

Hybrid Project Management Methodology: A New Way of Success to Deliver Projects Efficiently

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Abstract— Project Methodology is a set of processes or instructions that shall be used for managing a project. The choice of methodology helps to define the framework to get the desired output from a project at a successful rate. The choice of methodology purely depends on the scope, industry, and type. The project methodologies play a vital role in the success as they help to deliver higher value in terms of performance which can be in terms of cost, time, quality, or many other factors that define the project's success.

The PMBOK describes clearly traditional and agile frameworks. With the trend of the growing world towards Agile, there exist two sides, and the need is to somehow combine both to have advantages of both. The paper proposes an approach of combining both and implementing a Hybrid Project management methodology that is not industry specific (HW, SW, Service, Automobile, etc.) and can be used for all types of projects like NPD, RD projects, SW projects, VALVE projects, Customer projects, etc. This can be used to deliver projects more efficiently by overcoming the shorting of the existing project methodologies used individually.

Index Terms—Project Methodology, PMBOK, Agile, Hybrid methodology, all types of projects, efficiently.

I. INTRODUCTION

Project management has been evolving and it would be seen completely differently in the coming years. It was often seen in the industry that the projects were delayed and over budgeted. The few main reasons for these were the robustness of the waterfall methodology and lack of project management. This gave a sudden highlight to Agile which had an iterative approach that allows change every sprint. [1]

PMI which developed PMBOK defines project management as Project management is the discipline of initiating, planning, executing, controlling, and closing the work of a team to achieve specific goals and meet specific success criteria. It is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements [2].

The term "agile" was created when a group of software experts met together in February 2001 resulting in the agreement of the Agile manifest" which are set of principles. This was soon offered as an alternative to the waterfall methodology. It had all concepts of lean and making process flexible which was considered to be the main drawback of the waterfall. It focused on having a working product over strong documentation [3]. The agile environment promotes iterations, working software, customer collaboration, and adaptability [4].

The current project management focuses on efficiency by meeting project goals within a defined time, scope, and budget. However, with the change in the business environment, there is a need to make project management strategic and powerful to beat global competition [5].

The research was conducted amongst 25 Project managers from different industries including Hardware, Software, Service, and Manufacturing to find what methodologies they use and project success rates were calculated considering on-time delivery, within budget, and desired quality. Scrum representing Agile and PMBOK representing the traditional approach is used in the discussion and ways to have smooth integration are suggested. The paper proposes the result of how hybrid approaches help in integrating different project management methodologies.

It's often seen that various project management tools and frameworks are used in the industry. Each of these has some pros and cons resulting in a lower success rate of the projects. The research paper discusses the focus on developing a hybrid project methodology that can be used across various industries like automobiles; SW, services, etc., and project types classified as NPD, RD projects, SW projects, VAVE projects, Customer projects, etc.

II. COMMON PROJECT MANAGEMENT APPROACHES

A. Agile Project Management

Usually, Agile deals with short-term SW projects and requires less planning. Nevertheless, it's now used widely as per the Scrum guide for HW as well as Manufacturing projects. The product development life cycle includes the following phases 1. Requirements gathering, 2. Analysis, 3. Design, 4. Coding, 5. Testing, 6. Maintenance. Agile usually talks about the involvement of the customer and completing the feedback cycle to avoid risks. Agile is an iterative process, hence changes or new features can be added easily as

per customer demand [6]

Agile is an umbrella which had various methodologies like Extreme Programming (XP), Scrum, Dynamic System Development (DSDM), Feature Driven Development (FDD), Adaptive Software Development (ASD), Crystal methodologies, etc. Forrester state of the agile development report, the most practiced agile methodology by teams was Scrum (85%) [7].

Nevertheless, there is a lack of documentation on how to amplify the strengths of both methodologies and have a strong framework.

B. Scrum Framework of Project Management

The Scrum framework deals with the project in an incremental way called sprints which are defined boundaries of time usually 1-4 weeks. The Scrum framework consists of 3-5-3 i.e., 3 roles, 5 artifacts, and 3 ceremonies. [8][9]

Scrum talks only about 3 roles i.e., Development team, Product Owner, and Scrum Master. All the roles and responsibilities including management of the project are divided amongst them. The 5 ceremonies include sprint planning, backlog refinement, sprint review, sprint retrospective, and daily stand-ups. Each sprint starts with sprint planning and the team meet daily for 15 min during stand-ups to discuss if there are any blockers and if the team needs to swarm on the sprint goal. At the end of the sprint, the development team presents the product owner if they could meet the sprint goal followed by a retrospective with a major outcome as Kiazen which is the first thing to improve in the next sprint. The 3 artifacts include product backlog, sprint backlog, and making things visible. Every sprint, teams meet along with the Scrum master and Product owner to groom the backlog and prioritize the project deliverables [10]

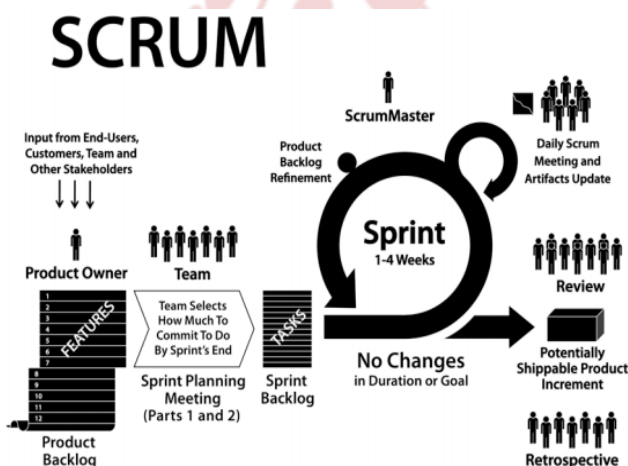


Figure 1. Scrum development cycle

C. Traditional Project Management

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D. Waterfall Project management concerning PMBOK Guide 6th Edition

Various editions of the PMBOK were released with the first in 1996 and the latest in 2017. PMBOK shows how process groups interact with each other and the relations between them. The major process groups include

- Initiating
- Planning
- Executing
- Monitoring and controlling
- Closing

The figure below shows the process flow as per the PMBOK 6

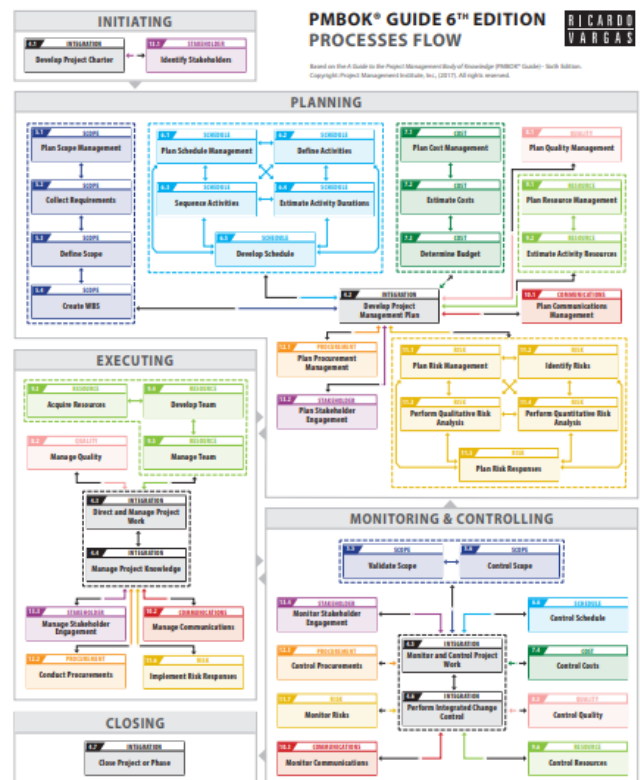


Figure 2. Project process groups and flow

E. Initiating Process Group

Defines and authorizes the project

- Are often done externally to the project’s scope of control.
- Obtain formal authorization for the start of a new project.
- Project manager assigned
- Project boundaries do not affect funding and approval
- Many large or complex projects are divided into phases and repeating it for each subsequent phase.

F. Planning Process Group

Defining and refining the objectives, and planning the course of action required to achieve the objectives and scope of the project

- Establishes a project management plan and refines the scope, cost, and schedule of the project
- Rolling wave planning is used throughout the execution process group to update and refine it
- All imperative stakeholders are involved in this process

G. Execution Process Group

Majority of the project budget will be spent on performing Executing Process Group.

- Coordinates the use of people and other resources to implement the project management plan.
- In the course of project execution, results may require planning updates and criteria.

H. Monitoring & Controlling Process Group

The main benefit of M&E Process Groups is that the project performance is measured and analyzed at regular interval

- Monitoring the ongoing project activities against the project management plan and the project performance measurement criterion
- Eliminating factors that could circumvent change control or configuration management so that only approved changes are implemented
- Monitoring changes and recommending corrective or preventative action in advance of potential problems
- M&E Process Group not only monitors and controls the work being done within a Process Group but its role is also to monitor and controls the entire project effort

I. Closing Process Group

Formalizes acceptance of the project or phase deliverable.

- Acquire acceptance by the customer or sponsor to formally close the project or the phase
- Conduct post-project or phase-end review
- Keeping record of impacts of tailoring to any process
- Document lessons learned
- Put in appropriate updates to organizational process assets.
- Accomplish all relevant project documents in the PMIS to be used as historical data
- Close out all procurement activities
- Release project resources

III. NEED TO DEVELOP NEW APPROACH AND COMPARISON

A. Need for development of the hybrid methodology

Over some time, project management was left out of just one of the departments without considering its contribution. Nevertheless, in reality, there is only a small weightage given to this, and project management is just looked at as a department to deliver the project in 3 constraints i.e. time, scope and budget.

We see organizations talking about various frameworks like waterfall, agile, and many more and look at them as key to success. In due course, it was found that Agile was restricted to SW and service project management whereas Waterfall was for hardware and product development projects.

Various studies have shown that each of them has its pros and cons and is successful in a given environment. Nevertheless, the project success ratios could not be excellent. In 2013, a survey on success rate done by Ambysoft's concluded that the Agile methodologies have a 64% success rate over the waterfall with 49% [13]

The challenge in the competitive market and industries around is to find an approach that brings them success with the defined framework and set of the process

The few issues today

1. Traditional mindset of 3 constraints
2. Lack of innovation
3. Low success rate of individual project methodologies
4. Testing the success of the Hybrid methodologies

B. Advantages and disadvantages of the SCRUM [14] [15] [16] [17]

Advantages

- Customer satisfaction as a response to requests and accepting change
- Quality improvement
- Better estimates in terms of story points to be on schedule
- Top features focused and hence release date not compromised
- Short sprints help in feedback loops
- Benefits customer project management and organizational project management

Disadvantages

- Less documentation
- It's a team goal and not an individual hence individual performance/contribution is missed
- Team member's focus is important
- Partial story completion or half work done is considered as not done

C. Advantages and disadvantages of the WATERFALL [14] [15] [16] [17]

Advantages

- Still widely used in many industries
- Sequential, hence easy to implement
- Historical data and facts are easily available
- Proper quality documentation followed
- Gate and checklists help to ensure quality
- Process ability increased process through standardization, measurement, and control of the project

Disadvantages

- Scope is frozen, hence the changes in the scope/requirements are difficult
- Fixed schedule and time plan makes it less adaptive and non-flexible
- High occurrence of errors, since the traditional methodology hampers the implementation of changes during the development process
- Focus is on the delivery time instead of customer satisfaction
- Extensive documentation and checklists sometimes make it just a formal page

D. Comparison between Waterfall, Scrum and Hybrid Methodologies

Comparison Factor	Waterfall	Scrum	Hybrid
Planning	In steps and dependency on each other	High level planning in sprints	Planning in MVPs broken down to sprints
			Rough planning with MVP
Completion date	Target set during planning	As project develops	Rectified and getting precise as project develops
Response to change	Only at planning	Each Sprint	Each MVP streamlined down to sprint
Team Flexibility	None	Too high Focus on T shaping	High with intention to have subject matter experts and T shaping

Comparison Factor	Waterfall	Scrum	Hybrid
Team Knowledge	Trainings at start	Over project	Shared by Subject matter experts over working time
Customer feedback	Only at Gates	planned at end of sprints	Mostly at MVPs
Customer satisfaction	Low	Medium	High
Probability of success	Low	Medium	High
Documentation	High	Low	As per the process to meet quality

IV. PROPOSED HYBRID APPROACH BY INTEGRATING THE METHODOLOGIES

With the emergence of agile methodologies, it is clear that two opposite sides exist: agile and traditional project management approaches. Traditional project management is based on linear development cycles like the waterfall model and disallows change [18]. Both agile and traditional methodologies have their strengths in various environments and different characteristics of a project. The pure use of either was not giving the results and the need to have a mixture was indicated by Project managers in industries.

Recently in 2020, a new term Scrumbanfall was discussed which integrated Scrum, Kanban, and waterfall methodologies trying to integrate all the advantages and developing the framework. The lifecycle was the combination of all the above [19].

The research was done to find if the hybrid methodology of project management can be implemented, but no strong conclusions could be drawn. It suggested that as both agile and waterfall have their advantages, the choice of the methodology has to be done carefully based on the project characteristics. The organizational characteristics have to be also considered while selecting this. The hybrid approach has its ways as it makes it highly customizable, but there is no defined framework for the same [20].

The research paper here wants to propose a hybrid lifecycle that includes the following step

Defining the project and its scope

- Breaking project to MVPs to form Project plan
- Multiple Sprints
- Backlog grooming as per MVP
- Sprint Planning
- Stand-ups (To Do, In progress, Done)

- Sprint Review
- Sprint Retrospective
- Product Release
- Project Closing

A. Defining the project and its scope

This is the most important step in any project, to begin with, and is also considered a step in the proposed hybrid methodology. This would integrate the Project initiation phase and the start of the planning phase. The stakeholders that would be involved in the phase would be the Project Manager, the Product owner of various Scrum Teams that would be involved along with the PPC and Project champion. The documents like the Project Initiation sheet and Project charter shall be signed off officially to ensure proper documentation of the project kick-off.

While defining the scope of the project, it is ok to have a big project backlog that has to be delivered over some time. The project manager is still responsible for the backlog and he has to manage the major chunk in refinements with the Product owners of different teams.

B. Breaking project to MVPs to form Project plan

Project planning would be done based on the structure of the teams and their earlier velocity patterns. The whole project shall be broken down into MVP (minimal viable product) which can be planned for every month or bi-month or quarter based on the project scope

As against the waterfall methodology of the project, an iterative method would be followed here and the backlog of MVP can fall to a backlog of the other, whereas the teams finishing earlier would pull from the backlog of the coming MVP's ensuring the acceleration

The drawback of Scrum where the date of project implementation is a challenge can be met by ensuring that the last sprint of an MVP would be the product release date. On the other hand, using the advantage of Scrum which helps the teams to accelerate faster, the chances of hitting the committed date are much higher against that would be waterfall planning.

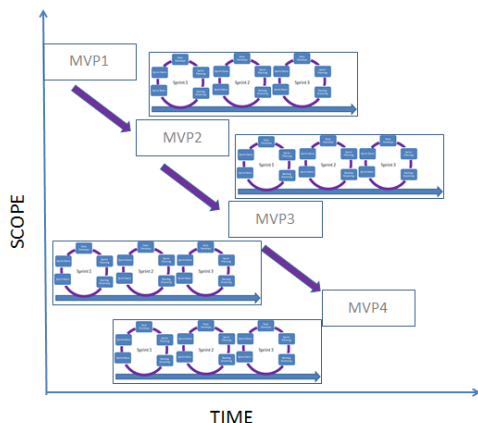


Figure 3. Project planning by Hybrid Methodology

C. Multiple Sprint

Sprint is defined as a fixed period of time (less than a month) in which a Team produces an Increment for review. The Sprint cycle would have 5 ceremonies. The proposal suggests having them iterative like in Agile. Each sprint would have Sprint Goal and multiple sprints will result in an MVP goal. Backlog grooming will be to prioritize the most important thing to be done followed in the coming Sprint. Planning helps to finalize the scope of what can be done in the sprint. A team shall daily meet for 15 min to discuss the topics and highlight impediments if any. At the end the team shall have a demo showing what was done and if the sprint goal was met. It is later followed by a Retrospective where the teams try to have a deep evaluation of them so they can do better in coming sprints.

The advantage of the hybrid methodology is that at each MVP you give your customer a real feel of the product making your project milestones tangible. The regular feedback loops help in iterations of the improvement and the chances of hitting the targeted time which is planned increases.

D. Product Release

Product release is the process of releasing the product for the customer's base in a specific market. It is part of the PR and marketing technique, which helps in getting customers. This is again an important milestone as the project SOP (start of production) is completely guided by the release of the product. Many a time companies make a product release with beta versions so the bugs and feedback can also be taken in the next sprints to improve the product. The release date is never compromised, if needed some functionalities might still help to have a competitive advantage.

E. Project Closing

These stills hold importance and very small FTE depending on the project type is left to take care of any feedback from the customer or improvements. In many types of industries, care is taken that no claims are found at this time. This is usually for 3 months to a max of 6 months and it must be ensured that the project is officially closed and no cost (FTE hrs., Development, etc.) are booked over it.

V. CHALLENGES AND FUTURE WORK

There has been some research and work done over a period of time to combine various methodologies of project management to get the outcomes, but the best fit and combination of techniques depends on the project and type of organization. The main challenge is there can be no defined framework and has to be modified for every project making it highly customizable. Another challenge here is while customization care must be taken that it is based on the defined project management process and quality is not compromised.

With the trend of inclination towards Agile, the introduction to the new framework and its acceptance needs to be validated. The paper discussed on few challenges like

- To have Hybrid project management and ensure that the advantages/disadvantages of both traditional and agile frameworks are considered
- To validate the proposed framework in various industries like HW, SW, Manufacturing, Automobile, etc.
- To develop customized processes as per the type of project and industry need.
- To develop tools or software in addition to existing ones for supporting project management.

VI. CONCLUSION

In this paper, the idea of integrating the project management framework and developing a Hybrid framework is discussed as a solution to effective project management. The framework must be chosen carefully considering the organizational environment and project characteristics, as each methodology has its advantages and disadvantages. It is possible to combine the approaches, keeping in mind the customization needed to be done.

Approach selection should be handled with care, considering both project characteristics and characteristics of the organizational environment, and it is possible to combine both approaches for a single project and within a single methodology, having in mind when it is better to use which approach.

In this paper, two project management methodologies are included: Scrum representing the agile approach and PMBOK representing the traditional approach to finding out the Hybrid fit. The approach can be implemented in 5 steps

- Defining the project and its scope
- Breaking project to MVPs to form Project plan
- Multiple Sprints
- Backlog grooming as per MVP
- Sprint Planning
- Stand-ups (To Do, In progress, Done)
- Sprint Review
- Sprint Retrospective
- Product Release
- Project Closing

The approach also provides a solution to deal with the disadvantages of the frameworks if used individually. This may help to develop a new framework over some time developing more effective and efficient project management.

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