



# Role of Agile Methodology in Software Development

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*Abstract: “Change is inevitable, growth is optional” said by a John C. Maxwell and in software engineering this sentence exists very truly. In last decades, remarkable progress has been done and Agile Software Development is the result of that changing environmental needs and efforts of researchers to overcome the traditional model of software development. Agile development is modern approach which deals with rapid delivery of quality software and full involvement of customers, so the requirement of customer can be fulfilled and achieve the goals. This review paper include different approaches of agile and risk management in agile.*

*Keywords: Agile software development; Extreme Programming; Scrum; Feature Driven Development; limitation of agile*

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## I. Introduction

In classical software development process all the requirements are complete and implemented in order to develop the software, but this is not the scenario of today day’s software development. In modern competitive era changes are frequent to any software product or module which is under development, due to market competitions priority of requirement changes frequently and only specific development is done which is urgently required and then later on changes and improvement comes into the picture for the rest developed modules. So the classical process models are not compatible with these kinds of changes and there agile methodology comes into the picture.

This paper will focus on what is agile software development, what are the various techniques/method implementing agile methodology and limitations of agile.

## II. Agile Software Development (ASD)

Before defining ASD, a quick look to its origin and background must be taken which gives the answer of questions like what is agile, from where it comes from and principles of agile.

### A. Agile Manifesto

In 2001, Agile Manifesto emerged from the meeting and signed by the entire seventeen participants. The manifesto declares:

“We are uncovering better ways of developing software by doing it and helping others to do it [2], [8].” The manifesto details four core values for high performance are as follow:

- i. *Individuals and Interactions over Processes and Tools:* To achieve high performance no communication gap should exist which helps to team to perform better than industry average. So, agile methodology seeks to increase communication and collaboration through inspect-and-adapt cycle.
- ii. *Working Software over Comprehensive Documentation:* The agile manifesto stress delivering small pieces of working software to the customer at set of intervals.
- iii. *Customer Collaboration over Contract Negotiation:* It is done by direct involvement of customer in the software development process which leads to success.
- iv. *Responding to change over following a plan:* Agile methodology has criteria of built-in process to change their plans based on feedback from customer at regular intervals.

### B. Principles of agile manifesto[9], [1]

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

Agile means “moving quickly “or “flexible”, as the meaning it also work like that. In other words, agile development is a modern approach which deals with inspection, monitoring, and self organization, rapid delivery of quality software and approaches to customer needs with company goals. Agile software development is described as iterative and incremental because all phases are revisited throughout the life cycle.

### III. Working of Agile Methodology

The model of agile is illustrated in following fig.1:

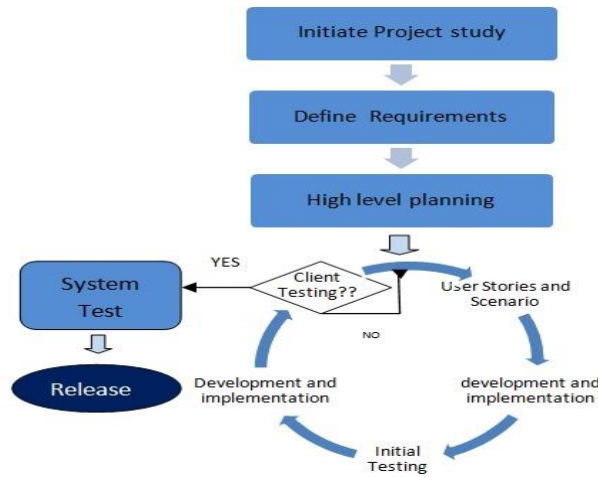


Fig. 1 Phases of Agile methodology

### IV. Agile Methods

Many studies have been conducted on agile methods. In this review paper four agile methods are discussed as below:

#### A. Extreme Programming (XP)

Extreme programming is a lightweight development methodology. It is successful because it stressed on customer satisfaction rather than delivery time of product. Extreme Programming emphasizes team work and implements a simple, but adequate way to enable group work style development. The XP (extreme programming) team not only included developers, also managers and customers as equal part of team which work together and deliver high quality product.

Five principles of XP are : Simplicity, communication, feedback, courage and quality work of team. But, Extreme Programming(XP) is not suitable for distributed teams. XP support collaborative code ownership i.e. no module is owned by a single person and that is the advantage of XP because it speed up the development process and also helps in detecting errors and faults at coding phase which improve the effectiveness of software. Working of XP is shown in fig 2.

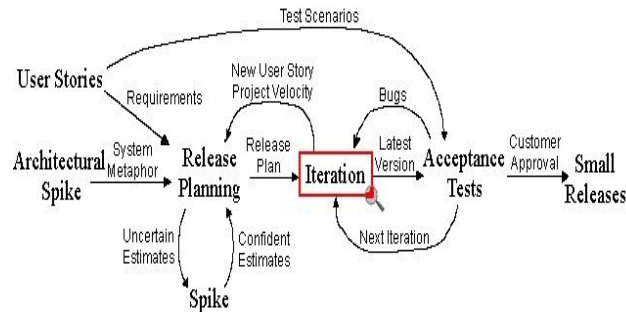


Fig. 2 Extreme Programming Methodology[7]

### B. Scrum

Scrum is another lightweight method for the development of software. Scrum is unique because it introduced the idea of practical experience rather than theories that is known as “empirical process control”. In Scrum, projects are divided into compact work sections, known as sprints, which are typically one to three weeks in duration. At the end of each sprint, stakeholders and team members meet to estimate the progress and make plan for its next steps.

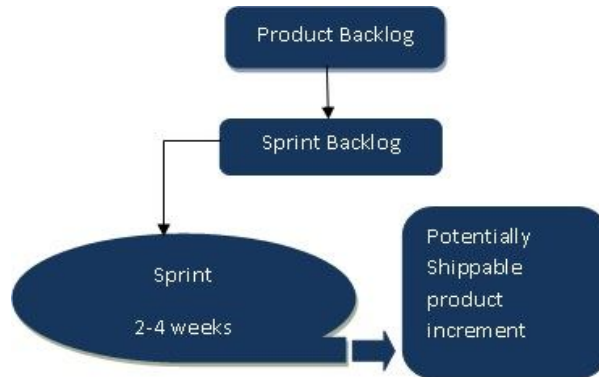


Fig. 3 Scrum Methodology

Scrum has three roles product owner who is responsible for communicating the vision of the product to development team and also represents the customer’s interest through requirements and prioritization; scrum master who acts as a facilitator for the product owners and team; team member they are responsible for completing work and team consist of seven cross- functional members. Phases of scrum methodology are illustrated in fig 3.

### C. Feature Driven Development

As name implies, feature referred to describing a small piece of valuable functionality Feature Driven Development (FDD) is a model- driven software development process tailored to the delivery of frequent, tangible and working results. It is an iterative process intended for use by large teams working on a project as illustrated in following fig 4:

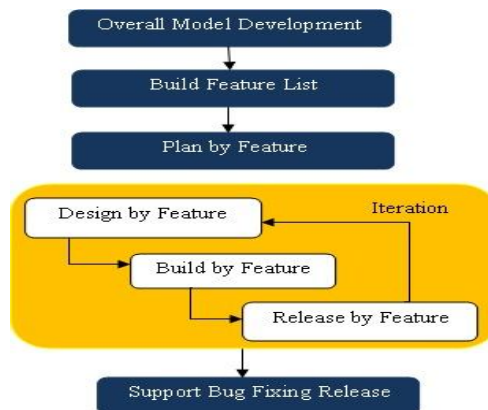


Fig. 4 FDD Methodology

## V. Limitations of Agile Methodology

With the birth of any new methodology, limitations also tag along and agile is no exception. There are some limitations to implement agile methodology. These are:

- Agile methodology is not perfect solution for green- field engineering.
- Due to less documentation agile is not suitable for maintenance purpose.
- According to agile manifesto, involvement of customer is very high, which makes success of project dependent upon user cooperation and communication.
- Agile focus on custom or specific problem solution not on general solutions.
- Agile methodology is rapidly used by companies and solves specific problems after that much effort software is not reusable.

### Conclusion

In this review paper we describe our analysis of agile methodology and their different methods or techniques which implement agile. The objective of this study is to understand the characteristics and limitations during implementation of agile methodology.

### References

- [1] Kaushal Pathak, Anju Saha, “*Review of Agile software Development Methodology*”, Volume No. 3, 2<sup>nd</sup> February, 2013
- [2] Ville Ylimannela, “*A Model For Risk Management In Agile Software Development*”, 2011
- [3] Tobin J. Lehman, Akhilesh Sharma, “*Software Development as a Service: Agile Experiences*”, 2011 Annual SRII Global Conference
- [4] Malik Hneif, Siew Hock Ow, “*Review Of Agile Methodologies In Software Development*”, Volume No. 1, 1<sup>st</sup> October, 2009
- [5] Naresh Kumar Nagwani, Pradeep Singh, “*An Agile Methodology Based Model for ChangeOriented Software Engineering*”, International Journal of Recent Trends in Engineering, Vol 1, No. 1, May 2009
- [6] Andrew Begel, Nachiappan Nagappan, Microsoft Res., Redmond, “*Usage and Perceptions of Agile Software Development in an Industrial Context: An Exploratory Study*”, Empirical Software Engineering and Measurement, 2007. ESEM 2007.
- [7] Extreme Programming: A Gentle Introduction, last confirmed 010903, <http://www.extremeprogramming.org/map/project.html>
- [8] Beck, Kent; et al. (2001), “*Manifesto for Agile Software Development*”, Agile Alliance. Retrieved 14 June 2010.
- [9] Beck, Kent; et al. (2001), “*Principles behind the Agile Manifesto*”, Agile Alliance. Archived from the original on 14 June 2010. Retrieved 6 June 2010.