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Adopting Agile Scrum

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Adopting
Agile Scrum

Thesis Documentation

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98308

Abstract

Agile Scrum has created great impact on project management. It has shown promising results and return of investment. This research paper fully gives reports on what type of projects actually fit with Scrum. Many teams tend to fail to during the migration and I will be putting forward points which will explain how and what things will happen in the teams during the migration from traditional methodology to agile Scrum. I will be discussing about the problem statements, success and failure factors our team come across during implementing scrum and come up with solution to figure out the ways for a successful migration. I will come with best practices by performing a research with scrum and project management experts to understand the inside scrum framework.

The purpose of this paper is to explore the challenges that we face when adopting agile scrum while using traditional methodology. This document also provides management guidelines to help understand and overcome barriers in adopting Scrum method. A quality research is conducted in an organization which has adopted scrum. The organization works on cloud and other virtual servers. Data is collected by conducting various interviews of project managers, business owners and other scrums. Also in-depth study of various case studies starting with evolution of Scrum and its increase in the market, about using Scrum, advantage and disadvantages of scrum have been included.

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Preface

This paper basically cover the strengths, weakness, opportunities and threats we come across while adopting agile scrum in an organization. I shall also mention about cultural shifts that needs to be taken care off.

I would like to thank my professor Dr. Thomas Sheives for all the guidance he has provided me throughout the completion of paper. I would also want to thank Professor Dr. Richard Kordel for helping me out with the initial research with the thesis topic. I would say this paper would never have been possible without them.

I shall also thank my friends and family who for being supportive right from the day I have started my research work till I finished it. And last but not least I would like to thank Harrisburg University for providing me with all the resources and guidelines required for the research.

Introduction to Agile

In recent years of software development there is an increasing interest in project managers to implement agile in the projects. Agile software development is an iterative way of developing a project. In agile the product owner communicates with stakeholders to get inputs and make a list of epics which will further be broken down into stories. The stories are then prioritized and broken down into task. All the prioritize tasks will be maintained in a backlog. Agile is a group of waterfall models following incremental model.

Agile software development has following attributes. It is incremental, cooperative and adaptive. Incremental here refers to small release which tea deliver at the end of sprints. It is cooperative because there is always close interaction between teams and customer. Finally it is adaptive because it has ability to accept the changes anytime during development.

About Agile Methods:

Agile methodologies are streamlined so as to develop the processes and to remove the impediments and barriers in accepting requirements changes during the software development stage. In agile there is no specific locking for requirement analysis. Agile methods like XP (Extreme Programming) and scrum are most widely practiced in established organizations.

What is Scrum?

Scrum is an agile framework in which there are three core roles. Product Owner, Scrum Master and Scrum team. Scrum method primarily focuses on planning of iterations, prioritizing requirements as per business requirements. The scrum value is that the framework should be visible for all those who are responsible for the end product. The scrum believe in transparency and it works in following steps:

1. A product owner creates a prioritized list of user stories called product backlog
2. During sprint planning the decides to work on the highest priority task
3. The team will be having a certain amount of time or a deadline to finish task called sprint.

4. Along the way, the scrum master keeps the team focused and makes sure that the team is following agile values and principles

5. The sprint ends with a sprint review meeting followed by a retrospective

6. After the end of sprint the team prepares to choose a user story from product backlog.

Other frameworks of agile methodology and comparisons:

Kanban:

Kanban is a methodology of agile which is introduced to have an incremental improvements. Kanban is not structured as Scrum. Kanban is not a fully process framework but can be used in any running projects. In Kanban there is a board organized and items are listed on left and moved to right as there is progress.

The columns in the board can be the phase of the project that were discussed during the meeting. For example it can be do, doing done. The items in "do "column are the one's which are yet to be started. The items in column "doing "are the tasks work in progress. And finally the third column "done "are the one's which are done. In every stand up meeting the tasks are moved from one column to another according to the status.

Kanban vs Scrum:

Comparing these two agile frameworks gives us an idea of how different these two methods are. Scrum is the method used if the organization is looking for more structured and fundamental method to start with. Scrum can give a shaping to project with its principles. And scrum is a complete process framework unlike Kanban. Kanban can be used as a support tool with scrum.

Extreme Programming (XP) vs Scrum:

Scrum and Extreme Programming (XP) are similar in many ways. But there few important differences between the two methods.

- Scrum teams work in iteration called sprints which might stretch from two weeks to a month. But in extreme programming the iterations only last for a week or at the most two weeks long.

- Scrum team don't change the requirements in the middle of sprint. The product backlog items that were promised in the beginning of the sprint remains unchanged till the end of sprint but where as in XP the changes during the middle of iterations are accepted as long as the team haven't started working on a task.

- In extreme programming the features are prioritized by the customer and the team should be working in the same order of priority. Whereas in scrum the scrum product owner prioritizes the backlog but team gets to select the task the order in which they want to work in.

Background about the paper

This paper will be discussing about the right approach required to adopt agile scrum. You will be reading about real time scenarios, scrum success and failure stories, expert opinions etc. Agile scrum is one among the widely implemented frameworks in corporate. Agile scrum gives an advantage of showing the end user the features of product once in every two weeks. This will give customer a picture of how the product is being built. Another amazing thing about agile scrum is that customer can customize his requirements anytime even after the requirement phase. Because of these advantages project managers are very excited to adopt agile for their project. But it is really important for us to know in what projects agile scrum fits in.

Highlights of Proposed Applied Project

This paper concentrates on scrum implementation in different projects. Now a days many project managers are choosing scrum agile over waterfall. But not all the projects are seeing success. Many of them fail because scrum agile doesn't fit the type of project they chose. Many project managers are choosing agile scrum because of cross functional teams, fast paced environment and aggressive approach. I would like to put forward problems and experiences from several projects implemented by experts.

Problem Statement

It is not just easy to bring a change in an organization or a team over night. There are few things that should take into consideration before going agile. Going agile means not just having a scrum sized team, a product owner and a scrum master. It needs lot research performed before adopting agile. There are scenarios where various teams have implemented agile in their organizations and have failed to accomplish their project goals. This is not because they don't have resources in required expertise but they have failed because they couldn't chose the right resources who can fit into agile environment. Agile teams are cross functional which mean you will have to be flexible to work with different set of technical and functional people who doesn't have any clue what you are into. The way you collaborate is the key factor to success in agile scrum. This would be the problem I would be dealing with in this research paper. In a gist at the end of this research paper you will have an idea what could the best ways of migrating to scrum.

Reason for this problem to be solved

Now a days as most of the projects managers want to adopt agile scrum there are few things which they should consider before choosing the right approach for their project. This paper will give the few good inputs which would help them understanding the success and failure scenarios of agile. This paper would help like a reference to scrum teams, project managers and other stakeholders who are interested in going agile.

Cultural Shift

What is a cultural shift?

Cultural shift is the first step companies should take when adopting agile culture. Adopting agile is more that changing the process. Agile is a culture which should be accepted to have a successful migration. Having a cultural shift means a lot more than just having a transitional plan. It requires bringing people together, processes and technologies and identifying transitional approach is required. There should be a collaboration between IT and business leadership.

What are the barriers to agile adoption?

The primary barriers we see when adopting the culture is that companies stick to their philosophies and current culture odds. When there is no management support it would be a bigger problem for a cultural transition. Unwillingness and insufficient training will lead to failures. Another reason why cultural change is failing because the companies often wanted traditional approach to co-exist with agile. Overall organization culture needs to change among other things like changing the tools, processes and other control mechanisms.

Literature reviews

Using Scrum in Global Software Development

Interestingly I have found a literature review in which author states that using Scrum practices in distributed environment has communication related issues and other major challenges. The paper also talks about cultural differences among the distributed team members will also impact the communication processes. The author says that the key challenges would be managing in large teams and large projects. Having video calls instead of conducting meetings in meeting rooms and distribution at multiple sites also appear to create to communication barriers.

The challenges in collaborated Scrum teams:

- ➢ Synchronous Communication
- ➢ Team collaboration
- ➢ Tool Support
- ➢ Team management
- ➢ Communication Bandwidth
- ➢ Office Space
- ➢ Multi Sites

The author also mentions other challenges with distributed teams using scrum:

- Scrum standups are considered the most important meetings in using agile scrum. But distributed teams will have miss them due to different time zones.
- A large project with distributed teams involves people from different culture diversity which will discourage offshore teams from voicing their opinions fully.
- Distributed teams will lack collaboration as they are not collocated to discuss and mitigate the communication barriers

- Sprint planning and retrospective meetings can last up to four hours or more and this would be difficult due to lack of synchronous communications.
- Author says using tools to provide better communication bandwidth will increase reliability among teams. The author points the importance and need in having a dedicated meeting room with necessary infrastructure.

Discussion about the paper:

➢ There is a growing interest about Scrum practices in globally distributed projects

➢ Globally distributed Scrum teams usually face a number of challenges as project involves communication, coordination and collaboration processes.

➢ Scrum practices need to be extended or modified accordingly to support globally distributed software development teams.

➢ Is scrum limited by project's contextual factors?

Conclusions from the literature review:

The aim of this review was to identify various challenging factors that restrict the usage of Scrum in globally distributed teams. Exploring potential strategies in dealing challenges we face with globally distributed teams. This review has opened discussions for research about increasing quantity and quality of studies to describe and evaluate use of Scrum practices in Global Software Development. The author suggests a survey that can be done on challenges practitioners are facing in distributed teams.

Scrum Agile Product Development method:

The author in the review is concentrating on Scrum agile product development. The author initially mentioned about why software development has become a challenge. The author states that because of improper requirement gathering or constant changes in requirements the software development has become more difficult. The author outlined how was agile implemented initially and in what organization it was started. In later part of review the author has mentioned about some recent researches that happened in 2008. The author has also given some interesting statistics about the acceptance criteria in the given years. Besides scrum

author also mentioned the value of agile modelling, AUP and other agile related methodologies. The review also deals and explains the principles of scrum and limitations. The interesting elements of this paper is that the author had mentioned initially how agile was started and what are difficulties organizations faced in implementing for the first time.

The author also mentioned that this research was performed in quantitative theoretical and conceptual method. Author also did good research on publications on CAPES and access various articles on AAAS, ACM, and ACS etc. This research was carried out in October 2008 using the key word Scrum. The author had results from 48 papers and finalized 40 which were relevant. Author states that increasing publications on Scrum has created more interest in this. There was 73% increase in literature review on scrum in 2007 and 2008.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number	1	0	0	2	2	3	3	10	19
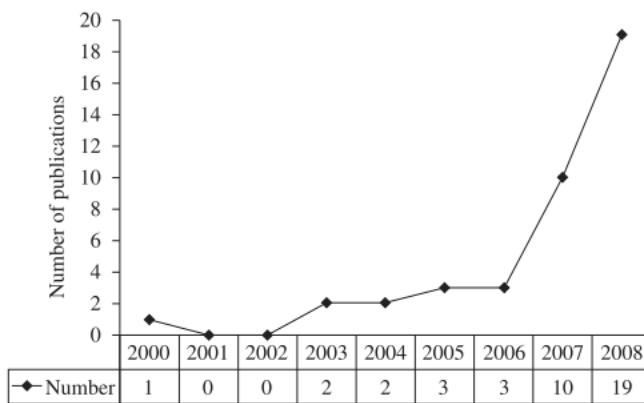
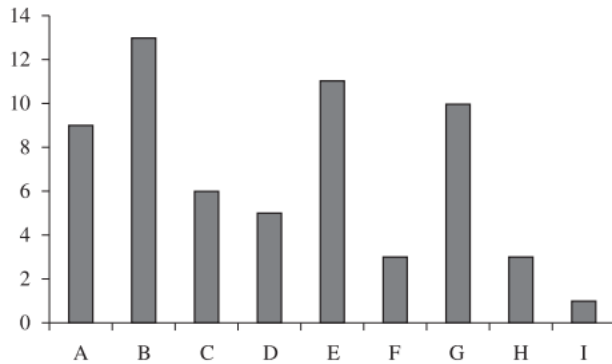**Figure 2.** Number of publications by year of publication.

Figure 1

Figure 2

Benefits of Scrum in organizations

The author concluded by stating by that time scrum was used less by that time but it might increase rapidly in coming years. Scrum has made significant impact on product development so far. He hinted that great concentrations of publication may come through in coming years. The author outer view was optimistic regarding scrum and highly intended to encourage scrum in coming years.

Conclusions:

Accordingly to the data this literature review on Scrum concludes states that growing number of publications have raised interest about this topic. The quality improvement and impact on the product quality has raised questions. This study also concludes that Scrum is a managerial tool with a weak scholar perspective. For future study on Scrum the research needs to be performed on how it can be implemented in high-tech small businesses.

Scrum agile product development method

In the literature the author presents a review and analysis on Scrum method. This literature review is an investigation conducted to find benefits of using scrum method. During this research author found that there were only 11 articles found in 2006 in their database about the scrum method but Scrum publications has increased along the years. The author has a statistical report about the benefits of scrum methods.

Benefit
Increase in client satisfaction (decrease in number of complaints)
Improvement in communication and increase in cooperation among team members
Increase in project return on investment
Increase in development team motivation
Improvement in product quality
Decrease in manufacturing costs
Increase in team productivity
Decrease in time to conclude projects
Decrease in project risk (lower failure possibility)

Figure 3

At the end of literature review the author suggests the future study can be carried out using the data collected. Author states that growth in the number of publications have surely increased interest of about adopting scrum.

Agile Adoption Statics

Measures and metrics of success:

Adopting a software process which meets the team requirements is important and equally difficult decision. It is considered as the most critical choices we will be making in a project. We have a list of choices starting from Rational Unified Process, Traditional methodology, Agile etc. We have plenty of information available on web written about these methodologies. Let's see what Agile Scrum has to offer us to be chosen most among others. Scrum is among the old methods in agile software development methodology. People are in fact researching more on Agile Scrum and evidences are being published and shared in various conferences worldwide.

Geoffrey Moore, in the book "Crossing the Chasm" has described five types of technology adopters:
- Innovators who pursue new concepts aggressively
- Early adopter who pursue new concepts
- Early majority wait and see before buying a new concept

- The late majority who are concerned about their ability to handle a new concept should they adopt it
- Who simple don't want anything to do with new practices

Agile Scrum approach excels in volatile environments where agility is given highest priority. Traditional methodology measure success in predicted plans whereas agile scrum emphasizes responsiveness to change. A study says that traditionalists measure metrics in cost variance, schedule variance, tasks variance etc. whereas agilists measure success through the regular delivery of high quality working software.

- In DDJ 2007 Project Success Survey it is proved that agile works better than traditional. Agile projects had a 72% success rate, compared with 63% for traditional and 43% of offshoring. These figures are shown in the figure below.

Software Development Project Success Rates

Agile	72%
Traditional	63%
Data Warehouse	63%
Offshoring	43%

Copyright 2007 Scott W. Ambler
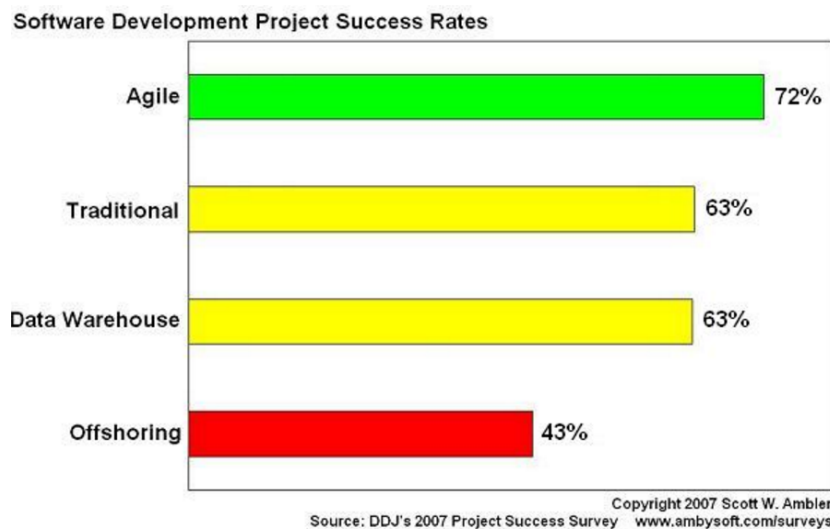Source: DDJ's 2007 Project Success Survey   www.ambysoft.com/surveys

Figure 4

- In DDJ 2008 Agile adoption survey the people experience with agile was very positive. It is shown in the figure below
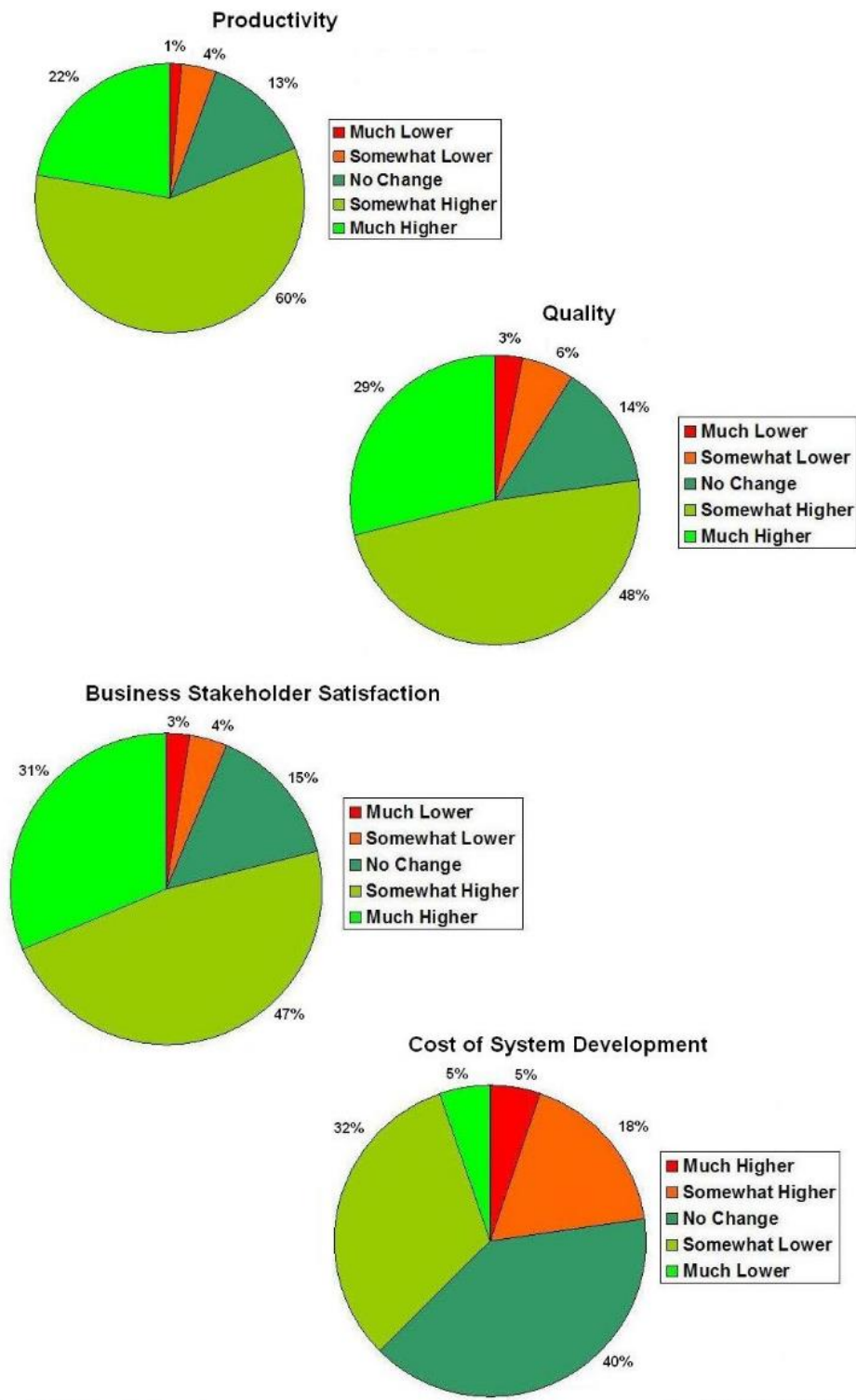

Figure 5

Resultsfrom a survey from 2013 IT Project Success Rates Survey Results are shown in figure below.

Figure 6
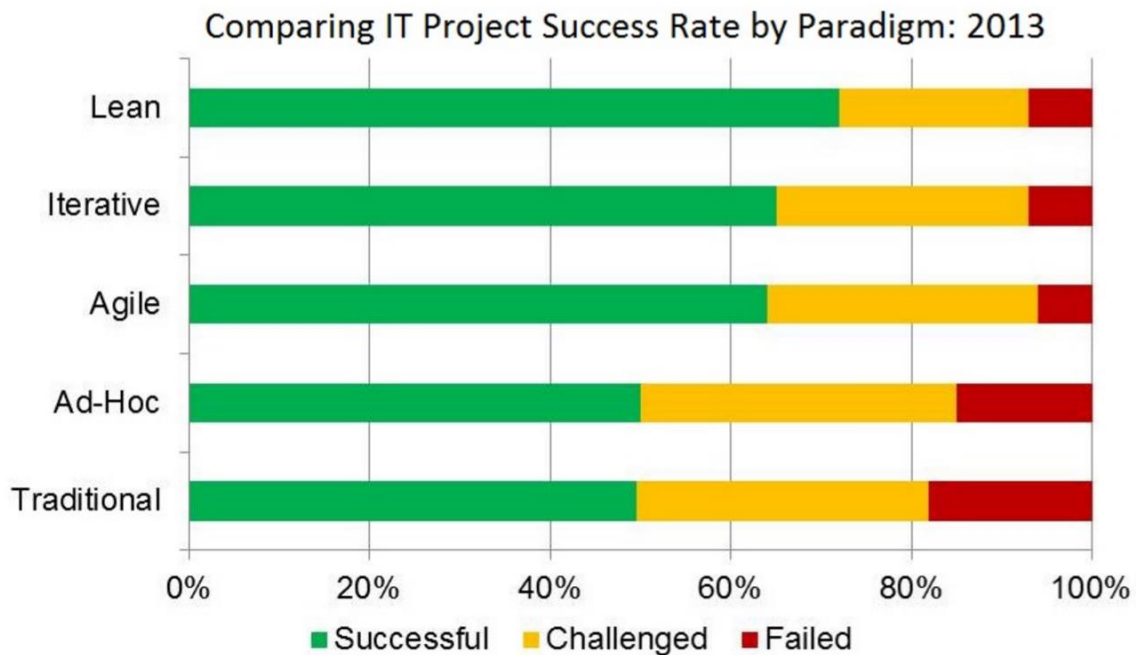
Research says that shorter feedback cycles will lead to greter lifecycles.Agile scrum hs shorter feed back cycle compared to traditional often in hours or days. Traditional on the other side has reviews, inspections and big requirements which has to be perfomred upfront which might take weeks or months. Below is a graphical representation of common techniques to the cost of change curve.
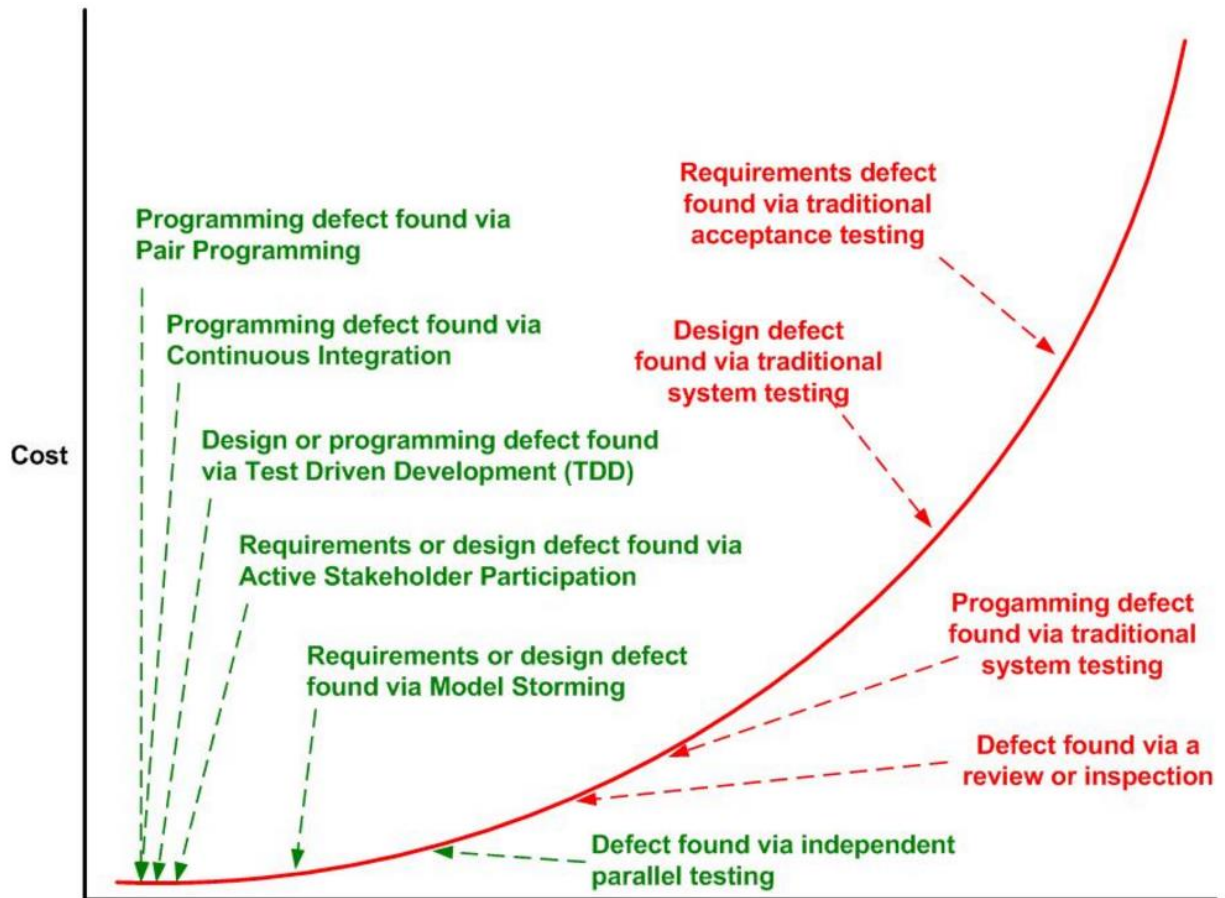
Figure 7

2012 CHAOS report:

This report gives statostics of companies that have used agile methologies and deliver winning resuslts. This survey also proves that agile adoption is constantly increasing.

- 49% of business say most of thei company is using Agile development
- 52% of customers are happy with Agile projects
- More than 50% of managers and customers agree that prioritzing customers demands is the biggest Agile challenge
- There was 15% increase in the number of respondents who work where there are at least 5 Agile teams from 2011 to 2012

- The number of those who plan to implement agile development in future projects has increased from 59% in 2011 to 83% in 2012

- Most Agile savvy groups are ScrumMasters and Project Mangers(57%)

- The most Agile method is Scrum (52%)

52% of companies state the biggest barrier to Agile Scrum adoption is the in ability to change organizational culture.

Does organizational culture and agile fit together? How?

Michael Sahota is a trainer and Certified Scrum Coach in Toronto. He helps Product Managers collaborate with stakeholders and customers. Michael is internationally recognized as an agile thought leader through regular conference presentations. Below is an interview conducted with Michael about cultural changes in an organization? Here is what he said about the changes.

Michael Sahota mentioned about Schneider model when asked about organizational culture and agile adoption. He explains about the model saying that there are four key culture types in any organization. Below is a picture explaining about four culture types.
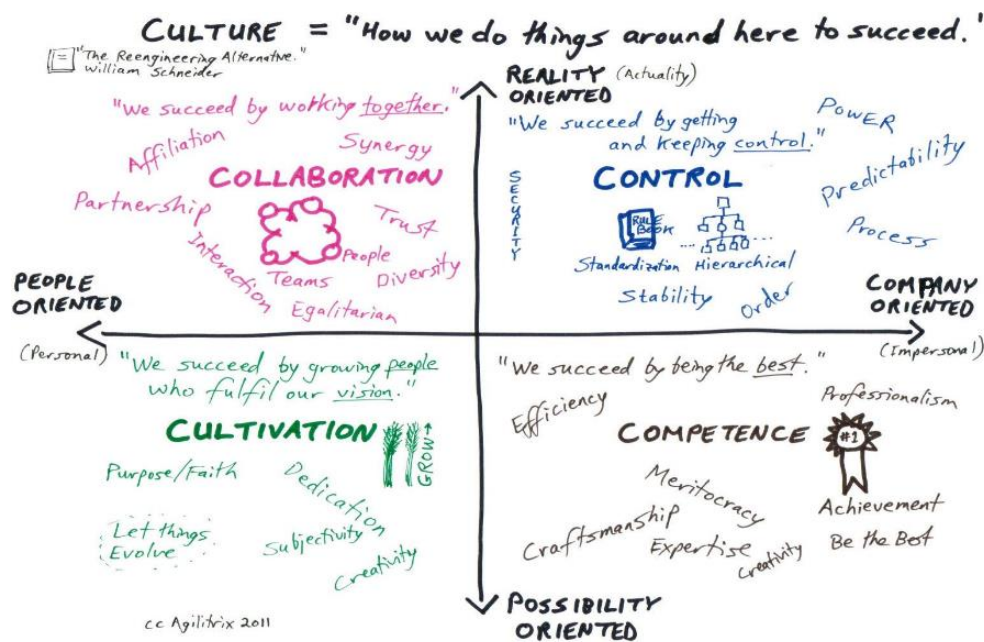

Figure 8

Quadrant 1: For agile the most important and common one is collaboration culture. This means the only way to succeed is by working together. Elements like team work, cooperation and better team organizations come into picture.

Quadrant 2: The second part is about cultivation and growth. Things like learning, personal development and having a vision will fall under this category. These elements help in driving individual success.

Quadrant 3: The next one would be control culture. Having standards. Pre-defined process, hierarchy and maintenance would drive the organization to success.

Quadrant 4: And the final culture is competence culture. This is all about having the best craftsmanship. In this culture people are driven by excellence and capability. Factors like talent shows the results.

Michael Sahota also stated that collaboration and competence are actually opposite in the model. He says collaboration means people succeeding by working together and whereas competence model is quite opposite. In competence people achieve success by their talent and creativity. And therefore being best will be the primary and personal goal. He says more of "I" comes than "We". But in agile scrum it needs more qualities of being a team player. If we observe the agile and compare with these quadrants Schneider has plotted then we can see that Agile has principles toward collaboration and cultivation and less in need of competence.

How can an Organization change its culture?

When Michael Sahota was asked about chances for an organization to change its culture he answered saying for any large established organization it might take anywhere up to 10 years to change. He mentioned about salesforce.com that the company founders viewed that adopting agile has returned them their core values that they would strayed from. He feels that it is possible to bring a change in organizational culture by doing the transformation in parts.

Who would play an important role in cultural changes?

Michael Sahota mentioned in his article that agile coach would play a prominent role in making changes and help the teams to get the where there want to be. Agile coaches can help in training the teams, improving their practices in a way that it wouldn't disturb the organizational culture immediately but they will find a way to fit agile in a simultaneously.

Method (Description of Approach):

Research Design:

In this thesis work I will be answering the research questions using qualitative methodology. Using qualitative method I will be collecting data through surveys, interviewing stakeholders and developing questionnaires. The qualitative data will be conducted researching the literature reviews and case studies which will also be documented in the paper. The main focus will be the on the adoption techniques that will be used or used in the past. The case study will be from an organization which wants the teams to migrate from traditional to agile scrum. This document will be consisting of rapidly changing requirements in the organizations. The other surveys will have the thesis focused on skilled team's efforts, business stakeholder's opinions. I will be presenting about challenges and opportunities when adopting agile. The literature reviews shall play a key role in identifying the agile methods that various companies have incorporated while adopting new methodology. I will also be documenting questioners and answers from the interviews I shall conduct. The questioners also have answers from employees on what they feel about the change the agile method bought.

Further steps to be carried out:

- I shall be doing some more extensive research.
- Reading more literature reviews would help in understanding more about scenarios that might face in the process of adoption.
- Conducting more interviews with stakeholders
- Going through case studies to understand the different causes of failures that might occur during migration.
- Conduct training sessions and document the feedback from the teams to map the scope of development
- Interact with other scrum teams in the organization to understand their strengths and weakness.

Systematic Literature Reviews

Working on various literature reviews help would be one of the methods of approach for doing further research. The following are the reasons why and how literature reviews help.

- The literature review helps in summarizing the existing evidences from various research papers. Literature reviews also helps in finding the benefits and limitations of specific agile method occurred in many instances
- We can also identify gaps in current research and work in the areas that needs further investigation.
- Literature reviews concentrates on a providing a framework or background for doing research based on recommendations in the papers.

Comparing existing methods in practice:

Comparing existing methods through survey question:

To have an idea of existing methods in use I have done some research answering following questions:

What are the current methods in practice?

This research question attempts to discuss the current methods in use. It is well known that traditional methodologies are very popular in many established organizations, so it is immediate concern to find out how agile methods should be implemented. This also contributes to the fundamentals of the paper. The outcome of this paper is expected to give more understanding of most commonly adopted agile methods.

What is the level of adoptability for agile methodology?

One of the most commonly asked question to managers is balancing the need for both predictability and adoptability when choosing a methodology for the project. Fast moving and uncertain environments creates paradoxes that can't be solved. Teams and managers both need to understand the fact that they need to manage both predictability and adoptability while choosing a methodology.

Factor that might affect the migration:

Agile teams predict schedule by time boxing the effort. Time box in the mean while specifies the schedules for the release of the product. Where as in agile agilists the adjust the scope to meet the deadlines which has proved its effectiveness in the projects but on the other side some managers are uncomfortable with scope adjustments feeling that it could under-perform which in some case is true. So experts feel that scope adjustments must be visible and not too complex.

Multi-level, Multi- Timeframe:

The other thing we follow in traditional project teams is we often plan entire project in mind with thousands of detailed tasks. Whereas agile teams do skeleton planning up front and later they have a continuous effort as the project proceeds. The traditional methodology will be having a longer and continuous road map till the end of project ad whereas agile will have broken roadmaps at the end of each release, iterations etc.

Planning is important but value is more important:

Several experts in their interviews and article state that over 50% of functionality in software is rarely used. They believe that if they can try to eliminate then there is more chance to see increase in productivity and meeting deadlines as planned. Agile has proved that product owners calculate the business value of the product which indeed helps in cutting down the waste.

Time horizons:

It is proved that end user are happy to see the shortened deployment tome horizon. Many organizations are doing much better in this regard. In traditional methodology the customer gets to see the product after the end of project but whereas in agile the customer can see after each release. Therefore the experts feel that it is better to predict for few weeks rather than 18 months out. This also solves the mystery of predictability and adoptability issues.

Predictability with requirements:

This is one of the most common issue that is faced by all the teams. Following traditional methodology sometimes might put in a fix. When the product development is work in progress and customers comes with a change the requirements and you will be in a situation where you really can't do anything about it at that time. But in agile there is always a way to add new requirements and prioritize them accordingly which gives an advantage over traditional methodology.

Surveys and Questionnaires

Survey and questionnaires can help in gathering different opinions and stats from group of people. They can be used to analyze and interpret the views of groups. I would be using two commonly used type of questions. They are open ended and close ended. The survey will be administered via email, face to face interaction and other tools available on web.

What are the motivations you find for adopting agile?

The primary reason I found after surveying is that many project managers feel that their customers demand for shorter time frames and release on product. Considering agile methodology has ability to adopt change in requirements quickly it would be helpful in gaining client satisfaction. Their customers believe that shorter time frames allows development and design team to get an instant feedback of what they are looking for.

What are factors that you would consider high priority to have a successful migration?

Based in current situation we understand that there is need for more learning and teamwork. The teams should be more focused on face-to-face communication and social interactions. There should be more importance given stakeholder communications. Organizational structure should become more flexible, participative and should encourage the teams.

What are the challenges that you come across during migration?

Currently the organization is running on management style leadership with executives, project managers and large teams where communication is formal and customers agree to wait to see

the end product for longer time frames. The biggest challenge would be dividing large teams into smaller and self-organizing teams with appropriate expertise.

What are the reasons that could restrict from going agile?

It's interesting to find out that there one common reason many employees have for not going agile is that having trained and traditional waterfall mind set. Organization has been running on traditional methodology for long time and few are reluctant to adopt agile methodology such as scrum. Agile requires collocated and smaller teams which would be another area which takes lot of effort. Sometimes agile has unrealistic timelines given within sprints.

Case Study at Work

The existing method that is in practice is the traditional waterfall environment. There are multiple teams always involved in the projects. The current team size I'm working on is 30 which is huge. We all work on different projects coordinating between ourselves. The challenge that we will be facing is that forming smaller teams from the existing large teams. Adopting agile scrums is not just having a scrum size team but we should be having a proper combination of resources depending the requirement of team. In the past when the team tried and failed agile scrum they have failed because of choosing the wrong resources for the team. The existing size of the team is huge which sometimes creates hassle when it comes to allocating resources to multiple projects.

Face-to-Face Interviews with the Stakeholders involved in case Study:

The key stakeholders for this project would be sponsors, Product owners, Project Managers from various teams and the executives of the company. I have interviewed few stakeholders from various teams to get a quick impression about the project. I was surprised to see that many stakeholders are still not confident enough that Agile Scrum would go long way in the company. Below are some responses I got from few stakeholders when I interviewed in recent past.

Project Manager (Automation Service Operations)

The project manager of this team says that agile scrum wouldn't fit his team because they usually work on issue which might take anytime between hours to a week at times. He expresses that the training time his team has to invest for going agile scrum is effecting his team's performance. He would rather be happy if the management initially try to implement it with a part of Automation Operations and of it is a success then the rest can migrate.

Project manager (Framework)

The project manager of framework team is quite happy with adopting agile scrum. He says that this would ease his way of working with his team. He also said that his team's tasks which would be due in a week or two. Adopting agile scrum would help them have a scrum master who would help them in organizing things in sprints. He also expressed his interest in using a Kanban board which could be visual representation of his team's activities.

Developer (Framework)

The developer from Framework team is happy to adopt agile scrum. He says having a scrum master for his team will help him in clearing impediments he face with external teams. He wants someone to clear the road blocks.

Business owner:

Business owner said that going agile scrum will help organize things better. They believe working in smaller teams will show better results.

Project Manager (Migration)

The project manager for all of this migration project feels that this could be the game changer in the organizations. He believes that working in smaller teams will make things easier when it comes to micro management. He has also mentioned that it could be a rough phase until the teams get fully trained but confident enough about showing results after.

Project Architect:

Project Architect said that it would be really difficult to adopt agile scrum in all the team at once. He feels that it might cause some instability in the organization but architects are trying to accommodate changes without having greater impact.

Results and Findings

Requirement analysis performed to carry out the research in the case study:

The requirements that were necessary to conduct research are:

- The company were looking for independent teams and projects which won't affect the performance of the company.
- Project Mangers had all the project timelines documented
- The other important thing is the dividing a large team of 30 into smaller number of teams and team members.
- We have discussed this with the project owners and other executives in the organization
- We are planning for training sessions.

Case Study Statistics:

The table below gives a comparison of how much agile is accepted in the organization. It describes about the concentration of agile scrum and traditioanl methodology they have been upto in the process of agile adoption. The first column talks about agile manifesto's values and principles. The second column talks about agile score which means it gives a score out of 10 how much the company follows the value or principle. The thrid column talks about the waterfall score which means how much the company follows waterfall in the given value or principle. And last section is comments which gives a quick comment about the value.

Agile Manifesto's Values and Principles	Agile Score	Waterfall Score	Comment
Our highest priority is to satisfy the customer	10	0	Customer satisfaction gets high priority.

through early and continuous delivery of valuable software.			
Welcome changing requirements, even late in development.	10	0	Requirements can be changed anytime during development
Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.	5	5	Some products are delivered in sprints and some processes take long time
Business people and developers must work together daily throughout the project.	10	0	Business users are required in brain storming sessions
Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.	10	0	The company has a supportive environment
The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.	10	0	All the conversations happen face to face since the customers are internal
Working software is the primary measure of progress.	10	0	
Promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.	10	0	Teams are collocated and have advantage of having best communication

Continuous attention to technical excellence and good design enhances agility.	10	0	
Simplicity--the art of maximizing the amount of work not done--is essential.	10	0	Work is as much as it could be simplified
The best architectures, requirements, and designs emerge from self-organizing teams.	10	0	All the teams are self-organized
At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.	10	0	We have daily stand-ups to track the status of teams.

- The first quality the team scored 10 on agile score because the highest priority goes to customer satisfaction in any given methodlogy. The value talks about continuous delivery which gives customer visiblity on the product

- In the second quality the team score 10 again in agile scrum because welcoming change of requirements in any phase. Agile came into lime light because project managers felt it was getting difficult to continue with development when customers were constantly changing requirements.

- The thrid quality talk about delivery in short time where the team scored 5 on agile scrum and 5 on waterfall. Because the teams here had difficulties in coping up sprint schedules.

- Fourth point talk about how much business teams and developers work together. The team follows 100% agile because the team participated in the adoption survey works for internal customers. Therefore the score is 10 on the scale.

- Fifth point talks about the environment created for projects and individuals. The company provides a very supportive environment for the teams.

- The next point is about having a face to face interaction with teams and customers. Like I mentioned in the previous point there is always a chance for more visibility to customers and team's because they are collocated.

- The last three points are inclined more towards agile scrum because working software is primary goal of any project. And the basic quality when working on a project is have a sustainable pace during development. Having attention to detail enhances agility and performance of the teams.

Why do Companies Fail in Adopting Agile?

Ashok Singh who has mentioned an in article published in scrumalliance.org has mentioned that the primary reason why companies fail in adopting agile is because of not having a change in mindset. Ashok also mentioned that companies think that adopting agile is a linear process between traditional to agile. So they look for a journey from waterfall to agile. Adopting agile practices is more than a process change, it's like adopting a culture. The company should realize that they should accept it and change the mindset. There are few thing point what I observed being a scrum master are also mentioned in the article.

Fear of Failure:

The next reason for failure is having "Fear of Failure". Companies with no experience in agile lack understanding if agile culture and fear to accept the change. They are afraid that their financial goals might get affected if they fail to adopt. This fear results in forcing teams in hybrid agile adoption. They try to bring changes to become fail safe. But in reality this becomes major reason for failure because they never learn the real agile values.

Being too liberal on agile:

Companies always make the decision to adopt agile practices with high hopes. But they should also realize the fact that adopting agile is not enough they should also adhere to agile values and principles. When the companies start being liberal towards agile values disillusions sets in

and they start wondering if they had made right decision. For the facts agile never fails if implemented correctly. The companies usually sense failure when they see following things:

- Failure of iterations
- Teams and team members not adhering agile principles
- Inability of maintaining cross functional teams

Results from Experiments:

Case study at work:

Experiment 1

Description about the project:

The company I work for have conducted analysis by experimenting on independent teams which wouldn't affect the performance line of the organization. We have chosen interns who were hired to be a part of newly proposed product and other set of experienced professional who have been working with the organization for a while now. They were trained for couple of weeks on agile scrum before they started working on the project.

What have we found?

- We have noticed that it was very east for the agile coaches to train the interns. The reason behind this was since they were fresh graduates from the college and open for agile scrum environment.
- On the other side we have noticed that the experienced set of people found real hard to get comfortable with the new environment.
- We found this difference in the level of understanding because on one side the interns were new to these methods and hence they found it easy to learn and understand and whereas on the other side the experienced employees found hard because they working in a different environment all this time and weren't comfortable in understanding the new environment.

- We have observed similar responses in the brainstorming sessions that we conducted for the adopting agile scrum.

Results after the experiment:

After initial stage of analysis and experimenting on smaller teams we have observed that it is easy to train the new people on projects as they are open to any kind of environment. We should be open for challenges that we will be coming across when we start training the teams on a full schedule. We should investing more time in training so as to make them comfortable in understanding the new environment.

Experiment 2:

Description about the experiment:

There was another experiment conducted in the same organization from above experiment. This time the company has implemented agile scrum on two different types of project. The first project was an improvement project where the team has set of new features which they should be adding to an existing infrastructure tool used internally. The second project was a brand new one which needs to start from the scratch. The tea, working on this project were hearing for the first time about the requirements from the client. There was one common project manager who has good experience in the organization.

Results after the project:

After the end of both the project when I interacted with the project manager about the project I came know few interesting things happened. The improvement project that the team took over went real well with agile scrum. They had set deadlines, perfect sprint planning and expected results. The project manager said that it was really easy for him to make a project plan because they knew what they were dealing with. The sprints were perfectly planned and completed as per schedule. As it was an improvement project it was more visible for the teams what the end points were.

The second team which were working on a brand new project found it very difficult. The project found it very difficult to create a project plans because there was no proper expectation from the teams. The sprints that were planned also did not find any success. There were sprints which were interrupted because of improper management. At sprint retrospective meetings the feedback were the two weeks' time frame was difficult to meet the deadlines. The teams when asked about the feedback on project they have worked on the common feedback was they were not giving proper training on the new methodology which made things very difficult to understand the process and the deadlines.

Feedback from teams:

When agile scrum was adopted in the team we surely have few changes that have been in place. Following are the points taken from feedback given by teams after going agile.

- Teams started being more independent and responsible
- The customers started loving the new culture of having seeing a prototype and improvement in every iteration
- Teams can now manager shifting priorities more effectively according to customer's requirements
- Incoming project changes are now predicted and tracked
- Teams can now get rapid feedback from the stakeholders in every sprint meeting

Comparing experiments

During the research I have gone through many experiments which were related to agile scrum. I would like to write about the observations and conclusions I have made from the below experiments conducted in different companies followed by a suggested solution

Implementing and Coordinating between offshore and onshore teams:

After reading an article published by PWC about agile adoption they have mentioned about incorporating offshore and remote teams. With the off shore culture rapidly increasing to reduce the development and infrastructure cost PWC had come up with a discussion to work on

staffing model and agile framework. The company is supportive towards off shore culture because the company can a have a blend of experience and talent from various experts.

The discussion I would want to talk about is what could be the risk mitigation measures of not having an agile team together in one physical location. One point the company tried is to facilitate communications between offshore and onshore teams using web based agile project management tools. Utilizing offshore resources helps in involving varies experts from different locations but might introduce some risks.

APM Volunteer Research report:

In the report the writer expresses about the how agile can address the causes of development project failures. The author states that agile methodology has evolved in the last 10 years. The agile unfortunately faced many challenges of complexity and level failures remain high.

The author has given a case study from Nokia in 2011. He states that results revealed that the benefits of agile increased the rate of satisfaction and effectiveness in the quality and performance. The survey says also says that even agile had adopted its characteristics from software development arena. Author also discuss about the project manager's use their experience in choosing best methods to for the projects. The survey says that agile has improved project management in the areas of stakeholder management, team communications between the teams which are not co-located.

Suggestion to the problem:

Employing a partially overlapping schedule between onshore and offshore teams might improve communication channels between teams and also help mitigate risks caused by communication failures. It is suggested to have employees partially overlapping their schedules between onshore and offshore teams will help in improving productivity. The members involved in the projects should work at same time for at least two hours a day. This will help in better coordination. Requirements gathered one day can be developed by off shore team the next morning. Implementing this strategy in continuous cycles will also break the communication barriers.

Case study:

I had interviewed an agile practitioner as a part of research. Rohit is an agile coach and Certified Scrum Master (CSM). The company he works also adopted agile scrum for one their projects. So here the experiences form the project Rohit has shared with me. The company wanted to go with agile scrum methodology because of the complexity in the project. There were more than eight different divisions in the company were involved in the company. The project is about a feature they would like to add to their customer care tool. The tool is currently used to check and verify information and products customer have with them. The marketing team wanted to add a new feature in the system through which the customer care representative can pitch a sale to the customer.

The business hierarchy to this project was like this:

Client -> Call center -> Customer Care Representative -> Customer Information Tool.

An agile scrum team was picked and the project had started. The initial challenge the team had come across was to start requirement gathering. There were different divisions of the company and the question was where they start from. The challenge was they did not have an agile product owner. The company appointed one of the mangers as proxy product owner. Rohit said that because there was no designated product owner it had become very difficult for them to get the requirements from business users. Even the teams couldn't make it to requirement session because of their hectic schedule. Rohit said even though the project was successful it was delayed for over six months than the proposed time at the beginning.

Challenges faced during the project:

- The team did not have a designated agile product owner which created communication gaps between teams.
- The business users couldn't spend time for requirement gathering
- Unavailability of Product Owner caused delay in backlogs.

Discussions

What do you feel about agile scrum?

When I opened a discussion about the topic in thesis there were lot of good feedback about adopting agile scrum. But there were people who are against going agile scrum in the organization. Especially people who are well established in the company working traditional methodology feel uncomfortable with agile scrum. They have an opinion that in agile scrum the tea need to manage business users and programmers are not great at managing clients. They feel that working with non-technical people make things harder for them because they should be taking all the business requirements which are direct requirements and confuse them what customer wants.

Teams feel that transparency in agile scrum is making project unproductive. When people are forced to work on two week sprint to satisfy the immediate business requirement they lose interest in working on the long project. It creates unnecessary excitement in the teams and destroys one's productivity skills when rushed for a two week deadline. I often got feedback about agile scrum that it is designed for companies which have no strong foundation and their only goal is non-negotiable with clients. They are ready to face tight deadlines in the project which decrease the efficiency and increase risk.

What are the project management issues addressed in the newly adopted method (Agile scrum)?

The project usually takes long duration to finish. Having unrealistic deadlines calculated and organized in mind would be a difficult task for project managers. Agile scrum has given a solution to this problem. In agile scrum the project is spilt into individual sprints which usually last for a month. There will be sprint retrospective meeting at the end of each iteration which gives a chance to review the project and prioritize the tasks at the start of a new sprint.

Stress on initial planning for the whole project has decreased and given a lead to understand the dependencies as the project progress. In agile scrum project managers can plan the project

on a high level without worrying about details. The product backlogs will be prioritized by business user which makes thing easier.

Any change to the project need not be documented and have to go through the change request document whereas it can be discussed in the next sprint meeting and can be done without hassle

If requirements are not understood by the development team it can lead to project failure but in agile scrum requirement selected for the each sprint are developed and released after at the end of release. Any changes requested by the customer can be accommodated.

Limitations:

In this paper you will find several limitations that should be taken into consideration while working with the reported finding and results.

- This paper has limited literature reviews research
- The paper dose not include chapters from agile project man agent or PMBOK.
- Since the research is conducted by individual researcher there is always possibility of threat to validity when compared to other research materials. There is always threat to the validity which might affect the accuracy of research in unfavorable way.
- Another threat to validly is that data that is displayed in the paper might differ from other researchers which might also affect accurate results.

Conclusion

I want to conclude this paper by writing down few points. After conducting research on why companies fail adopting agile I have understood that:

Adopting a new methodology means adopting a new culture. A company should be ready to adopt a new set of techniques, tools and cultural shifts. I have put best efforts to include major challenges faced by companies, employees and agile coaches while adopting agile.

I would also want to add that when agile scrum is adopted in a company we can't measure the success or failure criteria because agile scrum works well for few team and it does not suit certain division in the organization.

From my research I have understood that agile scrum when implemented for any improvement project it shows better results rather than implementing it on a brand new projects. I have also mentioned success factors for having a smooth and hassle free transformation from traditional model to agile scrum.

In this paper I have also presented my analysis and statistics from experiments conducted which gives an idea why agile scrum is not accepted by everyone in the company. The objective is to help companies to understand the key characteristics of these processes and adhere to values and principles when they adopt agile scrum.

Recommendations for Future Study

After intense research and information gathered I would like to conclude the thesis on adoption of agile scrum is increasing rapidly. In the current pace that agile scrum is growing there is need for more research to be performed on agile scrum. The further recommendation could be performed on conducting a comprehensive survey of practitioners to identify the challenges that companies face after adopting agile scrum. Working on post adoption problems would also help companies to avoid commonly made mistakes.

In addition to it, there can also be further work done in different types of industries how agile scrum is been adopted and used. Finally I would say that the present study met its objectives and has also shown possible areas and opportunities to carry out research about the subject.

Commonly used terms:

- **Agile**: Agile is time boxed approach to deliver a software or a product that is built incrementally from start of project.

- **Scrum**: Scrum is an agile framework in project management.

- **Sprints**: It is a set period time in which a specific task discussed needs to be completed.

- **Product Backlogs**: A collection of stories and tasks for a product that will be prioritized during sprint meetings.

- **Scrum Master**: The scrum master is a facilitator for the team. He is the servant leader. He is responsible for making sure that scum practices are being followed by the team. He is also responsible for clearing impediments.

- **Scrum Team:** A scrum team comprises of 5 – 7 people which includes developers, business analysts, testers and other experts who are required in the project. Scrum teams are cross functional.

- **Cross-Functional teams**: Teams which comprise of various functional and technical skill set.

- **Kanban**: Kanban is a tool used represent state of work in progress

- **Stakeholder**: Anyone external who is interested in outcome of the teams work.

- **Product Owner**: Scrum role who decides the done criteria.

- **Daily Scrum Standup meeting**: A daily meeting for each team member to answer three question before the start of day
    - What have I done?
    - What am I doing?
    - What are the impediments I have which are affecting my work.

- **Release**: Release is an incremental phase where a potential product prototype is delivered to customer.

- **Sprint Retrospective Meeting:** The last thing done at the end of sprint.

- **Impediments:** Anything that prevents a member of team from performing the work effectively. The team member will have to put this in front in scrum stand up meetings which will be taken care by scrum master.

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