best describes your response for each statement.

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4	Scrum masters have good communication with Product Owners					
5	Product owners have good communication with project					

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11	You have achieved your goal					
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Part 4: Please answer the following open questions

1. How effectively does MinT implement Agile methodologies in its collaboration with Eldix compared to traditional methodologies?

_____

_____

2. What specific challenges do you encounter while practicing Agile methodologies in the collaboration projects with Eldix?

_____

_____

3 In your opinion, what are the pros and cons of introducing Agile methodologies in the collaborative projects with Eldix?

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3. To what extent does the collaboration with Eldix enhance the implementation of Agile practices?

   *Note: Additional follow-up questions were asked as appropriate with each interview