

Comparative Study of Project Management Methodologies

Mr. Mohammad Moiz Sheikh¹, Ms. Varada Bhongle², Prof. Tushar Bhambre³

^{1,2}Dept of Project and Construction Management

^{1,2}MITCOM, MIT ADT University, Pune, Maharashtra

Abstract- when the project completed with specified cost & time, according to specifications, then the project is called successful project. For the success of any project, Project managers follow some guidelines and tools techniques for feasibility purpose which are called project management methodologies. These methodologies provides strong framework for constructing successful project but leaves project leads with flexibility to incorporate additional tools, processes, techniques and assets to be successful. This paper discussed various methodologies such as Agile, Waterfall, Lean, Six sigma, etc. By using these methodologies Project managers make their project manageable smooth and effective.

Keywords- Project Management, methodology, Organisational Structure, management approaches.

I. INTRODUCTION

A project management methodology is a collection of principles and practices that pilot you in organizing your projects to ensure their optimum performance. There are approximately 8462 project management methodologies. With so many project management methodologies available, there are many alternatives that would work well for your project. Since projects and the organizations in which you will implement them vary greatly, the approach you option for implementation, for each project will vary. Certain organizations like Google, frequently use a hybrid of approaches and frameworks to efficiently meet the project goal. Various approaches can be integrated with others, depending on the needs of your project.

A project methodology provides project team members with a set of standards to start and manage any project. A methodology provides guidelines, definition and templates for project management activities needed to deliver successful project and it sets common ground for all projects within an organization.

Choosing an approach that works best for the project, the organization, and the team takes time and practice. We

studied some of the most popular project management methodologies.

II. VARIOUS PM METHODOLOGIES

A. AGILE

Agile project management methodology was introduced to the world in 2001 in the USA. At a resort in the Wasatch Mountains of Utah, 17-18 self-proclaimed organizational anarchists assembled and combined various light weight processes to create **Agile Manifesto**. The founders of agile methodology intended it to be a set of values and set of principles that would improve and transform current software development processes, but companies from various industries quickly explored the value of Agile, too. Soon, Agile was considered and adopted across all fields globally.

Agile consist of short phases of collaborative, iterative work and often testing and consistently-implemented improvements. Various phases and tasks occur at the same time as others. In projects which uses agile methodology, teams own responsibility for managing their work. Scrum and Kanban tool are examples of agile frameworks, which are particular development approaches based on the agile philosophy.

Benefits of Agile

- It increases flexibility and helps teams to easily adapt to changes.
- Increases number of collaboration and feedback.
- Quick deployment of solution.
- Quicker project turnaround time.

A. waterfall

Waterfall is a conventional methodology in which tasks and phases are included in a, sequential and linear manner and each stage of the project should be finished before the next stage begins. The project manager is liable for prioritizing and assigning tasks to team members. In Waterfall methodology, the criteria used to measure quality is clearly defined at the beginning of the project.

Stages of Waterfall

The Waterfall method follows a chronological process and works based on fixed dates, requirements, and outcomes. By using this method, the individual execution teams aren't required to be in regular communication and, unless specific integration are required, are usually self-contained. Team members also need to work independently and aren't expected to provide status report as often as with the agile methodology. Usually, one phase does not begin until the previous one is finished.

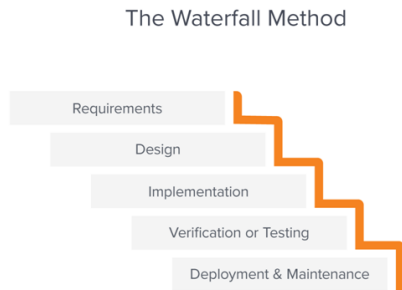


Fig. 1 Stages of waterfall methodology

Benefits of Waterfall

- Focused on structured organization
- Allows for errorless cost estimation
- Changes can be executed in early design phases
- Suitable for project where start date and end date is stated.

B. lean

Lean project management was developed by Toyota and it is a great methodology for manufacturing Industry. In fact, it's also called lean manufacturing, but it has been adopted by construction and education industries, among others in the manufacturing and countless start-up's and software development firms looking to drive products focused on the end-user.

Lean uses the 5S quality tool to remove eight areas of waste, save money, improve quality, and streamline processes. Lean methodologies state that you can do more with less by addressing dysfunctions that generate waste. Lean uses a Kanban scheduling system to manage production.



Fig. 2 5S Quality tool

Benefits of lean

- Minimize process waste
- Good project visibility at team level
- It reduces lead time
- It helps to increase employee morale

C. six sigma

It is introduced by engineers working at Motorola in the mid-1980s, Six Sigma works to enhance quality by identifying what is not working in the project. It focuses on quality management, including empirical statistics, and employs personnel who are specialists in these disciplines. There is also a Lean Six Sigma that adds lean methodology to remove waste

Six Sigma helps reducing variations by ensuring that quality processes are followed every time. This method follows a process-improvement approach called DMAIC, which stands for define, measure, analyze, improve, and control. This method works best in larger organizations. Even companies with a few hundred employees are too small to take advantage of its benefits. A certification is necessary to practice this methodology.

Benefits of Six Sigma

- Improve business operations and sustain quality improvement
- It minimizes companies lawful risk.
- This methodology is Compatible with any industry
- It Helps to grow managerial and leadership ability

D. Lean-six sigma

As a project manager has versatility to choose from various approaches, he/she can also combine two different methodologies. The prime example is Lean six sigma.

Lean Six Sigma is a fusion of two parent approaches, Lean and Six Sigma approaches. It is used in projects that aim to save money, improve quality, and move through processes quickly. Lean Six Sigma is also best possible for solving complex or high-risk problems. The 5S organization framework, the DMAIC process, and the use of Kanban boards are all components of this methodology.

Lean streamlines operations while Six Sigma reduces variation in products by building in quality from the beginning and inspecting products to ensure quality standards are met. You may find that any of these two methods or using them both together can improve the efficiency of your projects.

- It provides Better innovation
- It gives Stronger competitive stance
- Increased workflow productivity and boosts morale
- superior for improving current process and solving high risk problems

Table 2 SWOT Analysis for PM Methodologies.

	Agile	Waterfall	Lean	Six sigma	Lean Six Sigma
Strengths	Iterative approaches to corporate strategy Low Development costs	Suitable for geographically separated project teams It is easier to predict risks and costs	Minimizes process wastage Absolute financial transparency	Focused on consumers requirement Quality management refinement	Quality processes and procedures Eliminates waste
Weakness	Expensive to implement initially. Lack of management devotion	It needs steady requirements It carries unreasonable risk potential	Need owner's leadership and proficiency Higher commencing cost.	Delayed decision making process Delay in product design	Difficult for implementing. Not flexible kind of methodology
Opportunities	Regular customer assessment Proficient human resource	Beneficial in betterment of future projects Helpful for designing similar projects	Huge market potential It can use existing distribution channel	Enhance learning abilities Collaborative involvement of teams.	Good for manufacturing units Great market demand
Threats	Lack of person to person communication & Training	It is a hardware oriented model, & self-restricted..	Cheaper substitute in the market Can be effortlessly copied	Requires extra time for execution High implementation cost.	Loss of transparency Lack of regular training

III. CONCLUSIONS

By comparing and using project management methodologies we found out that it serves various purposes like reducing manufacturing time, reducing defects, increasing profit and also provides better visibility of ongoing project. These methodologies are very helpful in streamlining the processes and reducing legal as well as management risks.

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