

AGILE METHODOLOGIES FOR DIFFERENT INDUSTRIES

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Abstract

Today's industries demand is very much dynamic, and they are rapidly altering their product requirements to adjust with dynamic environment. Agile methods have increasingly attracted interest in the Software Industry. This paper has three purposes. First it proposes the definition of agile methodology and its different methods. Second, it analysis four agile methods. Third it disguises the factor of these four methods and confers the related companies that are using these methodologies according to the requirement.

Introduction

Process development of agile methods represents an important challenge for many software companies. According to the last few years' analysis report, several successful implementations of agile methods have been accounted in the literature, e.g. [1-4]. According to Agile Adoption Rate Survey [5] performed by Dr. Dobbs Journal in 2008 agile teams report significant improvements in productivity, quality, and stakeholder satisfaction, and reasonable improvements in cost. A similar survey conducted by VersionOne [6] additionally reports enhanced ability to manage changing priorities and significantly improved project visibility. For this reason, agile methods are especially suitable for development of information systems with changing and emergent user requirements.

The software industry, software technology, and customers expectations were moving very quickly and the customers were becoming increasingly less able to fully state their needs up front. As a result, agile methodologies and practices emerged as an explicit attempt to more formally embrace higher rates of requirements change.

In this research major four types of agile methodology and its successful implementation in various companies has been discussed.

Agile Methodology

Today's Agile development methodologies are rising in the various industries. Now industries are not satisfying to follow the traditional environment that's why they are following agile methodology. In agile development, testing is involved throughout the development lifecycle, testing the software throughout the development. The importance of agile comes from the fact that the product is to be kept ready in released shippable condition, so that it can be delivered whenever it is appropriate [7]. Agile methodology has gained popularity starting year 2000 wherein delivery in quick succession, iterativeness and incremental growth gained popularity for any product. Agile methods are gaining pace day by day due to the many advantages that this methodology comes with [8].

Methods of Agile Development

Scrum

Scrum is a simple yet incredibly powerful set of principles and practices that help teams deliver products in short cycles, enabling fast feedback, continual improvement, and rapid adaptation to change [9].

Main concept of scrum includes burndown chart, product backlog, scrum master and sprint backlog. The burndown chart is used both to track sprint progress and to decide when items must be removed from the sprint backlog and deferred to the next

sprint. Product backlog include the complete list of requirements that can be helpful for the request enhancement, usability and performance improvements. ScrumMaster is a person responsible for managing the Scrum project. Sprint backlog is the list of backlog items assigned to a sprint and helps the team predict the level of effort required to complete a sprint^[10]

Scrum process

An overview of the Scrum process is provided in Figure 1.1. Each of the elements of the process will be discussed in detail.

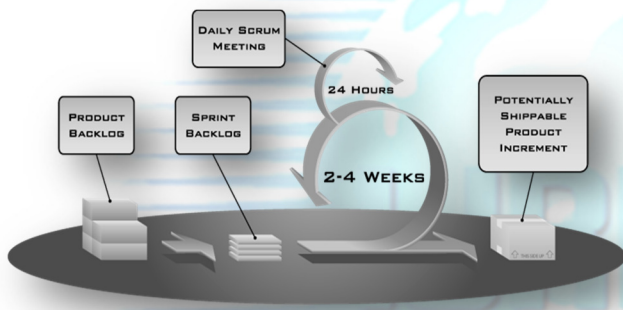


Figure 1.1 Scrum Process

Source:

<http://www.mountaingoatsoftware.com/presentations/an-introduction-to-scrum/>

Scrum for agile organization

According to the state of agile survey (2011), approximately 60% of projects are agile. After all, Agile frameworks help companies accelerate time to market, increase productivity, and respond to changes in priorities. Of all the Agile frameworks, Scrum is the most widely adopted. Professionals from around the world and in a variety of industries are using Scrum to position their teams for greater success.

Who uses Scrum and why?

Scrum can be used by the companies that are handling complex project and Prioritize large to-do

lists into manageable tasks with improved teamwork, better communication, and faster results.

- Scrum is designed to optimize team satisfaction and productivity, product quality, responsiveness to customers, and transparency for stakeholders^[11]
- To react more quickly and respond more accurately to the inevitable change^[11]
- To manage logistics for a store, or planning a charity event^[11]

When is Scrum Appropriate

- Scrum works best when the problems to be solved lie in the Complex Space^[12]
- New Product Development Work and Knowledge Work both tend to exist in the Complex Space.
- Research lies in the Anarchy space.^[12]
- Maintenance lies in the Simple Space.^[12]

Impact of SCRUM for organizations using different scenarios

The success of software development at firms like Salesforce.com [CRM], along similar customer-driven iterative methods in auto manufacture at firms like Toyota, has led to the spread of this different way of managing to related fields.

- The Quality Software Engineering group at IBM [IBM] is responsible for software development processes and practices across the company. As part of the effort to promulgate Scrum in developing software, an iterative process of working was adopted for doing change management^[13]
- First Line software received a Bronze rating after a detailed Scrum Capability Assessment. They have completed all Scrum roles, artifacts and ceremonies effectively. Team has submitted their projects on time at the end of each Sprint, are aware of and consistently remove obstacle, and demonstrate and sustain improvements in

velocity over time. Any variations from core Scrum are deliberate, are done only in response to specific business needs, and are grounded in Agile principles.^[14]

- Cognizant is also using scrum and after using this agile methodology team was able to deliver the first phase on time in four weeks. The second phase of the program has been now running for 12 weeks and it is currently ahead of schedule and expected to deliver early. This approach opened up communication at all levels; program sponsors knew weekly if we were on schedule or not. The teams were able to raise issues/blockers and know that they would be either removed quickly or the feature would be moved to another Sprint.^[15]
- Salesforce.com implemented different set of agile, customer-driven, outcome-oriented, iterative management practices in software development as Scrum and surveyed its employees and found that 86 percent were having a 'good time' or the 'best time' working at the company.^[16]
- SAP uses Scrum originally within .NET and Java development projects. In SAP an iterative methodology, called Agile, is based on the 'Lean' principles for software development and uses elements from 'Scrum' as implementation methodology. SAP Faster results, Improved progress monitoring & coordination, More flexibility during implementation, More transparency.^[17]
- Mingle facilitates successful implementation of Scrum at Siemens according to Sigbjorn Siemens team decided to go with Mingle, due to its usability, flexibility and features such as the virtual Story Wall, drag-n-drop functionality, and reporting capabilities. Mingle's ability to flexibly adapt to Siemens existing processes as well as support future adaptations made it a clear choice over other similar tools. The entire team, from management to testers, developers, support, and operations, relied on Mingle for all aspects of the delivery lifecycle—requirements gathering, analysis, planning, tracking, reporting, project management,

defect management, support management, etc.^[18]

Extreme Programming

Extreme Programming is a discipline of software development based on values of simplicity, communication, feedback, and courage. It works by bringing the whole team together in the presence of simple practices, with enough feedback to enable the team to see where they are and to tune the practices to their unique situation.^[20]

Extreme Programming is successful because it stresses customer satisfaction. Instead of delivering everything you could possibly want on some date far in the future this process delivers the software you need as you need it. Extreme Programming empowers your developers to confidently respond to changing customer requirements, even late in the life cycle.^[21]

Why XP?

- For more user satisfaction with high quality^[21]
- Understand the short user stories to solve and implement the solution^[22]
- Project velocity drives the release of planning and schedules updates.^[22]

When is XP Appropriate

- Requirements are changing rapidly^[19]
- High risk, new challenge projects^[19]
- Small groups of programmers (between 2-10)^[19]
- Able to create automated tests^[19]
- Direct customer involvement is possible^[19]

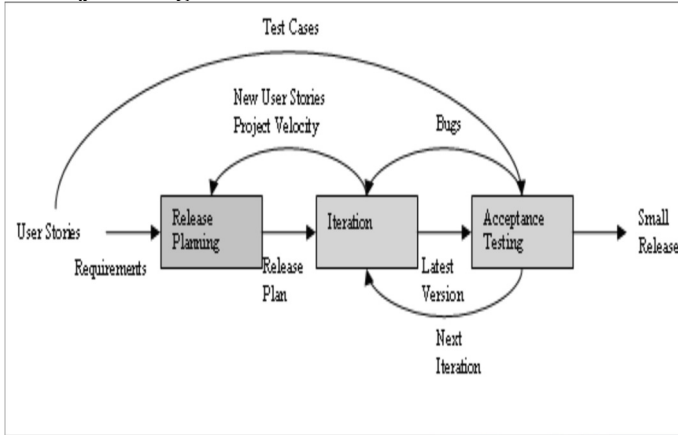


Figure 1.2- A simplified XP process

Impact of XP for organizations using different scenarios

- Monika yap describes the challenges and overall success that WDSGlobal experienced when implementing XP across three globally distributed teams. Located in the United States, the United Kingdom, and Singapore, the three project teams adhered as closely as possible to the practices detailed above. To do so, it had to overcome communication and cultural barriers in the process.^[23]
- Pulugurtha S. , Neveu J. , Lynch F., says that using extreme programming communication within CS and with other departments in IONA has improved considerably.^[25]
- Using Kent Beck’s Extreme Programming methodology, Chrysler started over from scratch and delivered a very successful result. In this effect the C3(Chrysler Comprehensive Compensation) system now provides monthly payroll information for Chrysler employees.^[26]
- At Motorola, a selected set of XP practices was used in the field of safety critical systems (Grenning, 2001). In that case, the use of XP practices was reported to have 53% improved average quality compared to plan-driven software development process.^[24]

Dynamic Systems Development Method (DSDM)

The DSDM is an agile project delivery framework, primarily used as a software development method. It is a framework which embodies much of the current knowledge about project management. DSDM is rooted in the software development community, but the convergence of software development, process engineering and hence business development projects has changed the DSDM framework to become a general framework for complex problem solving tasks.^[27] The DSDM framework can be implemented for agile and traditional development processes.

DSDM Process

Figure 1.3 is showing the DSDM development process, some of the arrows indicate the forward path while some arrows indicate the recognized routes to evolve the system. The so called three pizzas and a cheese development process.

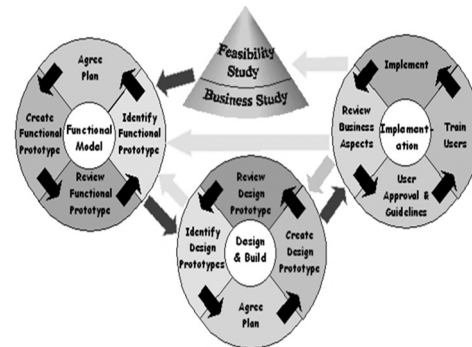


Fig 1.3 DSDM Development Process

Source: <http://eohmicrosoft.blogspot.in/2012/12/dynamic-systems-development-method.html>

Core Techniques Used in DSDM

- Timeboxing
- MoSCoW Rules
- Prototyping

Why DSDM

- Development results are directly and promptly visible.^[28]
- In DSDM users can actively involved in development system.^[28]
- Basic functionality is delivered at the right time.
- DSDM can be helpful to eliminate the bureaucracy and breaks down the communication barrier between interested parties.^[28]
- Because of constant feedback from the users, the system being developed is more likely to meet the need it was commissioned for.^[28]
- Developers/tester can get the early indicators of whether project will work or not, rather than a nasty surprise halfway through the development.^[28]
- System is delivered on time and on budget.
- Ability of the users to affect the project's direction.^[28]

When is DSDM Appropriate^[29]

- Interactive systems (all functionality reasonably visible at user-interface)
- Clear defined user group
- Decomposable / isolatable complexity
- Smaller functional components are more decomposable.
- Fixed delivery time
- Project is time constrained: priority of the requirement is high (MoSCoW)
- Mostly when the requirements are fixed or not in detail.

Impact of DSDM for organizations using different scenarios

- The use of the DSDM has been key to the success of the Combat Identification Server (CIdS)Technology Demonstrator Project (TDP): agile project management techniques in terms of quality, delivery on time and budget, reducing the probability of mistaken identity in the heat of battle.^[30]

- After using DSDM, The success of the CIdS project may have provided pointers for the future of project management in the defense sector of UK. In the defense sector they used a DSDM technique MoSCoW(Must, Should, Could and Won't) for the better performance requirement. CIdS project use DSDM for conflict management and risk management also.^[30]
- The successful implementation of DSDM Atern at Infonic AG in Switzerland improved software delivery beyond expectations. This enabled Infonic to address typical estimation issues and eliminate Technical Debt. Together, these allowed the teams to focus on one job at a time and the business to extract even more productivity from scarce, highly qualified and experienced resources.^[34]
- The Highways Agency use DSDM with PRINCE2 to accomplish a task of development and integration over thirty work packages into the existing system, including tools for data capture, quality assessment and asset reporting. After the successful completion of the project they could deliver twenty two work packages onto the live environment and de-scoped the remaining lower priority items for consideration in future phases.^[31]
- Tilney Investment Management is one of the UK's largest independent fund managers used DSDM technology Prototyping to develop a system whereby individual client portfolios could be reviewed in a regular professional manner. And they could deliver the project(Asset Manager product version 6) successful in 6 months only because of proper implementation of DSDM.^[33]
- The National Packaging Waste Database (NPWD) replaced a completely paper based system of regulation that had been open to fraud and did not provide the right information at the right time switched to

DSDM to ensure stakeholder engagement, on time and to budget delivery. [32]

Impact of FDD for organizations using different scenarios

FDD (Feature Driven Development)

Feature Driven Development (FDD) [35, 38] authors Peter Coad and Jeff de Luca characterize the methodology as having “just enough process to ensure scalability and repeatability and encourage creativity and innovation all along the way.” [37] Throughout, FDD emphasizes the importance of having good people and strong domain experts. FDD is build around eight best practices: domain object modeling; developing by feature; individual class ownership; feature teams; inspections; regular builds; configuration management; reporting/visibility of results. UML models [36] are used extensively in FDD. In figure 1.4 there are five main activities in

FDD that are performed iteratively. The first is Develop an Overall Model, second builds a features list next you Plan by Feature, the end result being a development, the identification of class owners more on this in a minute, and the identification of feature set owners.

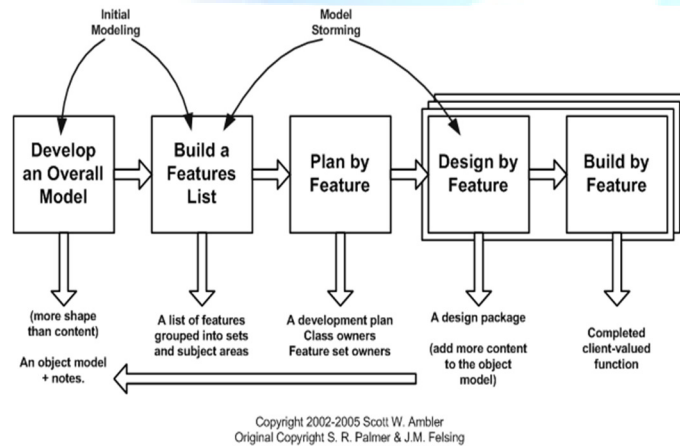


Figure 1.4 Project lifecycle of FDD

- Cognizant FDD integrated with Microsoft VSTS provides the automated process infrastructure for large-scale, feature-driven development that can enhance the productivity and quality with reduced overhead. [39]
- In select Business Solution FDD can be included as part of Select Perspective especially in the major development stages. However, FDD does not significantly differ from the processes and activities already defined in Select Perspective. [40]
- Adaptation of FDD in Tradechart com, Inc.(TradingCharts) address the unique requirements of Web development and align with local factors for the same. Other tweaks are simple modifications that align FDD practices with existing practices, scale it to team and project size, and adapt it to accommodate Web development and aid in implementation at TradingCharts. [41]
- The telecommunication industry has particularly benefited from a development centred on features. The introduction of Intelligent Network (IN) brought in a generic model where a basic call could be updated by adding features implemented as discrete components (Service Logic Programs). As a result, the telecommunication industry has a tradition of organizing development projects, people, and even marketing by features. [42]
- Microsoft has also apparently followed some feature-centric processes in their software product line for a number of years [43].

Analysis of the Study

In the following table 1.1 researchers have presented four agile methodologies, distinguishing factors of the methodologies and related companies to the particular methodology.

Table 1.1: Different factors and related companies to the particular methodologies

Agile Methodology	Distinguishing Factor	Related Companies to the particular Methodology
Extreme Programming	Intended for 10-12 co-located, object-oriented programmers	<ul style="list-style-type: none"> ▪ WDSGlobal ▪ IONA ▪ C3 ▪ Chrysllear
	12 highly-specified, disciplined development practices	
	Four values	
	Minimal archival documentation	
	Rapid customer and developer feedback loops	
DSDM	DSDM is an iterative and incremental approach that includes continuous user/customer involvement.	<ul style="list-style-type: none"> ▪ CIdS TDP ▪ UK defense sector ▪ Highways Agency ▪ Tilney Investment Management ▪ NPWD
	DSDM is working on 9 principles to frameworks philosophy and significantly decrease the project risks	
	Rapid Application Development	
	MoSCoW Rules	
	Time boxes are built into project schedule very early and not (usually) changed	
Scrum	Project management wrapper around methodology in which developer practices are defined	<ul style="list-style-type: none"> ▪ IBM ▪ Cognizant ▪ SAP ▪ First Line Software ▪ Siemens-Health Care(Mingle)
	30-day Sprints in which priorities are not changed	
	Daily Scrum meeting of Scrum Team	
	Burndown chart to display progress	
Feature Driven Development (FDD)	Scalable to larger teams	<ul style="list-style-type: none"> ▪ Cognizant ▪ Select Business Solution ▪ Tradechart com, Inc ▪ Telecom Industries ▪ Microsoft
	Highly-specified development practices	
	Five sub-processes, each defined with entry and exit criteria	
	Development are architectural shape, object models and sequence diagrams (UML models used throughout)	
	Two-week features	

Conclusion

Agile methodologies are rapid and involve continuous integration. After reviewing papers on agile methodologies like Scrum, Extreme programming, DSDM, FDD, It was evident from the papers that many software and management companies using agile methodologies. The reason being that companies are getting faster results, improved progress monitoring & coordination, more flexibility during implementation, more transparency and quality in the team. We can also make out that industrially scrum methodology of agile is very popular as much of the work is done by industry practitioners. We believe that the adoption of either

of these methodologies will Have a beneficial impact on a project team. Even any of these methodologies can be used jointly to get more values in management, customers, and development that allow them to create a unified, disciplined team.

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