

ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS

THE EFFECT OF AGILE METHODOLOGY ADOPTION ON PROJECT SUCCESS IN AN E-COMMERCE APPLICATION DEVELOPMENT: THE MEDIATING ROLE OF TEAM COMMUNICATION.

MSc. THESIS

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THE EFFECT OF AGILE METHODOLOGY ADOPTION ON PROJECT SUCCESS IN AN E-COMMERCE APPLICATION DEVELOPMENT: MEDIATING ROLE OF TEAM COMMUNICATION.

A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF PROJECT MANAGEMENT PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN PROJECT MANAGEMENT (MAPM)

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DECLARATION

I hereby declare that the study entitled " THE EFFECT OF AGILE METHODOLOGY ADOPTION ON PROJECT SUCCESS IN AN E-COMMERCE APPLICATION DEVELOPMENT: MEDIATING ROLE OF TEAM COMMUNICATION" is the result of my research and original work except for the literature review, where sources have been clearly identified and duly acknowledged. This research has not been submitted for any degree at this or any other university.

	Signature	Date
KIDIST SOLOMON	_____	_____

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ABSTRACT

This research explores the direct influence of Agile Methodology Adoption (AM) on Project Success (PS), as well as the critical function of Team Communication (TC) in understanding how organizational behaviors transform project frameworks into successful delivery. Respondents were deliberately chosen with a criteria of being experienced in project management and agile methodology. The study employs a strict quantitative survey methodology, collecting primary data from 105 project management and technical professionals including project managers, software engineers, Scrum masters, and product owners who are currently working on e-commerce projects. It was an explanatory research with correlational research design. The structural linkages and indirect routes were extensively analyzed using descriptive and inferential statistics, particularly utilizing Hayes' PROCESS Macro Model 4 for the mediation study. The study found that adopting Agile methodologies had a substantial beneficial impact on project success ($\beta = 0.2931$) and team communication quality ($\beta = 0.5345$). Most significantly, Team Communication was found to be a substantial partial mediator, implying that almost half of Agile's overall good influence on project outcomes is actively channeled via the communication channels it develops. The study concludes that merely implementing structural Agile tools or software is inadequate to ensure success; Agile thrives because it fundamentally optimizes behavioral interactions. To achieve maximum success, organizations must shift from tool-centric to behavior-centric practices, treat Agile ceremonies as meaningful collaborative dialogues rather than administrative updates, and flatten bureaucratic hierarchies to create a psychologically safe environment in which technical teams can openly express project risks and roadblocks early.

LIST OF ACRONYMS

AM: Agile Methodology

APM: Agile Project Management

APMM: Agile Project Management Methodology

CSF: Critical Success Factor

IT: Information Technology

PS: Project Success

PMM: Project Management Methodology

PMI: Project Management Institute

PM: Project Management

KPMG: Klynveld Peat Marwick Goerdeler

TC: Team Communication

1. INTRODUCTION

1.1 Background of the Study

Project management followed a sequential and rigid methodology that had distinct starts and ends in between stages. This waterfall type of project management practices could no longer handle the continuous demand by changes in customer and environmental needs. The constantly evolving global economy required not only doing it the right way and with quality but also with speed (White, 2008). As a result agile methodologies were introduced.

Agile methodologies benefits project management by allowing faster delivery of value to customers, enhancing flexibility allowing teams to respond to requirements and market condition changes, meeting customer needs and expectations, and promoting continuous testing and integration resulting in improved quality of software and diminished risk of defects (Boehm, 2002).

Main purpose of agile methodology is to utilise benefits throughout the life cycle stages of a project. Several iterations of agile project life cycles will be made to complete a project. Agile project management makes us focus on what matters. Agility is being flexible to change eventually delivering value through continuous feedback (Garcia, 2022, n.d.).

This study aims to identify the mediating role of team communication on the relationship between agile methodology on project success. Communication and communication both with stakeholders and project team is emphasized with agile technique. Traditional project management systems are characterized by lengthy planning phases trailed by implementation phase, where communication is short. Lack of communication gives rise to misunderstandings, misplaced expectations and eventually, project failure. Agile techniques ensure everyone is on board with regular communication facilitated by methods such as stand-up meetings and sprint reviews. Moreover, customers and stakeholders are engaged in the process resulting in a product that better fits their requirements (https://techpath.biz/). Agile methodologies have been implemented across various industries mainly software development, finance, manufacturing and healthcare.

Growth of the e-commerce industry is closely linked with digitalization, revolutionizing how individuals and businesses buy and sell product and services (Thorogood, 2012).

Development of artificial intelligence (AI), machine learning, block chain and the internet of things (IoT) allowed a better user experience through personalization and engaging shopping experience as well as improved operational efficiency (Rosário, 2021). Agile practices in the context of e-commerce allow organizations to utilize new technologies, and business models, which is beneficial in the instantly changing consumer preferences and technology. (Chen Y. L., 2021).

1.2 Statement of the problem

Many Factors could attribute to the failure of projects while few factors make them succeed. Project management is primarily accountable to lead projects either to success or to failure. Important measures to be taken in order to be successful are planning and estimating before project begins and handling changing requirements (Jones, 2004). According to PMI's *Maximizing Project Success* report, only 48% of projects are successful, globally. Despite the continuous development in the project management sector, projects keep experiencing cost overrun, scope creep and quality issues.

Modern project management methodologies such as agile methodology have a flexible and adaptive approach to cope with uncertainty and evolving requirements. The iterative nature of agile methodology and its characteristics of participating stakeholders in early stages could improve project performance. However, empirical evidence on its mechanism to impact project success is inconsistent, especially in developing countries context (Omonije, 2024).

Moreover, existing researches give limited attention to the impact of underlying variables such as team communication, only focusing on the direct relationship between agile methodology and project success. Team communication has a crucial role in conducing agile teams and increasing the success rate of projects (Hsu, 2012). Nevertheless, its mediating role between agile methodology and project success is yet to be explored. This study is believed to cover the gap by evaluating the mediating role of team communication and discover whether agile methodology contributes for project success.

1.3 Research questions

This study was guided by the following general research question, to examine the impact of agile methodology adoption on project success in e-commerce application development.

General Research Question:

1. To what extent does Agile methodology adoption influence project success in e-commerce application development, and how does team communication mediate this relationship?

Hypothesis statements

- H1: Agile methodology adoption has a significant positive effect on project success in e-commerce application development.
- H2: Agile methodology adoption has a significant positive effect on team communication in e-commerce application development projects.
- H3: Team communication has a significant positive effect on project success in e-commerce application development.
- H4: Team communication significantly mediates the relationship between agile methodology adoption and project success in e-commerce application development.

1.4 Research objectives

- General objective:

    1. To examine the influence of agile methodology adoption on project success in e-commerce application development with Team communication as a mediator.

- Specific Objectives:

    This Study aims to:

    1. Assess the effect of agile methodology adoption on project success in e-commerce application development.
    2. Analyse the effect of agile methodology on team communication
    3. Analyse the effect of team communication on project success
    4. Examine the role of team communication in the relationship between agile methodology adoption and project success.

1.5 Significance of the study

This study will contribute to existing literature by providing empirical evidence on how agile methodology impacts project success in the context of e-commerce application development. Also, encompassing the mediating role of team communication, which is under explored in similar studies. It will also provide practical insights for project managers on how agile practices can enhance project success. Moreover, understanding the role of team communication may assist practitioners in improving communication and decision making within agile environments.

It will also benefit e-commerce organizations by giving insight how they can improve their already existing systems and systems in the process of development. Moreover, this study will benefit researchers interested in the area of agile methodology, project success and team communication.

1.6 Scope of the study

This study will focus on the influence of agile methodology adoption on project success in e-commerce application development projects. It will be limited in the scope of agile methodology as independent variable, project success as dependent variable and with team communication considered as the mediating variable. E-commerce companies are mainly used because they commonly adopt agile approaches and work in dynamic environments with changing customer requirements.

Since there is a time and budget limitation, the study will be confined within certain e-commerce organizations only in the Ethiopian context. The population of the study will comprise project managers, software developers and agile team members engaged in these projects.

1.7 Limitations of the study

This study may be subject to some limitations. The fact that e-commerce is still at infancy stage in Ethiopia could limit practically developed project management experience in such organizations. Subsequently, the availability of organizations with extensive practical experience in applying formal project management methodologies is limited. Due to this, the findings may only reflect early stage practices and perceptions, which may limit their generalizability to more mature e-commerce environments. Despite the lack of practical experience in this industry, the researcher believes findings of this study would assist e-commerce companies in their future development.

Additionally, the study will be primarily dependent on self-reported data, which may introduce response bias and limit objectivity.

1.8 Organization of the study

This proposal will be organized in three chapters. Chapter one is introduction, consisting of 9 sub-sections; background of the study, problem statement, research questions, research objectives, significance of the study, scope of the study, limitations of the study, organizations of the study and definition of key terms. Chapter two is literature review, elaborating on each variable, their relationship to each other and empirical evidence on this variables. Chapter three is methodology, covering research approach, research design, population and sample, source data, data collection tools, data collection instruments, validity and reliability of instruments, methods of mediation model, methods of data analysis and ethical considerations.

1.9 Definition of key terms

Project Success: Is the extent to which a project achieves its objective within the desired scope, time, cost and quality.

Project Management: Application of knowledge, tools and techniques to project activities, in order to plan, execute, monitor and complete projects effectively.

Agile Project Management: an iterative and flexible approach to managing projects, emphasizing continuous improvements, customer communication, adaptive planning and responsiveness to change throughout the project lifecycle.

Team Communication: The process through which project team members exchange information, ideas and feedback.

E-commerce Organizations: are organizations that perform commercial transactions through digital platforms.

Change Responsiveness: the ability of a project team to adapt to changes arising in customer requirements, technology or environmental conditions.

Source: ((PMI), 2021)

2. LITERATURE REVIEW

The development of e-commerce platforms requires significant effort, time, and resources. Project management in this area can be challenging as it requires accuracy and efficiency at all stages.

The rapid growth of digital commerce has intensified the need for effective and efficient e-commerce application development. Organizations increasingly rely on software projects to deliver scalable, secure, and user-centered e-commerce platforms capable of adapting to dynamic market demands. However, software development projects, particularly in e-commerce contexts, often face challenges such as changing customer requirements, tight deadlines, technological complexity, and coordination among cross-functional teams. These challenges directly affect project success (Andrii K, 2023).

Agile methodology has emerged as a popular project management and software development approach designed to address uncertainty and enhance flexibility. Alongside Agile adoption, effective team communication has been recognized as a critical factor influencing project outcomes. This literature review examines existing research on Agile methodology adoption, project success, and team communication, with particular emphasis on their interrelationships and the mediating role of team communication in e-commerce application development projects

2.1. Project success

There seems to be a wide discrepancy of opinions in this field; the disagreement on what 'project success constitutes, seems to be the only common ground. (Shenhar, 1997)

(De Wit, 1988) and other writers define the border line between project success (measured against the overall aims of the project) and project management success (measured against the prevalent and traditional measures of performance against cost, time and quality). Yet another distinction is also essential i.e. it is the comparison between success criteria (the measures by which success or failure of a project or business will be judged) and success factors (those inputs to the management system that lead directly or indirectly to the success of the project or business).

At present, the most prevailing trend of research in the arena of project management has become project success. Project success can be established with satisfying stakeholders, firm level advantage, and the achievement of the deliverables. A project to be rendered effective must fulfil the customer's needs and must be able to perform the tasks for which it was undertaken. PS can

be considered as the success of the technique, objective and the firm (Shenhar, 1997). PS depends on variable situational events and how the project is implemented. It is significantly acknowledged that the methods used to perform a project widely influences project success. Research has identified that the choice of methodology ought to be given careful consideration for productive project execution.

In conclusion, project success is a multi-dimensional notion depending on standards, stakeholder perception, the setting, and the phase the project is on.

2.1.1. Critical Success Factors

According to (Saqib & Farooqui, 2008), to increase the chances of a project succeeding it is necessary for the organization to have an understanding of what are the critical success factors, to systematically and quantitatively assess these critical factors, anticipating possible effects, and then choose appropriate methods of dealing with them.

The factors leading to the success of projects are known as success factors and the success on projects is validated by success criteria. On one hand, project manager's competence contributes as a positive factor in successful delivery of projects and on the other hand, the project manager must be equipped in those areas that have the most impact on successful outcomes.

A study by (R. G. Saadé, 2015) cover most of the concerns of Chinese information systems' project managers, for which they reviewed extensive literature. The most commonly cited set of CSFs are:

(a) Effective communication
(b) Top management support
(c) User involvement
(d) Project manager and team members
(e) Project definition
(f) Project planning
(g) Project control and change management
(h) Technology support

2.1.2. Project success criteria

Project success is an important project management issue, it is one of the most frequently discussed topics and there is a lack of agreement concerning the criteria by which success is judged

A review of the literature further reveals that there is, in fact, a high level of agreement with the definition provided by (Baker B., 1983). Which is perception matters and that a project will most probably be perceived as an "overall success", if; the technical performance qualifications and/or mission to be performed are achieved. Additionally, if key people on the project team and key users or clientele are highly satisfied concerning the project outcome.

It is also general agreed that even though schedule and budget performance alone are are not adequate measures of project success, they are still essential components of the overall construct. Quality is seen mixed with issues of technical performance, specifications, and fulfillment of functional objectives and multiple project stakeholders' perception is subject to variation regarding achievement in these criteria.

2.1.3. Project success and Project management methodology

PMMs are a set of procedural guidelines, which can be adjusted to a specific need and are tools that enable to deliver a product, service or solution. PMMs assist project managers to efficiently and effectively, accomplish project success by delivering the project. They are channels for controlling and monitoring while providing guidance and support for the projects managers. completeness and appropriateness of PMMs vary from organization to organization(Robert Joslin, 2016).

Project management methodology mainly consists of (a) a linear sequential life cycle model (traditional project management/waterfall model) (b) agile or iterative project management methodology (c) hybrid. In traditional PM method, project success is mainly defined by a project completed within the prescribed scope, schedule, and cost. However, in APM methodology, project success is ensured by acquiring customer satisfaction associated with the project. Agile PM is better than traditional methodology since traditional methodology doesn't consider consumer relationship, a pre-established project scope, and focusing more on documented record (Pedro Serrador, 2015)

2.1.4. Agile Methodology and Project Success

The adoption of agile project management methodologies (APMM) is globally portrayed as a way of guaranteeing a more efficient and effective delivery of business strategies regardless of uncertainty.

Including large corporate environments, Agile methodologies are ever more being implemented. Agile project management methodology (APMM) are being vastly used in latest years to stand against the dangers of traditional, front-end planning methods that often lead to downstream development pathologies (Pedro Serrador, 2015).

Agile PMM in concept

Agile methodology can be defined as "an iterative and incremental style of development that dynamically adjusts to changing requirements and enables better risk management". Agile projects are customer-defined, aligned to the client's expectations and specific activities are measurable. Agile methodology gives attention in primarily meeting the clients need, by incorporating the customer's desire while formulating the project plan and adapting to changes to provide the better solution to the client (Ntshirane Alphios Malekana, 2024).

According to (Rico, 2012), agility means the proficiency to create and respond to change in order to benefit in a turbulent global business environment. Being Agile equips one to re-adjust quickly the use of resources when requirements, technologies and knowledge shift.

According to (Rigby, 2017), agility is defined as "the continuous readiness of an entity to rapidly, inherently proactively or reactively, embrace change, through high-quality, simplistic, economical components and relationships with its environment". Agility refers to promptness to accept a change or action. There are two dimensions. It can be the capacity to accept and adapt to changes or the ability to re-engineer the existing process. However, agile methodology pivots a development team to excel in volatile environment with its set of flexible techniques. For example, the teams are responsible for managing the software development project processes, resolving issues, making decisions and delegating tasks to other teams. Expertise to utilize Agile methodologies to manage changes allows them to be accepted by the software development team.

APMM benefits

APMM is advantageous in effectively managing dynamic projects while within higher level of urgency, difficulty and unpredictability. APMMs enable to withstand the constantly changing environments, such as going through organizational chaos. APMMs stick to to the fact that change should not be avoided but rather managed, contained and controlled, since it is inevitable. However, the other two PMMs fail to handle unexpected future events with precision, since they suppress change by extensively scheduling and detailing thoroughly before development begins. (Smith, 2010).

APMM Challenges

Agile becomes a challenge when working on projects with inflexible timeline and strict scope (Okkenburg, 2012). This poses a barrier since it does not accomodate flexibility, which is one of the foundations of Agile methodologies. On the other hand it's imaginable to apply agile if the project has a fixed deadline but not a strict scope, for the scope can be changed, reviewed or arranged differently.

In general, contractual and regulatory issues narrate to challenges of working Agile. This is for the reason that Agile does not entail flexibility or that it involves decisions, which cannot be achieved. Examples of the above situations can be public procurements, requiring meticulous plans from start to finish (Misra, 2017).

Merging Agile and traditional methodologies can be a challenge due to this. Working completely Agile is rare when executing Agile management, it must be merged with already existing methodologies. Which makes balance between different methodologies very important (Elliot, 2018).

Critical success factors of APMM implementation

The success factors of the agile PM methodology implementation have been related to people factors, training, customers, team size, capability, motivation, company culture, planning and scheduling. Agile methodology is hard to implement without an effective and self-organized project team, poised of empowered and inspired individuals (Dingsøyr, 2012). Agile software development have other success factors related to the organizational, people, process, technical and projects factors. Past studies by Chow and Cao (2018) in 25 countries indicate that APMM

has success factors such as team capability, delivery strategy, customer involvement, team environment, Agile software engineering methods and project management processes. Other researchers, such as (Misra, 2017), discovered statistically noteworthy Agile success factors, namely: decision time; corporate culture; learning; societal culture; customer communication; customer satisfaction; ; personal characteristics; control; customer commitment and training.

2.2. IT Projects and Success

2.2.1. IT projects

Information Technology (IT) is the tool that supports individual and social purposes through acquiring and processing information. It is generally realized through IT systems which are complex organizations of hardware, software, procedures, data, and people, developed to address tasks faced by individuals and groups, typically within some organizational setting.

Thus, an IS is a system which allows human partakers or machines execute work (processes and activities) by means of information, technology, and other resources to yield informational products or services intended for internal or external customers.

Bannerman defines an “IT project”, combining project features and IT objectives, IT projects as methods of multidimensional IT-based change that are discrete and unique activities (Thorogood, 2012).

IT projects are known for their high complexity and high chances of project failure making them differentiated and possibly more difficult than other engineering projects. Some designations deem them unique from other engineering projects and eventually increase their chances failure (L. Rodriguez-Repiso, 2007).

Information technology (IT) projects function as mechanisms of transformation and business growth. Annual global investment in information technology was noticed to have beeen permanently increasing.

Most IT projects are mainly differentiated since they relate to the fact that they involve software. IT projects often pressured by the market for swift delivery are usually poorly defined. The hurried pace of technological progress in IT slows advancement in expertise.

2.2.2. IT project success

IT projects continue to fail at a high rate, even with progress realized in project management practices and methodologies. Project methodologies and frameworks have played a role in the improvement of project achievements, and help resolve low success rates using project-related knowledge. However, over time, the IT failure rate is still high.

Specific approaches were harbored for an extensive study on critical success factors, and resulted with vast lists of critical success factors. Some authors focused on a specific methodology, technology, stakeholder perspective, specific group of factors, or others. Largely, this long list is because each project is unique (Carmen Iriarte, 2020)

Problems encountering in IT

Information Technology (IT) industry also widely encountered these problem. Imperative problems in IT sector projects are pinpointed as follows (Aqeel. W, 2023):

- Lower the usage of information technology systems functionalities and software applications.
- Communication issues with project stakeholders.
- Growing expectations to change the IT sector mindset globally.
- Rapidly changing and evolving consumer desires.
- Lack of skills and aptitude to communicate and form social relationships inside the organization to augment competitiveness.

To overcome these issues, agile PM approach considered the most effective and efficient methodology in communication with stakeholders (Gemino. A, 2021).

2.3. Project Management

Whatsoever the industry, Project Management is a crucial component for the company's growth and ultimate success. Likewise, the project manager is the key person managing the project and a central point of contact at any time. Recently, KPMG surveyed about the leading project management methodologies practicing across different industries, say 20, in New Zealand to give more insight into project management practice as such (Barlow, 2017).

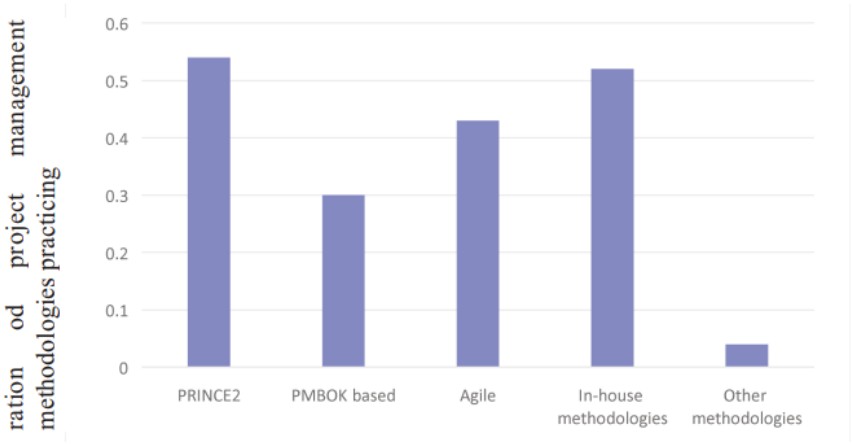


Figure 1: Distribution of project management methodology

The information in figure 1 has also shown the trend of leading project management methodologies practicing globally.

2.4. Empirical Evidence on Agile Methodology, Team Communication, and Project Success

2.4.1. Agile Methodology Adoption and Project Success

Agile methodology is the most successful, dominant, and effective model used for the successful accomplishment of IT project management. The agile methodology is continuously evolving to handle the risk associated with a project and give a response to market changes consequently leading to project success. In agile methodology, project success is measured based on customer satisfaction, on-time delivery, project quality, and business value achievement. Software companies moving toward agile practices being projects are complex and required the right approach to handle uncertain customer requirements effectively for the achievement of project success (Batra, 2018).

(Boehm, 2002) expressed that IT firms should carefully implement agile principles and practices for project completion and success. He argued that agile reduces the complexity of the project and provides innovative projects to the customers. The goal of the agile is to satisfy the project manager, team, clients, and project stakeholders. (Bergmann, 2018) stated that agile methodology projects become effective methodology due to an integral part of human factors such as highly skilled and knowledgeable teams, cooperative management, involved customers, smaller manageable teams, properly guided by the managers, and information easily accessible and adaptive leadership.

In their research (Rolstadas, Tommelein, Schiefloe, & Ballard, 2014) highlighted the significant contribution of agile to project management and success, expressed that agile offers more quality features for project management. Similarly, the agile methodology provides flexibility to the IT professional to implement required changes easily; this higher flexibility directly leads to project success

H1: Agile PM methodology has a positive and significant impact on project success.

2.4.2. Mediating Role of Team Communication

Agile practices meet new market trends efficiently, better serve a competitive market, and provide innovative projects to the market due to the on-time information exchange between the team members. Scholars like (Becerik-Gerber, 2012) underline that agile methodology can complete projects proficiently by augmenting the benefits of team communication. Similarly, team communication significantly contributes to project success. Moreover, team communication in agile methodology improves problem-solving skills and increases team member knowledge (Patrashkova, 2013). Additionally, a strong relationship is built between the team members through team communication

Team communication is essential for measuring agile project success. (Patrashkova, 2013) stated that inappropriate communication between team members can cause project delays and even sometimes become the basis of project failure. Due to this team communication gap is viewed as a critical project constraint (Stapel, 2009). Hence, team communication, and coordination is the critical facilitating factor in the relationship between agile practices and PS.

According to Gupta et al. (2004), team communication plays a facilitation role in agile methodology because agile teams discuss complex requirements with each other to provide a distinctive solution to the customers' requirements. Agile methodology provides a platform to the project management team and encourages them to perform creative tasks providing a vigorous environment where team members strive for achievement/success. In agile methodology, team communication is done more efficiently as compared to traditional project management methodology (Becerik-Gerber, 2012).

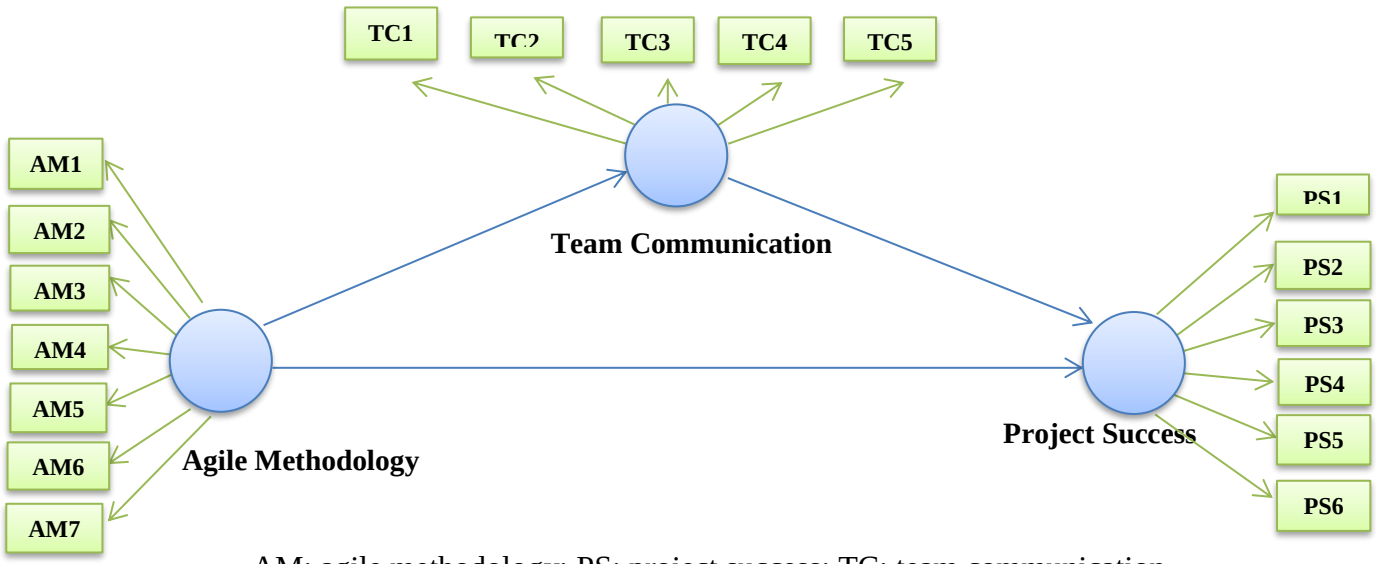
Different scholars had highlighted the significant mediating role of team communication in the relationship between APM and PS. For instance, (Ryan, 2013) underline that communication

enables project team members to better understand customer requirements and deliver quality project outcomes to them by applying the concept from the agile model. (Chen, 2010) found a positive impact of team communication on the relationship between APM and PS. He also stated that strong internal team communication in agile methodology provides highly successful projects to the IT industry.

H2: Team communication mediates the relationship between agile methodology and project success.

2.4.3. Conceptual Framework of the Study

This endeavor comprises on 3 variables, naming agile PM methodology, team communication, and project success. Agile methodology is an independent variable and affects the remaining variables. Team communication is the mediating variable that represents a relationship between dependent and independent variables. Project success is a dependent variable that is affected by the variable.



AM: agile methodology; PS: project success; TC: team communication

Figure 2: Conceptual framework of the study

3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter addresses the methodological technique that is used in the study. It provides detail information on research area, research design, research approach, population of the study, sample size, sampling techniques, data collection procedure and data analysis techniques used for the study and ethical considerations.

3.2. Research approach

This research strictly used a quantitative approach to investigate the mediating role of Team communication on using Agile methodology on project success'. The researcher used closed-ended questionnaire with likert-Scale and single multiple choice items for the quantitative data. Scientific research approaches are categorized into three categories by: quantitative, qualitative, and mixed research (Creswell, 2003). Quantitative research is a strategy for examining the relationship between variables that may be measured and evaluated using statistical methods in order to test objective hypotheses.

3.3. Research Design

Research design is defined as the specific procedure involved in the research process: data collecting, data analysis, and report writing, (Creswell, 2014). The study is explanatory since it aims to explain how and why agile methodology impacts project success through the mediating role of team communication. Quantitative research approach using a correlational research design was used due to the nature of the research title focusing on measuring the relationship between agile methodology and project success. Independent and dependent variables will not be observed or manipulated directly but will only be analyzed through previously existing system data and data gathered through structured questionnaire. For this purpose, correlational research design is well suited as it investigates relationships between variables in their natural occurrence without manipulating them.

3.4. Source of data and Sample

We selected Information Technology sectors of Ethiopian to evaluate relationship between the variables. The e commerce companies include Ethio telecom’s Zemen Gebeya, Ride, Feres, Beu delivery, Mercato online, Ashewa and Zay ride. Due to a lack of centralized data on the number

of project management professionals working in e-commerce companies, the population size could not be determined. Hence, through administering questionnaires in these companies a total of 105-questionnaire was collected from the local e-commerce markets in Addis Ababa, Ethiopia.

3.6. Data collection tools

3.6.1. Primary data

It is a first-hand data and survey research method, in which questionnaires was used to collect the information from e-commerce organizations in Ethiopia.

3.7. Data Collection Instruments

The scale for variables questionnaire was adopted from extant literature (Appendix-A). The questionnaire items included three variables including the independent variable i.e. agile methodology, the dependent variable i.e. project success, and mediator variable i.e. team communication

- Agile methodology. The scale for agile methodology has been adopted from the research work of (Lu, 2011). All 7 items have been adopted. The sample questions of agile methodology are “we make prompt decisions in response to changing market trends”, and “we utilize our skill better in agile practices”.
- Project success. The scale for PS has been adopted from the research work of (Engelbrecht, 2017). All 6 items have been adopted. The sample question of PS is “the project was delivered within the allotted schedule and budgeted cost”.
- Team communication. The scale for team communication has been adopted from the research work of (Roberts, 2004). All 6 items have been adopted. The sample questions of team communication are “team members have a provision to exhibit their viewpoint”, and “each person in a team listens to each individual's input”.

3.8. Validity and Reliability

To ensure the validity of the data obtained from the questionnaire and to bring meaningful conclusion from the collected data, the study was tested for the validity of the measurement instruments. chronbach’s alpha, outer loading, composite reliability and average variance extracted, were used to check for reliability and validity of the instruments.

Besides, the researcher believes that this study is valid in that the all respondents will be selected based on their past experience on IT project implementation in general and project management implantation in particular. Hence, their response is expected to be credible and applicable to independent researcher.

3.9. Methods of Mediation Model

The method is adapted from the (Baron, 1986). The model effect seeks to show that there is a direct effect relating X to Y and a mediated effect by which X indirectly affects Y through M.

The model equations to be used for the study are as follows:

$$Y = i_1 + cX + e_1$$

$$Y = i_2 + c' X + b M + e_2$$

$$M = i_3 + a X + e_3$$

Where:

- i_1, i_2, and i_3 are intercepts.
- X (Agile methodology) is the independent variable.
- Y (Project success) is the dependent variable.
- M (Team communication) is the mediator.
- c is the coefficient relating the independent variable and the dependent variable.
- c' is the coefficient relating the independent variable to the dependent variable adjusted for the mediator.

The widely used method to assess mediation is the causal steps approach outlined in the classic work of Barron and Kenny (1986) which this study will adopt. The four steps involved in the Kenny and Barron (1986) approach to establishing mediation are as follows:

Step 1

Shows that the initial value is correlated with the outcome. Y is used as the criterion variable in a regression equation and X a predictor (it estimates and tests path C). This step establishes that there is an effect that may be mediated.

Step 2

Shows that the initial variable is correlated with the mediator. M is used as the criterion variable in a regression equation and X a predictor (it estimates and tests path a). This step essentially involves treating the mediator as if it were outcome variable.

Step 3

Shows that the mediator affects the outcome variable in a regression equation and X and M as predictors (it estimates and tests path b) it is not sufficient just to correlate the mediator with the outcome, the mediator and the outcome may be correlated because they are both caused by the initial variable X. Thus, the initial variable must be controlled in establishing the effect of the mediator on the outcome.

Step 4

To establish that M completely mediates the X-Y relationship, the effects of X on Y controlling for M (path c) should be Zero. This means that after the mediator is entered in the regression model, the relationship between the independent and dependent variables should either disappear (full mediation) or significantly diminish (partial mediation) Barron and Kenny (1986). The effects in both steps 3 and 4 are estimated in the same equation.

3.8. Methods of data analysis

For data analysis, IBM SPSS was used. Several procedures was carried out during the data analysis process including the following:

1. Data entering and screening was done through IBM SPSS and filtered data will be taken for data analysis.
2. The variables data reliability was tested through outer loading, Cronbach alpha, and composite reliability.
3. The convergent validity of the variables was tested using the average variance extracted.
4. The discriminant validity was tested through HTMT ratio.
5. Hayes process macro model 4 was utilized to determine the significant relationship among variables.

6. The preacher and Hayes method was utilized to carry out mediation and to find out the effect of mediators between independent and dependent variables.

3.10. Ethical Considerations

Respondents were informed about the purpose of the study and their right to withdraw at any time. In addition, all data collected was treated with strict confidentiality, and used solely for academic purpose. An informed consent form was also attached to the questionnaire. Finally, ethical clearance was obtained from the university's research ethics committee

4. RESULTS AND DISCUSSION

4.1.Data Analysis and results

The analysis was conducted with a two-stage structural equation modeling approach. Firstly, the Measurement Model was assessed to check the reliability and validity of the constructs: Agile Methodology (AM), Team Communication (TC) and Project Success. It was assessed in five ways which include outher loading, Cronbach alpha, composite reliability, convergent and discriminant validity (Table 1,2).

The normal threshold limit of outer loading is > 0.5 (Gefen, 2005). All the items' other loading lies within the prescribed limit due to low factor loadings. In this phase, item refining was performed where one item from Agile Methodology (AM6) and one item from Team Communication (TC5) were removed to ensure that all factor loadings were at the required thresholds in the academic literature. The composite reliability normal range of a construct is 0.7. The result shown all variables possessed higher composite reliability. Besides, Saunders, Lewis, and Thornhill Cronbach's coefficient alpha normal range of a variable is 0.7 (Nunnally, 1978). The results affirm that data reliability has been established through Cronbach's alpha.

Second, the Structural Model was evaluated to test the direct and indirect relationships (mediation) between the variables.

4.2.Descriptive Analysis

4.2.1 Demographic Characteristics of the Respondents

105 questionnaires were distributed and all were found to be suitable for analysis, resulting a 100% response rate. Frequency and percentage proportion were used to analyze demographic characteristics of the respondents.

Gender Distribution

Gender	Frequency	Percentage (%)
Female	44	41.9
Male	61	58.1
Total	105	100.0

As per the result, 58.1% (majority) of the respondents were male, while 41.9% of the respondents were female.

Age Distribution

Age Group	Frequency	Percentage (%)
20 - 29 years	27	25.7
30 - 39 years	50	47.6
40 - 49 years	25	23.8
50 years and above	3	2.9
Total	105	100.0

Most of the respondents (48%) were 30 to 39 years old, indicating young professionals dominated the sample.

Educational Qualification

Education Level	Frequency	Percentage (%)
Diploma (TVET)	2	1.9
Bachelor's Degree	63	60.0
Master's Degree	40	38.1
Total	105	100.0

60% of the respondents hold a bachelor’s degree followed by 38.1% that hold master’s degree.

Work Experience

Experience	Frequency	Percentage (%)
Less than 2 years	18	17.1
2-5 years	39	37.1
6-10 years	31	29.5
More than 10 years	17	16.2
Total	105	100.0

Majority of the respondents had 2 to 10 years of experience, indicating respondents have s practical knowledge of the study subject.

4.2.2. Descriptive Statistics

Respondents attitude towards agile methodology and project success, were summarized using descriptive statistics. Mean and standard deviations of the response were analyzed to measure the central tendency and variations of responses.

Variable	N	Mean	Std. Deviation
Agile Methodology	105	3.89	0.68
Project Success	105	3.94	0.71

A mean score of 3.89 generally indicates that respondents agreed that agile methodologies were implemented in the project. Project success similarly, achieved a mean score of 3.94 proving positive perceptions for project outcomes. The low standard deviation portrays that there is consistency among the responses.

4.3.Assessment of the Measurement Model

The measurement model was evaluated based on reliability, internal consistency, and validity.

4.3.1. Reliability and Convergent Validity

The threshold limit of outer-loading is >0.50 (Gefen, 2005), thus, after an item-refinement process in which two inadequately performing indicators (AM6 and TC5) were removed, while other item factor loadings fell comfortably within acceptable thresholds (0.756 to 0.859).

Furthermore, (Saunders, 2009) claimed that Cronbach alpha is a general way for evaluating the internal consistency of a variety of items. Cronbach's coefficient alpha indicates that a variable's typical range is 0.7 (Bagozzi, 1988). The findings confirm that data dependability has been verified using Cronbach's alpha (range from 0.851 to 0.929).

The Average Variance Extracted (AVE) is used to calculate convergent/discriminant validity for whom the acceptable limit is 0.5 ((Fornell, 1981)). Regardless, all values exceeded the required baseline of 0.50, indicating strong convergent properties.

Table 1: Reliability and Convergent Validity Result

Construct	Item	Loading	a	Cr	Ave
Agile Methodology (AM)	AM1	0.790	0.878	0.908	0.623
	AM2	0.818			
	AM3	0.792			

	AM4	0.756			
	AM5	0.820			
	AM7	0.758			
Team Communication (TC)	TC1	0.794	0.851	0.894	0.628
	TC2	0.788			
	TC3	0.780			
	TC4	0.799			
	TC6	0.802			
Project Success (PS)	PS1	0.829	0.908	0.929	0.686
	PS2	0.800			
	PS3	0.859			
	PS4	0.833			
	PS5	0.851			
	PS6	0.794			

4.3.2. Discriminant Validity

The Average Variance Extracted (AVE) is used to calculate convergent/discriminant validity for whom the acceptable limit is 0.5 (Fornell, 1981). Regardless, all values exceeded the required baseline of 0.50, indicating strong convergent properties.

Table 2: Discriminant Validity

	AM	TC	PS
Agile Methodology (AM)	**0.789**		
Team Communication (TC)	0.595	**0.793**	
Project Success (PS)	0.499	0.542	**0.828**

Note: The Bold values on the diagonal represent the square root of the AVE.

4.4.Assessment of Structural Model (Sub Regression Paths)

The structural model was tested to confirm the mediating effect of Team Communication (TC) between Agile Methodology (AM) and Project Success (PS).

Path Track A: Agile Methodology ➔ Team Communication

The regression research looked at the impact of Agile Methodology (AM) on Team Communication (TC) and discovered a substantial, positive, and statistically significant association between the variables.

The model summary revealed a correlation coefficient (R = 0.595), implying a moderate-to-strong positive relationship between Agile methods and team communication. The R2 value of 0.355 demonstrated that Agile Methodology accounts for 35.5% of the variation in Team Communication, implying that Agile practices play an important role in encouraging communicative behavior within teams. The Adjusted R Square (0.348) confirms the model's stability and reliability.

Table 3: Model summary Agile Methodology ➔ Team Communication

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.595[a]	.355	.348	.45320
a. Predictors: (Constant), AM				

The regression model was extremely significant ($F = 56.587$, $p < 0.001$), indicating that Agile Methodology increases Team Communication prediction. Agile Methodology's regression coefficient ($B = 0.585$, $p < 0.001$) shows that a one-unit increase in Agile adoption results in a 0.585-unit improvement in Team Communication. The standardized Beta coefficient ($\beta = 0.595$) demonstrated a significant impact size, surpassing the previously found effect between Agile Methodology and Project Success.

Table 4: ANNOVA & Coefficient (AM ➔TC)

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	1.294	.302		4.281	.000
	AM	.585	.078	.595	7.522	.000
Dependent Variable: TC Regression $F = 56.587$, $p = 0.000$ (Annex B2)						

Theoretical Discussion

Agile methodology is a powerful and statistically significant predictor of team communication, as the first regression model showed. The regression coefficient for AM on TC was 0.5850 ($p < 0.001$), suggesting that team members communication more when Agile methods are used more frequently. Agile approaches significantly improve communicative behavior, as seen by the model's explanation of 35.46% of the variation in Team communication ($R^2 = 0.3546$). Theoretically, Agile approaches like pair programming, daily stand-up meetings, reviews, and multidisciplinary communication enhance team engagement, coordination, and communication. This study validates this theory.

Path Track b: Team Communication ➔ Project Success

The regression research examined the impact of Team Communication (TC) on Project Success (PS) and found a statistically significant, positive, moderate-to-strong association between the two variables.

The model summary revealed a correlation coefficient (R = 0.542), implying that higher levels of team communication are linked to greater project success. The R2 value of 0.294 showed that Team Communication explains 29.4% of the variation in Project Success, implying that communication team activities are a key predictor of successful project results. The adjusted R2 (0.287) supported the regression model's stability and dependability.

Table 5: Model Summary (TC ➔ PS)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.542[a]	.294	.287	.51647
a. Predictors: (Constant), TC				

Team communication strongly predicts project success, according to the ANOVA findings, which showed that the model was very significant ($F = 42.814$, $p < 0.001$). A one-unit increase in cooperation results in a 0.590-unit improvement in project success, according to the regression coefficient for team communication ($B = 0.590$, $p < 0.001$). Communication is a significant predictor of good project performance, as demonstrated by the moderate-to-large impact size indicated by the standardized Beta coefficient ($\beta = 0.542$).

Table 6: ANNOVA & Coefficient (TC ➔ PS)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.661	.324		5.134	.000
	TC	.590	.090	.542	6.543	.000
Dependent Variable: PS, Regression $F = 42.814$, $p = 0.000$ (Annex B3)						

Path Track C: Total Effect (AM ➔ PS)

The model showed a moderate correlation ($R = 0.499$) with Agile Methodology explaining 24.9% of the variance in Project Success ($R2 = 0.249$). The ANOVA results showed that the regression model was statistically significant ($F = 34.224$, $p < 0.001$), i.e., Agile Methodology is an important predictor of project success.

Table 7: Model Summary (AM ➔ PS)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.499[a]	.249	.242	.53239
a. Predictors: (Constant), AM				

The regression coefficient for Agile Methodology ($B = 0.534$, $p < 0.001$) indicated that an increase in Agile adoption will result in an increase in Project Success. The standardized Beta value ($\beta = 0.499$) indicated a moderate-to-strong effect size. These results suggest that Agile methods such as iterative development, customer communication and continuous feedback have a positive impact on project success.

Table 8: ANNOVA & Coefficient (AM ➔ PS)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.698	.355		4.781	.000
	AM	.534	.091	.499	5.850	.000
Dependent Variable: PS, Regression F = 34.224, p = 0.000 (Annex B1)						

When comparing the two analyses, Agile Methodology showed a greater effect on team communication (R^2 = 35.5%, β = 0.595) than on project success (R^2 = 24.9%, β = 0.499). Team communication increased agile methodology's impact on project success by an indirect effect of 0.2414. This shows that communication plays an important role in how Agile approaches lead to good project results. Agile concepts including daily stand-up meetings, sprint planning, retrospectives, cross-functional cooperation, and peer communication are likely to improve communication, transparency, and coordination among teammates.

In contrast to the earlier results, Team Communication directly explained greater variance in Project Success (29.4%) than Agile Methodology (24.9%). Furthermore, the direct impact of Agile Methodology on Project Success (β = 0.499) was smaller than the effect size of Team Communication on Project Success (β = 0.542). However, Agile Methodology had the greatest impact on Team Communication (β = 0.595), indicating that Agile practices improve project outcomes in part by fostering team member communication. This pattern demonstrates a mediation connection whereby Agile Methodology enhances Team Communication, hence improving Project Success.

The results align with socio-technical systems views and Agile theory, which emphasize the significance of communication, and interaction in achieving effective project outcomes. Agile techniques like interconnected cooperation, daily meetings, evaluations, and pair work probably create an atmosphere that enhances teamwork, accountability, and coordination. Practically speaking, companies should invest in communication enhancing techniques in addition to implementing Agile, and they should prioritize communication as a key performance metric.

4.5.Mediation Analysis (Direct and Indirect Impacts)

To evaluate the mechanism through which Team Communication (TC) mediates the association between Agile Methodology (AM) and Project Success (PS), a mediation analysis was conducted using PROCESS macro Model 4 with 5,000 bootstrap samples.

The findings demonstrated that Team Communication significantly mediates the association between Agile Methodology and Project Success. Four major pathways were examined in the analysis: the impact of AM on TC (route a), the impact of TC on PS while accounting for AM (path b), the overall impact of AM on PS (path c), and the direct impact of AM on PS with the inclusion of TC (path c').

4.5.1. Path C: Total Effect X on Y

Regression analysis findings showed that X had a statistically significant overall influence on Y:

Table 9: Total effect **Path *C***

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
.5345	.0914	5.8501	.0000	.3533	.7157	.4994

This establishes a strong baseline association necessary to move forward with mediation testing by showing that greater levels of Agile Methodology substantially predict higher levels of Project Success.

4.5.2. Path C': Direct Effect of X on Y

Agile Methodology (AM) has a considerable, positive, and statistically significant influence on Project Success (PS) regardless of Team Communication.

Table 10: Direct effect **Path *C'***

Direct effect

Effect	se	t	p	LLCI	ULCI	c'_cs
.2931	.1070	2.7390	.0073	.0808	.5053	.2738

Because this direct channel is still important alongside the mediator, it supports a partial mediation framework. Agile achieves success through two distinct mechanisms: its structural procedures (direct) and its ability to promote team communication (indirect).

4.5.3. Path a x b: Unstandardized Indirect Effect of X on Y

Agile Methodology (AM) as the independent variable, Team Communication (TC) as the mediator, and Project Success (PS) as the dependent variable.

Table 11: Indirect Effect ***Path a x b***

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
TC	.2414	.0689	.1106	.3825

This coefficient (Effect = 0.2414) represents the amount of change in Project Success that occurs when Agile Methodology increases by one unit, specifically because it drives an increase in Team Communication, which in turn drives up Project Success. Combined with the earlier significant direct impact (β = 0.2931, p <.01), this significant indirect effect verifies Team Communication's role as a partial mediator. It accounts for roughly 45.2% of Agile Methodology's total influence on project success

- $Indirect\ Effect / Total\ Effect = 0.2414 / 0.5345 = 0.4516 = 45.2\%$

This demonstrates that Team Communication is an important behavioral route for transforming Agile techniques into effective project outcomes.

4.5.4. Completely Standardized Indirect Effect of X on Y

The mediation framework's effect size was evaluated using the totally standardized indirect effect. The findings demonstrated a statistically sign

ificant standardized indirect effect of Agile Methodology on Project Success through the mediation of Team Communication.

Table 12: Completely standardized indirect effect(s) of X on Y:

Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI

TC .2256 .0623 .1058 .3514

According to Cohen's (1988) effect size guidelines, a standardized indirect effect of this magnitude (Effect≈ 0.23) represents a medium-to-large effect, indicating that the transmission of Agile principles through enhanced team communication channels yields a highly significant practical impact on project success outcomes. This result (Effect = 0.226) indicates that while Agile Methodology grows by one standard deviation, Project Success increases by 0.226 standard deviations, owing to the indirect improvement it causes in Team Communication.

4.6.Model Validation Synthesis

The PROCESS framework's second regression model examined both Agile Methodology (AM) and Team Communication (TC) simultaneously as predictors of Project Success (PS).

The overall structural model was highly significant and accounted for 34.20% of the Total Variation in Project Success ($R^2 = 0.3420$).

With both variables in the model, Team communication remained a powerful tool, independent predicator of Project outcomes, yielding an unstandardized regression coefficient of Path b = 0.4127, $p < 0.001$).

Simultaneously, when Team communication was included in the model, the direct effect of Agile methodology on Project success (Path *C'*) fell from its baseline total effect of 0.5345 down to 0.2931, yet managed to remain statistically significant ($p<0.0073$). This specific drop indicates that team communication channels actively transmit a substantial portion of Agile's efficiency.

The indirect impact of AM on PS through TC was 0.2414, and the bootstrap confidence range [0.1106, 0.3825] did not contain zero, the mediation effect is confirmed to be statistically significant. Exactly 45.2% of the total influence that Agile Methodology exerts on Project Success was transferred via Team communication, establishing a clear, mathematically sound partial mediation framework.

$$0.5345 = 0.2931 + (0.5850 \times 0.4127)$$

These findings provide significant empirical support to the argument that Team communication is a key process by which Agile Methodology supports Project Success. Agile approaches tend to improve project outcomes by encouraging team members to communicate, make decisions together, and coordinate. At the same time, the remaining considerable direct effect implies that

Agile Methodology helps projects succeed through additional mechanisms including flexibility, client participation, fast feedback, and iterative delivery.

In reality, the findings imply that organizations should actively develop communicative team cultures in addition to using Agile procedures and tools. Project managers and Agile trainers should consider cooperation as a key component.

Practical and Managerial Implications

In reality, the findings suggest that organizations should actively develop communication team cultures in addition to using Agile methods. Project managers should prioritize communication as a key component, and engage in approaches that improve communication, trust, and cooperation. Because over half of Agile Methodology's influence on project success is transferred through communication, strengthening communicative procedures may considerably improve project outcomes, even in businesses where complete Agile adoption is challenging.

Limitation and Future Research Direction

Despite the significant findings, certain limitations must be addressed. The study used qualitative and self-reported survey data, which limits direct interpretation and may add usual method bias. Furthermore, just one mediator variable was investigated, implying that additional characteristics such as communication quality, flexibility, leadership, and organizational culture may impact the association between Agile Methodology and Project Success. To gain a more complete knowledge of Agile success, future research should adopt long-term designs, include additional mediators and moderators, and integrate objective project performance metrics.

Conclusion

Overall, the mediation study reveals that Team communication partially mediates the association between Agile Methodology and Project Success. The data show that the Agile Methodology enhances project outcomes both directly and indirectly by increasing team communication. This highlights the critical role of cooperation as a driving factor behind successful Agile project implementation, and it supports the Agile concept that excellent interactions and teamwork are required for greater project performance.

5. CONCLUSION AND RECOMMENDATION

5.1.Summary of Findings

This study's main goal was to find out how Agile Methodology Adoption (AM) affected Project Success (PS) in Ethiopian e-commerce application development, specifically looking at Team Communication's (TC) mediating function. Using SPSS and Hayes' PROCESS Macro Model 4, descriptive and inferential statistics were used to evaluate data gathered from 105 project managers, developers, Scrum masters, and product owners.

The following is a summary of the empirical findings:

Direct Path (Adoption of Agile ➔ Project Success): Adoption of the Agile approach and project success were shown to be significantly positively correlated by the quantitative analysis ($\beta = 0.2931$, $p = 0.0073$). This demonstrates that in dynamic e-commerce contexts, greater adherence to Agile ideals, iterative cycles, and flexible adaptability positively improves project success.

Direct Path (Agile Adoption ➔ Team Communication): Adoption of the Agile methodology was found to be a strong, statistically significant predictor of successful team communication ($\beta = 0.5345$, $p < 0.001$). This confirms that the structural practices of Agile frameworks, such as sprint retrospectives and daily stand-ups, significantly promote accurate, frequent, and open communication.

Team Communication's Mediating Role: Project success's total variance explained (R^2) significantly increased from around 24.9% to 34.2% when Team Communication was added to the model. Agile adoption had a very significant indirect impact on project performance through team communication (Effect= 0.2414, BootSE = 0.0689, with a 95% bootstrap confidence interval entirely above zero [0.1106, 0.3825].

Because the direct effect remained considerable but reduced in magnitude when communication was controlled for, Team Communication serves as an important partial mediator, transferring a large percentage of Agile's benefit to project success.

5.2.Conclusion

Based on the empirical evidence, agile methodology has a significant positive effect both directly and indirectly on project success through team communication. A one unit increase in agile methodology directly increased project success by 0.2931 units, which means agile practices such as flexibility, iterative improvement, continuous feedback, and customer involvement contribute independently to project success.

Moreover, agile methodology had an indirect effect of 0.2414 through team communication, which contributed 45.2% of the total effect of agile methodology on project success. This shows 45.2% of agile methodology's positive influence was transmitted through better team communication among the project staff.

The key finding of this study is that Agile approach supports project success primarily by systematically improving behavioral interaction. Specifically, Team Communication. Team communication serves as an operational bridge between Agile techniques and qualitative project success (meeting stakeholder needs, scope flexibility, and functional software quality). Approximately half of Agile's overall beneficial impact on software project success is attributed to the quality, regularity, and transparency of team discussions. As a result, just implementing Agile architecturally without actively cultivating a psychological atmosphere of open communication may reduce the framework's efficacy and impede overall project success.

5.3.Recommendation

Based on the thesis results, the following is a succinct overview of the important suggestions designed for software development businesses and project managers in the e-commerce sector:

Shift from Tools to Behaviors: Avoid relying only on Agile software tools (such as Jira or Trello). Instead, concentrate on the Agile framework's human and behavioral components to realize its full potential.

Prioritize Agile Ceremonies: View daily stand-ups, sprint planning, and retrospectives as meaningful, collaborative dialogues rather than strict, administrative status-update procedures.

Invest in Communication Training: Provide focused soft-skills and communication training to technical team members (developers, testers, and product owners) to guarantee that more frequent

encounters result in a higher-quality, clearer flow of information. Since the mediation analysis proved that 45.2% of the total effect is carried by team communication.

5.4.Limitation and Direction for future Research

5.4.1. The limitations of the study

Context and Development Stage: Because e-commerce is still in its early stages in Ethiopia, there are few firms with broad, mature expertise in formalizing project management processes. As a result, the findings predominantly reflect early-stage behaviors and attitudes.

Data Nature and Bias: The study is mainly based on qualitative, self-reported survey data, which limits direct interpretation and may introduce common method or response bias.

Constrained Variable Scope: Because the framework only explores one mediator variable (Team Communication), a more comprehensive examination is not possible.

5.4.2. Directions for Future Research

Expand the Analytical Framework: Researchers are urged to explore beyond team communication by integrating new mediators and moderators such as communication quality, operational flexibility, leadership styles, and organisational culture.

Adopt Long-Term methods: To acquire a more thorough knowledge of sustained Agile success, future research should use longitudinal (long-term) research methods, rather than a cross-sectional approach.

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Appendix

Annex-A (Questionnaire)

Section1: Agile Project Management Methodology

Please indicate the extent to which you agree or disagree with the following statements regarding your exposure to social media advertisements for cosmetics products.

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

No	Statement	1	2	3	4	5
1	We implement appropriate decisions in the face of market/customer changes.					
2	We constantly look for ways to reinvent/re-engineer our organization to better serve our marketplace.					
3	We treat market-related changes and apparent chaos as opportunities to capitalize quickly.					
4	We utilize our skills better in agile practices.					
5	We fulfill demands for rapid response, and special requests of our customers whenever such demands arise, our customers have confidence in our ability.					
6	We can quickly scale up or scale down our production/service levels to support fluctuations in demand from the market.					
7	Whenever there is a disruption in supply from our suppliers we can quickly make necessary alternative arrangements and internal adjustments.					

Section2: Team Communication

Please indicate the extent to which you agree or disagree with the following statements regarding your exposure to social media advertisements for cosmetics products.

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

No	Statement	1	2	3	4	5
1	Everyone on the team has a chance to express their opinion.					
2	Everyone in a team participates					
3	Everyone in a team listens to each individual's input.					
4	Members feel free to make positive and negative comments.					
5	Members of a team are comfortable with the roles that they play in the group.					
6	Even though members do not have total agreement members do reach a kind of consensus that they all accept.					

Section3: Project Success

Please indicate the extent to which you agree or disagree with the following statements regarding your exposure to social media advertisements for cosmetics products.

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

No	Statement	1	2	3	4	5
1	The project was implemented and used by the business.					
2	The project was delivered within the allocated time.					
3	The project was delivered within the budgeted cost.					
4	The project was delivered within the agreed scope. Scope changes to be approved by the business.					
5	The project achieved/realized the business expected commercial and user benefits as outlined in the business case.					
6	The project was delivered according to the agreed quality.					

ANNEX B: Process procedure for SPSS Version 4.2

```
***************** PROCESS Procedure for SPSS Version 4.2 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : PS
    X  : AM
    M  : TC

Sample
Size:  105

**************************************************************************
OUTCOME VARIABLE:
 TC

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5955      .3546      .2054    56.5873     1.0000   103.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.2938      .3022     4.2808      .0000      .6944     1.8932
AM            .5850      .0778     7.5225      .0000      .4308      .7393

Standardized coefficients
        coeff
AM      .5955

**************************************************************************
OUTCOME VARIABLE:
 PS

Model Summary
```

```
          R       R-sq        MSE          F        df1        df2          p
      .5848      .3420      .2509    26.5095     2.0000   102.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.1638      .3625     3.2100      .0018      .4447     1.8829
AM            .2931      .1070     2.7390      .0073      .0808      .5053
TC            .4127      .1089     3.7891      .0003      .1966      .6287

Standardized coefficients
        coeff
AM      .2738
TC      .3788

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 PS

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4994      .2494      .2834    34.2238     1.0000   103.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.6977      .3550     4.7815      .0000      .9935     2.4018
AM            .5345      .0914     5.8501      .0000      .3533      .7157

Standardized coefficients
        coeff
AM      .4994
```

```
************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_cs
      .5345      .0914     5.8501      .0000      .3533      .7157      .4994

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_cs
      .2931      .1070     2.7390      .0073      .0808      .5053      .2738

Indirect effect(s) of X on Y:
       Effect     BootSE   BootLLCI   BootULCI
TC      .2414      .0689      .1106      .3825

Completely standardized indirect effect(s) of X on Y:
       Effect     BootSE   BootLLCI   BootULCI
TC      .2256      .0623      .1058      .3514

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000
------ END MATRIX -----
```

ANNEX B1: ANNOVA (AM ➔ PS)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.701	1	9.701	34.224	.000[b]
	Residual	29.195	103	.283		
	Total	38.895	104			
a. Dependent Variable: PS						
b. Predictors: (Constant), AM						

ANNEX B2: ANNOVA & (AM ➔ TC)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.622	1	11.622	56.587	.000[b]
	Residual	21.155	103	.205		
	Total	32.777	104			

a. Dependent Variable: TC

b. Predictors: (Constant), AM

ANNEX B3: ANNOVA (TC ➔ PS)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.420	1	11.420	42.814	.000[b]
	Residual	27.475	103	.267		
	Total	38.895	104			

a. Dependent Variable: PS

b. Predictors: (Constant), TC