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A Case Study on PPL's Journey to Agile Transition

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Contents

ABSTRACT

PPL Pennsylvania Power and Light Electric Utility Company is one of the largest power and light provider. PPL was found in 1920 and since then PPL has developed and extended its business over Pennsylvania, Kentucky and Great Britain. PPL performs planning and managing of several different Agile and Traditional projects. This paper will contain the information on PPL value services and challenges faced in developing traditional projects and agile projects. Attaining and maintaining competitive advantage of the company in the market. Challenges faced by the human resources in Agile and waterfall projects and with the implementation of using latest technical tools based on the project approach.

This paper will contain the PPL's journey from waterfall to agile and the implementation steps taken to make this change a success. All the focus areas will the evaluated based on the feedback from the human resources and online materials such as books, journals.

KEYWORDS:

Few Keywords: business processes, Project Methodology, Project Management

1. INTRODUCTION TO PPL

PPL is a public Corporation which was found in 1920. It currently serves 1.4 million customers in 29 counties of Pennsylvania in the United States and maintains more than 48,000 miles of power lines. PPL is the largest electric supplier and ranked highly among companies in the United States for customer service and satisfaction, providing high quality service to residential and business customers. It controls 8,000 megawatts of electricity in USA. Its mission is to provide reliable, safe energy at the reasonable cost to customers (residential or business) and best in sector returns to shareholders.

PPL Electric Utility headquarters is located in Allentown PA. It offers several different services to the customers of which customer safety is the top most priority. PPL has many power plants which burn coals, oil or natural gas. PPL has been using Agile since 2009 to until now 2016 on over 100 projects. Agile Transition has never been very easy and it is important to define the framework and set up the agile foundation. In PPL from agile three main frameworks were adopted such as Kanban, Scrum and Bundle enhancements.

2. AGILE IT OVERVIEW

2.1. Background

PPL has a history of planning and managing software projects. It has been following Waterfall from last several years and adopted agile in the year 2009. According to Alan "Agile Method" was created more recently in February 2001, by 17 of the lead developers and proponents of what were then known as "light" methodologies. The core values of Agile Manifesto are individuals and interactions, working software, Customer collaboration and responding to change. (Koch, 2004)

2.2. What is Agile?

Agile is not the methodology, it is set of principles and practices focusing on frequent delivery of the valuable resolutions to the company. Agile is essential paradigm shift for organizations to improve project delivery success rates. (Kloppenborg, 2016)

2.3. Difference between Traditional and Agile

Traditional and Waterfall process are compared for suitability with Business Transformation projects from an organizational and business perspective.

Traditional Projects typically collaborates at the beginning and the end of the project lifecycle whereas in agile customer collaboration happens very frequently and involves more customer interactions. In Tradition projects all the defined scope features such as medium, high, low priority are delivered whereas in agile highest priority and risk features are delivered first so if it fails initially it can be fixed quickly. In agile working software is completed and accepted in incrementally and iteratively in short periods whereas in traditional Monthly percent complete is based on the project plan or Earned Value Analysis (EVA). If there is a change in scope agile embraces and expects it. All the features delivery is estimated and re-prioritized in iteration which occurs in every 2- 3 weeks. In traditional there is very less scope of change is expected and it is supported by standard scope change process.

2.4. Agile Principles

The 12 main agile principles are the following:

- *Value of the Deliverable*- Delivering highest priority features frequently and continuous delivery of the valuable software.

- *Adapting the changes and building the right features*- changing requirements are expected and adapted even in late development in order to satisfy the business needs and for competitive advantage.

- *Shorten the Feedback loops*- Delivering the working application in short schedules from couple of weeks to couple of months.

- *Build the right things right*- Enable Technical team to work together every day and focus on technical excellence.

- *Face to face interactive environment*- Enable the team to have more and more interaction with the team or an individual.

- *Allowing the product teams*- Putting them in charge of their own intention.

- *Measuring the outcome*- focusing on the progress of the working software.

- *Promoting sustainable development*- short iterations, tasks and schedules etc.

- *Simplicity*- Maximizing the amount of work done.

- *Allow developing architectures and design*- continuous focus on design and technical excellence can improve the agility.

- *Inspect and adapt*- The team should implement adjustments based on the best approach for the project to move forward.

2.5. Why Agile?

The Main benefits of agile are that it responds well to changes. Changes can be expected anytime in the project for competitive advantage. The functionalities are delivered based on the priorities assigned to that user story. This reduces waste of Time and since the team is concentration more on high priority functionalities of the application it increases the quality of

the deliverable. It allows having more interaction between the team and an individual of the team.

16%

45%

19%

7%   13%

Sometimes
Rarely
Often
Aways
Never
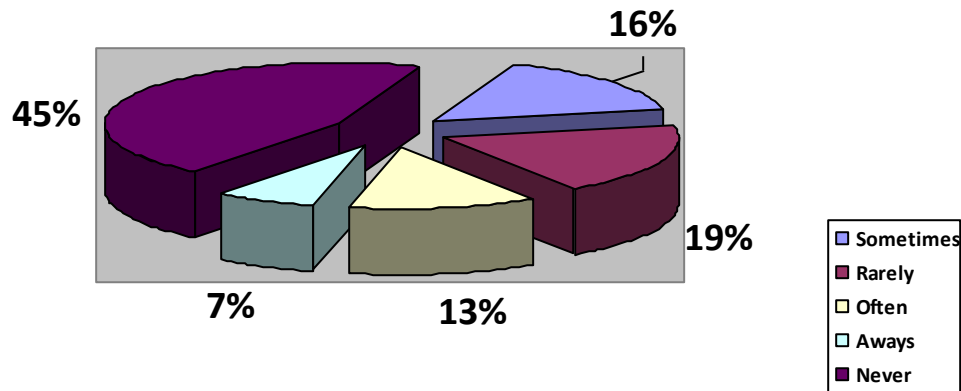
Figure 1 Features Used in Typical system

3. PROBLEM STATEMENT AND JUSTIFICATION

This paper further focuses on the details regarding PPL Electric Utility Company and overall checklist for success of the Projects. Therefore it discusses following issues:

- Key factors in transition of the Agile and Traditional projects

- Challenges faced with in the company with the transition to agile

- Software Rationalization- Consolidated Tools

- Main approaches/frameworks adopted by PPL in different projects.

Transforming into Agile did not happen suddenly and it was not so easy process. It took lot of groundwork and effort to create the agile base for the projects. Adopting the framework based on the Project type is also important. The inputs for this paper are obtained from the

articles and through interviewing different PPL employees on this transition. This paper will help reader understand the transition process and the challenges that are faced in this transition. Due to Agile advantages several projects are adopting Agile and transforming from waterfall to agile, hence this paper will help the reader determines all the barriers challenges and the key factors of the transition.

4. LITERATURE REVIEW -- ANALYSIS OF RELATED WORK

PPL provides services to central and northeastern Pennsylvania from Lancaster, Leigh valley, Scranton and Wilkes-Barre. PPL Electric Utilities has won 24 J.D. Power and Associates awards for providing top-quality service to residential and business customers. (PPL Electric Utilities).

PPL Electric is also the first in Pennsylvania to track hourly usage of all residential and bsuiensss customers using the advanced metering system. This system stores hourly electircity use data. PPl also has special offers for low income customers, it spends nearly $70 million every year on low income cutomers. In the next years ppl is expecting to improve the electric delivery system. (PPL Electric Utilities). Agile started in PPL by involving agile coaches, providing agile training for agile project roles, conduction ad-hoc agile workshops to improve the delivery.

The most important guidance when agile is new to an area initial pilot project to have well-defined scope and dates. Keeping small team from 4 to 8 is highly recommended and also implementing small agile practices such as daily stand ups, sprint planning, sprint demo, sprint retro and sprint backlog grooming. In tradition project managers are key team success whereas in agile Scrum Masters are the key team success.

According to Chaos Report across all the project sizes agile approach resulted in more successful projects and less failures. Below is the daigram which shows the Agile versus Waterfall sizes of the projects and their success and failuer rate (Wojewoda, 2015):

CHAOS RESOLUTION BY AGILE VERSUS WATERFALL

SIZE	METHOD	SUCCESSFUL	CHALLENGED	FAILED
All Size Projects	Agile	39%	52%	9%
	Waterfall	11%	60%	29%
Large Size Projects	Agile	18%	59%	23%
	Waterfall	3%	55%	42%
Medium Size Projects	Agile	27%	62%	11%
	Waterfall	7%	68%	25%
Small Size Projects	Agile	58%	38%	4%
	Waterfall	44%	45%	11%

The resolution of all software projects from FY2011–2015 within the new CHAOS database, segmented by the agile process and waterfall method. The total number of software projects is over 10,000

In today's world business as usual is a change and every company is adopting change. Change is constant and whether it is a small change or the whole system change there are always challenges that comes with the change. Harvard Business school professor and change expert introduced 8 step change model.

4.1.   Kotter's 8 step change Model:

- Create Urgency
- Form a Powerful Coalition
- Create a vision for Change

- Communicate the Vision

- Remove Obstacles

- Create short term wins

- Build on the Change

- Anchor the changes in Corporate culture (Sahota, 2012)

A framework is a supporting structure (process) to do something. A solid framework is necessary

to increase the adoption of the process and make it more effective. Therefore the three top most

frameworks that PPL uses are Kanban Framework, Scrum and Bundle projects.

4.2. Agile at PPL

In 2013 the state of agile adoption at PPL was estimated to rise from 10% to 40%. Most

of the project types that are using agile are Application development, COTS (Commercial off the

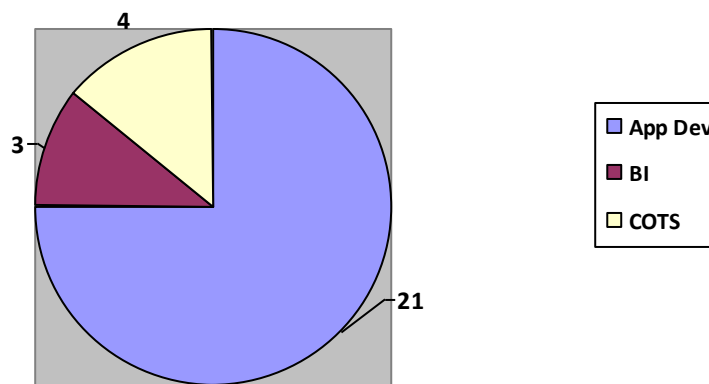Shelf) and BI projects. (PPL Electric Utilities)

Figure 2 Project Types uses Agile

Since 2010 until 2013 more than 45 larger projects have used Agile. There are currently

many experience active Scrum Masters and coaches involved in PPL Agile projects. The average

84% of the projects exceeds it estimated time and agile helps in reducing that project time. 64% of the features that are delivered are hardly been used whereas in agile the features are delivered based the highest priority or business value in different sprints. 2/3rd of the projects overrun their budgets and 40% of the project requirements changes during the project duration. Agile helps the project to overcome all the above situations.

Below is the diagram how Agile was visualized at PPL (PPL Electric Utilities):

Daily Scrum

Sprint Demo
*Team demonstrates **completed functionality** to interested stakeholders, Gathering feedback.*

Product Backlog Prioritized by Product Owner

Sprint Backlog tasks Expanded by team

Sprint Backlog

Two-week Sprint

Sprint Planning
Select, disaggregate, and refine acceptance criteria for prioritized User Stories

Potentially Shippable – ***working***

Retrospectiv

Figure 3 Agile Visualized

4.3.   What is Kanban Framework?

Kanban if the Adaption of lean manufacturing principles, primarily emphasizing minimal work-in-progress. The different roles in Kanban PPL are Team Lead, Technologists and Kanban Facilitators. Team lead is the one who manages prioritized backlog and also represents the customer needs. Kanban Facilitator facilitates the discussions representing kanban frameworks and butures self organizations. Technologists are the admins, archetects or the one who designs, builds and tests works in delivery solutions.
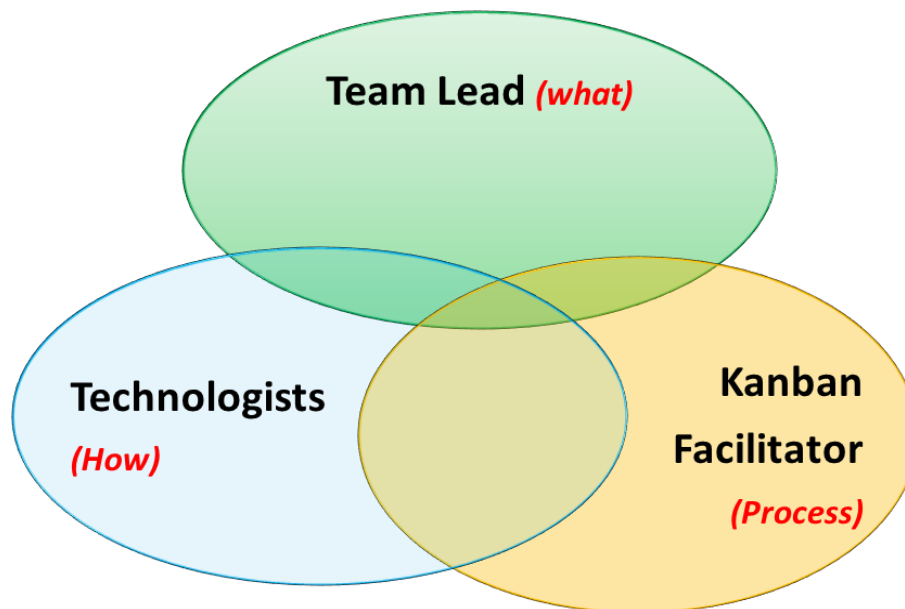
Figure 3- PPL Kanban Roles

Kanban Framework is mainly used for Hardware Projects, below is the Kanban Board:
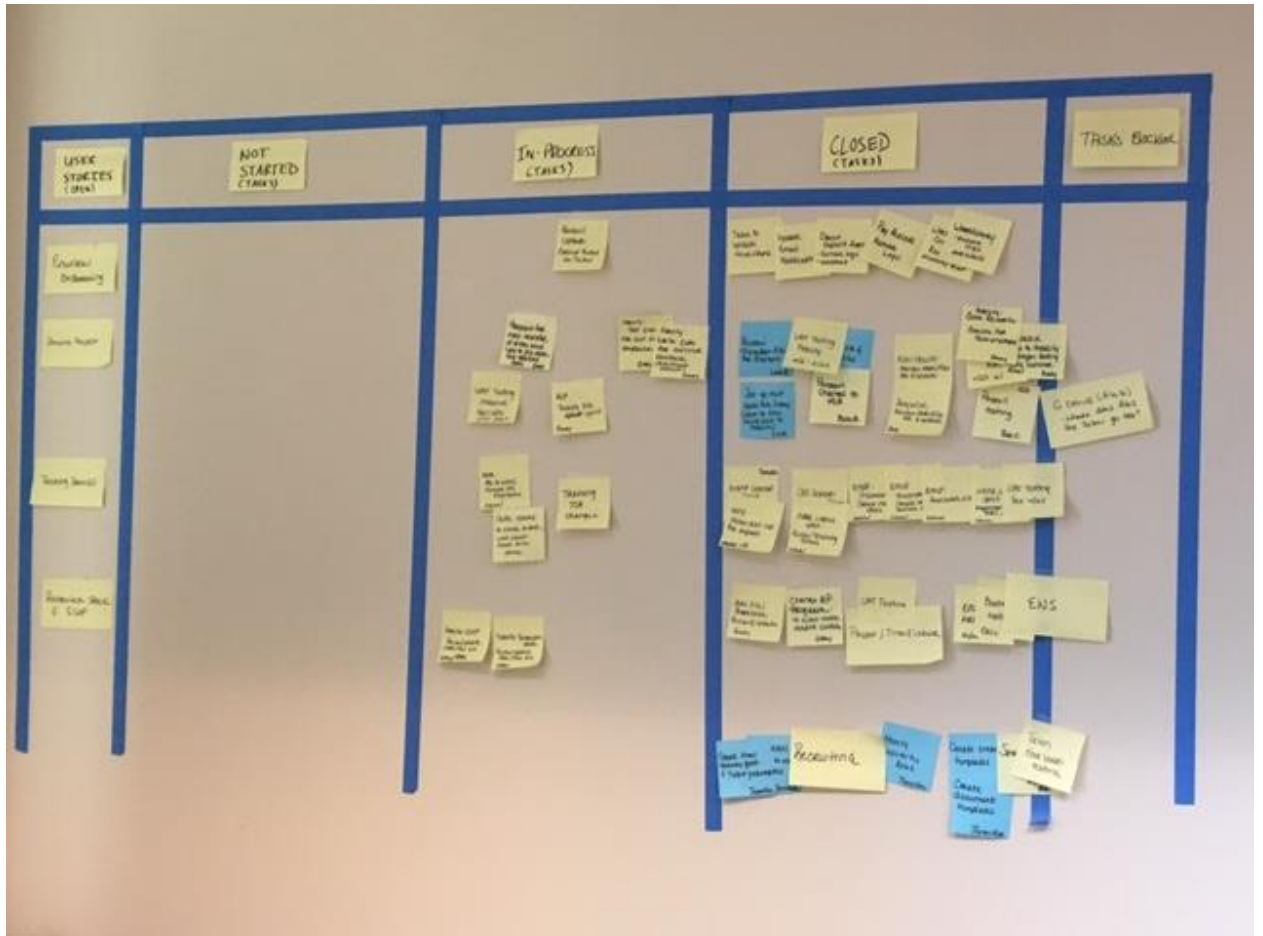
Figure 4 Kanban Board

Key PPL Kanban Events inclused Sprint 0 kick off and Backlog workshop, Sprint

Planning, Daily stand ups, and sprint Retrospectives. The Key Principles of Kanban are:

- Start with what you do now

- Visualize work

- Limit WIP

- Measure and manage flow

- Implement feedback loops

- Improve collaboratively, evolve experimentally

4.4. Kanban Artifacts

The two Key Artifacts of Kanban are Task board and Retrospec tive Summary. Taskboard is one

of Key Kanban artifacts which is the physical representation on work for the print. It facilitates

daily stand ups and displays blocks. The other artifact is Retrospective Summary which

represents the results of Sprint Retrospective inlucdes the pros and cons of the projects and how

can it be imporved. (PPL Electric Utilities)

4.5. What is Scrum Framework?

Scrum framework promotes transparency and communication saturation, which together

enable the team to regularly inspect and adapt to change. In this High level themes or user stories,

Visual representation of product evolution over time and defines dates and project milestones.

Scrum Framework is mainly used for Software projects, below are the sample scrum boards:

Figure 5 Scrum Board
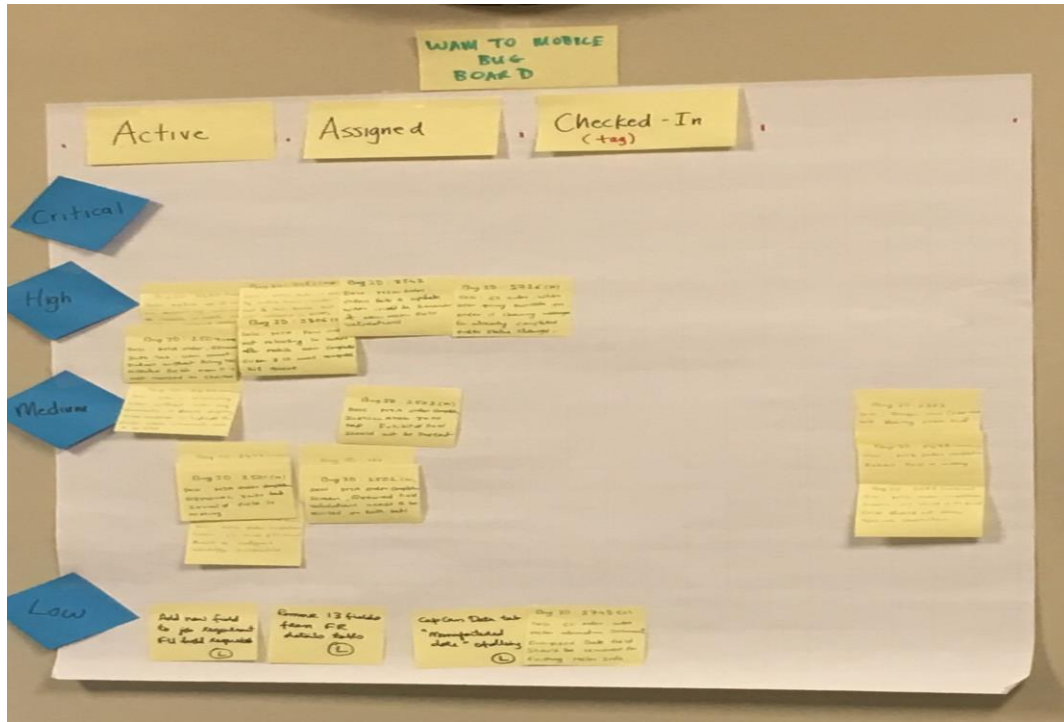
Figure 6 Bug Board

4.6.   What is Bundle Projects Framework?

Agile for Enhancement Bundle Projects was used for the projects which are the enhancements of

the existing of the application or software. Business advantages are Fliexibility, Time to market,

Visibility, Quality and Flexible agile process etc. IT advantages are Manages both project and

operations, less demand on supervisor, resourcess management, visibility and accountability and

flexible agile process.

PPL agile scrum roles includess product Owners who manages what to be included, prioritizes

the backlog and represents the customer needs. PM/Scrum Master facilitates the disscussions and

represents Scrum framework and Developers/IT BA's delivers the solutions by designing,

building and Testig. (PPL Electric Utilities)

Figure 7 PPL Agile Scrum roles

Figure 8 Scrum Board Project 2

4.7. Coaching and Agile Adoption

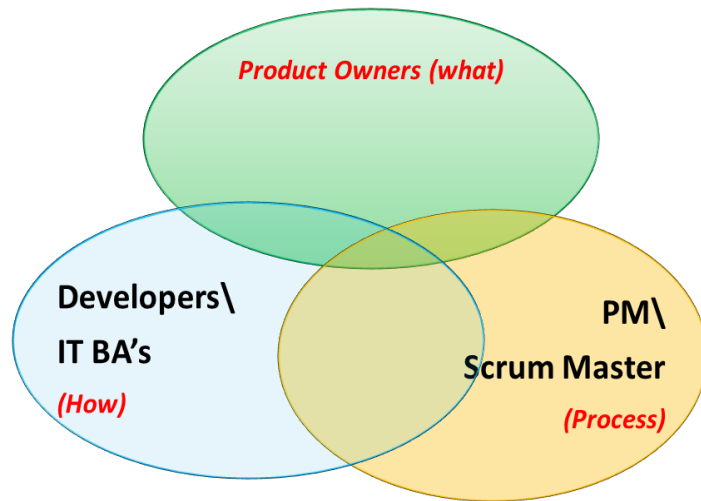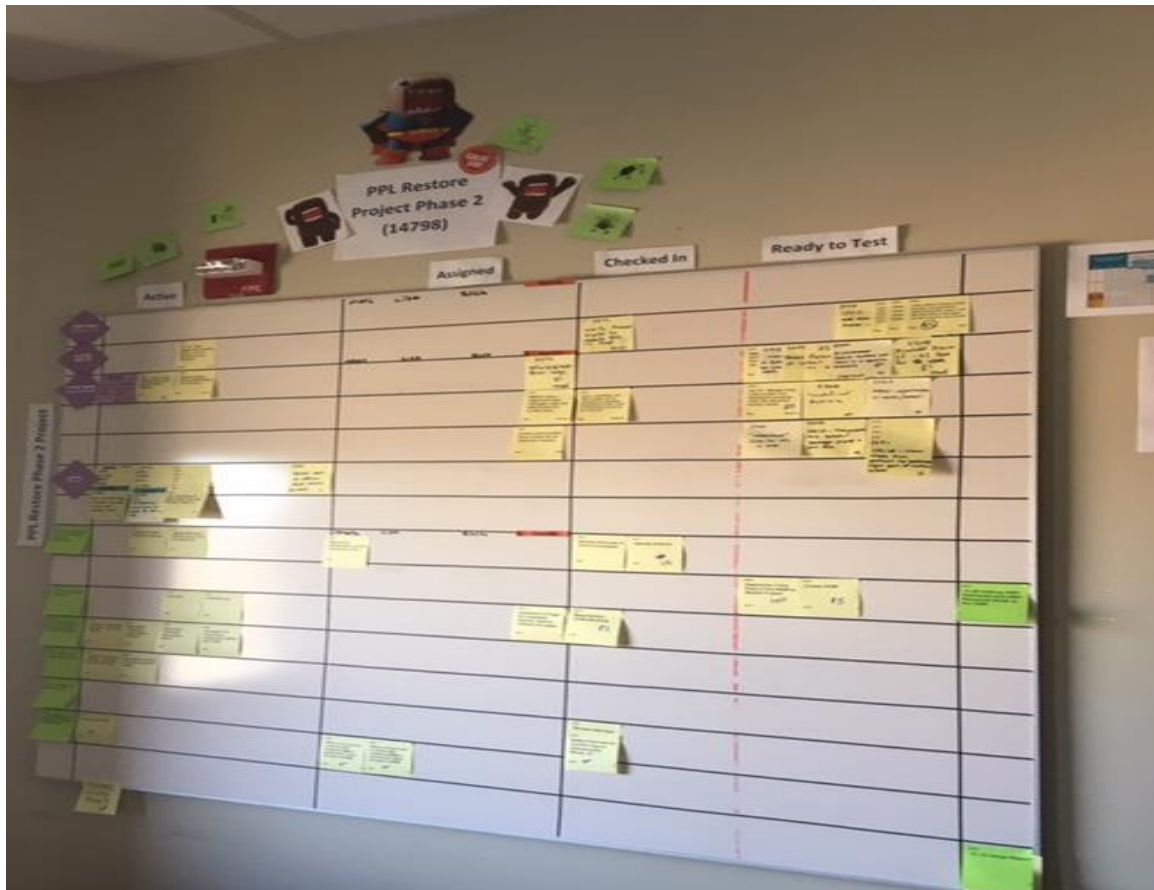In 2013 it was estimated that 35% (~ 18 million dollars) of the application development budget was spent on projects that use the Agile methodology. This is a 5% increase from 2012. (PPL Electric Utilities)

Coaching support model are not flexible:

- Internal coaches have to backfill when external coaches are not on site.

- Fixed scheduling of external resources does not work well with changing project priorities that result in changing project start dates

- Internal coaches not able to sustain current demand and accelerate adoption

5. Cultural Shift in Organization

5.1. Cultural Shift

Agile impacts the whole system and it requires change management to shift from waterfall to agile. Hence to be successful in agile transformation, organizations must practice and deploy change management capabilities and practices and agendas to monitor their efforts. Effective change management is iterative, adaptive, and assessable and depend heavily on management, sponsorship and ongoing communications. Organizational culture is not one day immediate process, instead it takes a very long time to change, however a cultural valuation will deliver you with the perception and ability to support phases of your culture that support agility and identify aspects that do not. (Kindsfater-Yerkes)

5.2. Building an Agile culture

With the Change management effort to Agile benefits the business very large but changing culture is hard. People frequently underestimate the complications related to shifting the current customer within their organization. Adopting agile approaches can cause conflicts.

This paradigm change may not be accepted by team members or some team members may not have expertise / experience to use new development approaches, such as pair programming or test driven development (TDD), and therefore reject agile as not including them. (Feggins, 2014)

According to Reedy Feggins[i], the three most critical success factors in adopting agile by organizations are:

- Clearly stated objectives and motivations communicated by senior management to all levels
- Shared ownership by impacted members and engagement of middle management
- Understanding of organizational change concerns and a well though out method to overcoming them.
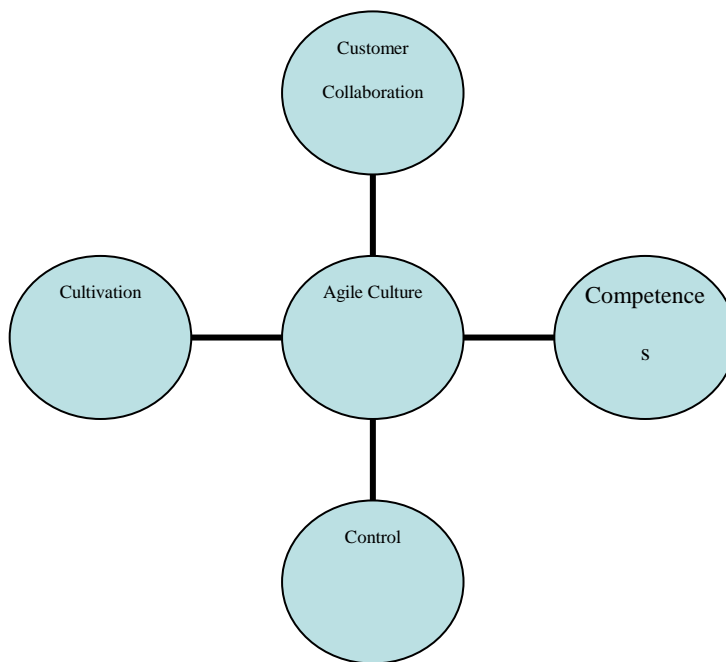
5.3.   Agile Culture

Figure 9 Agile Culture

- Cultivation

- Control

- Competences

5.4.   Barriers to Agile Adoption

Adoption of agile development continuous in the organizations has increased rapidly. 94%

percent of all organizations surveyed in Version One's 9th Annual State of Agile Survey

practice agile. And, the respondent's percentage with distributed agile teams jumped from

35% to 80% from 2012 to 2014. (CGI)

Respondents in the 9th Annual State of Agile Survey cited the following as the leading

causes of failed agile projects:

- Lack of experience with agile methods **(44%)**

- Company philosophy or culture at odds with core agile values **(42%)**

- Lack of management support **(38%)**

- External pressure to follow traditional waterfall processes **(37%)**

- Lack of support for cultural transition **(36%)**

- A broader organizational or communications problem **(33%)**

- Unwillingness of team to follow agile **(33%)**

- Insufficient training **(30%)**

According to the 10th Annual State of Agile Report Agile is succeeding at Scale. In 2006,

nearly two-thirds of the survey respondents said they worked in software organizations with

fewer than 100 people. By 2015, nearly two-thirds of the respondents said they worked for

software organizations with more than 100 people, and 31% said they worked for software organizations with more than 1,000 people. (Versionone, 2016)

According to 2016 report the highest barrier is Ability to change organizational culture which is 55%.
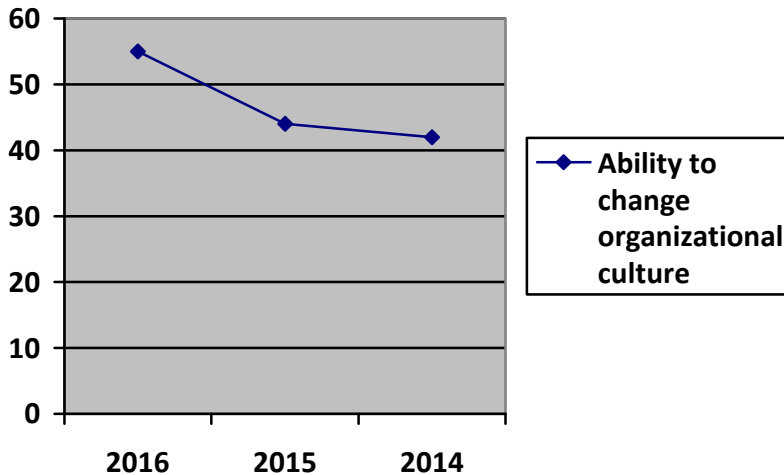
Figure 10 Ability to change organizational culture

The highest rating among Agile techniques employed is Daily stand up's that is 83 percent. Daily stand up is a very good technique in agile to discuss the daily improvement and the issues or concerns involved so it can addressed and resolved quickly. The second is Prioritized backlogs 82 percent. Prioritized the features and then delivering in short sprint provides the great advantage for projects. (Versionone, 2016)

Company culture continues to lead the top reasons of failed agile projects with company philosophy or culture at odds with core agile values at 46%, and lack of management support for cultural transition at 38%.

The top three benefits of Agile is Ability to manage changing priorities 85% percent, increased team productivity 84 percent and Improved project visibility 84 percent.

According to Version One 10 Status of Agile report, not just IT but different other industries have adopted Agile in their project development. Below is the graph of the Industries (Versionone, 2016)
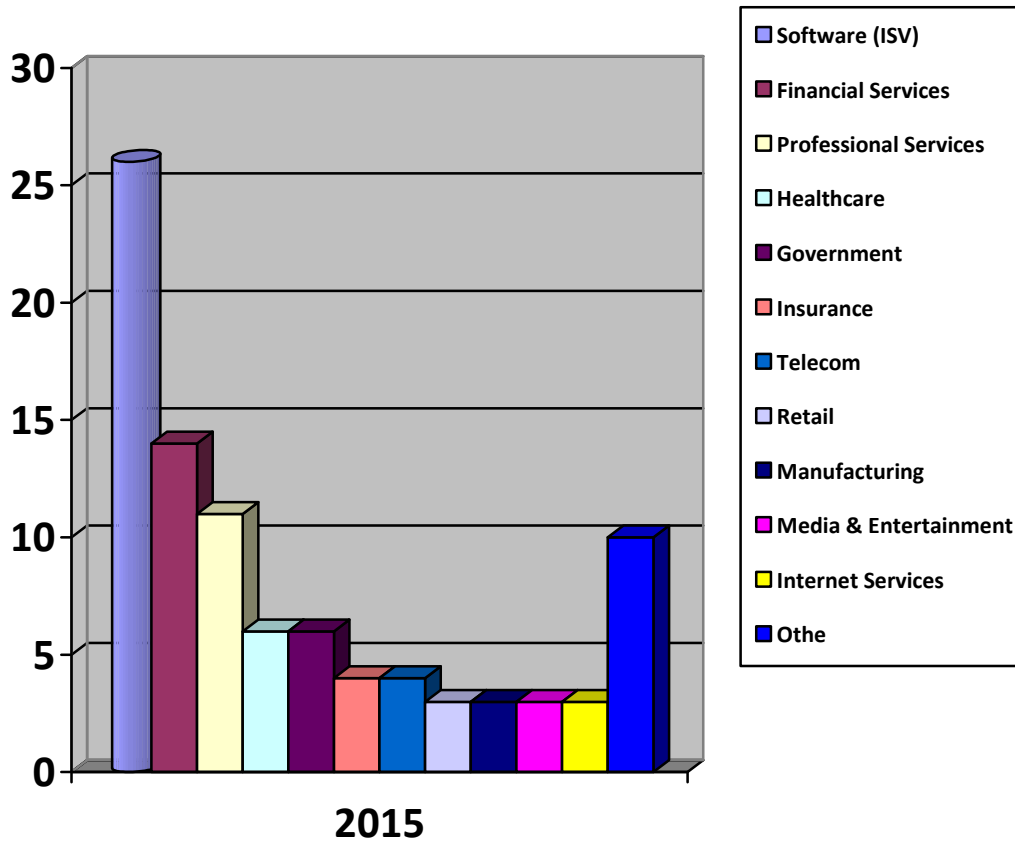
Figure 11 Agile in different Industries

6. METHODOLOGY

The Data collection methodology for this study would Qualitative method.

There will be two ways of Data Collection one is interviewing the project managers and getting their experiences and feedback on the Agile transition. Going through the case studies and articles about the transition and challenges faced during this transition. The last method would be through collecting questionnaire from employees of PPL and other company

involved in the transition and getting their experience. Questionnaire will contain more open ended questions and one will be closed ended question.

6.1.   Qualitative Questionnaires

The Questionnaire will include Qualitative questions and not the multiple choices where the interviewer will ask to provide the feedback about their personal experience. Different set of questionnaire will be prepared for BA, QA and project Managers/Scrum Masters based on their roles. Questionnaires will be collected from team members such as developers, BA and QA. Questions in the questionnaire will include about their roles and responsibilities, challenges that they have faced in agile and waterfall projects. Their feedback about the agile projects that they working on and the kind of tools that they are using in their current projects also including their views on this transition and how they feel about this change.

6.2.   Personal Interviews

The results will be produced based on the personal interviews and questionnaire collected from the PPL Employees who are involved in PPL agile and waterfall projects. PPL employees such as developers, Quality Analysts, Business Analysts and Projects Managers/Scrum masters who manage daily agile and waterfall projects in PPL. The questionnaire and interview questions will include their experience working waterfall and agile projects. From the perspective of developers, BA, QA and projects Managers will help this study to determine the challenges that they are facing and how their roles and responsibility varies from waterfall to agile projects.

Personal interview will be conducted with the Project Manager/Scrum Masters who have been involved in this transition and is currently working in multiple waterfall and agile projects. Since the data will be collected from the PPL employees the quality of the results will be valid. The questions will be modified and will restructure based on the interviewer's response.

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6.3. Key Roles involved:

All the below stakeholders can provide their experience on this transition and the challenges that they are facing from their point of view. Very member would be affected with this transition and by getting their in points will help evaluate the results.

- Developers

- Quality Analysts

- Business Analysts

- Agile Coaches

- Project Managers

6.4. Questionnaire

1. Are you currently involved in agile or Waterfall projects in PPL or have you worked on any agile projects before in PPL.

2. Can you tell us about your Developer experience high level? Like your responsibilities in the project?

3. How different are your responsibilities from agile projects and Waterfall projects?

4. Tools that you use in your projects? Like TFS or HPQC?

5. What are the 3 most important Developer/QA/BA skills

6. Why did you feel the need to adopt agile and transform from waterfall to agile?

7. Are there any challenges (from Dev/QA/BA perspective) that you faced in agile and Waterfall projects? If yes then what are they?

8. What kind of Culture change did you experience? What is more control or collaborative culture change?

9. What are the Main reasons for project failures?

10. Are there situations where projects are impaired and ultimately cancelled ranked incomplete requirements? (Project managers & project coordinators).

11. What are the high priority factors that you think are important for transition?

12. Rate the below challenges- Very Challenging, Somewhat Challenging, Not challenging at all:

CHALLENGES	VERY CHALLENGING	SOMEWHAT CHALLENGING	NOT CHALLENGING AT ALL
Lack of User Input			
Incomplete Requirements & Specifications			
Changing Requirements & Specification			
Lack of Executive Support			
Technology Incompetence			
Lack of Resources			
Unrealistic Expectations			
Unclear Objectives			
Unrealistic Time Frames			
New Technology			

7. RESULTS

The results are based on the feedback obtained from the stakeholders such as Developers, BA and Testers working in different waterfall and agile projects in PPL and by analyzing the transformation in other companies.

7.1. Key factors in transition of the Agile and Traditional projects

7.1.1. Results of Adoption Agile in different industries

Companies adopt Agile for several reasons and for the advantages that agile provide for customers, team, business and individual. According to (Manji & Jojic), some of the main advantages for Business are that it's faster, cheaper and better. From Team's perspective it improves the productivity and sustains pace. For the Individual, increases the ability to contribute and delivers value and higher moral. (Cao)

According to Cao who is a Agile Coach / Trainer, few e-commerce retail brands had in recent times combined with a company that operated 11 retail brands, establishing a powerful partnership in the e-commerce area.

During this merger they reviewed the company's IT process which was following mixed waterfall and Agile practices. They noticed the success of waterfall varied widely than Agile. PMO Directors defended but the team members such as Developers, QA, BA and product managers noticed projects falling behind schedule and not delivering to user requirements. Whereas, Agile was succeeding strongly with the e-commerce team and highly regarded as delivering on time and on budget.

There are lots more challenges that are involved while agile transformation such Lack of sufficient expertise. In one of the largest retailing brand, company wanted to transform whole IT

to agile due to its success rate. The biggest challenge the company faced that they were lacking resources with enough agile experience and all the resources were needed to be trained. Hence in order to completely transform into agile company needed additional support and minimum resources with agile experience to train and coach. Agile transformation in larger companies can be complicated, as it requires good knowledge and expertise in agile area that will go with company's culture, structure and processes. (Cao)

At Danske Bank there was a large scale agile transformation. The main agenda was to deliver their Improvement Strategy.

Scope	Projects (50%) System management areas (90%)
Flexible development model & organization	Adding another lifecycle, providing approach for system management
Efficiency	Productivity increase 10%
Time-to-market	Produce potentially shippable products after each increment
Quality	Frequent user and acceptance test
Customer and employee satisfaction	Ability to change scope and plans, motivated development team

Rasmussen. P is the senior vice president for IT Development Processes and Tools at Danske bank. In his words,

"*We intended to enhance the efficiency of our IT development process by 10% and reduce the time to market from approximately 14 months to an average of nine months. The first business delivers will even be provided in the course of just 4 months*" (Verstappen, 2013)

The Results of this agile transformation was successful. Time was reduced in different aspects such as Average Pre- analysis time was reduced and time to market reduced from 420 days in 2009 to 132 in 2010. Requirement/design votality was reduced, Productivity was increased, accurancy in status update was improved, improved predictability of delivery through agile, the quality has increased by test driven development and continouse integration, Reduced defect density etc.

Figure 12 Results of agile transformation

Hence, as per the above graph the general approach is applicable and the most important observations in Large scale company (Verstappen, 2013):

- Comprehensive consideration of a development environment

- Coordinating and accelerating adoption

- Adopting capabilities incrementally

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- Coaching is essential to transform people's behavior

- Tooling facilitates common behavior

Another success story is Mayden which is a small UK based health care company that had a transformation from Waterfall to Scrum. Chris May CEO of Mayden mentioned that when the company was following waterfall methodology they experienced problem for lack of time. In his words:

"*Our best-laid plans were continually being hijacked for short-priority developments. The end result was that we reached a point where we had started lots of things but were finishing very little."* (Mayden's Transformation from Waterfall to Scrum)

The biggest advantage in the Mayden was all the team members such as developers , BA or project coordinators are very enthusiatic and eager to learn new methodology and tools. Eldridge says.

"*Stories are now allocated internally by the Scrum team, freeing up that responsibility from the project lead. The team is empowered to divide up the work as they see fit, and they have moved away from internal experts over time.*"

Developers are more interested in the work. Fewer stories go into development at one time now, which has meant faster delivery of new features. (Mayden's Transformation from Waterfall to Scrum). Scrum also increases the visibility providing clear picture for the stakeholders on what going on in th eproject.

"*The client [is] getting a product they want rather then something we thought they wanted,*" Cullingford says. That deliverable is also of higher quality and all the defects are identified earlier in the process by reviews in the end of each two-week sprint. (Mayden's Transformation from Waterfall to Scrum)

The most important observations in agile transformation in small companies:

- Reduced lead time for delivery of new features to the customer

- Increased skill coverage across the development team, creating a more consistent work flow

- More frequent deadlines, keeping the development team alert and focused

- Empowered staff who now all contribute and comment on the best way to approach stories

- Increased quality of coding due to ongoing assessment from teammates

Eldridge compliments: "***Scrum is probably the single most productive change we've made in Mayden's ten-year history***." (Mayden's Transformation from Waterfall to Scrum)

USPTO has significantly increased its efficiency, effectiveness and the quality of the products and services it delivers to its customers, thus increasing the alignment between its business and IT strategies. The Center of Excellence is now fully functional and the necessary ground work has been established to stabilize and mature existing agile teams and practices.

7.1.2. Challenges Faced in Agile transformation

During the Agile Transformation process, USPTO faced the following challenges:

- Critical Agile practices and processes were inconsistently applied and followed by vendors partners contracted for Agile development and testing projects;

- The resulting significant variation in the application of common Agile practices across the enterprise severely constrained and limited USPTO's ability to

  o Capture consistent, accurate and meaningful Program, Portfolio and Team metrics across the agency

  o Define a consistent reporting structure within the Agile Application Lifecycle Management (ALM) tool

  o Achieve high quality standards and increases in development velocity due to the impact of disparate contractor team processes; (Halvik, 2011)

During Agile transformation procss, PPL faced following challenges:

- Analyzing and determining the framework was very challenging. In Todd Fernando (PPL Agile coach/Project Manager) words, when it was decided that PPL will be transformed into agile, it took several days to come up with up the framework for the projects and finally came up with three most important approaches in Agile.

- All the Employees were already working in PPL for several years and they are used to the current waterfall process and the existing tools. With the All the changes it was challenging for them to learn new process and new tools.

7.1.3. Key Stakeholders Feedback at PPL

In PPL from Developer Suresh Chintalapudi perspective who is involved in both agile and Waterfall projects and also a Certified Scrum Master by Scrum Alliance. Suresh has been working on projects that are using agile (scrum) methodology since 5 years and waterfall methodology. According to him "Agile developer needs a mixed skill of development as well as (integrated) testing along with the ability to use multiple tools that tracks both the processes. While the developer in the waterfall model will be purely focusing on design and development processes leaving the quality assurance to separate team at the end of complete development which might create a gap during the final delivery."

For the Waterfall project they are using ALM/HPQC & JIRA and for agile projects they are using TFS and Scrum board tracking for test management. According to Chintalapudi, One of the major challenges they face in Scrum model of development is end to end integration testing with in a sprint. If the functionality in the current sprint is dependent on another module from another scrum team and is developed using the technical design, it makes it difficult to test in the same sprint. He also believes that scrum model of

implementation works well for product or new functionality development as a whole, but are not fitting well for implementation type of projects with fixed bid costing.

Chinthu, Thomas J who is been working with PPL for a long time as a Business analysts in multiple different waterfall projects and currently working on agile projects. In PPL agile Thomas is involved in requirement analysis, backlog creation, reviewing development user stories during development phase, coordinating with QA during test phase, analyzing the feasibility of new requirements and prioritizing. (Personal interview)

The biggest difference from BA's perspective is that Waterfall is one time requirement gathering at the beginning, preparing the specification document and doesn't get a feel of the development until the last minute. They use similar tools for project story tracking such as HPQC, TFS and visio. The Biggest challenge form BA's point of view in agile are prioritize the new requirements and in waterfall "***managing the "unknown" "unknowns" at the end."*** (Personal interview)

Shraddha Sullere is the QA Manager at PPL and has been involved in managing multiple different waterfall and agile projects. She is more comfortable with agile projects as it has more visibility throughout the project. The biggest challenge is to finish the testing all the user stories with in the sprint time line, as QA are involved in testing previous sprint user stories which are ready for testing and also retesting the defects from past sprints. New sprint occurs in every two weeks timeframe. Another biggest challenge retesting the existing user stories due to frequent changes in user stories after the development. Whereas in waterfall the biggest challenge is that there is more risk of finding issues after the deployment to QA. In agile, bugs are fixed immediately in every sprint. (Personal interview)

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CHALLENGES	VERY CHALLENGING	SOMEWHAT CHALLENGING	NOT CHALLENGING AT ALL
Lack of User Input			NA
Incomplete Requirements & Specifications	VC		
Changing Requirements & Specification	VC		
Lack of Executive Support			NA
Technology Incompetence		SC	
Lack of Resources	VC		
Unrealistic Expectations			NA
Unclear Objectives		SC	
Unrealistic Time Frames	VC		
New Technology		SC	

8. DISCUSSIONS

8.1. What is the impression about agile Transition?

According to the team members the biggest challenge for them is changing requirements. When the requirements are changed the work for QA and developer is increased which makes it difficult for them to complete all the user stories with in the sprint. The higher Management has seen very good results with agile transformation especially with the time. The highest priority features were delivered in timely manner which resulted in less time. After comparing the results of agile transition in different companies, it was noticed that there are more advantages with Agile than disadvantages. The biggest advantages are Reduced lead time for delivery of new features to the customer, Increased quality of coding and more frequent deadlines etc.

8.2. Limitations:

In this paper there are few limitations that should be taken into consideration while working with the reported finding and results:

- The main limitation is the literature review, although it contains analysis of agile transition in different small scale and large scale industries from different sectors. But it would good if we have even more articles on different agile transition on few more companies.

- Feedbacks got from PPL stakeholders are very limited and opinion on agile transition changes from person to person and also the length of time they have been working in PPL.

9. CONCLUSIONS

I want to conclude this paper by writing down few points. After conducting research on what kind of challenges companies face when adopting agile:

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. This paper contains the challenges faced and results of adoption agile culture. After comparing the agile transformation in PPL and also in other large scale companies (Health sector, banking and trading), we can conclude that making agile a success is a combined team effort. There are many challenges and issues faced in agile projects which can be identified and improved during sprint retrospective. Agile is suitable for certain kind of projects but not all the projects. 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 teams and it does not suit certain division in the organization.

In this paper I have also presented PPL scrum boards for different kind of projects, the scope of agile projects and comparison of number of projects practicing agile methodology.

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