Agile Project Management

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ABSTRACT
As agile software development gains awareness and popularity in the software industry, it also continues to capture the interest of the research community. There are several topics within the agile software development area that demand deeper understanding and research. One such topic is 'Agile Project Management' which relates to the management of software projects that are developed using various agile frameworks such as eXtreme Programming (XP) and Scrum.

This paper outlines proposed research on agile project management. In particular we hope to explore the role of the project manager, the process and problems of transitioning into an agile framework, and the management of outsourced agile projects.

Categories & Subject Descriptors:
K.6.1 Project and People Management: *Management techniques*

K.6.3 Software Management: *Software development/process*

General Terms
Management, Experimentation, Human Factors, Theory.

Keywords
Agile Methodologies, Agile Project Management, Outsourcing or Off-shoring, Project Manager, Transitioning.

1. INTRODUCTION
Agile development methodologies are becoming popular in the industry [1] and consequently companies and practitioners are faced with the challenge of understanding and embracing this new paradigm. They are eager to know what it is, how it works, and what does it take to make it work. Companies or practitioners interested in adopting agile frameworks are faced with the challenge of making the transition. Traditional roles are challenged and processes are revamped to reflect the new development methodologies.

In this new setup, we find three major areas of concern and wish to explore them as the main aims of our research.

1.1 Aim of the Research
The objective of the research is to investigate 'Agile Project Management' within companies, practitioners, or mentors using agile software methodologies such as XP, Scrum, Crystal etc. The investigation is expected to delve into the following sub-topics, and closely examine:

- The role of the project manager in an agile project.
- The process and problems of transitioning into an agile framework.
- Management of off-shored or outsourced agile software projects.

2. MOTIVATION
Looking specifically at the aims of our research above, we begin to formulate some of the most obvious questions surrounding these issues. For instance, it will be interesting to explore the kinds of pressure the manager faces in trying to bring the agile principles to life. With agile processes promoting the concept of 'self-directed teams' [1], is there room for the conventional project manager or does this role also need to evolve to suit the principles of the new paradigm? How are the agile manager roles different from the traditional manager roles?

How do organizations adapt to a radically new framework such as agile? Does it merely take up gradation of technical skills or a complete change in outlook and the way the organization works?

Finally, as outsourcing becomes a common practice, we are faced with other challenging questions. How difficult is agile project management for outsourced or off-shored projects? Does communication become a prime concern or does management suffer at the hands of trying to synchronize distributed teams spanning different continents and time zones? Is agility thrust upon the teams that the projects are outsourced to by their parent companies or do they freely choose to follow agile processes?

These are the issues we hope to investigate in our case studies. For the rest of the paper, we first explain the concepts of agile methodologies like XP and Scrum and the basics of grounded theory as a qualitative research method. Then we discuss the issues surrounding agile project management. This is followed by planned road map of the research. And finally we present the conclusion.

3. BACKGROUND

The research focuses on agile methods like eXtreme Programming (XP) and Scrum and use grounded theory as a qualitative research method. Before we describe the details of the proposed research, we discuss these concepts in more detail.

3.1 Agile Methods

Agile methodologies follow iterative and incremental style of development that dynamically adjusts to changing requirements and enables better risk management. The four basic principles of agile as defined by the Agile manifesto [2] are:

- individuals and interactions over process and tools,
- working software over comprehensive documentation,
- customer collaboration over contract negotiation,
- responding to change over following a plan.

There are differences between the traditional ways of software development and the agile style of working. Some of the prominent ones are highlighted in Table 1.

Table 1. Comparative Chart – Traditional vs. Agile

Categories	Traditional	Agile
Development Model	Traditional	Iterative
Focus	Process	People
Management	Controlling	Facilitating
Customer involvement	Requirements gathering and delivery phases	On-site and constantly involved
Developers	Work individually within teams	Collaborative or in pairs
Technology	Any	Mostly Object Oriented
Product Features	All included	Most important first
Testing	End of development cycle	Iterative and/or Drives code
Documentation	Thorough	Only when needed

In real life development, its common to experience frequent change requests in customer requirements. The traditional forms of development left little scope of refactoring to address this need. They adopt the traditional model of development which unrealistically assumes that the customer requirements remain fixed over the entire length of the project. Agile methodologies on the other hand are focused towards customer satisfaction and therefore allow for changes through iterative style of development where only needed functionalities are focused on. Since only a hand full of tasks are achieved in one iteration, its easier to modify functionalities as needed and manage the associated risks better.

There are many versions of agile methodologies such as Crystal, Feature Driven Development (FDD), Dynamic Systems Development Method (DSDM), and Adaptive Software Development. For our research purposes we concentrate on the more popular XP and Scrum flavours.

3.1.1 eXtreme Programming (XP)

XP was created by Kent Beck [3], who compiled a collection of good practices and took them to the extreme. Its mostly targeted at small to medium sized projects and has gained rapid acceptance and practice over the world.

The five XP values are communication, simplicity, feedback, courage, and respect. Its hallmark principles are planning game, small releases, metaphors, simple design, refactoring, pair programming, testing, collective ownership, 40-hour work week, on-site customer, coding standards, and continuous integration.

Customers provide the specification of required functionalities in the form of user stories [4]. They are written concisely in non-technical formats and focus on the needs of the user avoiding any design details. They help the developers to estimate the implementation time and go into the release planning.

Each short iteration achieves a handful of tasks and its recommended that a steady project velocity be maintained. Developers work in pairs and perform unit tests and integrate code often. The customer is ideally available on-site and is closely involved in the development through rapid feedback. Refactoring the code to renew obsolete designs and remove redundancy allows for a higher quality product to be produced. Testing is an important part and is undertaken frequently in form of unit tests and acceptance test. Finally lengthy documentation is avoided and optimization is left till last.

3.1.2 Scrum

Scrum is another agile development methodology developed by Jeff Sutherland and formalized by Ken Schwaber.

The roles involved in this process are Product Owner, Scrum Master, and the team. The Product Owner is responsible for maintaining the correct business perspective. The Scrum Master works with the Product Owner and facilitates the team. The team should contains seven (plus/minus two) members.

Activities include sprint planning, sprint review, and scrum meeting. A sprint is usually 2 to 4 weeks of development time where a set of selected stories are worked on. The sprint review reviews the previous sprint in terms of tasks achieved and the next sprint details are defined. The Scrum Master leads a daily 15 minutes meeting where each member briefly describes their tasks and concerns.

The artifacts produced are named Product Backlog, Sprint Backlog, and Burndown Chart. The product backlog is a list of product features prioritized by value delivered to the customer [5] and is maintained by the Product Owner. The sprint backlog refers to the development tasks that are needed in order to implement a feature and is a subset of the product backlog. The burndown chart shows the total work remaining in a sprint.

3.2 Research Method – Grounded Theory

We intend to make use of Grounded Theory – a qualitative research method which was originally developed by Glaser and Strauss [6].

The major components of Qualitative Research [7] are:

1. the data, which can be derived from different sources, interviews and observations being the most common.
2. the different analytic or interpretive procedures that are used to arrive at theories.
3. written and verbal report

As Strauss and Corbin note in their book on grounded theory [7], "*A grounded theory is one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon."*

According to grounded theorists, research questions may be derived from suggested or assigned research problems, technical literature, and personal and professional experience. In our case it was a combination of all of these factors that led to the finalization of our research topic.

As grounded theory suggested, we must not bind ourselves to any preconceived notions and allow important categories to emerge through the iterations of interviews. Therefore, we plan to proceed by conducting a pilot study to understand the real issues within the agile project management area and then improve our list of questions to focus more on the important categories in succeeding interviews.

Researchers adopt different methods of coding to handle the large amounts of raw data extracted from the interviews and observations. They need to exhibit a personal quality called 'theoretical sensitivity' in order to derive meaning from the mountains of data gathered.

'Theoretical Sensitivity' is defined as "*the ability to recognize what is important in data and to give it meaning. It comes from being well grounded in the technical literature as well as from professional and personal experience."* [7]

After the split of ideologies occurred between Glaser and Strauss (founders of the Grounded Theory) different views on 'coding paradigms' emerged. According to Strauss, various methods of data analysis can be employed in order to convert the collected data into theories. Some of these are Open Coding, Axial Coding, and Selective Coding. Glaser maintains "all is data" and requires researchers to treat all information, whether derived from interviews, observations, surveys, or statistical analysis etc to be treated as data. It will take more exploration of the two, Glaserian and Straussian, paradigms before we can decide on which one to follow.

Now that we have explained the basic paradigms involved in our research, lets explore the topic 'agile project management' in greater detail.

4. AGILE PROJECT MANAGEMENT

Project management is an integral and indispensable part of any software development process. Managing the teams, customer relationships, cost reduction, risk management, maintaining project time line and budget constitute the crux of project management. Although these basic tasks remain the same, their execution details are slightly different for each agile framework. What is drastically different- is the way of thinking.

The role of the project manager has undergone considerable changes with the evolution of agile methodologies. While Scrum has introduced the Product Owner and Scrum Master, XP has invented the roles tracker or coach.

Sanjiv Augustine and Susan Woodcock explore the role of the project manager and propose the concept of visionary leader as opposed to an uninspired taskmaster.[1] While traditional management was viewed as governing and commanding, experienced agile project managers are preaching of 'self-directed teams' with 'light touch' leadership[1]. Similar sentiments are resonated by Mary Poppendieck in a panel discussion titled Agile Management – An Oxymoron? [8] where Poppendieck notes *"I distinguish management tasks – getting the maximum value from the dollar – from leadership tasks – helping people to excel. Leaders are required. Managers are optional."* It will be interesting to observe the new face of project managers in an agile setting through the course of this research. We plan to interview managers about their perceived roles and how different do they find it from the traditional manager roles.

Our research also aims to focus on the process and problems of transitioning into an agile framework. Experienced practitioners suggest having a checklist to assess the company's need and readiness for embracing the agile wave. In a paper by Nerur et al. from the University of Arlington, Texas [9] various issues related to transitioning into an agile environment are mentioned. They are broadly divided into people-related, process-related, and technological issues.

Finally, the last item on our research agenda is exploring the management of outsourced or off-shored agile projects. We hope to contact and collaborate with companies in India that deal with off-shored agile projects. We find that previous research on outsourcing in an agile environment suggests that there is a co-relation worth exploring. In a paper titled When XP Met Outsourcing [10], the researchers note that they "*saw a strong awareness of the interactions between outsourcing arrangements and the XP process"*. Sutherland et al.[11] note in their recent paper that in order to ensure success "o*utsourced teams must be highly skilled Agile teams and project implementation must enforce geographic transparency with cross-functional teams at remote sites fully integrated with cross-functional teams at the primary site.*" We will aim explore these interesting angles further in our case studies. Having done some initial reading and exploring the literature available on agile project management, we now chart out our research road map.

5. THE PROPOSED RESEARCH – Road Map

5.1 Finding Agile Practitioners

After gaining Human Ethics Committee approval, the next important and challenging part of the research process is finding interested parties for interviews and observations. We searched for agile companies, groups, and organizations on the Internet and contacted them with details of our research. We also signed up on agile mailing lists and joined user groups of agile enthusiasts. We also gained some contacts in the New Zealand agile community and will follow them up for possibilities of interviews. Searching through different avenues, we are planning to build a set of practitioners and companies that can be representative of the larger agile community. We

must however acknowledge that our representative set of practitioners and companies is confined to those that exhibit their interest in participation.

5.2 Interviews

In order to gather information regarding the topic, we will conduct interviews in New Zealand and India. We plan to follow projects averaging between 6 to 12 months and hold interviews and observations at important milestones of the projects or at regular intervals mutually agreed upon by the interviewees. This is so we can get a complete picture of agile project management through the entire life cycle of different projects.

5.3 Data Collection

The data collected will be analyzed as per the principles of grounded theory.. All materials collected will be stored in a secure and confidential way and will be destroyed at the completion of the research.

5.4 Building the Theory

The research will use qualitative analysis methods named Grounded Theory to gather valuable data regarding various issues in Agile Project Management in New Zealand and India.

As we gather more data from our case studies, we'll need to undertake in-depth analysis of all the information and follow the systematic coding procedures to arrive at theories. We will also need to revisit the data time and again in order to validate the emerging theories against the raw information and carefully avoid any biases or misinterpretations.

6. CONCLUSION - The Future is Agile

There is no lack of interest in the research community and the software industry for agile processes, as is evident from the numerous research being conducted on agile practices and from the growing awareness of agile methodologies in the industry. This gives us the motivation and encouragement to explore another important issue in the agile sphere – Agile Project Management, one that demands greater understanding. Our research hopes to explore three specific issues, namely process and problems of transitioning into an agile framework, role of the agile project manager, and management of outsourced agile projects and derive theory to comment on the successful practices in all of these areas.

The agile community in New Zealand is respectable in size but difficult to discover and follow, largely because of the lack of a central organization or banner that could cover the regional interests. We are aware of efforts being directed to rectify this problem.

The agile community in India seems to be vast and very proactive. It was also encouraging to see their interest and willingness to participate in our research. Societies such as Agile Software Community of India or ASCI [12] are working to support and propagate agile practices in the India software industry and academia.

Finally, growing number of companies are adopting agile ways of development in New Zealand, India, and rest of the world. We must develop deeper knowledge and comprehension of the critical issues such as agile project management, if this interest and growth of the agile methodologies is to be sustained. Our proposed research is a step in that direction.

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