



አዲስ አበባ ዩኒቨርሲቲ
ADDIS ABABA UNIVERSITY



Addis Ababa University School of Commerce

**An Empirical Assessment of Agile Project Management Approach For
Fintech Project: The Case Of M-Birr.**

By: Alazar Amberber

ID: GSE/0004/08

Advisor: Abdurazak Mohammed (PhD)

**A Research Project Work Submitted to Addis Ababa University School
of Commerce In Partial Fulfillment of The Requirements For The
Degree of Master of Art In Project Management**

June, 2018

Addis Ababa, Ethiopia

**Addis Ababa University
School of Commerce**

**AN EMPIRICAL ASSESSMENT OF AGILE PROJECT
MANAGEMENT APPROACH FOR FINTECH PROJECT:
THE CASE OF M-BIRR.**

By

ALAZAR AMBERBER

JUNE, 2018

ADDIS ABABA, ETHIOPIA

Declaration

I hereby declare that the study which is being presented in this thesis entitled “**An Empirical Assessment of Agile Project Management Approach For Fintech Project: The Case Of M-Birr.**” is original work of my own effort and that all sources of materials used for this thesis have been fully acknowledged. The information presented in this thesis is true to the best of my knowledge and understanding. I, the undersigned, declare that this project work is carried out under the supervision of Dr. Abdurazak Mohammed. Indeed, I would also declare that this thesis is not submitted to this university or any other academic institution anywhere for the award of any academic diploma or degree.

Alazar Amberber
Candidate

Signature_____ Date:_____

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

Dr. Abdurazak Mohammed
Advisor

Signature_____ Date:_____

Certification

Addis Ababa University School of Commerce Graduate Studies

This is to certify that the thesis prepared by Alazar Amberber entitled: “**An Empirical Assessment of Agile Project Management Approach For Fintech Project: The Case Of M-Birr.**” as a partial fulfillment of the requirements for the degree of Master of Arts in project management compiles with the regulations of the university and meets the accepted standards with respect to originality and quality for the award of Master’s degree in Project Management.

Board of Examiners

Approved by:

Internal Examiner Solomon Markos (PhD) Signature _____ Date: _____

External Examiner Dr. Abdu Signature _____ Date: _____

Advisor Abdurazak Mohammed (PhD) Signature _____ Date: _____

Acknowledgements

First and for Most, Glory be to the almighty God for all help throughout my life. I would like to express my sincere gratitude to my research project advisor Abdurezak Mohammed (PhD) for his diligence and resourceful comments that shaped the research project work and Dr. Worku M. for his unreserved guidance that made this study possible.

In particular, I would like to acknowledge the hard work and support of the following people Dr. Iyob Haile and Daniel Beyera for laying a good foundation during my undergraduate study at Adama Science and Technology University. Indeed, I would also like to forward my special gratitude to Addis Ababa University School of Commerce Graduate Studies Program for providing me such a great opportunity to do my MA in project management that is one of my dream fields of study.

Furthermore, special thanks goes to my beloved family and friends for supporting me and helping me realize my second chapter with unforgettable patience and many enjoyable moments.

Finally, I extend my profound gratitude to all M-Birr project team and project stakeholders who made themselves available for the questionnaires and for the interviews in their positive cooperation providing the necessary information. The precious time they gave to me is very much appreciated.

List of Tables

Page

Table 1. Target population category.....	42
Table 1.1. Number of questionnaire administered and returned.....	43
Table 2. Gender of Respondents.....	45
Table 3. Age of Respondents.....	46
Table 4. Education Level of Respondents.....	46
Table 5. Work Experience of Respondents.....	47
Table 6. Current role of respondents in the project.....	48
Table 7. Respondents pre-experience with agile.....	48
Table 8. Respondents' general opinion statement of agile method.....	49
Table 9. Respondents' general opinion statement of agile method.....	51
Table 10. Crosschecking closed-ended questions section 1.....	53
Table 11. Crosschecking closed-ended questions section 2.....	54
Table 12. Crosstabulation section 1.....	55
Table 13. Responding to change trade-offs.....	55
Table 14. Crosstabulation section 2.....	56
Table 15. Customer collaboration trade-offs.....	56
Table 16. Crosstabulation section 3.....	57
Table 17. Individuals and interactions trade-offs.....	57
Table 18. Crosstabulation: Section 4.....	58
Table 19. Working software trade-offs.....	58
Table 20. Statement of agile principles practice: Section 1.....	59
Table 21. Statement of agile principles practice: Section 2.....	61
Table 22. Gender of Stakeholder Respondents.....	63
Table 23. Age of Stakeholders Respondents.....	64
Table 24. Education Level of Stakeholder Respondents.....	64
Table 25. Work Experience of Stakeholder Respondents.....	65
Table 26. Work Status of Respondents vs. organization they represent.....	65
Table 27. M-Birr agile approaches vs. its stakeholders' overall project performance.....	66
Table 28. M-Birr agile approaches vs. its stakeholders' project cost performance.....	67
Table 29. M-Birr agile approaches vs. its stakeholders' business strategy alignment.....	68

List of Figures	Page
Figure 1. Factors of each agile element.....	13
Figure 2. The project landscape.....	20
Figure 3. The iron triangle of project constraints.....	25
Figure 4. Conceptual differences between TPM and APM.....	28
Figure 5. The traditional iron triangle vs. the agile triangle.....	29
Figure 6. The plan driven vs. the value driven triangle.....	30
Figure 7. The relationship between the agile manifesto values, principles, and practices.....	32
Figure 8. Conceptual Framework for Agile Project Management.....	35
Figure 9. Gender of Respondents.....	45
Figure 10. Age of Respondents.....	46
Figure 11. Education Level of Respondents.....	46
Figure 12. Work Experience of Respondents.....	47
Figure 13. Respondents pre-experience with agile.....	48
Figure 14. Responding to change trade-offs.....	55
Figure 15. Customer collaboration trade-offs.....	56
Figure 16. Individuals and interactions trade-offs.....	57
Figure 17. Working software trade-offs.....	58
Figure 18. Gender of Stakeholder Respondents.....	63
Figure 19. Age of Stakeholders Respondents.....	64
Figure 20. Education Level of Stakeholder Respondents.....	64
Figure 21. Work Experience of Stakeholder Respondents.....	65

List of Appendixes

Page

Appendix 1. Agile principles.....	xi
Appendix 2. Questionnaire for M-Birr project team.....	xii
Appendix 3. Questionnaire for project stakeholders.....	xvi

List of abbreviations and Acronyms

ACSI	Amhara Credit and Savings Institution S.C
ADCSI	Addis Credit and Savings Institution S.C
APM	Agile Project Management
ASD	Agile Software Development
ATM	Automated Teller Machine
DSDM	Dynamic Systems Development Method
DECSI	Dedebit Credit and Savings Institution S.C
E-banking	Electronic Banking
E-commerce	Electronic Commerce
E-payment	Electronic Payment
Fintech	Financial Technology
ICT	Information Communication Technology
IPMA	International Project Management Association
IT	Information Technology
M-Birr	Mobile Birr
MFI	Micro Finance Institution
MPx	Emertxe Project Management
NBE	National Bank of Ethiopia
MABD	Mobile and Agent Banking Directive
OCSSCO	Oromia Credit and Savings S.C
OMO	OMO Microfinance S.C
PERT	Program Evaluation Review Technique
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMLC	Project Management Lifecycle
POS	Project Overview Statement
PRINCE	Projects in Controlled Environments
RBS	Requirements Breakdown Structure
SPSS	Statistical Package for Social Science
TPM	Traditional Project Management
WBS	Work Breakdown Stricture
xPM	Extreme Project management

Abstract

Agile approach is an emerging methodology which has been introduced recently as a new approach for managing complex software projects to improve project performance and efficiency of software development process compare to traditional methodologies used before. Agile methods are designed for customization; they offer an organization or a team the flexibility to adopt a set of principles and practices based on their culture and values. While that flexibility is consistent with the agile philosophy, it can lead to the adoption of principles and practices that can be sub-optimal relative to the desired objectives. Whereas, accomplishment of this methodology is still subjective and deeper investigation in this area is limited in academic circles. This paper presents a case study of M-Birr software development project where the project team adopted methods from agile in the development effort. The purpose of this research is to assess the adoption of agile project management method and the agile project management practices of M-Birr. The study has conducted a census survey in order to investigate important aspects of project management process using descriptive approach. In order to collect required data, close-ended and open-ended questionnaires were administrated among project team and key project stakeholders.

Keywords

Agile, changing requirements, disruptive innovation, financial technology, information technology, project management, scope change, software development and unstable environment

Table of Contents

Contents	Page
Cover page	
Declaration.....	i
Statement of Certification.....	ii
Acknowledgement.....	iii
List of Tables	iv
List of Figures	v
List of Appendixes	vi
List of abbreviations and Acronyms.....	vii
Abstract.....	viii
Table of Contents	ix
1. Chapter One: <i>Introduction</i>	1
1.1. Background of the study	1
1.2. Background of the project.....	2
1.3. Statement of the problem	3
1.4. Research questions.....	4
1.5. Objective of the study	4
1.6. Significance of the Study	5
1.7. Delimitation of Study.....	5
1.8. Limitation of Study	6
1.9. Definitions of Terms	6
1.10. Organization of the study	7
2. Chapter Two: <i>Related Literature Review</i>	8
2.1. Introduction	8
2.2. Theoretical literature review	9
2.2.1. Agile software development methods.....	9
2.2.2. Continuous development.....	10
2.2.3. Dimension of agile project management.....	11
2.2.3.1. Organizational	11
2.2.3.2. People.....	11
2.2.3.3. Process	12

2.2.3.4.	Technical.....	12
2.2.4.	Dimension of agile project management methods	13
2.3.	Project Concepts and Definitions.....	14
2.3.1.	Projects versus Operations	15
2.3.2.	Project Management definitions	16
2.4.	Empirical literature review.....	17
2.4.1.	Process school of thought	17
2.4.2.	Optimization school of thought.....	17
2.4.3.	Modeling school of thought	18
2.4.4.	Success school of thought	18
2.4.5.	Behavioral school of thought	18
2.4.6.	Contingency school of thought	19
2.5.	An intuitive view of the project landscape.....	19
2.5.1.	Traditional Project Management Approach.....	21
2.5.1.1.	The traditional project management iron triangle	24
2.5.2.	Extreme project management approach.....	26
2.5.3.	Emertxe project management approach.....	27
2.5.4.	Agile Project Management approach.....	27
2.5.4.1.	The Agile Triangle	28
2.5.4.2.	The Agile Manifesto	31
2.6.	Conceptual framework.....	35
2.7.	Critical context review	36
2.7.1.	Concept of Fintech Related Projects	36
2.7.2.	Nature of M-Birr Projects	38
2.7.3.	Agile method for Mobile Software Project.....	39
2.8.	Conclusion of the related works.....	40
2.9.	Synthesis and Gap.....	40
3.	Chapter Three: <i>Research Methodology</i>	41
3.1.	Research Design.....	41
3.2.	Target Population of The Study	41
3.3.	Sources of Data and Gathering Techniques	42
3.4.	Reliability and Validity	43
3.5.	Method of Data Analysis	43

3.6.	The Quantitative Research Approach	44
3.7.	The Qualitative Research Approach	44
3.8.	Ethical Considerations	44
4.	Chapter Four: <i>Data Presentation and Analysis</i>	45
	Introduction.....	45
4.1.	Demographic Profile of Respondents	45
4.1.1.	Gender of Respondents	45
4.1.2.	Age of Respondents	46
4.1.3.	Education status	46
4.1.4.	Work experience of Respondents	47
4.1.5.	Current role of respondents.....	47
4.1.6.	Respondents pre-experience with agile.....	48
4.2.	Statement of general opinions regarding agile method: Section 1.....	49
4.2.1.	Analysis of general opinion of the team toward agile method: Section 1.....	50
4.3.	Statement of general opinions regarding agile method: Section 2.....	51
4.3.1.	Analysis of general opinion of the team toward agile method: Section 2.....	52
4.4.	Analysis of crosschecking questions on M-Birr agile approach: Section 1.....	53
4.5.	Analysis of crosschecking questions on M-Birr agile approach: Section 2.....	54
4.6.	Analysis of project quality vs. agile value crosstabulation: Section 1	55
4.6.1.	Analysis of project constraints time and cost vs. responding to change	55
4.7.	Analysis of project quality vs. agile value crosstabulation: Section 2	56
4.7.1.	Analysis of project constraints time and cost vs. customer collaboration	56
4.8.	Analysis of project quality vs. agile value crosstabulation: Section 3.....	57
4.8.1.	Analysis of project constraints time and cost vs. individuals interactions.....	57
4.9.	Analysis of project quality vs. agile value crosstabulation: Section 4.....	58
4.9.1.	Analysis of project constraints time and cost vs. working software	58
4.10.	Analysis of agile principles perceived in the project: Section 1	59
4.10.1.	Interpretations of agile principles perceived: Section 1	60
4.11.	Analysis of agile principles perceived in the project: Section 2	61
4.11.1.	Interpretations of agile principles perceived: Section 2	62
4.12.	Stakeholders respondents' profile	63
4.12.1.	Demographic Profile of Respondents	63
4.12.1.1.	Gender of Stakeholder Respondents	63

4.12.1.2.	Age of Stakeholders Respondents.....	63
4.12.1.3.	Education Status of Stakeholder Respondents.....	64
4.12.1.4.	Work experience of Stakeholder Respondents	64
4.13.	Analysis of stakeholders’ responses: Crosstabulation section 1	65
4.14.	Analysis of stakeholders’ responses: Crosstabulation section 2	66
4.15.	Analysis of stakeholders’ responses: Crosstabulation section 3	67
4.16.	Analysis of stakeholders’ responses: Crosstabulation section 4	68
4.17.	Analysis of open-ended questions of project stakeholders	69
5.	Chapter Five: <i>Summary, Conclusion and Recommendation</i>	71
5.1.	Summary of Major Findings.....	71
5.2.	Conclusion	72
5.3.	Recommendation	73
5.4.	Future Research Area.....	74
	Reference List	75
	Appendixes	x
	Appendix 1. Agile principles.....	xi
	Appendix 2. Questionnaire for M-Birr project team.....	xii
	Appendix 3. Questionnaire for project stakeholders.....	xvi

Chapter One: *Introduction*

1.1. Background of the study

Traditional project management utilizes extensive planning, detailed procedures, rigorous process, heavy documentation and big design up front. The traditional methods are still widely used because of their relative straightforward, methodical, and structured nature, as well as their predictability, stability, and better success rate. Though many project management tools and techniques have been developed to provide significant project performance improvements, none of them are free from major problems including cost overrun, missed schedules, and defective products, and they have failed to provide dramatic improvements in managing complex projects. Due to constant changes in the technology and business environments, it is a challenge for traditional project management to create a complete set of requirements up front for software projects unlike other industry projects. The nature of IT project calls for agility (Williams and Cockburn, 2003).

As a remedy for the limitations of traditional project management, a number of agile methodologies have been developed and evolved since 1990s to embrace, rather than reject, high rates of change. Such new approaches focus on iterative and incremental development, customer collaboration, and frequent delivery through a light and fast project management life cycle (Wysocki, 2014). Agile methods have emerged as group of project management methodologies which are adaptive rather than predictive and are people-oriented rather than process-oriented. It is increasingly becoming the dominating developing method in the software industry. A lot of companies are turning toward agility in one way or another because of the need for fast delivery while at the same time dealing with fast changing requirements. While many of these companies have succeeded in this to some extent, many others faced obstacles in their attempt to change from the old traditional project management methods to the modern agile methodology (Sampaio, 2004).

According to Martin Fowler and Jim Highsmith (2001), the agile manifesto proposes the feature of new dynamic form of managing complex projects in a changing environment. Ideally, agile approach involves change in people's mindset and work culture, technology and project management process. Financial institutions have discovered the importance of incorporating technological projects into their operations.

This has given rise to agile project management. Nevertheless, the anticipated benefits of agile project management approach don't come out of fate; instead from carefully made preparation and the appropriateness of adopted approach used given the organizational realities and the ability to manage changing priorities. Software development project, being extremely fast-paced industry, calls for flexibility and responsiveness in every aspect of project development. Agile methodologies allow for delivering cutting-edge products and cultivating innovative experiences, while keeping the product in sync with the market trends and user requirements. Above all, the project management style should be compatible with growing project management demands; to ensure the approach of favorable climate in agile project management; should be appealing for both project managers and project team (Sampaio, 2004). This suggests that mere improvement of the project management approach just as compared to the past traditional project management practices will no longer considered as appealing project management approach to be employed.

Therefore, the focus of this particular research is on the assessment of agile project management practice, one of the contemporary project management issues in the project landscape of the overall complex project management. Assessing agile practices on organizational and project level efforts in more comprehensive, objective, and professional perspective has greater importance in identifying and examining: the possible agile outcomes, the possible gaps and its causes; the best practices in the due course. In this regard, selective case study of project based financial technology company (M-Birr) which has implemented projects employing agile project management approach in Addis Ababa was the focal of the study.

1.2. Background of the project

Financial technology companies offer modern technology in the sector. Such companies have become a noticeable trend in Ethiopia since 2010. Namely: M-Birr, Hello cash, BelCash, Hi-bir, Mob-Birr, Kifiya, and the recent CBE-Birr are among the well-known introducing new innovative system to improve existing traditional banking services. The emergences of these new technologies enabled fintechs provide mobility, ease of use, speed and lower cost products by implementing IT projects. There are many drives for changing role of the traditional financial services and project initiatives in the sector. The next more innovative and bold move to disrupt the financial services industry has begun now. At this time financial technology called fintech has become the dominant innovative disrupter to evolve the financial sector.

Innovation and technology have brought about a radical change in traditional financial services. The rationale is simple: the earlier traditional banking services failed to bring about the desired services and prompt technological integration has become increasingly necessary to the financial industry to survive and to place innovation at the center and deliver efficient service with lower cost.

In this regard, the very driver of fintech is to identify fragmented financial services in the sector that possibly leads to delay, inefficiency, customer dissatisfaction and associated cost. As a result, the move is how to make fintech project management practice responsive to the project nature and changing environmental requirement to remain innovative and competitive. Agile project management can be used to manage projects whose goals are clearly specified but whose solutions are not known at the outset of the project. These are what are known as complex projects (Robert, 2014).

MOSS ICT Consultancy has developed M-Birr to deliver mobile money services to Ethiopian financial institutions banks and MFIs. The platform is offered as a Software as a Service (SaaS). The system enables users to send money, store money on a mobile in electronic form, and deposit or withdraw money in the form of hard currency at any M-Birr agent locations. The service is provided by five largest Micro Finance Institutions in Ethiopia - ADCSI, DECSI, ACSI, OCSSCO, and OMO. M-Birr is run and operated by these regulated financial service providers that have a long standing and trusting relationship with their customers.

1.3. Statement of the problem

Agile method is an important aspect of complex project management; it addresses and gives a new and effective direction to all those unfit methodologies and practices traditionally followed for the traditional project. Still there are unclear concepts that which projects mostly succeed the one with the traditional methods or the one with the latest agile methodology.

The ultimate target of agile is to bring about quickly response to changing project requirements and achieve project objective in minimizing risks through ensuring improved project performance that has clear target. Unless agile approach is well customized with the company's existing project management trend and well implemented it is hardly possible to bring about the intended project outcomes. Unless the approach is accompanied by flexible and innovative project team ensuring agile approach to meet the success criteria of a project may lack the capacity to bring about the favorable project outcome and timely project delivery.

The conventional saying in project management is project is considered successful when it is completed as per performance requirement under the golden triangle of quality, cost, and timing (Westerveld, 2003). In this regard, it is important to examine agile project management practice how whether the approaches used in introducing modern project management methodology through the use of agile triangle has resulted to the intended project outcomes.

Consequently, it is found reasonable to consider company that has implemented agile projects with relatively more professional project management processes and relevant track records during the implementation in order to identify the potential benefit and drawbacks of agile as a project management method for promoting innovation and achieving project objectives. This particular study focuses on the project team to assess the agile methodology for improved project outcomes. The aim of the study is to find out agile method practice on project management which is less explained area in the current practice of complex project management context. Accordingly, among the fintech companies; M-Birr which has implemented agile software development method in Addis Ababa selective case was considered for the purpose of this particular study. In general, the study is intended to address the following core questions.

1.4. Research questions

1. To what extent the approach and implementation of project applying agile method has won the commitment of project team at different levels in the company?
2. To what extent the adoption of agile method has improved project performance?
3. To what extent the use of agile approach has improved project management process?
4. What are the major challenges and best practices in applying agile in the context of M-Birr?

1.5. Objective of the study

The general objective of this particular study is to assess the effectiveness of agile approach as a chosen project management methodology for project performance improvement.

The specific objectives of this particular study are:

- I. To identify the project team attitude of how agile is applied in the context of M-Birr.
- II. To identify gaps and its possible causes in adopting agile as a project management method.
- III. To draw experiential lessons learned out of considered case.

1.6. Significance of the Study

The first significance of this particular study is to submit to Addis Ababa University, school of commerce in partial fulfillment of the requirements for MA program in project management as an academic exercise; as a result to get the relevant experiences of practical scientific research practices and its implication in future endeavors.

As the financial sector gradually desired to improve its overall competitiveness and innovativeness the project undertakings become very demanding, complex and above all greatly requires project management and follow up for its effectiveness. In this regard, obtaining research based on objectives of agile project management practice assessment may offer significant inputs for improvement of the project management efforts. Since the study is directly focused on one of the contemporary issue in project management it is timely as a result the research may offer significant inputs for future academic study and practitioner research efforts.

1.7. Delimitation of Study

Measuring the success of agile, obtaining holistic and objective agile project assessment requires well designed comprehensive study with clearly identified context specific examination. Simply, examining agile project calls for considering the traditional project management approach result and the agile approach result in managing the projects by capturing both practices and other relevant items but, this particular study is only limited to the adoption of agile method as an integral part of project management approach as clearly specified in the objective of the study.

Therefore, this particular research is focused to the adoption of agile software development project as project management approach. Since agile is the new kid on the block it is difficult to consider the whole parts of the agile methods in a single study assessment. Geographically, it's limited to the Addis Ababa M-Birr project office since the core development team is located in Ireland the core development liaison was considered out of them. Organizationally, it is limited to selected fintech company at M-Birr project level. The study is only limited to M-Birr which has implemented the agile software project development management. The specific project team and key stakeholders were considered in the study to determine the assessment findings of project.

1.8. Limitation of Study

The use of agile project management technique is not yet a widely used concept for companies outside of the software development industry. For this reason, findings may be limited in scope. And also as indicated in the research method this particular research is a case study. Thus, it's not free from the common criticism of other case studies in its dependency on a single case description making it difficult to reach a generalizing conclusion (Tellis, 1997). Yin (1993) considered case methodology 'microscopic' because of the limited sampling cases. Therefore, provides very little basis for scientific generalization since the study uses a total number of a small case, conducting with only M-Birr case. So as mentioned in the significance of the study the very purpose of this particular study is an academic experience of practical scientific research practices.

Since descriptive statistics are limited in such the study only allows making summations about the case to be measured. Validity of the research findings as mentioned above, 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. Moreover, due to the nature of the project and its agile approach, the study mainly presents the project team perspective and the key project stakeholders' responses of the case under consideration. Thus, findings may be open to their own interpretation (Shadish, 2001 and Yin, 2009). Therefore, the reader should take these limitations into account while referring the research.

1.9. Definitions of Terms

It is important that some of the key concepts in this study be adequately defined, in an effort to remove some of the ambiguity from concepts which are often subject to a wide range of individual interpretations.

A project -A project is an organization of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, or high risk undertakings which have to be completed by a certain date, for a certain amount of money, within some expected level of performance (Kerzner, 2004).

Agile -means it is both light and sufficient (Robert K. Wysocki, 2014).

Agile Methods -Agile processes are light-weight and attempt to minimize the project failure risk associated in the project by developing and releasing products in short iterations.

The objective of using agile methods is to produce higher quality product in a shorter period of time. Agile methodologies were developed to streamline the development process and to remove barriers to accepting business requirement changes during the implementation stage (Jim Highsmith, 2009).

Agile software development -is an iterative way of planning and guiding projects (Wesley, 2002).

Fintech- Financial Technology which disrupts the way in which traditional finance companies do business in the financial sector (Bazot, 2013).

Fintech Company- provides financial services with modern financial technology, innovative methods in the market to offer internet-based and application-oriented products using automated processes and innovative business models (Thomas Philippon, 2015).

Project management-is the application of knowledge, skills, tools, and techniques to project activities in order to achieve the target goal of a project. A project is a combination of human and nonhuman resources pulled together in a temporary organization to achieve a specified purpose (Atkinson, 1999).

1.10. Organization of the study

This paper work is organized with five chapters. For simplicity sake, the first chapter discusses and provides a brief description of background on the issue under consideration and constitute the statement of the problem, objectives, research questions, delimitation of the study as well as the limitations of the study and other introductory parts of the study. The second chapter holds review of different related literatures and presentation of the existing studies and their findings on the research topic. The chapter also lays out the conceptual framework of the study to designate the basic variables and their relationships. The third chapter outlines the research methodology of the study. The fourth chapter followed by the last chapter focus on the analysis, presentation, and interpretations of the results from the data collected using appropriate charts, graphs and tables. The last chapter presents the summary of conclusion and forward appropriate recommendation.

Chapter Two: *Related Literature Review*

2.1. Introduction

The first section introduces the research problem that raised the question of whether adopting agile approach over traditional project management method would improve project performance in a financial technology environment. This section presents the academic literature pertinent to the research, and places it in context of the research. The aim is to provide the background information of the research topic, so as to identify the areas the research is focus on and to establish a solid foundation of the existing literature, and to investigate the primary research question: To what extent the application of agile has improved project performance of M-Birr IT project? To investigate this question properly a comprehensive investigation of the related literatures areas will initially need to be undertaken. This provides a brief history of these topics, and also details of the main areas where research has previously been conducted. This is an important step in the complete process for two key reasons. It ensures that this research is not a repetition of work that has already been completed.

The second reason for the literature review is to provide the research with a frame of reference in relation to the complete scientific body of work. This establishes the tone of previous research, and forms the introduction for this particular research, which will be discussed in detail in the literature review. In conclusion, this section will endeavor to assess the existing agile project management and software development methods, and methodically demonstrate the shortcomings of these practices when implemented in financial technology environment. The gap in the current literature will be clarified, and then it will be briefly demonstrated how this research endeavors to address each research question.

2.2. Theoretical literature review

2.2.1. Agile software development methods

With the evolvement of how software was built, how quickly the initial requirements change, how fast new technologies were appearing in tech domain and evolving innovation needs of dynamic businesses, the software industry was feeling the need for a better way of managing projects. A group of well-known software professionals got together to develop a set of industry guidelines now known as the Agile Manifesto to help standardize this new way of managing projects which helped lay foundations to now widely used the Agile project management methodology.

Agile software development method is characterized by following attributes: incremental, cooperative, straightforward and adaptive incremental refers to small software releases with rapid development cycles. Cooperative refers to a close interaction between team and customer. Straightforward implies that the method is easy to learn and to modify and that it is sufficiently documented. Finally adaptive refers to the ability to make and respond to last moment changes agile methods break software features into small increments which require minimum of planning and do not directly involve long-term planning. Each iteration involves a cross functional team working in all software development cycles stages, such as planning, requirement analysis, design, coding, unit testing, and accepting testing.

At the end of each iteration a working product is presented to the stakeholders. Managing software projects in this way minimizes the risks of failure and allows the project to adapt to changes quickly. An iteration does not essentially add enough functionality to a market release, but the aim is to have an available release at the end of each iteration. Several iterations might be needed to release a product or new feature (Beck Kent, 2001). Agile software development methods focus on keeping the code simple, testing often and encouraging the stakeholders to collaborate actively. On the contrary, traditional development methods often use the concept of waterfall development model which based on linear and sequential phases where each phase has a defined goal.

Agile methods emphasizes on quality and project agility. In order to improve quality and project agility, specific tools and techniques such as continues integration, automated text, pair programming, test-driven development, design patterns, code refactoring and other techniques

are often applied while developing of software (Beck and Andres, 2004). These methodologies were developed to streamline the development process and to remove barriers to accepting business requirement changes during the software writing stage. In practice with agile methods, needs for locking the business requirements and design details in the development phase duration remain minimum. Most Agile methods share several common features focusing on planning and tracking of the iteration, organizing requirements by business and technical value, and always selecting the most prioritized task to do (Beck Kent, 2001).

2.2.2. Continuous development

Continuous development is achievable if the project teams are motivated and empowered to utilize agile practices in their work (Dingsøyr, 2012). Through technical excellence and simplified designs, continuous development is achieved through delivering working solutions at short regular intervals.

The principles in the agile manifesto (Beck et al., 2001) advocate practices that accommodate change in requirements at any stage of development thus ensuring that the final product is refined and timeless. Customers are involved in the development process providing valuable feedback and insight that can lead to more and better outcomes over the course of development. To ensure continuous development, the development team must be aware that doing better takes time. When trying to solve a technical problem, the team should first determine the qualities that must be possessed by a solution so that development does not get terminated midway. This means that the software project must be regular as well as sustainable within the allocated budget (Balbes, 2013).

Continuous development through agile practices helps produce a clean build of code several times in a day or depending on the milestones set by the project manager. This ensures that the customers and other interested parties are able to use the resulting solution to provide better feedback to the development team. Which results the iterations that follow are far much better than the previous iterations. Agile practices promote shorter and faster cycle times. In turn, faster cycle times ensure that working and important features of a solution are available more quickly and timely (Balbes, 2013). There is a natural progression in producing working features at a short time while ensuring that quality is maintained.

Considering that there has been a heavy use of automation, modularization and availability of flexible infrastructure, each code change during iteration becomes a deployable solution. Since manual testing in continuous development is normally too cumbersome, there is need to develop automated testing in order to quickly find defects in code, this quickens iteration and while at the same time helping to find defects prior to release for production (Reichert, 2015).

2.2.3. Dimension of agile project management

2.2.3.1. Organizational

Organizational context includes variables such as rewards, culture, training, and resources. Collective rewards help motivate groups whose tasks were made interdependent, while individual rewards acknowledge members whose performed tasks reflect individual responsibilities (Shore, 2008). Several agile teams work within an organizational environment. Organizational can have many factors to determine the success or failure in executive support system, commitment of sponsor or manager, corporation in organization culture instead of hierarchical, process of oral communication replacing high number and worth on face-to-face communication, accepting to apply agile methodology, gathering the whole team, facility with the most suitable agile base environment which is proper for agile style and rewards system appropriate for agile process.

2.2.3.2. People

Interactions among team members and interactions with other teams, customers, and suppliers directly affect team performance (Cao, 2009). Group processes can determine the relationship between inputs and outcomes. Team interpersonal processes and work procedures are considered group processes. Such as team cohesion, communication between team and conflict in management process which presents the fact that how they coordinate their activities. Moreover, agile methods and their practices are work procedures played by team members that may affect productivity directly or, at least, mediate the relationship between input factors and productivity outcomes. Because agile methods focus on people, teamwork, and their interactions through agile practices, all those processes may have a significant influence on team productivity. The framework is presented in Figure 1 which discusses about team members with competence and expertise, team members with motivation, managers knowledgeable in agile process, adaptive management style, self-organizing teamwork and good customer relationship.

2.2.3.3. Process

Process contains information about how to follow agile-oriented needs for management or following agile-base project management, also information about following agile-base configuration management process, information about how to follow strong communication method which its critical point is mostly about daily face-to-face meetings, following honoring regular working schedule, following strong customer commitment and presence.

2.2.3.4. Technical

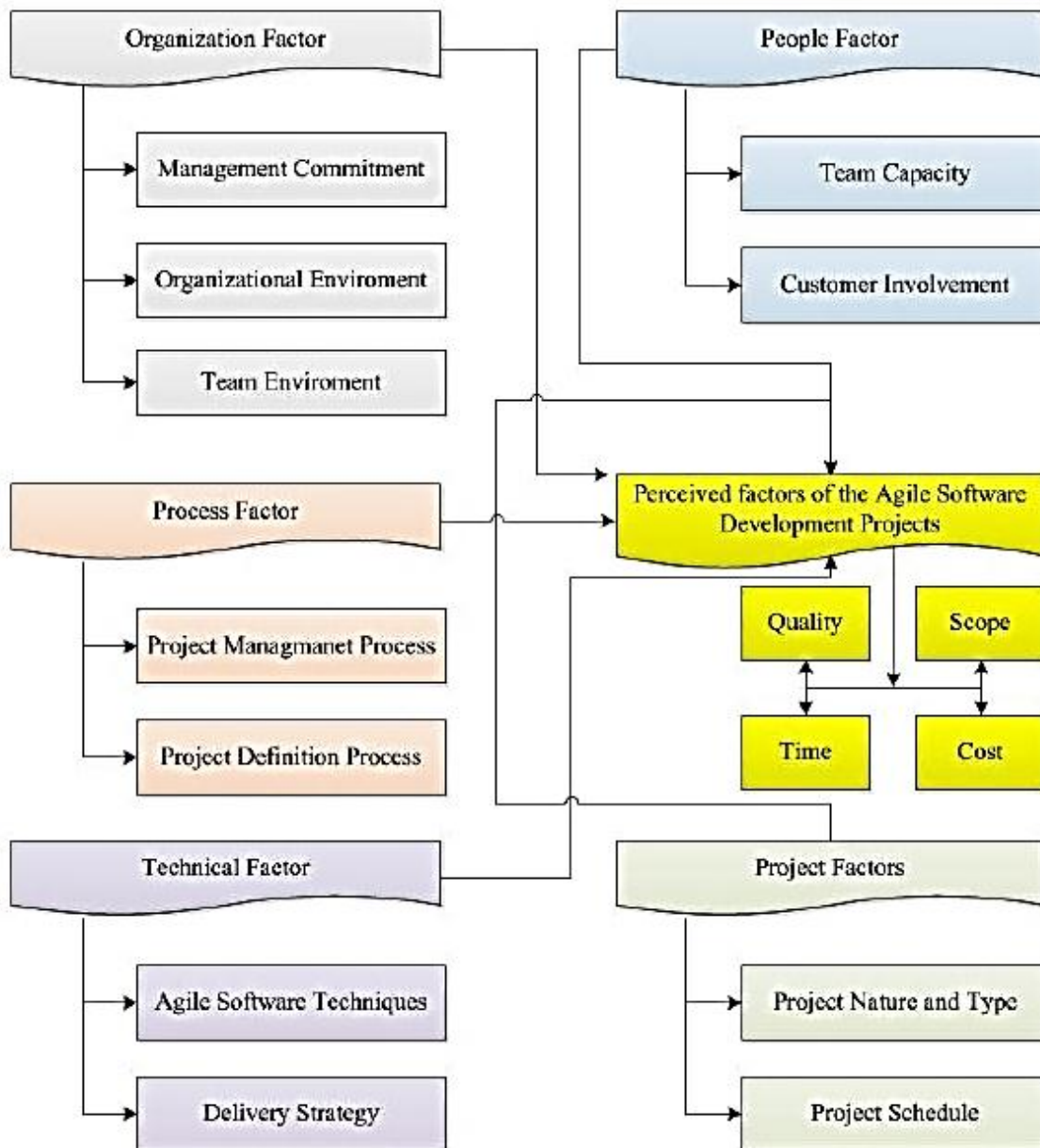
Experience is defined as encounters that one undergoes or lives through (Conboy, 2009). In the software industry all around the world, experience can be accompanied by previous obtained technical knowledge and expertise compare to the length of experience (Doran, 2004). Previous research has suggested that experience is an important factor that increases an individual's ability to manage knowledge (Chetankumar, 2009). Cohen and Levinthal in 2004 suggested that individuals have the capacity to understand knowledge in areas where they have previous experience because individuals learn, or absorb, knowledge by associating it with what they already know. Thus, project teams with more experience are more capable of understanding and managing knowledge about the agile methodology.

As presented above the graphical description of the agile dimension of agile methods in Figure 1 blow discuss some of the implications of each factor in respects to agile method that has already been established in the methodologies. Since agile project management is an emerging section of the field of project management, which highlights a developing way of thinking in this area of management. It is important to identify the critical dimensions which contribute for the success and failure of a project implemented by agile methods.

There were several main factors discussed above that pertain to agile project management practices. These established the fundamental understandings either to adopt agile as it is in a unique setting, or should customize the method in new way considering the project and organizational context, which enables fresh insights to be derived. These concepts are graphical depicted in Figure 1 to provide a visual summary of this section.

2.2.4. Dimension of agile project management methods

Figure 1: Factors of each agile element



Source: Chow and Cao' agile research model

2.3. Project Concepts and Definitions

There are number of definitions about project by different scholars having similar meaning. According to Robert, a project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by a specific time, within budget, and according to specification. Project is an organized common-sense approach that utilizes the appropriate client involvement in order to meet sponsor needs and deliver expected incremental business value. Projects arise out of unmet needs. Those needs might be to find a solution to a critical business problem that has evaded any prior attempts at finding a solution and also Robert put business-focused definition of a project as a project is a sequence of finite dependent activities whose successful completion results in the delivery of the expected business value that validated doing the project (Robert K, 2014). Similarly, Kerzner defines it as a series of activities and tasks that have a specific objective to be completed within a certain specifications, have a defined start and end dates, have funding limits and consume human and non-human resources (Kerzner, 2009).

According to the PMBOK guide, a project can create a product that can be either a component of another item or an end item in itself, a capability to perform service and a result such as an outcome or document. Project management is accomplished through processes comprising five process groups. Which are initiating, planning, executing, monitoring and controlling and closing (PMBOK Guide, 2008). Association for project management (APM) defined a project as an endeavor in which human material and financial resources are organized in a novel way to deliver a unique scope of work of given specification often defined by set of objectives.

Callahan and Brooks (2004), states that projects has three important characteristics. The first characteristic of a project is that it should have a beginning and an end. The second characteristic of a project is that the final deliverable is unique. The third characteristic of a project is a defined scope. In addition to these characteristics of a project Richardson (2015), states that projects should be envisioned as formal undertakings, guided by explicit management charters and focused on enterprise goals. However, according to Gray and Larson (2000), project management is not without problems. Because projects have different characteristics than ongoing operations, they pose a brand new set of challenges (Verzuh, 2005). Organizations are working more or less with projects, some of them are smaller, could be done in some days or months and some projects are larger and could take up to several years to finished.

2.3.1. Projects versus Operations

Many people have tried to make a definition of a project. Atkinson (1999) made a definition; a project is a unique and a one-time task that has a beginning and an end. Another definition by Project management Institute (2013) is that a project is a temporary task that will create a product or a service. Temporary means that there is a clear beginning and an end. Unique is that the product or service is something different from what already exists (PMI, 2013). Projects are temporary in nature and have definitive start dates and definitive end dates.

The project is completed when its goals and objectives are accomplished to the satisfaction of the stakeholders. Sometimes projects end when it's determined that the goals and objectives cannot be accomplished or when the product, service, or result of the project is no longer needed and the project is canceled. Projects exist to bring about a product, service, or result that didn't exist before. This might include tangible products, services such as consulting or project management, and business functions that support the organization. Projects might also produce a result or an outcome, such as a document that details the findings of a research study. In this sense, a project is unique (Kim, 2009).

Typically a project is a one-time effort to accomplish an explicit objective by a specific time. Unlike an organization's ongoing operations, a project must eventually come to a conclusion (Greer, 2001). This means that a project is done only one time. If it is repetitive, it's not a project. In other words, a project is different from the normal operations of an organization. According to Lewis (2002), projects are different from standard business operational activities as they: are unique in nature, have a defined time scale, have an approved budget, have a limited resource and involve an element of risk. The project team could be one single person in one organization up to many persons from different organizations (PMI, 2013).

Operations are ongoing and repetitive. They involve work that is continuous without an ending date, and often repeat the same processes and produce the same results. The purpose of operations is to keep the organization functioning, while the purpose of a project is to meet its goals and to conclude. At the completion of a project, the end product (or result) may get turned over to the organization's operational areas for ongoing care and maintenance (Heldman, 2009).

2.3.2. Project Management definitions

The Project Management Institute (PMI) formally defines project management as follows: The application of knowledge, skills, tools and techniques to project activities to meet the project requirements. A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end (PMBOK Guide, 2008). From the project characteristics highlighted above, it is clear that projects require a unique form of management. Hence according to Roberts and Wallace (2004), the concept of project management evolved in order to plan, coordinate and control the many complex and often diverse activities involved in projects. Project management brings together a set of tools and techniques performed by people to describe, organize, and monitor the work of project activities. Project managers are the people responsible for managing the project processes and applying the tools and techniques used to carry out the project activities. All projects are composed of processes, even if they employ a haphazard approach. There are many advantages to organizing projects and teams around the project management processes endorsed by PMI.

Roberts and Wallace, also state that project management is concerned with the life cycle of the project from inception to completion. It is therefore about deciding the various success and failure criteria of a project and then organizing and running the project as a single entity so that all the success criteria are met. Project management is about people and the systems, processes, tools, and methodologies they use. In order to manage any kind of project there should be some kind of system with group of people who can run the established system. Project management is concerned with several objectives at once. The objectives typically fall under the headings of time, cost and quality (Roberts and Wallace, 2004).

The project management approach is to make the project move forward, by involving the project team and the customers. Since it is the project managers' responsibilities to plan the project and define activities, the project manager play a key role in a project (Karlsen, 2005). Furthermore, an easy definition of project management is the application of tools, knowledge, skills and techniques to move the project activities towards the project requirements (PMI, 2013).

2.4. Empirical literature review

In order to trace the development of project management method and how agile method has evolved over time; it's important to conduct critical review of major project management schools of thoughts. Which leads to the investigation of the progress of project management that have been introducing new tools or improvements on old methods and techniques through the decades there have been variety of researches conducted concerning project management, and one of the outcomes of this research has been the establishment of several schools of thought. It has been argued that there are nine main schools of thought that have arisen from this project management research, where researchers differ in their opinion of how a project should be viewed and managed (Anbari, Bredillet, and Turner 2008). A few of these relevant schools of thought will be briefly described, to demonstrate the breadth of project management research that they encompass and how these schools of thought interact with one another.

2.4.1. Process school of thought

The process school has been popular during the last decade, with research focused upon the refinement of the project management processes. These processes comprise the tasks and goals of normal project work, and are used to control the project from commencement to completion. Large organizations particularly choose this approach, as these organizations have a pressing need for structured control of project work. Two of the more pervasive methods in this category are the PRINCE2 method and the PMBOK framework (PMI, 2008). The processes of these methods are continually being amended and improved in response to advancements in the field.

2.4.2. Optimization school of thought

Project management as it is known today grew out of operations research. This approach also focuses upon process control, and is where the development of certain tools came from. From this school of thought we see the emergence of tools such as CPM, PERT and Gantt charts. In this approach project processes are targeted for continual improvement, as these can be improved while still keeping within the specifications of a project. Which focus primarily on continual refinement to improve execution times and delivery schedules, and these methods are also being merged with project management techniques. This type of approach is ideally suited for projects where there is an occurrence of repeated elements and the scope is well defined, such that processes and work flows can be measured and monitored and then refined and improved (Bredillet, 2002).

2.4.3. Modeling school of thought

As projects became more complex, the optimization approach matured into the modeling approach, as project managers increasingly needed to gain an overview of these projects. Modeling has progressed to such a point that even the soft effects of a project can be modeled to a degree, including such areas as customer interactions, the consequence of scope change, and even the subjective effects of certain managerial decisions (Williams, 2002). This approach aims to improve the complete system by combining hard and soft systems, and is an ongoing area of research (Ahlemann, 2009). This school, much like the optimization approach, works well in projects where the end product is well defined, but is not particularly useful in an unstable environment or where the scope is extremely unique.

2.4.4. Success school of thought

The success school of thought focuses on ensuring project success for the benefit of the organization. This area of research concentrates on factors that have the potential to influence the success of a project and the mitigation of failure (Frame, 2003). This is especially important as projects increase in size and complexity and the likelihood of failure also increases. This has led to the development of areas such as risk management and team building; two factors which are especially important for an agile IT project company (Cooper, 2005).

2.4.5. Behavioral school of thought

One progressive area of research encompasses the view that project management is but one component in a social system, with a web of interactions to other components of the total system (Anbari et al., 2008). The goal of this behavioral school of thought is to clarify the social aspects of the project teams. Research into team behavior and the development of project leadership skills are just two of the topics under investigation in this school of thought (Turner et al., 2006), in addition to knowledge management to improve the organization, managing virtual teams, and the problems associated with globally spread teams (Khazanchi and Zigurs 2005). These are areas that can also affect an IT projects, especially when the organization is conducting complex projects, a practice which brings with it some of these issues mentioned here.

2.4.6. Contingency school of thought

The contingency school of thought is particularly relevant to the topics covered in this research. This is an emerging area of the project management discipline such as agile methods, with project managers recognizing that adjustments are required for projects taking place in different industries and settings (Anbari et al, 2008). A management style that is successfully used for the management of large construction projects will usually not provide satisfactory results when applied against small-scale software projects. Even within the same industry this disparity can be experienced, as large software projects can be managed with RUP (Rational Unified Process) methods, whereas the project team for smaller software projects may find these methods to be administratively burdensome (Runeson and Greberg, 2004). This has consequently lead to the development of methods that use a more contingency-based style of management, and these modified methods have been utilized by small teams to produce software in changeable environments (Schwaber, 2004). This school of thought will be one of the major areas from which the proposed assessment on project management practice will be analyzed for this research. In this section the details about how project management progressed overtime was briefly discussed, and how it grew in popularity. In the next section the focus will turn to research into project the complexity and uncertainty domain of project management life cycle based on the four main types of project natures how it has been approached in different project management life cycle models.

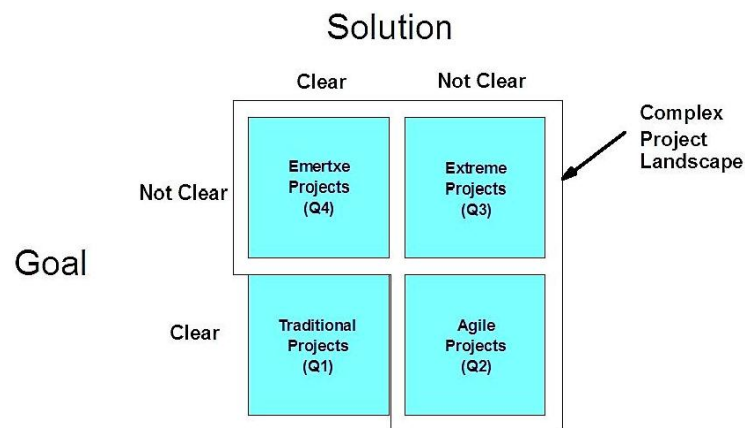
2.5. An intuitive view of the project landscape

Projects are not viewed in isolation the complexity and uncertainty domain of projects varies. The enterprise will have collections of all types of projects running in parallel and drawing on the same finite resources, so there has to be a way of describing that landscape and providing a foundation for management decision making. For simplicity sake and intuitive models, the project landscapes are defined around two characteristics: goal and solution.

Every project can be defined by its goal and solution to achieve that goal. Goals and solutions are either clear or not clear. This two-by-two grid is the architecture and foundation for four types of project management categories: Traditional Project Management (TPM), Agile Project Management (APM), Extreme Project Management (xPM), and a fourth category called Emertxe Project Management (MPx). This section deals with the issues and challenges that project managers face in these four landscapes of project management. A number of metrics to quantify

these characteristics can be used but the simplest and most intuitive will be two values: clear and complete or not clear and incomplete. Two values for each characteristic generate the four quadrants matrix shown in Figure 1. The point is where the dividing line is between clear and not clear, but that is not important to this landscape. These values are conceptual, not quantifiable, and their interpretation is certainly more subjective than objective. A given project can exhibit various degrees of clarity. The message in this landscape is that the transition from quadrant to quadrant is continuous and fluid. To further label these projects; Traditional projects are found in Quadrant 1; Agile projects are found in Quadrant 2; Extreme projects are found in Quadrant 3; and Emertxe projects are found in Quadrant 4 (Robert K. Wysocki, 2014).

Figure 2: **The project landscape**



Source: (Robert K. Wysocki, 2014)

The four-quadrant project landscape (Figure 2) is used first to categorize the project to a quadrant, and within that quadrant to select a best-fit PMLC model. But even having made that categorization and selected a best-fit PMLC model based on goal and solution clarity, it is not quite enough to deal with each project nature. Contemporary projects have become more uncertain, and along with this increased uncertainty is increased complexity and risk. Uncertainty is the result of changing market conditions that require high-speed and high-change responses to produce a solution in order to be competitive. Complexity is the result of a solution that has eluded detection and will be difficult to find. That imposes a challenge on the project manager to be able to respond appropriately. Hence the complexity of project management increases as well. Uncertainty and complexity are positively correlated. And finally, risk increases along with increasing complexity and uncertainty. As the project nature move through the quadrants from clarity to lack of clarity and from low uncertainty to high uncertainty, the project management processes to be used must track with the needs of the project nature (Wysocki, 2014).

As Jim Highsmith said in his book *Agile Project Management: Creating Innovative Products*: “The idea of enough structure, but not too much, drives agile managers to continually ask the question, ‘How little structure can I get away with?’ Too much structure stifles creativity. Too little structure breeds inefficiency.” TPM projects are plan-driven, process-heavy, and documentation-heavy and hence are very structured projects. Moving to Quadrants 2 and 3, project heaviness gives way to lightness. Plan-driven gives way to just-in-time planning, which is change-driven and value-driven, rigid process gives way to adaptive process, and documentation is largely replaced by tacit knowledge that is shared among the team members. These are some of the characteristics of the many approaches that fall in the Agile Project Management (APM), Extreme project management (xPM), and Emertxe project management (MPx) quadrants. These are important issue to choose and adapt several models and approaches that fall under the umbrella of agile (Jim Highsmith, 2009).

2.5.1. Traditional Project Management Approach

The concepts of project management date back to the beginning of history with the constructions of The Great Wall of China, The Pyramids of Egypt and the Stonehenge of England. Traditional project management and one of the oldest and most popular ways of managing project is the document driven, sequential method. The catch of this method is to follow the pre-defined stages and milestones and to invest on early planning. An output of a stage is an input for upcoming stage (Bhuvaneswari, 2013). However, the era of modern project management began in the 1950’s with the development of two mathematical scheduling models: the PERT, which is basically a method for analyzing the tasks involved for completing a given project, and the CPM, as presented above it determines schedule flexibility for each activity. In the early 1960’s industrial and business organizations began to take notice of the benefits of organizing work around projects; after which, the project management institute was founded (in 1969) with the aim of promoting project management best practices (Kilkelly, 2008). It is approaching things from the predictive point of view. It is based on detailed plan with a complete list of items that must be completed. All the changes are going through a change control management (Ghilicmicu, 2013). In TPM perspective, the overall planning, directing, coordinating, monitoring and control of all dimensions of a project from its inception to completion, and the motivation of all those involved to produce the product, service or result to the satisfaction of participants are the main issues under the traditional project setting (Atkinson, 1999).

According to Robert K. Wysocki, 2014 a project management life cycle (PMLC) has a sequence of processes that includes: Scoping, planning, launching, monitoring and controlling, and Closing. The project to which it applies a valid PMLC always starts with a scoping process and ends with a closing process. All five of the processes must each be done at least once and may be repeated any number of times in some logical order. It involves identifying the project requirements, establishing project objectives, balancing constraints, and taking the needs and expectations of the key stakeholders into consideration. Planning sets the standard for the remainder of the project's life and is used to track future project performance.

Projects that fall into the TPM quadrant are familiar to the organization. Many infrastructure projects will fall in the TPM quadrant. Perhaps they are similar to projects that have been done several times before. There are no surprises. The client has clearly specified the goal, and the project team has defined how they will reach that goal. Little change is expected (Martin and Highsmith, 2001).

The traditional waterfall methodology is considered a heavy process. This is because waterfall is plan-driven and relies upon continuously improving processes and procedures. While not all processes contained in the PMBOK must be applied to each project, the basic framework should be applied to help guide the project toward a successful outcome. Without following the basic framework, a waterfall-based project can quickly fall out of scope, or run over the allocated schedule or budget. While these processes provide much job security for the project manager, they also could burden the development team with unnecessary overhead (Wysocki, 2013).

As the systems development field has advanced, the waterfall methodology has become less practical for complex projects. Customer involvement was very low except at only the most major milestones which frequently caused major changes to the project scope. The simple projects have all been done. The projects that remain in the TPM quadrant are those which have been done many times before and well-established templates are probably in place. As TPM approaches are becoming less frequent, they are giving way to a whole new collection of approaches that are more client-focused and deliver business value rather than strict adherence to a schedule and budget. In addition to a clearly defined goal and solution, projects that correctly fall into the TPM quadrant have several identifying characteristics as briefly identified in the following sections: low complexity, few scope change requests, well-understood technology infrastructure and low risk (Wysocki, 2014).

➤ **Low Complexity**

Other than the fact that a low-complexity project really is simple, this characteristic will often be attributable to the fact that the project rings of familiarity. It may be a straightforward application of established business rules and therefore take advantage of existing designs and coding. Because these projects have been done many times, they will often depend on a relatively complete set of templates for their execution. To the developer, it may look like a cut-and-paste exercise.

➤ **Few Scope Change Requests**

This is where TPM approaches get into trouble. The assumption is that the RBS and WBS are relatively complete, and there will be few, if any, scope change requests. Every scope change request requires that someone needs to decide if the request warrants an analysis by a project team member, the project manager must assign the request to the appropriate team member, the assigned team member conducts the analysis and writes the project impact statement, the project manager informs the client of the recommendations, the project manager and client must make a decision as to whether the change will be approved and if so how it will be accomplished. If the scope change request is approved, the project scope, cost, schedule, resource requirements, and client acceptance criteria are updated. All of this takes time away from the team member's schedule commitments (Wysocki, 2014). Furthermore, much of the time spent planning the project before the request was made becomes non-value-added time. So the answer to too-frequent scope change requests is some form of management monitoring and control. Those management controls can be built into every TPM, APM, xPM, and MPx approach but are different for each type of project (Wysocki, 2014).

➤ **Well-Understood Technology Infrastructure**

A well-understood technology infrastructure is stable and will have been the foundation for many projects in the past. That means the accompanying skills and competencies to work with the technology infrastructure are well grounded in the development teams. If the technology is new or not well understood by the project team, there are alternative strategies for approaching the project.

➤ Low Risk

The requirement for TPM projects is that their environment is known and predictable. There are no surprises. All or some that could happen to put the project at risk has occurred in the past, and there are well-tested and well-used mitigation strategies that can be used. Experience has rooted out all of the mistakes that could be made. The client is confident that they have done a great job identifying requirements, functions, and features, and they are not likely to change. The project manager has anticipated and prepared for likely events (not including acts of nature and other unavoidable occurrences). There will be few unanticipated risks in TPM projects. That doesn't mean you can skip the risk management process in these projects. That will never be the case, regardless of the quadrant the project occupies. However, the intensity, analysis, monitoring, and mitigation strategies will be different in each quadrant.

Experienced and Skilled Project Teams Past projects can be good training grounds for project teams. Team members will have had opportunities to learn or to enhance their skills and competencies through project assignments. These skills and competencies are a critical success factor in all projects. As the characteristics of the deliverables change, so does the profile of the team that can be most effective in developing the deliverables. TPM project teams can include less experienced team members and project managers. They can be geographically dispersed and still be effective. Plan-driven TPM Projects because all of the information that could be known about the project is known and considered stable, the appropriate PMLC model would be the one that gets to the end as quickly as possible.

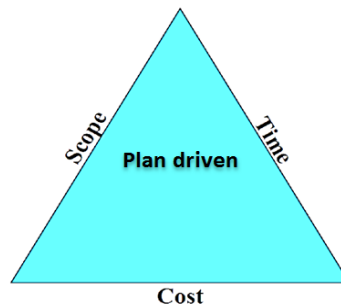
Based on the requirements, desired functionality, and specific features, a complete project plan can be developed. It specifies all of the work that is needed to meet the requirements, the scheduling of that work, and the staff resources needed to deliver the planned work. TPM projects are clearly plan-driven projects. Their success is measured by compliance and delivery to that plan (Wysocki, 2014).

2.5.1.1. The traditional project management iron triangle

When implementing a project, a project manager will find that there are several constraints to be aware of and taken into consideration. Traditionally in project management this is comprised of three constraints, as depicted in Figure 2, namely time, cost and scope. This triangle is known as either the iron triangle of project management constraints, or the golden triangle of project management success.

The constraint time refers to the amount of time required to complete the project successfully, and is frequently referred to as the project schedule. Cost, or budget, is in reference to how much the project will cost to complete. And finally, scope, sometimes called specification, refers to the product or end result of the project.

Figure 3: The iron triangle of project constraints



Source: Jim Highsmith, 2010.

This was conceived as a framework to enable project managers to evaluate and balance the competing demands of cost, time and quality within their projects (Atkinson, 1999). Subsequently it has become the de-facto method to define and measure project success, with the general perception amongst project managers that a successful project is based upon these three criteria alone (Duggal, 2011). Any attempt to deviate from, or supplement the three criteria that make up the Iron Triangle is often considered a problem that must be either corrected or prevented in the first place (Turner and Bredillet, 2009). Centre to the concept of the Iron Triangle is the mutual dependency between the three constraints: increasing quality will increase the amount of time needed, which also will lead to an increase in cost. A tight time schedule could lead to a decrease in quality and subsequent increase in cost (Morris and Sember, 2008).

Success in project management has been traditionally associated with the ability of the project manager to deliver in scope, time, cost, and quality. The “iron triangle” is a very popular metaphor pointing out that the project manager is asked to reach a reasonable trade-off among various concurrent, heterogeneous, and visible constraints. At the same time, the “soft skills” for the project manager have traditionally been identified as a set of cross-cutting skills that should complement the core job of establishing and maintaining reasonable tradeoffs among the elements of the iron triangle (Bragantini, 2012). However, the validity of the iron triangle and the traditional triple constraints of time, cost and quality, have been debated throughout the academic and industry literature on project management practices.

2.5.2. Extreme project management approach

Extreme projects at a very detailed level the kinds of projects that lend themselves to extreme xPM PMLC models. Both Extreme and Emertxe projects utilize the same PMLC models but with very different purposes in mind. The major differences are in iteration planning and interpretation of the deliverables from each iteration. The vast majority of these projects are research and development (R&D) projects. For projects in the xPM quadrant, the goal is a best-guess and usually reflects the proposer's idea of an ideal end state that the project should attain. Two different project management life cycle (PMLC) models are presented below. The first model, xPM, is a model appropriate for projects that have a goal in search of a solution. The second model, MPx, is a model for projects that have a solution in search of a goal (Robert K. Wysocki, 2014).

Extreme Project Management (xPM) is the least structured and most creatively managed of the five models that define the project management landscape presented above in Figure 1. Extreme projects are at the furthest corner of the landscape where uncertainty and complexity are at their highest levels. Because of that, the failure rates of Extreme projects are the highest among all types of projects. As Doug DeCarlo put it Extreme project management is the art and science of facilitating and managing the flow of thoughts, emotions, and interactions in a way that produces valued outcomes under turbulent and complex conditions: those that feature high speed, high change, high uncertainty, and high stress.”

The reason for the high comparative failure rate follows from the nature of the Extreme project. These projects are searching for goals and solutions where none have been found before. Goals are often nothing more than an expression of a desired end state with no certainty they can ever be attained. Solutions are often totally unexplored. At most there will be a few alternative directions to begin the search. Even if a solution is achieved, it may only apply to a revised goal statement. Then there is the question of the business value of the final goal and its solution. Risky, isn't it? To converge on a goal and solution with business value is often a hunt in a dark room for something that doesn't exist in that room but might in another room, if it was known where to find that other room. Therefore, one of the major challenges in xPM projects is to terminate the chosen direction at the earliest point where future failure is almost a certainty. That allows for saving resources for a redirection of efforts. In this model is that the phases repeat all process groups in a linear fashion which differ from increments, iterations, and cycles used in other models. If the decision is made to go to the next phase, that phase begins with the scoping of the changed direction for the project (Robert, 2014).

2.5.3. Emertxe project management approach

An Emertxe project is an Extreme project, but done backwards. Rather than looking for a solution, it's looking for a goal. It was the best way to name these types of projects as such. The Emertxe project looks exactly the same as the Extreme project. Everything that was said previously about the Extreme PMLC model applies unchanged in the Emertxe PMLC model. The differences have to do with the intent of the project. The Extreme PMLC model starts with a goal that has great business value and searches for a solution to deliver that business value. The solution may require a change in the goal. If that revised goal still has great business value, the project ends. The Emertxe PMLC model starts with a solution and no goal. The question to be answered by the Emertxe PMLC model is this, "Is there a goal that this solution can reach, and does that goal have business value?" The commonality is that both PMLCs strive to gain a simultaneous convergence of goal and solution, but from different perspectives one to find a solution, the other to find a goal. The Emertxe PMLC model should be a chosen model in any project that seeks to find business value through the integration of a new technology into a current product, service, or process. There are two major types of projects that call for this model to be used: R & D projects and some problem-solution projects (Robert K. Wysocki, 2014).

2.5.4. Agile Project Management approach

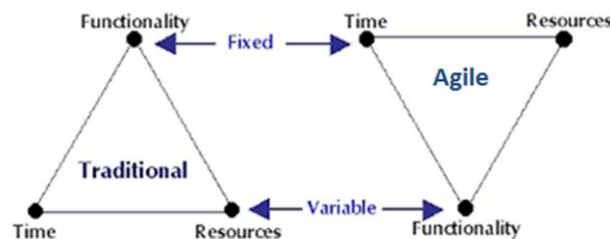
The emergence of the agile methods commenced in the mid-1990s. Generally, agile methods improve product development performances (Sommer, 2015). Today we are living in a fast paced society with quick communication activities and demands. Traditional methods of project management are unidirectional and do not take into account customers' wants and needs. However, the customer is ultimately the one to determine success or failure of the project. Agile techniques on the other hand are dynamic getting regular input from the customers and the environments (Highsmith, 2002). Agile project management methodologies grew out of the need to correct these issues with traditional methodologies. There are different approaches that are in use for such projects, and you will learn how to choose from among them the approach that best fits project. The limiting factor in the TPM plan-driven approaches is that they are change-intolerant. They are focused on delivering according to time and budget constraints, and rely more on compliance to plan than on delivering business value. The plan is sacred, and conformance to it is the hallmark of the successful project team. That has proven to be misdirected. Because of the times we live in, the frequency of projects legitimately delivered via the TPM quadrant is diminishing rapidly.

2.5.4.1. The Agile Triangle

The idea of the “Agile Triangle” which is an extension of the traditional “Iron Triangle” of traditional project management. This is an idea that was originally conceived by Agile luminary, Jim Highsmith, where he states that “many agile teams are now caught in a dilemma. On one hand they are told to be agile, flexible, and adaptable, but on the other they are told to conform to pre-planned traditional Iron Triangle framework of scope, schedule, and cost. In essence they are being told ‘be flexible in a very small box.’ Agile teams are striving to meet one set of goals and managers and executives are measuring against another set”. The Agile Triangle, shown in the Figure 4, addresses the real goals of projects producing value that delights customers, building in quality that speeds the development process and creates a viable platform for future enhancements, and delivering within constraints (which are scope, schedule, and cost). The Agile Triangle alters how we view success (Highsmith, 2010).

As anticipated above, the Tradition Iron Triangle will no longer be appropriate. In the Tradition Iron Triangle, the constraints are scope, time and cost. Considering these three constraints as the main success factors of the project will make us lose the main objective and purpose that the agile method is developed for.

Figure 4: Conceptual differences between TPM and APM



Source: Jim Highsmith, 2010 agile triangle

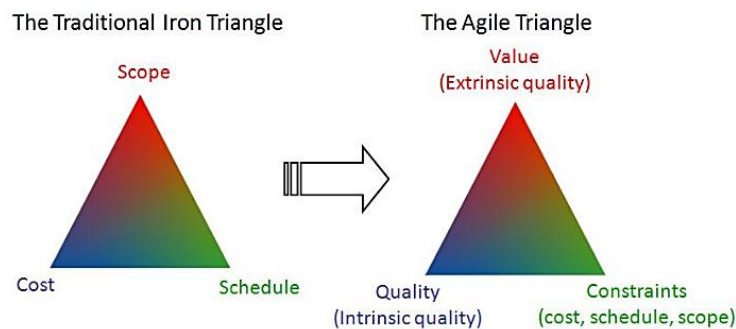
Jim Highsmith suggests that Agile applied to the Iron Triangle would consist of the following end points:

1. Value – for the customer in terms of a released product or deliverable.
2. Quality – continuous delivery of high quality and adaptive products.
3. Constraints - the traditional scope, schedule, and cost.

From this perspective, agile teams should focus on releasing the project rather than getting constrained by the iron triangle. The three end points of the iron triangle would collapse into one end point of the agile triangle called constraints.

The other end points define the project's goal of obtaining the value and quality of the deliverables that are of utmost importance to the stakeholders and that would require more attention. Thus, according to Jim Highsmith, Agile teams should focus on the releasable product rather than getting constrained by the iron triangle. The three end points of the iron triangle collapse into one vertex of the agile triangle called constraints. The other end points such as value and quality define the ultimate goals, since they are of utmost importance to the stakeholders and need more attention.

Figure 5: The traditional iron triangle vs. the agile triangle



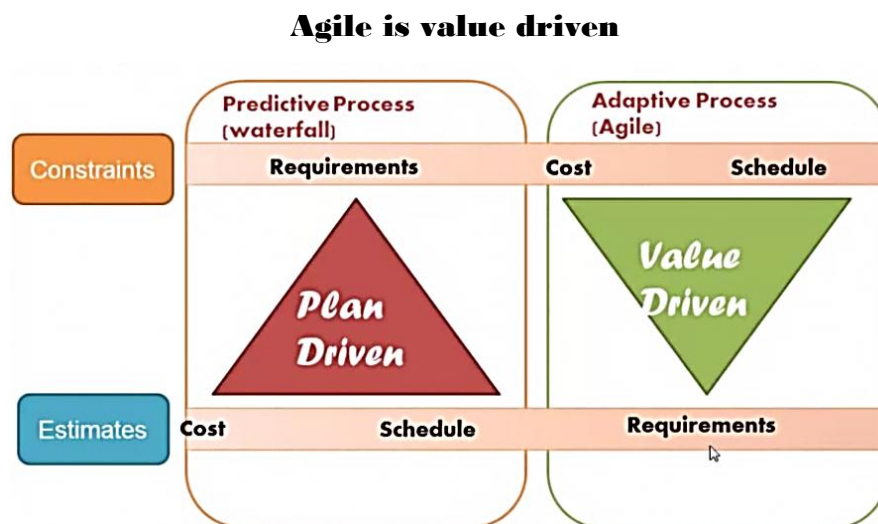
Source: (Jim Highsmith, 2010).

First, the value in the agile triangle represents releasable products. A number of studies have shown that 50% or more of functionality delivered is rarely or never used. Even if some of that functionality is necessary, there is still a huge percentage of unused functionality in most software systems. This leads the conclusion that scope is a very poor project control mechanism we should be using value. Furthermore, rather than asking, “Did the project implement all the requirements?” the question should be “Can the project release this product now?” many projects that were deemed releasable with 20-30% of the originally anticipated functionality and the customers may be delighted. They got their ultimate needs met very fast. The Agile Triangle elevates the critical role of quality, a dimension that is given lip service to for far too long. If quality is taken serious then it deserves a primary place in any project measurement. Quality comes in two flavors today and tomorrow. “Today” quality addresses the current iteration or release of a product. It measures the reliability of the product “Does it operate correctly?” If a product operates reliably, it delivers value to the customer in the form of implemented features. Products that are unreliable, ones that give incorrect answers or periodically fail completely will fail to deliver current value (Jim Highsmith, 2010).

The second dimension is future quality “Can the product continue to deliver value in the future?” The ability to deliver in the future tests an application’s ability to respond to business changes, both anticipated and unanticipated. While it can often be used flexible designs for anticipated changes, allowing for some changes, the strategy to deal with unanticipated changes is different. Responding to the unanticipated future requires adaptability, and the key to adaptability is keeping technical skill high and keeping open for customer feedback (Jim Highsmith, 2010).

The final piece of the Agile Triangle is constraints scope, schedule, and cost. It’s not that these elements are unimportant, but they are not the goals of an agile project. Constraints are critical to the delivery process; they establish clear boundaries within which the team must operate. However, only one of the three can be paramount, and on agile projects this is normally schedule. With this approach, the project will be seen feasibly from a different perspective, and will be planned as such. At this point in the project lifecycle, it will be important to have constant and direct contact with the customer in order to define clear priorities and the most critical features of the final deliverable. It will be important to analyze the building techniques to maximize the value of the final deliverable, as well as its internal quality. The Agile Triangle gives us a different way of looking at success, a way that resolves the paradox of adaptability versus conformance to plan (Jim Highsmith, 2010).

Figure 6: The plan driven vs. the value driven triangle



Source: (Kim, 2014).

2.5.4.2. The Agile Manifesto

In 2001 a group of developers convened to discuss the future of a new generation of software development methods. These methods were not as process-heavy as earlier methods tended to be, and one of the main results from this meeting was the agreement to the term ‘agile’. This term would be used to represent the kind of method that was able to respond quickly to changes in software project requirements. Another major outcome from this meeting was the establishment of the Agile Manifesto, where the core values of agile development were made clear (Beck and Andres, 2001):

It is being uncovered better ways of developing software by doing it and helping others do it through valuing:

- ✓ Individuals and interactions over processes and tools
- ✓ Working software over comprehensive documentation
- ✓ Customer collaboration over contract negotiation
- ✓ Responding to change over following a plan

While there is value in the items on the right, agile methods value the items on the left more.

A host of methods and procedures that have varying degrees in adhering to the principles of the agile manifesto have emerged. They include extreme Programming (Beck and Andres, 2004), Scrum (Schwaber, 2009), Crystal method family (Cockburn, 2007), lean and kanban software development and FDD which means feature-driven development.

The motivation behind the agile methods was to address these core principles laid out by the manifesto. First in the manifesto, there appeared to be a distinct adoption of collaborative development in which people/team members were given more high value than processes and tools used in the development. This is because people are the ones who normally respond to business needs and therefore through their skills, they drive the development process. If instead the process and tools were given more high value in order to drive development, the team would end up being less responsive to new changes and therefore less likely to meet customers’ needs.

Second principle in the manifesto, a lean mentality was encouraged and advocated. Its intention was to reduce the amount of work and resources spent on the creation of documentation which at times was regarded as wasteful.

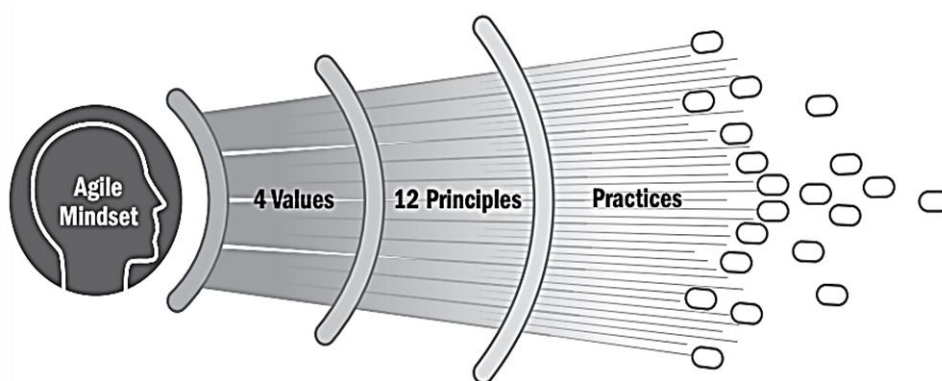
Documentations before agile involved creation of technical specifications and requirements, interface design documents, test and documentation plans and also each document required approval thereby consuming a lot of time. A lean mentality ensured that documentation was only done for absolutely necessary requirements and nothing more.

Third principle of the manifesto gives a description of a customer who is involved as well as collaborates throughout the development period of the project they had requested. This makes it extremely easier for the development team to meet the requirements of the customer exhaustively since the customer usually is a daily part of the team which includes attending all team meetings.

The fourth and final principle of the manifesto states that changes always improve a project and provide more value to that project. Traditionally before agile became popular, change was regarded as expensive and was highly avoided. The intention was to develop plans that were detailed and elaborate and with all the features having been defined thus ensuring that results were delivered in a certain order. Therefore, a consideration was made that it was necessary to accept the fact that uncertainty in software development ought to be part of the plan hence an open mindset to change ought to be adopted (Dingsoyr, 2012).

The Relationship between the Agile Manifesto Values, Principles, and Common Practices

Figure 7: The relationship between the agile manifesto values, principles, and practices



Agile is a mindset defined by values, guided by principles, and manifested through many different practices. Agile practitioners select practices based on their needs.

Source: (Sanjiv Augustine, 2004)

The challenges associated with traditional software project methodologies such as waterfall have led to the switch and adoption of agile methodologies which are modern and established as well as being relatively considered as quick compared to others. The agile approach came to live as the request for innovations and impacts on projects increased (Spundak, 2014). By the time projects got bigger a more flexible approach was needed. The current literature suggests that agile methodologies and practices are effective in project management especially when dealing with modern software complexity and the fast-changing business environment. The critical nature of software development projects has placed a greater demand on project management and hence the need for project management methodologies. Agile method which has emerged to be popular ensures that emerging development issues are dealt with when ensuring rapid delivery and performing frequent changes during the development cycle. Several different agile methods have some differences from each other. Overall the agile methods have in common that it is an iterative work process the customer should frequently making updates (Beck et al., 2001).

Studies have shown that agile has gained a lot of interest among software project practitioners in the field of software engineering worldwide. Empirical studies related to agile project management aim at giving a scientific and rational viewpoint of understanding the methods as well as techniques used in software engineering (Salo, 2004). Agile is flexible project methods, which invite for last minutes changes. The Agile methods promote daily work together with a direct face to face communication. Furthermore, agile needs frequently reflection to see what is done and what could be better and more efficient next time (Stocia, 2013).

Globally, agile methodologies are usually considered effective. The agile practices have received more recognition and adoption worldwide due to innovation in development of software's and hence businesses have in turn become reliant on innovation in software solutions to be able to gain a competitive advantage (Denning, 2015). Survey done by Jeremiah (2015) showed that most project managers and IT professionals prefer agile compared to other approaches like Waterfall. Adoption has been driven by the belief that agile is more customer-centric and promotes collaboration and teamwork. Vast majority of IT companies involved in the survey claim to primarily use agile practices in their software development projects. The motivating factors behind adoption of agile are it improves team collaboration, increases customer and satisfaction and ensuring that software quality is high (Jeremiah, 2015).

Considering that agile methods are optimized to handle small teams, they are highly suitable in the project-oriented companies where most projects are usually done by small development teams. Adoption of an agile practice like scrum allows those small teams to break huge projects into small manageable feature sets and then focusing on developing these features as fast as they can (Beck and Andres, 2012).

According to study done by Mbelli and Hira (2010), software engineers prefer adoption of agile methodology with some claiming that there does not exist a single way to practice such kind of methodology but if there is one, then it must be followed to the latter to prevent emergence of unforeseen consequences. While most of the availability literature materials mainly focus on the global adoption of agile practices, currently there is little or no research done in Ethiopia pertaining to its adoption and practices of agile project management methodologies since there are few technology project-based local companies.

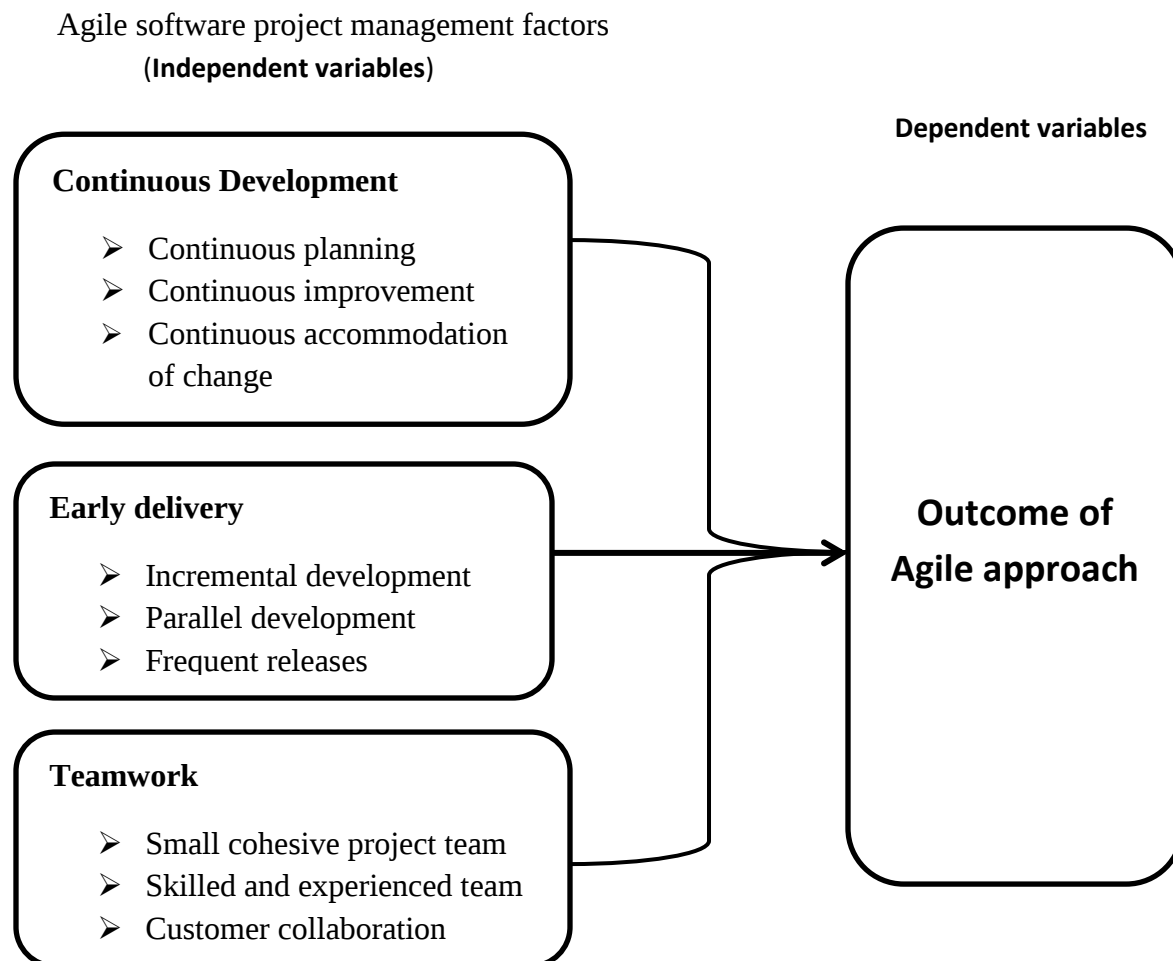
It has been argued that the current research has only a few case studies on agile software projects (Layman, Williams, & Cunningham, 2006). While this is true, there are a few papers which empirically study Agile Methods, such as Scrum. For instance, the paper of (Salo and Abrahamsson, 2008) brings a series of interesting findings from an empirical study of Scrum embedded software development organizations; for instance, the authors show that 77% of the respondents who have used Scrum have reported positive experiences, while 27% of the respondents claim to use Scrum systematically or mostly through the project. However, the number of empirical studies remains low.

As a summary of agile, agile as a project method is best when the time frame is hard to determine. Also if the customer wants to be involved in the process and have a possibility of making last minute changes, agile is good one. Agile work load needs a clear structure and smaller tasks which the project team could develop during sprints and deliver to the customer to get feedback and minimize the risks of work that need to be redone. As the empirical studies showed, there has to be context specific assessment on organization level and project level to customize and adopt the appropriate methods among available agile methodologies.

2.6. Conceptual framework

A conceptual framework maps out the actions required in the course of undertaking the study. As McGaghie (2001) put it: The conceptual framework “sets the stage” for the presentation of the particular research question that drives the investigation being reported based on the problem statement. The conceptual framework below explains how the independent and dependent variables are related to each other. In this study, agile practices through adoption of agile approach to promote continuous development, early delivery and promotion of teamwork enhance project performance. If the output of agile practices assessment is positive, then project management approach demonstrate the agile manifesto, where the core values of agile project management methods were made (Beck et al., 2001).

Figure 8: Conceptual Framework for Agile Project Management Software Development and its adoption in M-Birr. Source: this has been adapted from Kaur & Mehta (2011) “Agile Methodology: Embracing Change in Software Development Project”



2.7. Critical context review

2.7.1. Concept of Fintech Related Projects

Fintech is a new area of research. There are a limited number of studies, partly due to the lack of data. Fintech is a broad subject area that could touch on many different aspects of financial technology, including payments related innovations such as blockchain and other distributed ledger technology, technology to facilitate payments to individuals and businesses. The financial services industry is an information industry, where money is simply a nominal representation of real value (goods or services). Yet, compared with some information industries that reaped disruptive gains from information technology, the financial-services industry has experienced mostly incremental innovation. For instance, the creation of the Internet enabled innovations to route voice traffic over networks, changing telephony from an expensive, intermediary-driven system to the efficient global system we have today (Mills and Brayden, 2016).

Technology frequently plays a role in financial innovations, and perhaps the most famous example is the automated teller machine (ATM). Fintech is a term used to denote firms that offer modern technology in the financial sector. According to a report by Accenture, fintech is one of the fastest growing sectors of the economy. Global investments in the sector have increased rapidly reaching 12.2 billion dollars in 2014, exceeded 20 billion dollars in 2016, while in 2008; it was only 930 million dollars. The highest increase was observed in Europe (Accenture, 2016). Fintech is a hot topic. The financial press reports on its disruptive potential on a seemingly daily basis, 'Bitcoin' has officially been made part of the English language and the world biggest decentralized financial system with no actual cash.

FinTech is a broad term that means different things to different consumers, and is context-dependent. As a form of disruptive technology, the service offerings of FinTech companies depend on the market in which they are present. FinTech in developed markets looks and acts different to FinTech in emerging markets (Rabobank, 2005). FinTech firms are adapting rapidly, aggressively filling gaps in a market traditionally dominated by established financial firms (Ernst & Young, 2016). A recent survey of 16,000 customers in 32 countries showed that two-thirds of respondents are using at least one form of FinTech, and these users are younger and tech-savvier (Capgemini, 2016).

The financial service industry is potentially at a similar inflection point, where expensive, dedicated single-purpose networks and systems are giving way to cheaper, user-friendly, efficient, transparent, automated, and general-purpose ones. Collectively referred to as “Fintech,” the businesses pushing this transformation promise improvements in financial-services industry productivity, greater ease and lower prices for consumers, and greater access for those now underserved by the financial-services sector. These innovations are poised to radically improve how consumers and businesses transfer money and make payments, store value, save and invest, borrow, and make purchases (Turban, 2014).

The emergences of these new technologies enabled fintechs provide mobility, ease of use, speed and lower cost products. Finance institutions have discovered the importance of incorporating financial technology projects into their operations which has given rise to project management. Nevertheless, achieving this by implementing complex technology project requires project team to actively manage projects in adopting agile approach (Capgemini, 2016). The agile methods have emerged as group of project management methodologies and are adaptive rather than predictive and are people-oriented rather than process-oriented.

As it is noticed Ethiopian financial service sector has been engaged in evolving its financial sector with the anticipation to make it more responsive, more efficient, and more compatible with demand of changing environment and its competitive challenges despite the trend of late adoption when it comes to new technologies it is easy to forget that services which now form part of the banking fabric such as ATMs cards once represented radical innovations. The financial sector has been one of the first sector that adopted different technologies to improve performance and gain a competitive advantage. Until now, technological adoption and innovation within financial services has, for the most part, been sector-led: implemented by financial institutions to update and enhance the existing functions and services, without challenging underlying business models. One might reasonably describe these iterations over time as an evolution and the claimed success stories by the financial institutions.

As John Chaplin showed in his survey reports on African payments innovation (2017) In many regards Ethiopian financial sector is falling behind some African country’s standards to cope effectiveness of the sector, the country is also failing in terms of global competitiveness rank that including institutional innovativeness considered as an elements in the standard (Chaplin, 2017).

2.7.2. Nature of M-Birr Projects

MOSS ICT Consultancy, an Irish software company which gave birth to the project in 2009, launched a mobile money transfer system called M-Birr in Ethiopia. The system allows users to send or receive money on their cell phones. There are few fintech companies in Ethiopia, but those firms that are operating, introduced specific innovations in Ethiopian financial market and changed the consumers' opinion about financial services. The most popular fintech enterprises are M-Birr, Hello-Cash, BelCash, Hi-bir, Mob-Birr, Kifiya, CBE-Birr and others. These companies provide financial services with modern, innovative technologies in the market offer Internet-based and application-oriented products. They generally aim to attract customers with products that are more user-friendly, efficient, and automated than those currently available E-banking services.

M-Birr enables users to send money in electronic form, store money on a mobile phone in an electronic account, top up airtime, make payment and deposit or withdraw money in the form of hard currency at any of the nearly nationwide M-Birr's agent locations and at a later stage, international remittances. The system is ready now, the project team is in place, and the pilot testing has been successful. In 2017, M-Birr has been able to facilitate 3,000,000 transactions for ETB 6,000,000,000 and has served almost 800,000 account holders having 6,000 branches and agents. Only between 2009 and 2012, the number of mobile phone users increased from 2.5m to 18m for a total population of above 90m. The potential for mobile services is untapped. Until now, customers who had no access to the traditional financial institutions had no other way than cash transactions. M-Birr has opened new possibilities.

M-Birr was launched in partnership with five large Ethiopian financial institutions in order to develop an alternative banking system with integrated IT system solutions. These financial institutions have increased their accessibility by working with agents and more branches. M-Birr has partnered with these institutions because the company is not permitted to offer financial services direct to consumers. Under NBE Directives of Mobile and Agent banking Ethiopia's financial sector is subject to permits and strict legislation that does not permit foreign companies to offer banking services and Fintech companies not to operate alone (NBE Directives No. FIS/01/2012). After several successful pilot testing, the services have now received the approval from the central bank for deploying the services commercially and at large scale one of which was UNICEF's financial aid project to poor people to pay electronically instead of in cash.

2.7.3. Agile method for Mobile Software Project

Mobile applications market is currently undergoing rapid expansion, as mobile platforms continue to improve in performance, and as the users' need for a wide variety of mobile applications increases. The latest mobile platforms allow for extensive utilization of network resources, and thus offer a strong alternative to devices and associated software. Software development for mobile platforms comes with unique features and constraints that apply to most of the lifecycle stages (Abrahamsson, 2004).

The development environment and the technologies that support the software are different compared to “traditional” settings. The most important distinguishing characteristics include: a high level of competitiveness; necessarily short time-to-delivery; and added difficulty in identifying stakeholders and their requirements. Development teams must face the challenge of a dynamic environment, with frequent modifications in customer needs and expectations (Abrahamsson, 2007). Technological constraints apply to mobile platforms in the form of limited physical resources and rapidly changing specifications. There is also a great variety of devices, each with particular hardware characteristics, firmware and operating systems. Another view of the constraints associated with mobile applications itself (Hayes, 2003).

The unique features of agile methods derive from the list of principles found in the “Agile Manifesto”. In (Boehm & Turner, 2003), the authors identify fundamental concepts to agile specifically for software projects: simple design principles, a large number of releases in a short time frame, extensive use of refactoring, pair programming, test-driven development, and seeing change as an advantage which can be applied in mobile application projects to provide incremental (multiple releases), cooperative (cooperation between team and client), straightforward (easy to understand and modify) and adaptive (allowing for frequent changes). The use of agile methods in software development has received both supporting and opposing arguments. The main argument against agile methods is the asserted lack of scientific validation for associated activities and practices, as well as the difficulty of integrating plan-based practices with agile ones. Indeed, some projects present a mix of plan-based and agile characteristics, in which case a balance must be achieved in the use of both types of methods. However, as Salo (2006) stated, agile methods do provide an organized better development approach (Salo, 2006).

2.8. Conclusion of the related works

Most reviewed literatures showed the effectiveness of agile methods in software and high-tech related projects under a changing environments. Some scholars reasoned out on the need of agility and the modified agile triangle than the traditional iron triangle. Yet challenges are expected in adoption of agile in different settings for different projects. There is ongoing research currently being conducted in this field. There is a strong debate among advocates from both APM and TPM with regard to which path to follow. While some scholars regard the two as antagonistic a significant number of them argue that the two are not mutually exclusive but complementary. As noted in the literature above both approaches is suited to different scenarios. This is supported by an analysis by Sauser (2009) who concluded that projects are different and they demand different ways of management.

The principles from engineering (construction) and defense industries played a crucial role during the development of TPM methodologies (Augustine and Woodcock, 2008). This resulted in the bias towards predictability, deterministic and reductionist approaches that gave partial solution to the problem of project scheduling (Weaver, 2007).

2.9. Synthesis and Gap

There exist a lot of opportunities in exploring the adoption of agile practices in project management approach and more specifically in complex software projects. Considering the fintech projects are regarded as the next economic giant, there is needed to conduct research and investigate on best practices and lessons learned to adopt and to increase the usage of agile project management methodologies in Ethiopia context.

There exist a lot of gaps between agile principles used in other parts of the world compared to the ones used in Ethiopia as presented in the literature. This is coupled by the fact that adoption rate and level in Ethiopia is still low and therefore the financial technology project implementing companies are not benefitting from the advantages that come with adopting modern project management approach principles as outlined in the agile manifesto. This therefore calls for a study that will fill this contextual gap by assessing the use of agile project management techniques and its application in M-Birr project context which is one of the first fintech company with IT project implementation and agile practice in Ethiopia in the field of financial service sector.

Chapter Three: *Research Methodology*

3.1. Research Design

For a comprehensive description and analysis of the issue; the research applied case study method. It was selected in order to allow the study in-depth close analysis and investigation of the issues under consideration, so that its findings and interpretation will be valid and consistent. Through single-case detailed contextual analysis of a limited number of project cases, and their relationships. Yin (1984) defines the case study research method to investigate a contemporary phenomenon within its real-life context. The research design was implemented on the basis of descriptive research. In this type of research, both qualitative and quantitative mix of data was obtained from primary sources through different instruments where data were collected from each single elementary unit in the population to allow comprehensive analysis.

The research design was chosen for it fits well with the problem under consideration and makes the issues to intensively examine the contemporary specific context of the issue. To serve this purpose the research had guidelines indicating the process of the research as mentioned before. In addition, this study is a cross-sectional study which only took a snapshot of a particular case in the time perspective.

3.2. Target Population of The Study

The target population for this study was all of M-Birr project team and the five key stakeholders of the project under this study. The assessment was undertaken with its main project team in Addis Ababa City. The research considered only one Fintech Company among the financial technology companies that has engaged in IT projects and its agile approach in managing the project.

The project team members and five key project stakeholders were the target group. The identifications and selection of the project was carefully done after consultations with project managers and the subject matter experts who are authorized in the area. The projects chosen was among those projects which are aimed at achieving organizational objective through implementation of agile project and approved in relative expert opinion assessment which are closer to the matter under consideration in their application process of agile as project management approach of project performance. Once the project was identified, and chosen depending on the approach of the project management style the study used the census inquiry technique of total target population for this study mainly from the perspective of project team.

As mentioned above that the target population of this study was all of M-Birr project team and 5 key stakeholders of M-Birr project. According to the information gathered from the M-Birr HR database, there are 21 direct project team members who are responsible in planning, executing, managing and supporting the overall projects implementation of the company next to the core development team with the 5 stakeholder representatives. Therefore these target population were the data source from which the data was collected through structured questionnaires.

According to Kothari (2004) census inquiry needs to be emphasized that when the universe is a small one, it is no use resorting to a sample survey. Census is a complete enumeration of all items in the population. It can be considered that in such an inquiry, when all items are covered, no element of chance is left and highest accuracy is obtained. Thus, in this study census inquiry was employed as presented in Table1 below.

Table 1: Target population category

Participant category	No of target respondents	Percentage
IT development manager	1	
Project manager	1	
Business analyst (PO)	2	
Core development liaison	1	
Graphic designers	3	
Content manager	1	
Marketing manager	1	
Agent network managers	2	
Call center contact managers	2	
Cyber law professional	1	
Supportive department heads	3	
Frontline project staff	3	
Sub Total of project team	21	80.77 %
Key project stakeholders	5	19.23 %
Grand Total	26	100 %

Source: M-Birr HR record, 2018

3.3. Sources of Data and Gathering Techniques

In this particular study the data collection technique was mainly on primary data. The primary data were obtained from project case through well designed questionnaires to targeted group. Besides, supplementary open ended questionnaires and semi-structured interview were conducted with key project stakeholders and agile experts. Mainly the study used primary information that were acquired and analyzed in at as different scenario as possible in order not to misrepresent the issue under consideration. Cases are bounded by time and activity, and researcher collects detailed information using a variety of data collection procedures (Stake, 1995).

3.4. Reliability and Validity

Creswell (2009) states that employing multiple data collection instruments help the researcher to combine strengthen and amend some of the inadequacies and limitations. Thus, the internal consistency of the items was checked. The rationale for internal consistency is that the individual items or indicators of the scale should all be measuring the same construct and thus be highly inter-correlated. 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 was also be performed. Therefore, the open-ended and the closed-ended questionnaires along with the crosschecking questions and the semi-structured interview were employed and validity and reliability issues were addressed through triangulation. In addition, qualitative interview obtained from targeted respondents was thematically analyzed to allow triangulation. Furthermore, to overcome the inability of a single-case design to provide a generalizing conclusion, in particular rare agile project case the data was triangulated with other methods in order to confirm the validity of the process.

3.5. Method of Data Analysis

The data gathered through different method was analyzed by descriptive instruments of analysis and by the assistance of consulting the subject matter experts or experienced agile professionals. The study mainly used descriptive statistics as a tool to help data analysis with the help of SPSS and Spreadsheet. The raw data was classified and tabulated. This was followed by analysis and interpretation of findings. Merely due to the descriptive nature of this study hence, descriptive statistical tools such as frequency distribution, percentage, and charts were used to present the data followed by detail analysis.

Table 1.1: Number of questionnaire administered and returned

Respondent category	Total	Percentage
No issued for the Project team	21	100
No returned	21	100
Sub total	21	100
No issued for the stakeholders' rep	5	100
No returned	5	100
Grand total	26	100

The above table shows that 26 questionnaires were distributed to 26 respondents; the whole number (100%) administered were returned. Therefore, the analysis that will be made in subsequent chapter will be based on the administered and returned data form the main project team and the stakeholders' representatives.

3.6. The Quantitative Research Approach

In order to assess the effectiveness of Agile method in M-Birr; quantitative method was facing in project management approach, various project management processes lists of factors affecting Agile methods were surveyed through structured questionnaire containing closed type of questions using five point Likert scale.

3.7. The Qualitative Research Approach

In order to obtain more insight on the topic out of the questionnaire scope, in a less structured and more flexible approach a qualitative approach was used. Using this approach an opened questionnaire and interview was conducted with one respondent and two key project stakeholder who have better experience in the IT project environment as well as in agile approach.

Qualitative researchers tend to use open-ended questions so that participants can express their views and meanings are constructed by human beings as they engage with the world they are interpreting (Creswell, 2003). The Qualitative interview obtained from targeted respondents was thematically analyzed to allow triangulation and any other appropriate tool for the data analysis purpose. As it's shown above table 1 the 21 questionnaires were distributed to 21 respondents in the M-Birr Project team and the five open-ended questionnaires to the key project stakeholders. Thus, the analysis in subsequent section will be based on the administered inquiries.

3.8. Ethical Considerations

According to Saunders there are key ethical issues that arise across the stages and duration of a research project. They stated that the issues relate to privacy and consent of participants, maintenance of the confidentiality of data and their anonymity. Therefore, the research processes was guided by sound ethical principles which include: voluntarism, objectivity, confidentiality, respect and informed consent. The researcher tried to ensure that all aspects of ethical consideration while conducting the research.

Particularly, the researcher ensured that respondents are not manipulated into participating in the study. Respondents were told the purpose of the study and their consent to participate in the study. The researcher were also ensured objectivity when carrying out the research any attempt to bias results were considered unethical and should therefore be avoided. The respondents were also assured of confidentiality and anonymity. Their names was not written anywhere in the report and the information given will only be used for academic purposes.

Chapter Four: Data Presentation and Analysis

Introduction

This section presents data collected in this study from the primary source. The questionnaires which are analyzed to look for patterns of the responses from respondents using descriptive statistics such as, tabulation, charts, and frequency distribution followed by detail analysis in line with the agile manifesto and its principles. In this section, to confirm the validity of data analysis between variables the data was measured using IBM Statistical Package for Social Sciences version 20 and Microsoft Spreadsheet version 2013. Additionally, summaries that are useful in this research will be proffered, and the findings for forthcoming section to expand on the results of this work will also be discussed. The first section will briefly present the demographic characteristics of respondents and summarizing the main information that are directly related to these questions. The next section will present the five parts of the questionnaires which are directly related to the topic of the study. For simplicity sake the data collected from main project team and the five project stakeholders will be presented separately. These data will be subsequently expanded upon and presented in more detail in the concluding sections of the research, where the distinct implications for study are presented.

4.1. Demographic Profile of Respondents

4.1.1. Gender of Respondents

The respondent's gender profile indicates, as shown in the table two below, the majority of the respondents are male which accounts 71.4 percent of the respondents whereas female respondents account for 28.6 percent of the respondents. This shows that women lag behind men in playing role in project management which may also indicate men's characters is reflected in project agility and its chosen approaches.

Table 2: Gender of Respondents

Gender				
Variables	Frequency	Percent	Valid %	Cumulative Percent
Male	15	71.4	71.4	71.4
Female	6	28.6	28.6	100.0
Total	21	100.0	100.0	

Source: Own Primary Survey, 2018

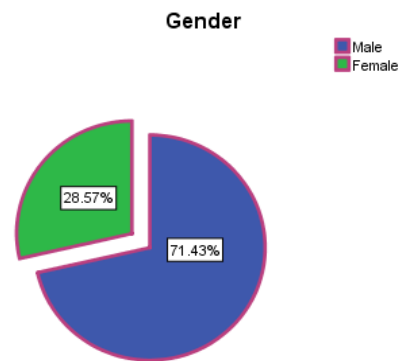


Figure 9

4.1.2. Age of Respondents

The age of majority of the respondents as shown from table three is between 25-35 years of age numerically 47.6 percent. Whereas 38.1 percent falls under 25 that means more than 86 percent of the project team are within the age of 25-35 years that may contribute to the acceptance of agile method with less resistance to change. The fact that the majority of the respondents are young and adult implies it is an opportunity for project agility in the project environment.

Table 3: Age of Respondents

Age of Respondents				
Variables	Frequency	Percent	Valid %	Cumulative Percent
Under 25	8	38.1	38.1	38.1
25 to 35	10	47.6	47.6	85.7
36 to 45	2	9.5	9.5	95.2
Over 45	1	4.8	4.8	100.0
Total	21	100.0	100.0	

Source: Own Primary Survey, 2018

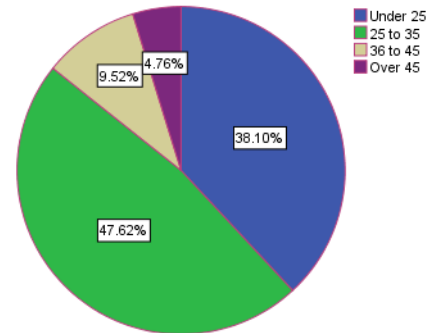


Figure 10

4.1.3. Education status

Education level attained by respondents as indicated in table four and figure 12 below shows majority of the respondents were first degree holders which is 57.1 percent of the total respondents which is followed by Post graduates 23.8 percent and the least percent is 19% of College diploma graduates. That means most of M-Birr project team in Addis Ababa office where the data is collected from have higher educational status which is an opportunity to M-Birr provide advanced contemporary project management methods such as agile since level of understanding and educational background of team will play an important role in adopting new approaches.

Table 4: Education Level of Respondents

Educational status				
Variables	Frequency	Percent	Valid %	Cumulative Percent
Diploma Graduate	4	19.0	19.0	19.0
Bachelor Degree	12	57.1	57.1	76.2
Post Graduate	5	23.8	23.8	100.0
PhD graduate	0	0.0	0.0	0.0
Total	21	100.0	100.0	

Source: Own Primary Survey, 2018

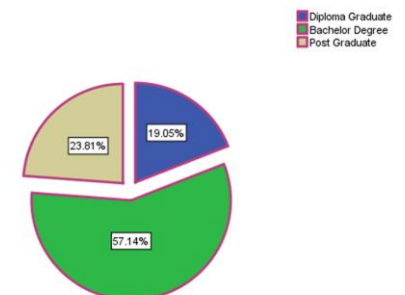


Figure 11

4.1.4. Work experience of Respondents

Looking at table five below about the respondents work experience, most of them joined the project in less than 5 years since the project itself is about 10 years old but before the project commerce there were few team for the pilot. As it can be referred from table 5 and figure 13 below, 6 respondents represent 28.6 percent fall within 0-2 group years in the company and 10 respondents represent 47.6 percent fall within 3-5 years. The rest correspond to 5 respondents representing 23.8 percent are within 6-10 years. This shows that most of the respondents have been with the company's project form the inception to completion. Therefore, it's believed that these respondents can provide the correct data form their agile experience. Hence, their agile experience will give them flexibility advantage by enabling project team to accustom themselves with the agile methodologies.

Table 5: Work Experience of Respondents

How long have you been working in the company?				
	Frequency	Percent	Valid %	Cumulative Percent
0 to 2 Years	6	28.6	28.6	28.6
3 to 5 Years	10	47.6	47.6	76.2
6 to 10 years	5	23.8	23.8	100.0
Over 10 years	0	0.0	0.0	0.0
Total	21	100.0	100.0	

Source: Own Primary Survey, 2018

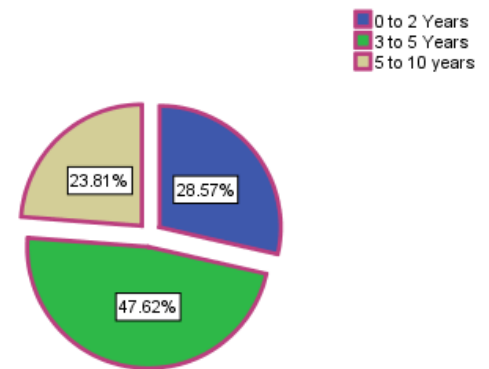


Figure 12

4.1.5. Current role of respondents

Although the project was identified as an IT technical software project, respondents were not skipped from participating in the rest of enquiry simply by their association with the project as a project team member. There are a number of job functions required to support a software development project, such as sales, marketing, business analysis, finance, human resources, content management, core development, graphic design and training; therefore, the question was used to identify those with software and information technology development as their primary role and supportive role. In order to filter the enquiry results to only those working in teams outside of the software and IT groups, participants were asked to identify the area of the role in which they primarily playing.

Table 6 shows the results, with IT (80.77 %) 21 participants making-up a large portion of the enquiry and (19.23%) 5 key project stakeholders who are participating in the project as shown in the sample breakdown. In this section for simplicity sake, only the main project teams are presented. In the subsequent section the stakeholders' data will be presented separately.

Table 6: Current role of respondents in the project

Current role in the project	Frequency	Percent	Cumulative Percent
Agent network managers	2	9.5	9.5
Business analyst (PO)	2	9.5	19.0
Call center contact managers	2	9.5	28.6
Content manager	1	4.8	33.3
Core development liaison	1	4.8	38.1
Cyber law professional	1	4.8	42.9
Frontline project staff	3	14.3	57.1
Graphic designers	3	14.3	71.4
IT development manager	1	4.8	76.2
Marketing manager	1	4.8	81.0
Project manager	1	4.8	85.7
Supportive department heads	3	14.3	100.0
Total	21	100.0	

Source: M-Birr HR record, 2018

4.1.6. Respondents pre-experience with agile

More than Fifty-seven percent (57.1%) of respondents said they are at least knowledgeable (2+ year of experience) about agile software development techniques. Additionally, 42.9 % said they are 'less' to 'not' knowledgeable about agile before the method was introduced in the company. This indicates the respondents' first time experience with agile common agile methods and principles. Response ratio for this question was 12 respondents is no which indicate most project team have no first experience with agile is in M-Birr while only 9 respondents representing 42.9 percent have previous awareness and experience about agile methods which may affect the adoption speed of the approach.

Table 7: Respondents pre-experience with agile

	Frequency	Percent	Valid %	Cumulative Percent
Yes	9	42.9	42.9	42.9
No	12	57.1	57.1	100.0
Total	21	100.0	100.0	

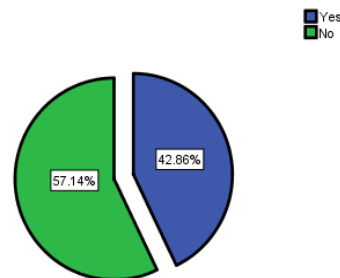


Figure 13

Source: Own Primary Survey, 2018

4.2. Statement of general opinions regarding agile method: Section 1

Frequency of agile project management methods adopted in the project that best describes respondents' experience on the agile methods with their project endeavor. These questions have a 5-point likert scales ranging from strongly disagree to strongly agree that covers the first six general questions form part one.

Table 8: Respondents' general opinion statement of agile method

	1. S-Disagree	2. Disagree	3. Neutral	4. Agree	5. S-Agree		
	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	Mean	Std.Dev
Q1. IT project management method needs to be less formalized to be able to respond more quickly to changing requirements.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	2 (9.5%) [9.5]	19 (90.5%) [100]	4.90	.301
Q2. Agile methods serve an important purpose in our project.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	4 (19.0%) [19.0]	17 (81.0%) [100]	4.81	.402
Q3. Agile accommodates change in requirements at any stage of development to ensure that the final product is refined.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	3 (14.3%) [14.3]	18 (85.7%) [100]	4.86	.359
Q4. Best practices of Agile are adopted in the company.	4 (19.0%) [19.0]	9 (42.9%) [61.9]	8 (38.1%) [100]	0 (0.0) [0]	0 (0.0) [0]	2.19	.750
Q5. In agile method, the technical skill and know-how of participant customers can affect the success of a project.	0 (0.0) [0]	1 (4.8%) [4.8]	3 (14.3%) [19.0]	6 (28.6%) [47.6]	11 (52.4%) [100]	4.29	.902
Q6. Prior organizational culture determines the effectiveness of Agile.	0 (0.0) [0]	0 (0.0) [0]	1 (4.8%) [4.8]	9 (42.9%) [47.6]	11 (52.4%) [100]	4.48	.602

Source: Own Primary Survey, 2018

4.2.1. Analysis of general opinion of the team toward agile method: Section 1

According to data gathered from the project team in the first 12 inquiries approximately 83% of respondents that have practiced agile for greater than three years with the total mean of 4.255 and .553 standard deviation. Most respondents (90.5%) strongly agreed on less formalization of IT project management method to be able to respond more quickly to changing requirements. In addition, approximately (9.5%) of respondents agreed in less formalization of IT project management method that need to be practiced in IT projects for better project flexibility and performance. In cases where agile projects were implemented, most respondents pointed to the important purpose that agile methods serve in managing IT projects (81%) strongly agreed while (19%) were agreed. One of the top five reasons for introducing agile method in IT project was related to company culture on accommodating changing project requirements at any stage of development to ensure that the final product is refined. Accordingly 85.7% of respondents strongly agree on implementing agile improved their ability to manage changing priorities while 14.3% respondents agree which indicate the ability to manage changing requirement of project.

Consistent with agile principles, most respondents don't adopt agile best practices in the project (19%) strongly disagreed on the adoption of best practices of agile in the company. Majority of the respondents negatively agreed on the adoption of best practices that corresponds to 42.9%. However, 38.1% of the respondents were neutral on adopting best practices of agile during the project. The most important practiced agile requirement is close customer involvement throughout the project. In cases where agile projects were implemented, most respondents pointed to the importance of technical skill and experiences with agile methods (52.4%) of the respondents were strongly agreed on importance of technical skill and know-how of customers for the success of a project. The remaining responses were account to agree, neutral, disagree; 28.6%, 14.3%, and 4.8% respectively. Which indicate the technical skill and know-how of customers and stakeholders needs more attention to improve better project performance.

Furthermore, there is also lack of readiness on organizational culture suitable for effectiveness of agile methods. 52.4% strongly agree, 42.9% agree, 4.8% neutral about the determinant effect of prior organizational culture on effectiveness of agile approach. This could be related to the traditional project management organizational culture and experiences of the team and especially the frontline project staffs. As it can be referred from table 8, more than $\frac{3}{4}$ of the respondents responded that they believe prior organizational culture before the adoption of agile can positively or negatively affect the effectiveness of the adoption.

4.3. Statement of general opinions regarding agile method: Section 2

Frequency of agile project management methods adopted in the project that best describes respondents' experience on the agile methods with their project endeavor. These questions have a 5-point likert scales ranging from strongly disagree to strongly agree that covers the subsequent six general questions form part one.

Table 9: Respondents' general opinion statement of agile method

	1. S-Disagree	2. Disagree	3. Neutral	4. Agree	5. S-Agree		
	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	N f (%) [C%]	Mean	Std.Dev
Q7. Agile method improves engineering discipline and self-organizing teamwork in our project.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	6 (28.6%) [28.6]	15 (71.4%) [100]	4.71	.463
Q8. It is important that IT projects should deliver the right product timely.	0 (0.0) [0]	0 (0.0) [0]	3 (14.3%) [14.3]	5 (23.8%) [38.1]	13 (61.9%) [100]	4.48	.750
Q9. Agile method reduces project risk as compared to traditional waterfall method.	1 (4.8%) [4.8]	9 (42.9%) [47.6]	5 (23.8%) [71.4]	6 (28.6%) [100]	0 (0.0) [0]	2.76	.944
Q10. The challenges in applying Agile methods in the context of our project were within the control of my ability.	2 (9.5%) [9.5]	9 (42.9%) [52.4]	6 (28.6%) [81.0]	4 (19.0%) [100]	0 (0.0) [0]	2.57	.926
Q11. Agile approach increases team morale/motivation.	0 (0.0) [0]	0 (0.0) [0]	1 (4.8%) [4.8]	6 (28.6%) [33.3]	14 (66.7%) [100]	4.62	.590
Q12. The agile method can help a company achieve its project objective.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	2 (9.5%) [9.5]	19 (90.5%) [100]	4.90	.301

Source: Own Primary Survey, 2018

4.3.1. Analysis of general opinion of the team toward agile method: Section 2

According to the data gathered from the respondents majority of them agree on the questions under the: agile method contribution on engineering discipline improvement and self-organizing teamwork in the project 71.4% strongly agree and 28.6% of respondents agree on the agile approach introduced as an attempt to make software engineering more flexible and efficient. More than $\frac{3}{4}$ of the respondents support agile self-organizing team as opposed to the traditional methodologies. Concerning the agile methods importance in delivering the right product on time Table 9 shows 61.9% of respondents strongly agree, 23.8% agree and 14.3% were neutral. The perception of project risk varied from project to project, from person to person, as table 9 question 9 shows 28.6% of respondents agree on the agile ability to reduce project risk than traditional one while 23.8% were neutral about it. As per the respondents, even though formal risk management system is applied in the company, the nature of agile project is difficult to manage unanticipated risks. Even if the 23.8% respondents were neutral that doesn't mean they skip the risk management process. However, the risk mitigation strategies are different in each project. The rest 42.9% and 4.8% of respondents were disagree and strongly disagree on the agile method project risk reduction probability as compared to traditional waterfall project management method.

Moreover, 9.5% of the respondents were strongly disagreed and 42.9% disagree on their ability to deal with the challenges in applying agile methods in the context of their project environment. Yet 28.6% of the respondents were neutral while 19% were agree on getting better project performance by managing the challenges that agile method appeal that indicate the project team maturity level in dealing with the challenges of agile project. On the contrary, 66.7% of the respondents strongly agree on the agile methods contribution for increased team morale and motivation throughout the project 28.6% agree only 4.8% of respondents were neutral which means more than three-quarters of respondents are motivated in applying agile method in their project management endeavor. On the other hand, the responses for the 12th question show that agile method can help a company achieve its project objective and can result in much better project performance. 90.5% of responses were strongly agree and the remaining 9.5% were agree which implies if agile is implemented well, agile company can meet their goals and business intent that is aligned with the company's project objectives and overall goals higher than what low agile company achieve.

Table 10: Crosschecking closed-ended questions section 1

	1 Yes	2 No	Mean	Std.Dev
	N (f %) [C %]	N (f %) [C %]		
Q1. Is working with Agile principles challenging?	17 (81.0%) [81.0]	4 (19.0%) [100]	1.19	.402
Q2. Should the company introduce other methods than agile?	14 (66.7%) [66.7]	7 (33.3%) [100]	1.33	.483
Q3. Do agile methods attract interest of project team to work with?	14 (66.7%) [66.7]	7 (33.3%) [100]	1.33	.483
Q4. Should agile methods be considered as a best working approach for IT projects?	17 (81.0%) [81.0]	4 (19.0%) [100]	1.19	.402
Q5. Do the project teams overlook the benefits of Agile in their day to day activities?	8 (38.1%) [38.1]	13 (61.9%) [100]	1.62	.498

Source: Own Primary Survey, 2018

4.4. Analysis of crosschecking questions on M-Birr agile approach: Section 1

According to numbers shown as per Table 10 above, one of the most agile challenges that must be tackled is adaptive project delivering which represents the idea that projects should always be in a state of continuous adaptation with agile mindset, which results in better project performance. With regard to this, table 10 shows that working with agile principles is considered as challenging by more than three-fourth of respondents (81%) response were “Yes” working with agile principles is challenging. While 19 percent of the respondents respond “No” which implies the agile mindset is not yet incorporated in project team and respondents are experiencing barriers to using agile project management methods. As Table 10 shows about 66.7 percent of the respondents respond “Yes” the company should introduce other methods than agile methods whereas 33.3% of respondents respond “No”. Similarly 66.7 % of the respondents respond “Yes” to agile methods attracting interest of project team to work with while the remaining 33.3% of respondents respond “No”. That implies more than two-thirds of respondents are ok with current agile method because 81% consider agile as a best working approach for IT projects 61.9% of respondents value the worth benefits of agile in their activities.

Table 11: Crosschecking closed-ended questions section 2

	1 Yes	2 No	Mean	Std.Dev
	N (f %) [C %]	N (f %) [C %]		
Q6. Do agile methods improve project management processes?	19 (90.5%) [90.5]	2 (9.5%) [100]	1.09	.301
Q7. Do agile methods enhance ability to manage changing priorities?	21 (100%) [100]	0 (0%) [0]	1.00	.000
Q8. Do agile methods keep individuals motivated throughout the project?	15 (71.4%) [71.4]	6 (28.6%) [100]	1.29	.463
Q9. Is agile method effective for face-to-face communication of project team?	15 (71.4%) [71.4]	6 (28.6%) [100]	1.29	.463
Q10. Is there a strong customer collaboration and commitment in your project case?	6 (28.6%) [38.1]	15 (71.4%) [100]	1.71	.463

Source: Own Primary Survey Result, 2018

4.5. Analysis of crosschecking questions on M-Birr agile approach: Section 2

Managing a project requires managing process to manage agile-oriented project needs accordingly, table 11 shows 90.5% of respondents respond “Yes” to the improvement that agile method has made on project management processes while 100 percent of respondents respond “Yes” to the enhancement of ability that agile method can add in managing changing priorities. Almost, $\frac{3}{4}$ of respondents reply “Yes” that agile methods keep them motivated throughout the project. One of the most important elements of agile project team is interaction among team members and interaction with other teams, customers, and suppliers since communication can directly affect team performance. With respect to this, table 11 shows that agile is considered as an effective means of face-to-face communication in managing project (71.4 %) responses were “Yes”. Among the agile manifesto, customer involvement is given much attention yet 71.4 percent of respondents indicate that there is no close customer collaboration throughout the development period of the project. This implies lack of customer involvement that makes it extremely difficult for the project team to meet the requirements of the customer exhaustively since customer usually are not closely part of the team which includes attending team meetings.

Table 12: Crosstabulation section 1

1. Responding to change over following a plan in terms of Value * Responding to change over following a plan in terms of quality Cross-tabulation				
		Responding to change over following a plan for quality		Total
		Good	Poor	
Responding to change over following a plan in terms of project value	High	16 (76.19%)	3 (14.29%)	19 (90.48%)
	Low	0 (%)	2 (9.52%)	2 (9.52%)
	Total	16 (76.19%)	5 (23.8%)	21 (100%)

Source: Own Primary Survey Result, 2018

4.6. Analysis of project quality vs. agile value crosstabulation: Section 1

As shown in Table 12 the Crosstabulation matrix above, High is the most indicated responses among agile manifesto principles from the row variable (Responding to change over following a plan in terms of project value). From the column variable (Responding to change over following a plan for project quality), Good is shown as the most preferred principle of the manifesto contributing to the project value. Therefore, using the intersection value 76.19% between project quality and the project value it can be concluded that most software project companies indicate changes always improve a project and provide more value to that project. These two responses reveal project quality and accommodating changes are highly valued by most respondents.

Table 13: Responding to change trade-offs

	Frequency	Percent	Cumulative Percent
Increase	14	66.7%	66.7%
Decrease	7	33.3%	100%
Total	21	100%	

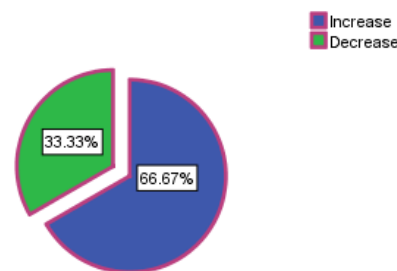


Figure 14

Source: Own Primary Survey Result, 2018

4.6.1. Analysis of project constraints time and cost vs. responding to change

The above table shows that the agile triangle with a different way of looking at project success, a way that resolves the paradox of adaptability versus conformance to plan. Responding to change over following a plan may effect project time and cost. Over two-thirds of respondents conform that responding to change over following a plan increases project time and cost which has tradeoff effect on the project constraints.

Table 14: Crosstabulation section 2

2. Customer collaboration over contract negotiations in terms of Value * Customer collaboration over contract negotiations in terms of quality Cross-tabulation				
		Customer collaboration over contract negotiation on quality		Total
		Good	Poor	
Customer collaboration over contract negotiations in terms of project value	High	12 (57.14%)	1 (4.76%)	13 (61.9%)
	Low	6 (28.57%)	2 (9.52%)	8 (33.33%)
	Total	18 (85.71%)	3 (14.29%)	21 (100%)

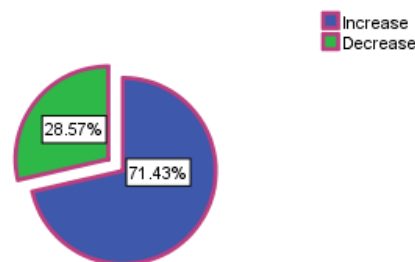
Source: Own Primary Survey Result, 2018

4.7. Analysis of project quality vs. agile value crosstabulation: Section 2

As shown in Table 14 the Crosstabulation matrix above, High is the most indicated responses among agile manifesto principles from the row variable (Customer collaboration over contract negotiations in terms of project value). From the column variable (Customer collaboration over contract negotiation on quality), Good is shown as the most preferred principle of the manifesto contributing to the project value. Therefore, using the intersection value 57.14% between customer collaboration and contract negotiations can be concluded that most software project companies indicate customer collaboration improve project performance and meet more customer needs than negotiating on exhaustive contract terms.

Table 15: Customer collaboration trade-offs

	Frequency	Percent	Cumulative Percent
Increase	15	71.4%	71.4%
Decrease	6	28.6%	100%
Total	21	100%	

**Figure 15**

Source: Own Primary Survey Result, 2018

4.7.1. Analysis of project constraints time and cost vs. customer collaboration

The above table 15 shows that the project triangle with customer collaboration over contract negotiations and its effect on project cost and time. In addition, respondents were asked whether the interaction affect project constraint in time and cost 71.4% of respondents' responses indicate that it increases project time and cost which has tradeoff effect on the project constraints.

Table 16: Crosstabulation section 3

3. Individuals and interactions over processes and tools in terms of Value * Customer				
Individuals and interaction over process and tools in terms of quality Cross-tabulation		Individuals and interactions over processes and tools on project quality		Total
		Good	Poor	
Individuals and interactions over processes and tools in terms of project value	High	17 (80.95%)	1 (4.76%)	18 (85.71%)
	Low	3 (14.29%)	0 (0%)	3 (14.29%)
	Total	20 (95.24%)	1 (4.76%)	21 (100%)

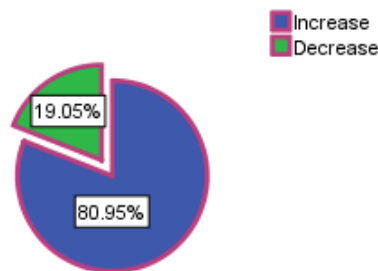
Source: Own Primary Survey Result, 2018

4.8. Analysis of project quality vs. agile value crosstabulation: Section 3

As shown in Table 16 the Crosstabulation matrix above, High is the most indicated responses among agile manifesto principles from the row variable (Individuals and interactions over processes and tools in terms of project value). From the column variable (Individuals and interactions over processes and tools on project quality), Good is shown as the most preferred principle of the manifesto contributing to the project value. Therefore, using individuals and interactions over processes; the intersection value 80.95% between project value and project quality can be concluded that majority of respondents prefer individual interaction than process and tools.

Table 17: Individuals and interactions trade-offs

	Frequency	Percent	Cumulative Percent
Increase	17	81%	81%
Decrease	4	19%	100%
Total	21	100%	

**Figure 16**

Source: Own Primary Survey Result, 2018

4.8.1. Analysis of project constraints time and cost vs. individuals interactions

People are the ones who normally respond to business needs and therefore through their skills, they drive the development process. The process and tools were given less value in order to drive more responsive project team. As table 17 shows 81% of respondents' responses indicate that the individuals and interactions over processes and tools have a tradeoff effect on project cost and time that results in increased project cost and time.

Table 18: Crosstabulation: Section 4

4. Working software over comprehensive documentation in terms of Value * Working software over comprehensive documentation in terms of quality Cross-tabulation				
		Working software over comprehensive documentation on quality		Total
		Good	Poor	
Working software over comprehensive documentation in terms of project value	High	16 (76.19%)	5 (23.81%)	21 (100%)
	Low	0 (0%)	0 (0%)	0 (0%)
	Total	16 (76.19%)	5 (23.81%)	21 (100%)

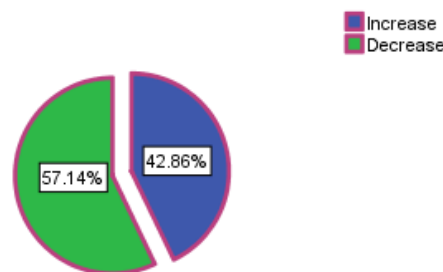
Source: Own Primary Survey Result, 2018

4.9. Analysis of project quality vs. agile value crosstabulation: Section 4

As shown in Table 16 the Crosstabulation matrix above, High is the most indicated responses among agile manifesto principles from the row variable (Working software over comprehensive documentation in terms of project value). From the column variable (Working software over comprehensive documentation on project quality), Good is shown as the most preferred principle among the manifesto contributing to the project value. Therefore, using working software than documentation; the intersection value 76.19% between project value and project quality can be concluded that majority of respondents prefer delivering incremental working software than maintaining comprehensive documentation.

Table 19: Working software trade-offs

	Frequency	Percent	Cumulative Percent
Increase	9	42.9%	42.9%
Decrease	12	57.1%	100%
Total	21	100%	



Source: Own Primary Survey Result, 2018

Figure 17

4.9.1. Analysis of project constraints time and cost vs. working software

Documentations before agile involved creation of technical specifications and detail requirements, and documentation plans and also each document required approval thereby consuming a lot of time. Valuing working software over comprehensive documentation has an effect on time and cost. The agile mindset ensures that documentation was only done for absolutely necessary requirements and nothing more. As table 19 shows 57.1% of respondents' responses indicate that delivering incremental working software decreases project cost and time than maintaining comprehensive documentation results in optimizing project competing demands of project constraints. While 42.9 % of them were still stick to detailed documentation.

4.10. Analysis of agile principles perceived in the project: Section 1

Frequency of agile principles practiced in project management. This section contains the 12 principles behind the agile manifesto, which expands on the core values of agile software development methods. Below Table 20 presents the respondents' experience on these principles with a 5-point likert scales ranging from never to always to describe how often the respondents practice the principles in their project environment. The first section covers the first six questions in line with agile principles.

Table 20: Statement of agile principles practice: Section 1

	1. Never	2. Seldom	3. Sometimes	4. Often	5. Always	Mean	Std.Dev
	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]		
Q1. The highest priority is given to satisfy the customer through early delivery of valuable deliverables.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	3 (14.3 %) [14.3]	18 (85.7%) [100]	4.86	.359
Q2. The company is ready to welcome changing requirements, even late in development stage.	0 (0.0) [0]	0 (0.0) [0]	2 (9.5%) [9.5]	4 (19.0%) [28.6]	15 (71.4%) [100]	4.62	.669
Q3. The company delivers working deliverables frequently with a shorter timescale.	0 (0.0%) [0]	4 (19.0%) [19.0]	17 (81%) [100]	0 (0.0%) [0]	0 (0.0%) [0]	2.81	.402
Q4. The customers and the project team work together closely throughout the project.	0 (0.0%) [0]	8 (38.1%) [38.1]	4 (19.0%) [57.1]	8 (38.1%) [95.2]	1 (4.8%) [100]	3.10	.995
Q5. The company provides motivating and supporting environment, and trusts the team to get the job done.	0 (0.0%) [0]	0 (0.0%) [0]	0 (0.0%) [0]	5 (23.8%) [23.8]	16 (76.2%) [100]	4.76	.436
Q6. The project team considers face-to-face conversation as most efficient method of conveying information within a project team.	0 (0.0) [0]	0 (0.0) [0]	1 (4.8%) [4.8]	2 (9.5%) [14.3]	18 (85.7%) [100]	4.81	.512

Source: Own Primary Survey Result, 2018

4.10.1. Interpretations of agile principles perceived: Section 1

According to the data gathered, more than $\frac{3}{4}$ of the respondents replied “always” (85.7%) the highest priority is given to satisfy the customer through early delivery of valuable deliverables while 14.3 % of them reply often on the question. In respect to the company readiness to welcome changing requirements, even late in development stage 71.4% of respondents said always, 19.0% said often and 9.5% replied sometimes. With shorter planning cycles, the company can easily accommodate and accept changes at any time during the project. For market sync, frequent delivery of working project deliverables in shorter timescale is important as per the requirement of customers and to increase project performance. In the studied, it is revealed in table 20 that 81% replied “Sometimes” while 19% replied “Seldom”. This shows the company is not delivering incremental products even though over two-thirds of respondents said the company is responsive to changes with respects to frequency, which may delay time to market that adversely affect market synchronization since within a company’s domain, a key to achieving agility is to deliver working product more frequently in shorter timescale.

Unlike the traditional project management method the customers and the project team are required to work together closely throughout the project. However, as table 20 shows 38.1% replied “Sometimes”. The rest 19.0% replied “often” while 38.1% replied “Seldom”. This indicates customers are not heard or given the opportunities to see the project being developed, share their input, and have a real impact on the end product having a sense of ownership by working closely with the project team and balancing the work limit in progress to avoid an endless chain of non-prioritized open tasks. Concerning motivation and support that the company provides to get the job done table 20 shows 76.2% of respondents said “always”, while 23.8% of them said “often”. The respondents perceive the company’s supportive environment as significantly more important to get the job done. It indicates the company considers the project team as trustworthy to get the job done with autonomy. Another important issue in agile method is strong team interaction and frequent communication and face-to-face conversation. Accordingly, 85.7% of the respondents replied “always” that the project team considers face-to-face conversation as most efficient method of conveying information within the project team. The rest 9.5% of respondents replied “often” while 4.8% replied “Sometimes”. This indicates the project team considers face-to-face conversation as most efficient method of conveying information within a project team to visualize work and increase collaboration.

4.11. Analysis of agile principles perceived in the project: Section 2

Frequency of agile principles practiced in project management. This section contains the 12 principles behind the agile manifesto, which expands on the core values of agile software development methods. Below Table 21 presents the respondents' experience on these principles with a 5-point likert scales ranging from never to always to describe how often the respondents practice the principles in their project environment. The second section covers the last six questions in line with agile principles.

Table 21: Statement of agile principles practice: Section 2

	1. Never	2. Seldom	3. Sometimes	4. Often	5. Always		
	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]	N (f %) [C%]	Mean	Std.Dev
Q7. Working product is the primary measure of progress in our project.	0 (0.0) [0]	0 (0.0) [0]	1 (4.8%) [4.8]	2 (9.5%) [14.3]	18 (85.7%) [100]	4.81	.512
Q8. Agile methods promote sustainable project management processes to maintain a constant pace with the market.	0 (0.0) [0]	0 (0.0) [0]	0 (0.0) [0]	1 (4.8%) [4.8]	20 (95.2%) [100]	4.95	.218
Q9. Continuous attention is given to technical excellence to enhance agility.	0 (0.0) [0]	0 (0.0) [0]	2 (9.5%) [9.5]	12 (57.1%) [66.7]	7 (33.3%) [100]	4.24	.625
Q10. Project simplicity maximizes the amount of work done.	0 (0.0%) [0]	0 (0.0%) [0]	1 (4.8%) [4.8]	3 (14.3%) [19.0]	17 (81%) [100]	4.76	.539
Q11. The best artifacts emerge from self-organizing teams.	0 (0.0%) [0]	0 (0.0%) [0]	0 (0.0%) [0]	2 (9.5%) [9.5]	19 (90.5%) [100]	4.90	.301
Q12. At regular intervals, the project team reflects on how to become more effective, and then adjusts its behavior accordingly.	0 (0.0) [0]	0 (0.0) [0]	3 (14.3%) [19.0]	6 (28.6 %) [42.9]	12 (57.1%) [100]	4.43	.746

Source: Own Primary Survey Result, 2018

4.11.1. Interpretations of agile principles perceived: Section 2

When asked about working product as the primary measure of progress in agile project, majority of respondents responded favorably “always” (85.7%) and most thought that this issue would help extremely well within software project. This was due primarily to the nature of the project and the company culture, which respondents felt was particularly aligned with the principles of agile development. Mainly, agile methodologies are usually considered effective. The practices have received more recognition and adoption widely due to innovation in promoting sustainable project management processes to maintain a constant pace with the market. In this regard, as table 21 depicts majority of the respondents responded “always” (95.2%). This indicates the value that an agile method adds up to maintain a constant pace with the customer requirements and market needs. High-quality adaptive software is developed by small teams using the principles of continuous design improvement based on high complementary technical skill. 33.3% of respondents replied “always” while 57.1% of them replied “often” continuous attention is given to technical excellence to enhance agility in their project implementation. This indicates contribute to the speed of adoption and improved project performance.

The research results showed in table 21 above indicates that 81 percent of the respondents perceive project simplicity maximizes the amount of work done. While the 14.3% of the respondents replied “Often” indicating simplicity not necessary maximizes the amount of work done. Agile is a time-focused, iterative method that allows building a product step-by-step (incrementally) one step at a time, delivering it by smaller pieces. One of its main benefits is the ability to adapt and change at any step depending on feedback, market conditions, corporate obstacles, and to work only relevant simple user story list called backlog. The table further shows that, 90.5 percent of the respondents confirmed that best artifacts emerge from self-organizing teams. This indicates that the majority of the respondents perceive self-organizing team produce more synergy than individual. Regardless of the exact artifacts and designs they produce in team than their mere sum, self-organized teams have proven to improve project performance. 57.1 percent of respondents justified that at regular intervals, the project team reflects on how to become more effective, and then adjusts its behavior accordingly. While 28.6 percent of them perceive that the intervals were not as required by the approach employed in managing the project. This indicates that the project team use backlogs to manage requirements and agree on which requirements they should meet with the next delivery to ensure the most important features get prioritized before moving to next iteration begins.

4.12. Stakeholders respondents' profile

This section presents data collected from the key project stakeholders of M-Birr. The questionnaires which are analyzed to determine the level of customers involvement in the project from stakeholders respondents using descriptive statistics such as, tabulation, charts, and frequency distribution followed by detail analysis in line with one of the agile manifesto i.e. customers interaction and close involvement (Customer collaboration over contract negotiation). In this section, to summarize the data in this research the stakeholders' respondents who participate in the project as representatives of their partnering organization will be discussed. The first section will briefly present the demographic characteristics of respondents and summarizing the main information that are directly related to the questions. The next section will present the open-ended questions in more detail.

4.12.1. Demographic Profile of Respondents

4.12.1.1. Gender of Stakeholder Respondents

The respondent's gender profile indicates, as shown in the table two below, the majority of the respondents are male which accounts 80 percent of the respondents whereas female respondents account for 20 percent of the respondents.

Table 22: Gender of Stakeholder Respondents

	Frequency	Percent	Valid %	Cumulative Percent
Male	4	80%	80%	80%
Female	1	20%	20%	100%
Total	5	100.0	100.0	

Source: Own Primary Survey Result, 2018

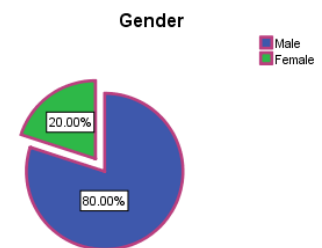


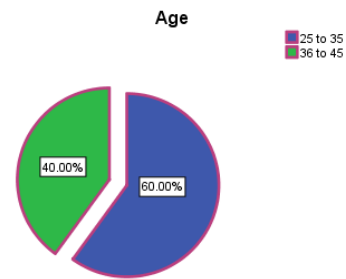
Figure 18

4.12.1.2. Age of Stakeholders Respondents

The age of majority of the respondents as shown from table three is between 25-35 years of age numerically 60 percent. While 40 percent falls within the age of 36 to 45 years that may contribute to the flexibility of the team to work more closely. The fact that the majority of the respondents are young and adult implies it is an opportunity for shaping the representatives as a responsive as possible.

Table 23: Age of Stakeholders Respondents

Age of Respondents				
Variables	Frequency	Percent	Valid %	Cumulative Percent
Under 25	0	0	0	0
25 to 35	3	60%	60%	60%
36 to 45	2	40%	40%	100%
Over 45	0	0	0	0
Total	5	100	100	

**Figure 19**

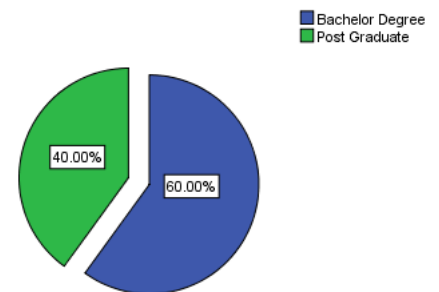
Source: Own Primary Survey Result, 2018

4.12.1.3. Education Status of Stakeholder Respondents

Education level attained by stakeholder respondents as indicated in table 24 and figure 21 below majority of the respondents were first degree holders which is 60 percent of the total respondents which is followed by Post graduates 40 percent. That indicates most of M-Birr project stakeholder team in Addis Ababa have higher educational status which is an opportunity to M-Birr to work more closely with these partners representatives since level of understanding and educational background of agile team will play an important role in adopting new approaches such as agile methods.

Table 24: Education Level of Stakeholder Respondents

Educational status				
Variables	Frequency	Percent	Valid %	Cumulative Percent
Diploma Graduate	0	0	0	0
Bachelor Degree	3	60%	60%	60%
Post Graduate	2	40%	40%	100%
PhD Graduate	0	0	0	100%
Total	5	100.0	100.0	

**Figure 20**

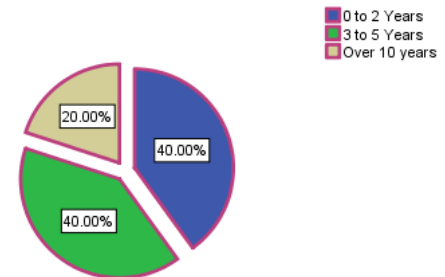
Source: Own Primary Survey, 2018

4.12.1.4. Work experience of Stakeholder Respondents

Looking at the table below about the respondents' work experience, most of them joined their respective organization in less than 5 years. As it can be referred from table 25 and figure 22 below, 2 stakeholder representatives were within 0-2 group years and 2 respondents represent 40 percent within 3-5 years and the one remaining respondent, representing 20 percent over 10 years. This shows most of the respondents have been working on the company's project for more than three years. Therefore, their inputs are considered important for the study.

Table 25: Work Experience of Stakeholder Respondents

How long have you been working in the company?				
	Frequency	Percent	Valid %	Cumulative Percent
0 to 2 Years	2	40%	40%	40%
3 to 5 Years	2	40%	40%	80%
6 to 10 years	0	0	0	0
Over 10 years	1	20%	20%	100%
Total	5	100.0	100.0	

**Figure 21**

Source: Own Primary Survey, 2018

4.13. Analysis of stakeholders' responses: Crosstabulation section 1

As shown below in Table 26 the crosstabulation matrix above, DECSI and OMO representative's work experience is 0 to 2 years. While ADCSI and OCSSCO representative's experience fall under 3 to 5 years and the ACSI representative is over 10 years. Therefore, using representative's work experience in their respective parent organization; the intersection value between parent organization and project work experience can be concluded that majority of respondents were working on the project from two to ten years. It implies that agile approach has been introduced in the company as an attempt to make software engineering more flexible and efficient collaboratively with the key stakeholders. The company practicing agile collaboratively to speed up the adoption and team development much faster among other principles, agile manifesto shifted value system from appreciating processes and tools to more valuing "individuals and interactions". Also in new value system "customer collaboration" got more attention than contract negotiation and they emphasized on "responding to change" rather than following a plan. These three principles out of twelve can be considered as dominating in the most responses.

Table 26: Work Status of Respondents vs. organization they represent

1. The respondents role in project * How long have the respondents been working in the company cross-tabulation					
1. Amhara Credit and Savings Institution S.C (ACSI) 2. Addis Credit and Savings Institution S.C (ADCSI) 3. Dedebit Credit and Savings Institution S.C (DECSI) 4. Oromia Credit and Savings S.C (OCSSCO) 5. OMO Microfinance S.C (OMO)		How long have you been working in the company?			Total
		0 to 2 Years	3 to 5 Years	Over 10 Years	
Description of the respondents current role in project	ACSI representative	0	0	1	1
	ADCSI representative	0	1	0	1
	DECSI representative	1	0	0	1
	OCSSCO representative	0	1	0	1
	OMO representative	1	0	0	1
	Total	2	2	1	5

Source: Own Primary Survey, 2018

4.14. Analysis of stakeholders' responses: Crosstabulation section 2

As indicated in Table 27 below the crosstabulation matrix describes how M-Birr agile approaches have affected the project stakeholders' overall performance. The Amhara Credit and Savings Institution S.C (ACSI) and the Addis Credit and Savings Institution S.C (ADCSI) representative respondents indicated the improvement that the M-Birr agile approach brought on the overall project performance by replying "much higher" among the given options which corresponds to 40 percent among the respondents. For the same question on project performance improvement, 60 percent of the representative respondents form Dedebit Credit and Savings Institution S.C (DECSI), Oromia Credit and Savings S.C (OCSSCO) and OMO Microfinance S.C (OMO) indicated that there is "Higher" joint improvement on their business performance.

The reliability of this inquiry obviously is quite subjective over the former independent business operation approach as values represented are pure perception of success of individual representative respondent as there are no multiple questions which try to minimize the subjective bias of perception of a concept like improvement of a project or business operation improvement or any other variable since these representatives or stakeholder organization are not the focal of this study. Nevertheless, referring the representatives' responses it's possible to reach at a conclusion of the intersection value. The representatives' focus is on business value and market reachability, prioritizing the work that needs to be done to serve the market widely; specifically the unbanked rural area with M-Birr.

Table 27: M-Birr agile approaches vs. its stakeholders' overall project performance

7. The stakeholders respondents' organization * Working with M-Birr agile approaches in overall project performance cross-tabulation							
1. Amhara Credit and Savings Institution S.C (ACSI) 2. Addis Credit and Savings Institution S.C (ADCSI) 3. Dedebit Credit and Savings Institution S.C (DECSI) 4. Oromia Credit and Savings S.C (OCSSCO) 5. OMO Microfinance S.C (OMO)		Working with M-Birr agile approaches on overall project performance.					Total
		Much Lower	Lower	No change	Higher	Much Higher	
Description of the respondents' organizations that they represent for.	ACSI	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	1 (20%)
	ADCSI	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	1 (20%)
	DECSI	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	OCSSCO	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	OMO	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	Total	0 (0%)	0 (0%)	0 (0%)	3 (60%)	2 (40%)	5 (100%)

Source: Own Primary Survey, 2018

4.15. Analysis of stakeholders' responses: Crosstabulation section 3

As shown in Table 28 below the crosstabulation matrix describes how M-Birr agile approaches have affected the project stakeholders' overall performance. The Amhara Credit and Savings Institution S.C (ACSI), Addis Credit and Savings Institution S.C (ADCSI), Dede-bit Credit and Savings Institution S.C (DECSI) and OMO Microfinance S.C (OMO) representative respondents indicated the optimization that the M-Birr agile approach has brought on the project cost performance by replying "Decreased" among the given options regarding to project cost expenditures which corresponds to 80 percent. While respondent from Oromia Credit and Savings S.C (OCSSCO) indicated that there is "Much decreased" project cost due to the joint project they undertake with M-Birr in agile approach.

From this response, one can conclude that, the cost reduction which can bring about more efficiency as per agile value driven triangle. Increased cost savings needs constant communication to ensure the team is aware of all issues and changes as soon as they arise, helping to lower expenses and increase quality. By implementing business requirement in smaller chunks, with continuous feedback and mistakes can be corrected early on, before they get too expensive to fix. Therefore, as the intersection value implies the representatives fairly perceive the reduction in cost due to agile approach that M-Birr has adopted.

Table 28: M-Birr agile approaches vs. its stakeholders' project cost performance.

7. The stakeholders respondents' organization * Working with M-Birr agile approaches in terms of project cost performance Cross-tabulation							
1. Amhara Credit and Savings Institution S.C (ACSI) 2. Addis Credit and Savings Institution S.C (ADCSI) 3. Dede-bit Credit and Savings Institution S.C (DECSI) 4. Oromia Credit and Savings S.C (OCSSCO) 5. OMO Microfinance S.C (OMO)		Working with M-Birr agile approaches on overall project cost.					
		Much increased	Increased	No change	Decreased	Much decreased	Total
Description of the respondents' organizations that they represent for.	ACSI	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	ADCSI	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	DECSI	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	OCSSCO	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	1 (20%)
	OMO	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	Total	0 (0%)	0 (0%)	0 (0%)	4 (80%)	1 (20%)	5 (100%)

Source: Own Primary Survey, 2018

4.16. Analysis of stakeholders' responses: Crosstabulation section 4

Organizations often focus on short-term results, such as immediate financial goals. However, projects are expected to achieve results that link back to an organization's overall business strategy. There has to be a strategic alignment as a two-way process to link project planning to project success impacts enterprise overall success. The research results showed in table 29, it is indicated how well did the stakeholders' business strategy meet their expectations in regard to M-Birr agile methods (40%) of respondents argues the business strategy "met" their respective performance expectation while the remaining 60 % of them replied "exceed" their expectation.

Those who replied "exceed" were more than ½ of the total representatives which indicates every project requirements are agreed upon that each project stakeholder representative needs to decide if the requirements warrants an analysis by a project team member, business analyst, the partner organization (the key stakeholders) must assign the request to the appropriate representative, the assigned representative conducts the analysis of its own organization perspectives and writes the project impact statement, the project manager informs the team of the recommendations, the project manager and the stakeholders must make a decision as a team as to whether the task will be approved and if so how it will be accomplished in line with the overall business strategy of the stakeholders. If the requirement is approved, the project scope, cost, schedule, resource requirements, and stakeholders' acceptance criteria are modified.

Table 29: M-Birr agile approaches vs. its stakeholders' business strategy alignment.

7. The stakeholders respondents' organization * Working with M-Birr agile approaches in terms of business strategy Cross-tabulation							
1. Amhara Credit and Savings Institution S.C (ACSI) 2. Addis Credit and Savings Institution S.C (ADCSI) 3. Dedebeit Credit and Savings Institution S.C (DECSI) 4. Oromia Credit and Savings S.C (OCSSCO) 5. OMO Microfinance S.C (OMO)		How well does the stakeholders' business strategy meet their expectations in regard to M-Birr Agile methods?					
		Fails to Meet	Almost Meet	Meet	Exceed	Greatly Exceed	Total
Description of the respondents' organizations that they represent for	ACSI	0 (0%)	0 (0%)	1 (20%)	0 (0%)	0 (0%)	1 (20%)
	ADCSI	0 (0%)	0 (0%)	1 (20%)	0 (0%)	0 (0%)	1 (20%)
	DECSI	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	OCSSCO	0 (0%)	0 (0%)	0 (0%)	1 (20%)	1 (20%)	1 (20%)
	OMO	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)
	Total	0 (0%)	0 (0%)	2 (40%)	3 (60%)	1 (20%)	5 (100%)

Source: Own Primary Survey, 2018

4.17. Analysis of open-ended questions of project stakeholders

This section presents the open ended questions of this research. The questionnaire was set in accordance to the objectives of the study. It is conducted with the five key project stakeholders of M-Birr to further elaborate the issue by additional sub-questions and open ended questions each targeting a specific area of interest that contributes to the research purpose. For the purposes of this study, a clarification of the each open-ended question is presented. In this section, the participants were selected from each partner organization representative in the project. These representatives came from organization such as Amhara Credit and Savings S.C, Addis Credit and Savings S.C, Dedebit Credit and Savings S.C, Oromia Credit and Savings S.C, and OMO Microfinance institution S.C. In an open-ended comment section, respondents also indicated a wide range of perspectives to be gathered, as the questions were spread out across the project stakeholders, though each possessed a wealth of information about the specific area of their representing organization, whilst still containing portions of overlap in perspective with other organizations. This also assisted with the corroboration of information received, as the researcher was able to ask participants for confirmation about facts that were gathered from core team.

The first question, was asked to gather additional information on the stakeholders' perspective about how well did their business strategy meet their expectations in regard to M-Birr agile method. As the research results showed in table 29, in regard to M-Birr agile methods 40 percent of respondents' responses were "meet" the business strategy of their respective performance expectation while the remaining 60 percent of them replied "exceed" their expectation. The subsequent open ended question was "what do you think the reason?" As the summery of their written answer for this question, the alignment of M-Birr agile method and their overall business strategy resulted in synergy. Before MOSS ICT Consultancy was established in Ethiopia these microfinance institutions were operating for more than two decades.

The project stakeholders' organizations were much older than the commencement of M-Birr project. That means these organization had prior business strategies to their customer on different strategic perspectives such as profit maximization, cost reduction and customer reachability where the M-Birr project has met their independent business strategies with agile project partnership. Because IT projects has been recognized as a strategic weapon within any organizations. Microfinance institutions also recognize a need for new information technology system (Fintech) that provide mobility, ease of use, speed and lower cost products by implementing IT projects. The rationale is simple their earlier business strategies couldn't bring about the desired outcome without integrating IT projects with the overall business strategies.

The second question was asked to gather additional information on the stakeholders' perspective about what would be the possible consequence, if M-Birr didn't adopt agile approach for the project which they are partner with. In this regard, the preponderance responses show the very consequence would be the difficulties in managing fragmented financial services with their independent operation that possibly leads to delay, inefficiency, customer dissatisfaction and associated increased cost. As a result, the main advantage was that the adoption of agile by M-Birr which enables the customer to interact closely with the development team in managing the project. This collaboration makes the organization responsive to the project nature and changing environmental requirement to remain innovative and competitive. When asked about the concepts of agile project management approach, all respondents responded favorably, and most thought that this approach would work extremely well within microfinance institutions and banks. This was due primarily to the approach of agile and the demanding complexity of contemporary projects, which stakeholders representatives felt was particularly aligned with the principles of agile development.

The third question about the stakeholders' perspective on the bottleneck activities in the way their representatives interact with M-Birr project team in line with its organizational culture. Since every project management method has limitation in process, identifying and tackling such weaknesses enable companies to gain more benefit from employed methods. With respects to this, most responses suggest that there are bottleneck activities found between agile method in implementing project so this suggests that there is no way back to the traditional waterfall method in this changing environment the demand is to shift toward those methods which are recognized and which would deliberately lead to the success of the projects by integrating the intersection value of existing organizational culture with the intended agility of agile culture.

Therefore the main challenges to be dealt with are: planning was less concrete, lack of time commitment to the entire duration of the project and lack of formal detailed documentation which can be concluded from the main setbacks maintained by the respondents that were considered unfit to the existing organizational culture and way of managing traditional projects. Regardless of the fact some respondents provide arguments by suggesting that it is not necessary to implement the agile approach for successful implementation mostly in such financial projects where documentation and detailed planning has to be strictly implemented. Generally, in an attempt to bring the approach closer to the project team daily consideration along with the results of the questionnaire presented in Chapter four have consolidated the belief that agile methods are usually the best alternative for fintech software development projects.

Chapter Five: *Summary, Conclusion and Recommendation*

5.1. Summary of Major Findings

This paper examines agile project management practice from the perspective of project team and key project stakeholders to provide a view of the progress on the adoption as a project management approach. The purpose of this study was to identify and assess the adoption of agile project management method and its management practices. This chapter summarizes the major results from the case study entitled, examining the outcomes of agile method adoption for fintech project. As the primary objective, the research tries to establish the understanding of agile method whether agile project management method adopted successfully in the project is also being adopted fully, or in part, when managing software development projects of M-Birr. This focused further on the extent to which it contributes to the overall project success which was completed by 26 practitioners belonging to M-Birr project team and key stakeholder organizations' representatives to explain how this information helps answer the research questions presented in chapter one, to discuss the importance of the findings, and to compare how these findings relate to previous research studies of agile project management practices. Most agile adoption has been driven from the software development arena, but there emerging investigation whether this methodology can be used by other industries.

In this study, the project management approaches found for managing software development is agile approach. The approaches established for developing software related project are: Waterfall (Traditional) and Iterative (Agile) approach. Hereby, each approach can separately be seen as a reaction to the limitation of an approach previously introduced. Subsequently, various hybrid project management approaches were found in practice. Both scientifically validated and practical fintech sector results suggest that there are benefits resulting from adopting agile. Accordingly, basic questions were describing the agile project management practice in M-Birr software development project case. Specifically managing project in a changing environment where time to market is very short. Therefore, based on findings the following are brief summaries: high quality adaptive software was developed by small teams that use the principles of continuous improvement of design and testing based on fast feedback and change where the knowledge management was more of tacit based with less detailed documentation. The organizational structure was flexible and participative, encouraging cooperation, targeting financial technology sector while quality control, interactive input requirements, design and solutions were based on continuous iteration testing were among the major findings of the study.

5.2. Conclusion

The findings of this study imply that traditional and agile project management strategies in combination have greater potential to offer fintech projects better ways to cope with an external environment characterized by increased marketization, including competition, customer choice and technological advance. The study suggests that traditional project management is a precondition for agile management. This means that an efficient and structured (waterfall) resource base can be used to enable capabilities of project team and stakeholders capabilities (agile). However, when developing waterfall strategies as a precondition for agility, there is a risk of product quality and a narrow customer value focus, making adjustments to changes in the external environment more challenging. Therefore, it is necessary to find an optimal balance between waterfall and agile activities that are adjusted to the characteristics of the fintech project environment.

To successfully combine waterfall and agile activities, companies need to exhibit certain balance and dynamic effective management capabilities. They need to become aware of and synergize information from external stakeholders, adapt rapidly to new market conditions using existing resource bases, collaborate with other stakeholders outside the organization, manage the contradictions in multiple stakeholder collaborations, and flexibly manage human and physical resources.

Based on the findings of the data analysis, agile principles can be based on whether the principle is more affected by prior organizational culture and other difference in order to better leverage what agile has to offer in IT projects. Understanding the difference between traditional (waterfall) and iterative (Agile) approach in the outcome of a project is difficult. The multitude of factors that are always changing depending on the project make it hard to pinpoint on factor or even type of factor that has the most bearing on that outcome.

Though both traditional and agile methods are broader encompassing concepts than software project alone (see, Beck et al. 2001), this paper argues, based on agile manifesto and its twelve principles in managing IT projects (Jim Highsmith, 2010), uncovering better ways of developing software by valuing: individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan. When seen as a project performance improvement, can be used to distinguish between traditional and agile management approaches.

5.3. Recommendation

The study notes passive project management methods are the main cause of projects failing because needs are never fully understood. There are also other findings in the study that have indicated technical aspects can be what bring a project down. These factors become multiplied when a company is going through a transition. Transitioning between methodologies can lead to even more issues because the workflow and phases that a project goes through are changing, which affects the people and the technology. Based on the case results alone, it seems evident that most findings of the study indicate some human factor is the key to successful agile project.

This study may be of value to fintech practitioners (IT project managers, in particular) in the development of a combined waterfall and agile management approach. They may find this research useful in a situation in which project complexity and technological advance create an unstable or turbulent project environment. The following actions are recommended for financial technology companies which are interested in employing agile principles:

- ☞ Pay attention to organizational factors including variables such as rewards, culture, training, and resources. Collective rewards help motivate groups whose tasks were made interdependent, while individual rewards acknowledge members whose performed tasks reflect individual responsibilities (Shore, 2008). In general, culture which favors open and objective thinking over tradition, values results more than bureaucracy is suitable to agile;
- ☞ Pay attention to people. Interactions among team members and interactions with other teams, customers, and suppliers directly affect team performance (Cao, 2009);
- ☞ Pay attention to process. Process contains information about how to follow agile-oriented needs for project management or following agile-base project management, agile-base configuration, strong communication channel which its critical point in daily face-to-face conversation, following honoring regular working schedule, following strong customer commitment and presence;
- ☞ Develop technical expertise of the team. In software industry, previous technical expertise and knowledge compare to the length of experience matters in project (Doran, 2004); and
- ☞ Pay attention to both internal and external conditions so that continuous actions may be taken that improve the company and exhibit a readiness to redeploy existing resources, thereby enabling rapid adaptation to changes in project requirements.

5.4. Future Research Area

This research has undertaken the study on the assessment of general agile project management practice but there is no well-organized and scientific research conducted in practices and challenges of agile project management methods. Therefore, it is lucrative area to conduct further research in more detail in each tools and techniques of agile methods. Future research could expand the focus of this research by an exploration of the following questions:

- ☞ How do financial companies experience agile management approaches? What are the possible effects on their project environment and well-being?
- ☞ How are stakeholders/customers' needs and preferences respected and/or considered when adopting agile management approach in Ethiopian context?
- ☞ How do IT projects can benefit from the combination of traditional and agile approaches?
- ☞ What are the implications of a wider adoption of agile project management for the national financial system (e.g., Banks, Microfinance quality of service)?

Reference List

- Abrahamsson, P. (2008) Establishing the Essential Components of a Technology- Dependent Framework: A Strawman Framework for Industrial Case Study-Based Research, Workshop on Software Engineering (ICSE) 2008, St. Louis.
- Agilemanifesto.org, (2001). Manifesto for agile software development. Available at: <http://www.agilemanifesto.org/iso/en/manifesto.html>
- Alleman, G.B. (2005) 'Agile project management methods for IT projects' Story of Managing Projects: An Interdisciplinary Approach, Carayannis E.G., Kwak, Y.H., and Anbari, F.T., (editors), USA: Greenwood Press, Praeger Publishers, pp. 324-334.
- Anbari, FT, Bredillet, CN & Turner, JR 2008, 'Perspectives on research in project management', Academy of Management Proceedings, pp. 1-6.
- Atkinson, R., 1999. Project management: cost, time and quality, best guesses and a phenomenon, time to accept other success criteria. International Journal of Project Management 17,337.
- Balaji, S. & Murugaiyan, S. (2012). Waterfall vs V-Model vs agile: a comparative study on SDLC. International journal of information technology and business management, [online] Volume 2(1), pp. 26-29. Available at: <http://jitbm.com/Volume2No1>
- Brereton, J. (2016). Report: Agile practice is the competitive advantage for a digital age The Agile Coach. Atlassian. Retrieved 18 April 2017, from <https://www.atlassian.com/agile/harvard-business-review-agile-report>
- Caccamese, A. & Bragantini, D. (2012). Beyond the iron triangle: year zero. Paper presented at PMI® Global Congress 2012—EMEA, Marsailles, France. Newtown Square, PA: Project Management Institute.
- Cicmil, S., Williams, T., Thomas, J., and Hodgson, D. (2006) 'Rethinking Project Management: Researching the actuality of projects.' International Journal of Project Management, Vol. 24(8), pp. 675–686.
- Creswell, J.W. (2008). Research Design: Qualitative, Quantitative and Mixed Methods Approaches. (Third Edition). California: SAGE Publications.
- Creswell, J.W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches. (Fourth Edition). California: SAGE Publications.
- Dingsøyr, T., Nerur, S., Balijepally, V., & Brede Moe, N. (2012). A decade of agile methodologies: Towards explaining agile software development. Ac.els-cdn.com. Retrieved 13 April 2018, from <http://ac.els-cdn.com>

- Drury-Grogan, M. L. (2014). Performance on agile teams: Relating iteration objectives and critical decisions to project management success factors.
- Frye, C. (2009) 'Can traditional project management and agile development coexist?' Software Quality News, 18 Feb 2009.
- Ghilic-Micu, B., Mircea, M. and Stoica, M. (2013). Software development: Agile vs. traditional. *Informatica economica*, [online] Volume 17(4), pp.70. Available at: <http://www.revistaie.ase.ro>
- Gray, C.F. and Larson E.W. (2000). Project Management: The managerial Process. (International Edition). Singapore: McGraw-Hill.
- Greer, M (2001). The Project Manager's Partner: A Step-by-Step Guide to Project Management, HRD Press, Amherst, USA.
- Highsmith, J. A. (2002). Agile software development ecosystems (Vol. 13). Addison-Wesley Professional.
- Karlsen, J, Andersen, J, Birkely, L, & Ødegård, E 2005, 'WHAT CHARACTERIZES SUCCESSFUL IT PROJECTS', *International Journal Of Information Technology & Decision Making*, 4, 4, pp. 525-540, Business Source Complete.
- K. Beck, and C. Andres, *Extreme Programming Explained: Embrace Change* (2nd Edition), Addison- Wesley, Boston, 2012.
- Kerzner, H (2009), *Project Management, A Systems Approach to Planning, Scheduling, and Controlling*, 10th ed ,John Wiley & Sons, Inc
- Kerzner Harold, (2001). *Project Management: A System to Planning, Scheduling and Controlling*, 7th Edition , John Wiley & Sons
- Kilkelly, E., 2008. Blended Learning: Pathways to Effective Project Management. *Development and learning organizations: an International Journal*, 23 (1), pp. 19-21.
- Kothari, C.R. (2004). *Research Methodology: Methods and Techniques*. (Second Revised Edition). New Delhi: New Age International.
- Lewis James P. (2007) *Fundamentals of project management*, 3rd edition, AMACOM, a division of American Management Association, New York, USA.
- Lewis P.L. (2002) *Fundamentals of Project Management: Developing Core Competencies to help outperform the competition*: USA.
- Lucas Layman.,Williams and Cunningham (2006) *Fraunhofer Institute, co-advised by Robert St. Amant) Information Needs of Developers for Program Comprehension*

- Mills, Karen, and Brayden McCarthy (2016) “The State of Small Business Lending: Innovation and Technology and the Implications for Regulation,” Harvard Business Working Paper.
- Morris, R.A., Sember, B.M., 2008. Project Management That Works: Real-World Advice on Communicating, Problem-Solving, and Things You Need to Know to Get the Job Done.
- National Bank of Ethiopia, Directive (FIS-01-2012), retrieved from: <http://www.nbe.et.com>
- PMBOK (2000) A guide to Project Management Body of Knowledge, project management Institute, Newton square Pennsylvania, USA.
- Richardson, G.L. (2015). Project Management Theory and Practice (Second Edition). CRC Press Taylor and Francis Group.
- Robert K. Yin, 2012. Applications of Case Study Research by Robert K (Sage Publication,2012).
- Roberts, A. and Wallace, W. (2004), Project Management, Pearson Education Limited
- Sanjiv Augustine. (2005), Managing Agile Projects, Prentice Hall PTR May 12, 2005
- Shenhar, A.J., Dvir, D., 2007. Reinventing Project Management: The Diamond Approach To Successful Growth And Innovation, 1st ed. Harvard Business School Press.
- Sommer, A. F., Hedegaard, C., Dukovska-Popovska, I., & Steger-Jensen, K. (2015). Improved product development performance through Agile/Stage-gate hybrids: The next-generation stage-gate process, 58(1), 34-44.
- Špundak, M 2014, 'Mixed Agile/Traditional Project Management Methodology – Reality or Illusion?', Procedia - Social And Behavioral Sciences, 119, Selected papers from the 27th IPMA, World Congress, Dubrovnik, Croatia, 2013, pp. 939-948.
- Stoica, M., Mircea, M. & Ghilic-Micu, B. (2013): Software Development: Agile vs. Traditional. Informatica Economică. Vol 17, No 4/2013, pages 64-76.
- Turner, R., Bredillet, C., 2009. Perspectives on Projects. Taylor & Francis. WCED, 1987. Our Common Future. Oxford University Press, Oxford.
- Thierry Mbah Mbelli¹ and Jainesh Jaintylal Hira (2010): DaKM, PDCTA, NeCoM - 2016 pp. 219–227.
- Williams, L. & Cockburn, A. (2003, June). Agile software development: It’s about feedback and change. IEEE Computer, 36(6), 39-43.
- Wysocki, R (2014), Effective Project Management, Traditional, Agile, Extreme, 7thEd., PhD, John Wiley & Sons, Inc
- Yu, X., and Petter, S. (2014). “Understanding agile software development practices using shared mental models theory.” Information & Software Technology 56 (8), 911–921.

Appendixes

Appendix-1

Agile principles

This appendix contains the principles behind the Agile Manifesto, which expands on the core values of agile software development.

Principles behind the Agile Manifesto

We follow these principles:

- ✓ Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- ✓ Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- ✓ Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- ✓ Business people and developers must work together daily throughout the project.
- ✓ Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
- ✓ The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- ✓ Working software is the primary measure of progress.
- ✓ Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- ✓ Continuous attention to technical excellence and good design enhances agility.
- ✓ Simplicity - the art of maximizing the amount of work not done - is essential.
- ✓ The best artifacts i.e. architectures, requirements, and designs emerge from self-organizing teams.
- ✓ At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Source: (Beck et al. 2001)

Appendix-2
Questionnaire for M-Birr project team
Addis Ababa University
School of Commerce
Project Management Program

Dear respondents,

This questionnaire is prepared by a graduate student of Addis Ababa University, School of Commerce to identify and assess the outcomes of agile methods applications as a project management approach of software development process in M-Birr at Addis Ababa. It is designed to collect information about your experience with agile methods and practices **related to your role in the company as a project team**. Your response to the items of this questionnaire will be used to analyze the existing agile practices and its result on the project performance improvement and its management process.

I hope you will be able to take some time and carefully complete this questionnaire. You are kindly requested to fill the questionnaire as frank and reasonable as possible. You don't need to mention your name and also you are assured that responses for these questions remain confidential and used for academic purpose only.

Thank you in advance for your cooperation!

General information

The following questions will not be used for identification purposes. Participant ID: _____

Just tick in a check box  ☒

1. **Gender:** Male ☐ Female ☐
2. **Your age:** Under 25 ☐ 25 to 35 ☐ 36 to 45 ☐ Over 45 ☐
3. **Educational status:** Diploma graduate ☐ Post graduate ☐
Bachelor Degree ☐ PhD graduate ☐
4. **How long have you been working in the company? (Yrs)**
0-2 years ☐ 3-5 years ☐ 6-10 years ☐ over 10 years ☐

5. **How would you best describe your current role in the project team?**

6. Have you had any experience with agile methodology or have taken training on Agile at M-Birr or elsewhere? Yes ☐ No ☐

Part one, Instruction

Please complete the following questionnaire with specific regard to the Agile software project management approach in your company. These questions have a 5-point Likert scales ranging from strongly disagree to strongly agree.

Please indicate your response by ticking on the appropriate box among option that best describes your experience on the agile methods with your project endeavor.

1. SD: **Strongly Disagree** 3. N: **Neutral** 5. SA: **Strongly Agree**
2. D: **Disagree** 4. A: **Agree**

Tick on your response  ☒

No	1. Please signify your agreement level with the following questions about agile approach in your company	SD	D	N	A	SA
		1	2	3	4	5
1.	IT project management method needs to be less formalized to be able to respond more quickly to changing requirements.					
2.	Agile methods serve an important purpose in our project.					
3.	Agile accommodates change in requirements at any stage of development to ensure that the final product is refined.					
4.	Best practices of Agile are adopted in our company.					
5.	In agile method, the technical skill and know-how of participant customers can affect the success of a project.					
6.	Prior organizational culture determines the effectiveness of Agile.					
7.	Agile method improves engineering discipline and self-organizing teamwork in our project.					
8.	It is important that IT projects should deliver the right product timely.					
9.	Agile method reduces project risk as compared to traditional waterfall method.					
10.	The challenges in applying Agile methods in the context of our project were within the control of my ability.					
11.	Agile approach increases team morale/motivation.					
12.	The agile method can help a company achieve its project objective.					

Part Two, Put a **CROSS (x)** sign in the appropriate box for the following yes or no questions

2. Have you been involved in any of the following experience in your company?	YES 1	NO 2
<u>Objective one and two</u> Assessing effectiveness of agile approach in the company and identifying the project team attitude		
1) Is working with agile principles challenging?	☐	☐
2) Should the company introduce other methods than agile?	☐	☐
3) Do agile methods attract interest of project team to work with?	☐	☐
4) Should agile methods be considered as a best working approach for IT projects?	☐	☐
5) Do the project teams overlook the benefits of Agile in their day to day activities?	☐	☐
<u>Objective Three and four</u> Identifying gaps and its possible causes in applying agile and drawing experiential lessons learned		
6) Do agile methods improve project management processes?	☐	☐
7) Do agile methods enhance ability to manage changing priorities?	☐	☐
8) Do agile methods keep individuals motivated throughout the project?	☐	☐
9) Is agile method effective for face-to-face communication of project team?	☐	☐
10) Is there a strong customer collaboration and commitment in your project case?	☐	☐

Note: Here you evaluate the questions in line with agile manifesto contribution to the agile project triangle from three key project perspectives that are value, quality and constraints.

1. **Value-** for the customer in terms of a released product or deliverable.
2. **Quality-** for the project in terms of continuous delivery of high quality and adaptive products.
3. **Constraints-** the traditional time and cost excluding scope for this purpose.

<u>Part three,</u> 3. How would you evaluate the following questions regarding the value given in adopting the agile manifesto in your project experience and agile triangle? Put a CROSS (x) sign in the appropriate box	Value		Quality		Constraints Time & cost	
	1	2	1	2	1	2
	High	Low	Good	Poor	Increase	Decrease
1. Responding to change over following a plan						
2. Customer collaboration over contract negotiations						
3. Individuals and interactions over processes and tools						
4. Working software over comprehensive documentation						

Part four, Instruction

Please complete the following questionnaire with specific regard to the agile principles for software project management approach. In this section 12 questions are designed to investigate the frequency and types of activities in line with the agile principles. These questions have a 5-point Likert scale ranging from never to always to indicate how often you practice the principles in your project environment. Please tick the option that best describes your response.

1. **Never**

2. **Seldom**

3. **Sometimes**

4. **Often**

5. **Always**

Tick on your response  ☒

No	4. Please signify your agreement level with the following questions about agile approach In your project:	Never	Seldom	Sometimes	Often	Always
		1	2	3	4	5
1.	The highest priority is given to satisfy the customer through early delivery of valuable deliverables					
2.	The company is ready to welcome changing requirements, even late in development stage.					
3.	The company delivers working deliverables frequently with a shorter timescale.					
4.	The customers and the project team work together closely throughout the project.					
5.	The company provides motivating and supporting environment, and trusts the team to get the job done.					
6.	The project team considers face-to-face conversation as most efficient and effective method of conveying information within a project team.					
7.	Working product is the primary measure of progress in our project.					
8.	Agile methods promote sustainable project management processes to maintain a constant pace with the market.					
9.	Continuous attention is given to technical excellence to enhance agility.					
10.	Project simplicity maximizes the amount of work done.					
11.	The best artifacts emerge from self-organizing teams.					
12.	At regular intervals, the project team reflects on how to become more effective, and then adjusts its behavior accordingly.					

Appendix-3
Questionnaire for project stakeholders
Addis Ababa University
School of Commerce
Project Management Program

Dear respondents,

This questionnaire is prepared by a graduate student of Addis Ababa University, School of Commerce to identify and assess the outcomes of agile methods applications as a project management approach of software development process in M-Birr at Addis Ababa. It is designed to collect information about your experience with agile methods and practices **related to your role in the company as a project stakeholder representative**. Your response to the items of this questionnaire will be used to analyze the existing agile practices and its result on the project performance improvement and its management process.

I hope you will be able to take some time and carefully complete this questionnaire. You are kindly requested to fill the questionnaire as frank and reasonable as possible. You don't need to mention your name and also you are assured that responses for these questions remain confidential and used for academic purpose only.

Thank you in advance for your cooperation!

General information

The following questions will not be used for identification purposes. Participant ID: _____

Just tick in a check box  ☒

1. **Gender:** Male ☐ Female ☐
2. **Your age:** Under 25 ☐ 25 to 35 ☐ 36 to 45 ☐ Over 45 ☐
3. **Educational status:** Diploma graduate ☐ Post graduate ☐
Bachelor Degree ☐ PhD graduate ☐

4. **How long have you been working in the company? (Yrs)**

0-2 years ☐ 3-5 years ☐ 6-10 years ☐ over 10 years ☐

5. **How would you best describe your current role in the project team?**

6. Have you had any experience with agile methodology or have taken training on Agile at M-Birr or elsewhere? Yes ☐ No ☐

Closed and open-ended questions for the project stakeholders

This section of questionnaire is designed to collect information from the five key M-Birr stakeholder namely: Amhara Credit and Savings Institution S.C (ACSI), Addis Credit and Savings Institution S.C (ADCSI), Dedebeit Credit and Savings Institution S.C (DECSI), Oromia Credit and Savings S.C (OCSSCO), and OMO Microfinance S.C (OMO). The representatives of these organizations who are working closely with M-Birr whose experiences with agile practices are important for a conclusion and recommendation of the study.

After you read the following questions carefully; then indicate your point of view in the scale provided for each question that best describe your response. Tick the check box  ☒

1. Indicate the organization that you represent?

ACSI

☐

ADCSI

☐

DECSI

☐

OCSSCO

☐

OMO

☐

2. How have M-Birr agile approaches affected your organization's overall performance?

Much lower

☐

Lower

☐

No change

☐

Higher

☐

Much higher

☐

3. How have agile approaches affected the cost of your project development with M-Birr?

Much increased

☐

Increased

☐

No change

☐

Decreased

☐

Much decreased

☐

4. How well does your business strategy meet your expectations in regard to M-Birr Agile methods?

Fails to Meet

☐

Almost Meet

☐

Meet

☐

Exceed

☐

Greatly Exceed

☐

What do you think the reasons for that?

5. What would be the possible consequence, if M-Birr doesn't adopt agile for the project?

6. Are there any bottleneck activities in the way your representatives interact with M-Birr project team in line with its organizational culture?

Please write any further comments overleaf