

A study of Hybrid-Agile: Agile With Discipline at IBM

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Abstract

Agile is quickly being adopted by many companies as a replacement for traditional software development methods. Some companies continue to hold on to traditional software development practices, even as many others move to Agile. Many companies struggle with the move towards Agile, as they fear losing many of the advantages of traditional approaches. However, this can create challenges for them in today's rapidly changing competitive environment. To adapt to these changes some companies are adopting hybrid approaches. This study examines a hybrid Agile approach observed at IBM that employees refer to as Agile with discipline. Through interview conducted with IBM staff, this study examines how Agile is integrated with traditional development practices at IBM. Understanding more about these hybrid approaches can aid in developing new methods that can improve existing practices and education programs.

Keywords: Project Management, Agile, Waterfall, Hybrid

Introduction

A variety of agile practitioners believe that the agile methodology offers more benefits than the traditional software development approach. Some of those benefits incorporate flexibility, increases product quality, developer happiness, and earlier defect detection (Lannti, Salo, & Abrahamsson, 2011). This shift is seen by some as an evolution in the significance of knowledge-based work, and changes the form of management from a hierarchical to a more collective approach (Fernandez & Fernandez, 2008).

Studies demonstrate that management might see the advantages of using agile in its adaptability of embracing requirement changes, increasing in production time, and software contribution (papatheocharous & Andreou, 2013). Although agile methodology provides many benefits, its

adoption is not challenge-less for managers (B. Boehm & Turner, 2005; Nerur, Mahapatra, & Mangalaraj, 2005). Moreover, agile might not be the perfect fit specifically type of projects; for all, for the projects which have fixed requirements (McHuge, McCaffery, & Casy, 2012). To govern the challenges that businesses were facing with new development, some have developed styles hybrid project management which consolidates both traditional, and agile methodology (Binder, Aillaud, & Schili, 2014; Rahmanian. 2014).

The main purpose of this article is to contribute to the existing knowledge of hybrid Agile approaches by discussing a hybrid management approach which was witnessed during a case study at the IBM center of Excellence in Chicago, Illinois, USA. This approach consolidates the components of the waterfall approach into Agile, and it is known as Agile with discipline. This paper first demonstrates a comparison between both traditional and agile approaches. Second, it elucidates IBM's environment working with Hybrid-Agile. Then, based on the case study and interviews with IBM managers it presents the agile with discipline approach. Finally, a proposed model based on Agile with discipline will be presented.

Background

Traditional VS Agile Project Management

Project management is defined as planning, organizing, directing, and controlling of available resources for a short time of period to accomplish a specific goal(Kerner,2013). The traditional project management process is linearly structured, and it depends on hierarchical methods. In the beginning phases of a project, these methods reckon on planning, documentation and requirements analysis (Sixsmith, Freeburn, & Mooney,2014).

A variety of traditional project management (TPM) processes are seen as linear and each phase in the process waits to be feed from the previous phase (Femandz & Frenandez, 2008). For example, the initiation phase must be completed in order to the planning phase begin. In addition, a complete plan for the product will be created based on the input that comes from the initiation phase. Then, the plan becomes executed, and, finally, the project will be closed. In this approach, from the beginning of the project until the end of it any form of changes to the project are strictly controlled.

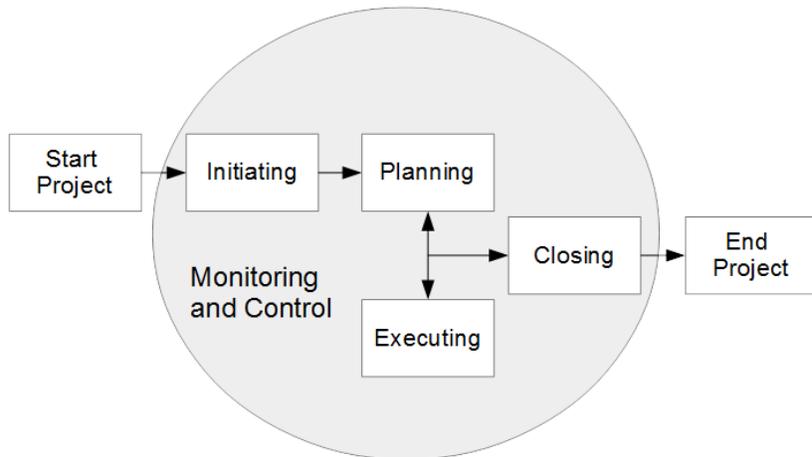


Figure 1. Traditional Project Management (TPM) Process Groups according to (Rose, 2013)

Commonly, software development practices embraced the TPM approach. These practices are plan-driven and depend on command and control (Rehman, Rauf, & Shahid 2010). For instance, one of the popular models utilized in software development management world is called the waterfall. The waterfall is a model that falls under the traditional project management framework.

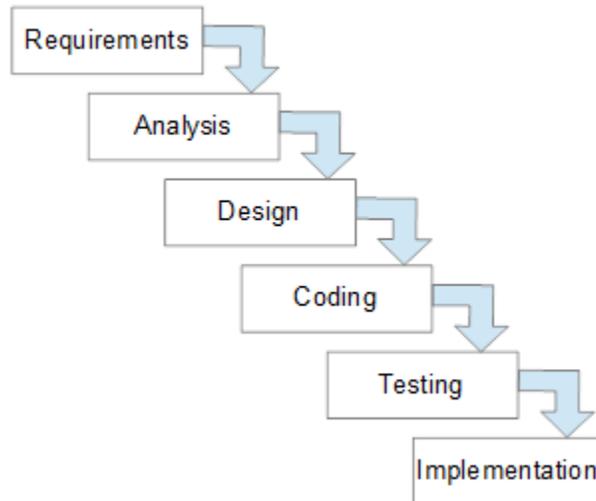


Figure 2: Waterfall development model (Royce, 1970)

Waterfall model first was defined as an approach in 1971 by Royce, and since then it is utilized for software development by various organizations. Waterfall model composed of six phases and the phases are consecutively connected from the top to the bottom like a waterfall. Each phase must be finish in order to start the next phase. Thru the end of each stage a documentation is developed (Balaji & Murugaiyan,2012). In this type of model, once the requirements gathered

and closed the complete plan will be established in which the flows of the project from the begin to end is determined. This concrete planning process can be viewed as a weakness of the model. In real world development changes in the requirements during the software development life cycle are extremely common and can introduce new problems which may not be addressed in the planning phase. Unfortunately, those unanticipated problems are not embraced by the waterfall approach (Schwaber, 1997). To address and deal with this type of problem, various project management models emerged adopted some of those models are the spiral model, v-model, iteration model, and extreme model (Munasser & Govardhan, 2010).

Because of new project management methodologies ,(TPM) models, are utilized for several years in software industry, are viewed by some as outdated (Koskela & Howell, 2002). The reason for this kind of perspectives is the inability of TPM approach in managing unstructured projects, in which the business requirements are subject to changes at any time while the project is running. Nowadays, the new business environment needs to adopt a project management methodology that has the characteristics dealing with any changes that emerge while the project is already in process. TPM lacks in dealing with unpredictable changes, and changes while the project is running, can increase the problems instead of reducing it(Williams,2005). A new mythology is introduced as alternative the TPM, and it is widely adopted by organizations called Agile.

Agile	Over	Traditional
Individuals and Interactions		Processes and Tools
Working Software		Comprehensive Documentation
Customer Collaboration		Contract Negotiation
Responding to Change		Following a Plan

Table 1: Agile manifesto summarized by (Moniruzzaman & Hossain, 2013)

Agile is an approach widely used in software development industry. It is composed of a set of principles in which iterative and incremental development is supported. To support the incremental and iterative process agile encourages a cross-functional and self-organizing team approach. Agile methodology is well known as iterative, incremental, self-organizing, and emergent (Lind et al.,2002). Agile is iterative since the development process is broken into several iterations. After completion of each iteration a small part of the product is produced rather than whole product. Teams in Agile are self-organized and have the flexibility in choosing a task to work on. One of the core difference between the TPM and Agile is the agile characteristics of having the ability to accept and handle any changes to the project even if those unanticipated changes were made at the last minute. Agile users may welcoming the changes as they think in some cases that changes can improve the product quality. Table 1 outlines some of the key components of Agile as described in the Agile manifesto and compares them to TPM (Beck et al., 2001).

Agile project leaders are leading small teams, and they have a variety of responsibilities such as encouraging the quick teamwork by creating simple rules, elaborating the roles and responsibilities, establishing communication vision for the team, and providing the needed recourse to the team to accomplish the task (Augustine et al., 2005). This framework does not contain heavy documentation, and plan heavy as TPM does; therefore, they are different.

In agile the project leader is called scrum master or team lead rather than a project manager(PM) is used in TPM approach. The scrum master or team lead is not required to perform heavy documentation (Uikey & Suman, 2012). There are several methods defined under the name Agile such as (eXtreme Programming, Scrum, Dynamic Systems Development Method, Adaptive Software Development, and Crystal). Scrum is the most utilized agile method (Moniruzzaman & Hossain, 2013; K Schwaber & Beedle, 2002). Scrum is extremely powerful in managing unstructured projects in which changes can arise in anytime while the project is running (Augustine, Payne, Sencindiver, & Woodcock, 2005).

Agile provides an environment in which the software development processes become very dynamic. Scrum is one of the Agile methods that highly utilized for managing the software development process. Scrum is iterative and incremental (Ken Schawaber,1997). In a scrum, first, a general idea about the product is discussed. Then, the ideas are broken into small pieces to form the product backlog. After that, the sprints are created and then the backlogs assigned to it. Based on sprint backlogs the product is built, and at the end of each sprint cycle, a small piece of product is delivered. In a scrum, the product backlogs are flexible in welcoming any changes that are made by stakeholders while in waterfall model once the requirement phase is closed changes are not accepted.

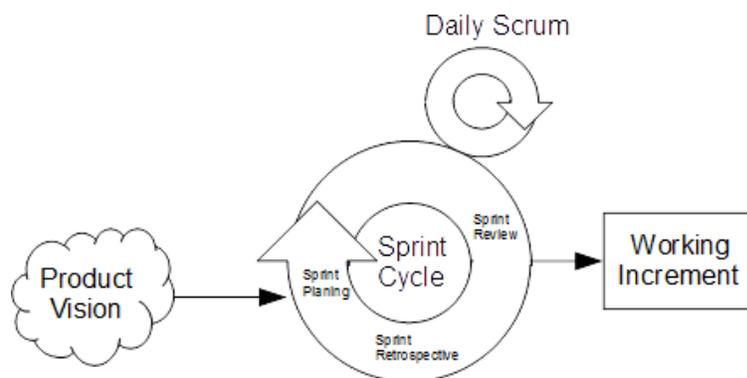


Figure 3: Modern Scrum Approach

Many organizations believe that the Agile approach can replace the traditional approach for managing projects (Lanti et al,2011). Some believe that change is needed (Nerur et al., 2005). However, theoretically, both approaches have huge differences, researchers also demonstrated the differentiation of both approaches in real practice (Sixsmith et al., 2014). Researchers also

explained approaches that consolidate both TPM and APM (Binder et al., 2014; Hass, 2007). Nonetheless, many of those approaches are either experimental or theoretical frameworks. In the next section a hybrid model, which was witnessed in practice at IBM in united states, is explained.

Research Methods

To investigate the agile methodology a group of researchers from the DePaul university started to discover the use of Agile in practice. The team visited IBM, which is one of the giant companies in the software world, and there they discovered a unique hybrid approach. To look closer to the new approach the researchers began to conduct interviews with project leaders at IBM. The main goal of this research is to understand the hybrid TPM-APM practice at IBM. In the winter of 2014, Chicago, USA at IBM's Center of Excellence, a group of researchers performed semi-structured interviews, and observations to profoundly study the approach. Semi-structured data interview techniques were used by researchers for collecting empirical data. This data was gathered from employees working at the Center of Excellence in Chicago. A permission was given to record the interviews, so all interviews were recorded except one person refused to be recorded. Five participants were interviewed. The participants were PMs, project lead, architects, or senior PMs. Four hours of interview data was collected. The size of the sample might be small for a quantitative study, but for qualitative studies such as this, the samples size is constant sufficient after insight accumulation (Guest, Bunce, & Johnson, 2000). This can emerge after the first 12 interviews. Similar answers to the questions from the participants were identified after the third interview. Moreover, the accumulated interview data from the practitioners at IBM reinforces what researchers found; hence, the number of gathered interviews are sufficient for explaining the practice.

The questions asked at the interview were as follow:

What PM methods are used in the center and what methods within IBM? Do all PMs use the same methods across the enterprise? What influences the decision of which software development method is used and thereby the PM approaches? Do PMs develop same type or same quantity of documentation regardless to the development method?

The participants revealed that IBM uses both traditional and Agile approach for their projects. The methods and tools are used for development based on the project needs. Throughout the interview, participants did not mention a particular method as their standard method rather they were discussing the Agile with discipline.

Result

During the interview, all PMs pointed to the limitation in using the traditional methodology to manage projects, but none of them were using the Agile method as it is explained in the Agile

manifesto. The PMs interviewed, actually utilized the hybrid approach. The reason is that throughout the years of providing IT/Business solutions, managing successful projects, IBM developed its own custom methodologies. The study participants used the word “Agile-with-discipline” instead of hybrid-agile. The Agile-with-discipline integrates agile development components into a structured approach to project management.

“In this approach [hybrid-agile] sufficient documentation and timelines with flexibility can accommodate requirement changes, development sprints, and continuous customer/client feedback.” – A senior PM

In the agile methodology, the role of the project manager is lessened comparing to the traditional approach. However, our study shows that project managers participated in our research are heavily engaged in leading people, unlocking resources, and supervising the project to success.

“The PM’s role does not change with managing an agile project in a delivery organization. How the PM delivers his/her solution and involves customers is what changes. The PM still owns the project, still drives the project through the completion of sprints, still goes through all of the checks and balances needed, and still gets all of the required sign-offs. The things that change are that the PM has a lot more interaction with the customers, leads daily sprint calls with the team, and scopes the projects a bit differently (i.e. delivery in smaller chunks and frequent reviews with the customer.” – A Senior PM

There are also architects, senior developers or project stakeholder that might take the position of a PM or scrum master, but only temporarily. IBM has a project manager for each project.

“I am an architect but sometimes I take the role of the scrum master on an agile project when needed.” – An Architect

Furthermore, all participating PMs during the interview indicate that they are accountable for creating a project plan in the Agile-with-discipline. Even though time, scope and the budget are unfastened, for a project to succeed it needs good organization. Moreover, PMs are accountable for delivering the required tools to the teams for completing the project tasks. SharePoint was mentioned by interviewees as their internal collaboration tool used among team members during the work on projects. However, the type of project and client preference has a strong impact on the selection of a collaboration tool for the project. The PMs are accountable for maintaining and assuring the team's communication and collaboration.

“The plans developed for agile-with-discipline projects may not be as detailed and as far thought out as a traditional project plan may be.” – A PM

Establishing project milestone and creating loose project timelines can be a part of the project plan. Commonly, payment plan or some type of success-measurement marker is stuck to the project milestone. Besides that, an important part of the PM’s plan is managing the communication. PMs are accountable for delivering the critical project related information to the team members, and they are also responsible for setting and managing the meetings.

“We have noticed that the Traditional approach to project planning doesn’t work very well. You can’t plan everything before you execute. It is impractical... So we do the best to plan some [hybrid-agile] but be ready to adapt as needed.” – Senior PM

Furthermore, strong constraints of scope, time, and budget face the PM while managing a project using a traditional project management approach. In contrast, the constraints in the Agile development process are known as the project grows. However, in hybrid processes limitations are lightly mentioned at the beginning of the project for the PM. The PM is responsible for observing the constraints and alleviating conflicts if arise to reduce customer dissatisfaction and contract violation. In addition, PM is accountable to communicate any modification and its influences on the areas to the stakeholders.

To manage the project limitations and to assure the customers are satisfied with their products, documentation becomes an essential part of Hybrid-Agile/Agile-with-disciplines methodology. PMs are responsible for documenting requirements, changes, resources use, and timeline of the project. It is possible that the requirements expand during the project life cycle, in the meanwhile, documentation becomes vital in making the product owner responsible for the project’s success, preserving track on changes in both requirements and iterations, and creating a concert project plan.

“When we start any project we at least try to get a blueprint or an initial set of requirements and what we do is internally manage a change request process...if there are changes to the original requirement, we go through the change request process to make sure the customer is aware of this particular change before we make it happen so, it’s more documented; any changes to the timeline or the budget is reflected based on the new change request.” – Senior PM

Teams at IBM usually have some of its members globally dispersed, thus, the use of documentation and collaboration is extremely vital to keep the member of the team active and push the project forward. Moreover, the PM’s management role includes document version control, broadcasting to the team, project stakeholders, and creation/collection of test scripts and design decision documents. The Formality and frequency of the documentation rely on the context of the project, such as customer stratifications and the business environments.

Regarding team establishment Agile theoretically supports self-organized team with power making decision; however, pragmatically that might be impossible for all if the teams are a part of giant corporations. Teams working inside those giant companies might face a variety of obstacles. In this kind of situations, PMs will be the link between team and organization, and they work to remove obstacles that teams face during project life cycle. One of the interviewed PM expressed an example illustrating a situation in which a team had lost one of their members and they were in need for a new member. This type of situation is usually managed by PMs since they have access to the resources that the teams might not have. The example elaborates the importance of the role that PMs have in leading team, and controlling the project

In addition, the popularity of Agile methodology has raised the demand of the approach among organizations. Companies have the desire to perceive their progress and engage more in the development of their products.

“More PMs are managing agile or agile-like projects. Interest in Agile Project Management seems to be increasing in the project management field.” – Team Lead

The study participants indicated that IBM offers a variety of resources, tools, and process (such as agile development education) to its PMs in order to fulfill customer needs for the hybrid-Agile.

Discussion

There are various criteria impacting the decision of selecting a project management approach at IBM. The PMs discuss the usefulness of agile methodology in managing unstructured projects. However, the observation showed that the agile processes were not utilized as it is described in Agile Manifesto. IBM combined the traditional and agile methodology to create a new project methodology called Hybrid-Agile approach. This approach also called Agile-with-discipline by IBM employees, and it seems to be working effectively for managing projects. In contrast with TPM unanticipated changes considered strong characteristics of the agile approach. In Agile it is not like TPM, the heavy documentation and timeline plan are not supported. Our study observed that documentation and timeline plan for the project is a part of the Hybrid-Agile approach. In addition, Changes and feedback from the stakeholders are welcomed and adjusted. Unlike the TPM, the role of PM is abated in agile. However, through our investigation we observe the importance of PMs even in Agile methodology. Our study showed that the PMs in hybrid-agile still heavily involved in leading people, unlocking resources, and supervising the project success.

In addition, our study observed that the PMs in hybrid-agile are required to establish project plan even though the budget and scope are loosely defined. PMs are responsible for ensuring that the team has the all necessary resource for finishing a task, and they are required to provide the teams with essential project information. Not all team members at IBM co-located. Thus, Documentation and collaboration are important to make the members engaged and move the project forward. Moreover, in Hybrid-Agile approach constraints are loosely defined at the beginning of the project for the PM. To control the constraints and ensure customer gratification documentation becomes a vital part of Hybrid-Agile/Agile-with-disciplines methodology.

The evolution in the software development world forced a variety of organizations to adopt and mix software management methodologies for the success of their project. Waterfall model was the leader in software companies for many years, and it was proven to be good for structured projects. However, nowadays organizations are dealing with an area in which the software

projects are unstructured and have a lot of unanticipated changes in requirements. Organizations also need to have their product out to the market in a very short time. Agile methodology seen as solution to those types of project by many project managers. However, our study showed in the case of the IBM agile was not used as an alternative to TPM but combined.

Conclusion

In conclusion, according to our study of the IBM case we observed a new approach used for software development called Hybrid-Agile or Agile with discipline. This method is a combination of both TPM and Agile. Our Study conducted a comparative analysis for both agile and traditional items in the literature against the Hybrid Agile with Discipline approach which was recognized by our team at IBM. The results of this paper were published at 2017 International Conference on Information Resources Management. The choose of the project management approach is based on many factors but the most important factor is the customer preference. IBM provides the tools and techniques to move more towards the Hybrid-Agile methodology. Our research data shows that hybrid-agile has the capability in welcoming changes to the project. Our study data indicates that documentation is an important part of hybrid-agile approach. The research concludes the importance role of PMs in waving obstacles for the team. Finally, the data gathered does not support the idea that Agile teams completely are self-organized and self-managed.

Next, our team is going to conduct a research about the software development and management approaches used at the DePaul ID-LAB.

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