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Investigation on Migration to Agile Development

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Information Services - Enterprise Data Management
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Executive Summary

The Canadian Pension Plan Investment Board's (CPPIB) Enterprise Data Management (EDM) group has recently switched over to the Agile development methodology using the Scrum framework. Before switching to Agile the team was using a traditional waterfall development model. This report discusses the advantages and disadvantages of the Agile development process using Scrum compared to the old waterfall method.

This report analyzes the two methodologies using the following criteria:

- Advantages: There have been notable increases in productivity, teamwork and knowledge sharing.
- Disadvantages: The team felt that more time is needed in design discussions/documentation, the defect process needs to be clarified and that there are bottlenecks caused by other teams in CPPIB not familiar with and skeptical of the Agile methodology.
- Areas for improvements: These follow directly from the disadvantages as well as general acceptance of the Agile methodology at CPPIB.

This report recommends that, for further success, the EDM team should rearrange its work environment to a more Agile style setup, increase design stories in sprints with the caveat being a clear deliverable with proper documentation and discussions be time boxed, and lastly, invite other members of CPPIB to their daily meetings and hold Agile information workshops for the rest of the company.

1.0 Introduction

The Canadian Pension Plan Investment Board's (CPPIB) Enterprise Data Management (EDM) group has recently switched over to the Agile development methodology using the Scrum framework. This is an iterative and incremental development process that depends highly on the collaboration of cross-functional teams that work in quick life-cycles for development (two weeks in the EDM group's implementation). Teams work on small pieces of value called stories that are broken into smaller tasks, and a short team meeting is held every day to discuss what the team has worked on the day before, what they will be working on the current day, and what is blocking them from completing their task. At the end of the sprint the team demonstrates the completed stories to the product owner and then holds a retrospective to discuss what went well and what could be improved for the next sprint.

Before switching to Agile the team was using a traditional waterfall development model, a highly structured one which was not very adaptable to quick changes and challenges that may occur during development. The team wanted to move away from this model due to the slow return on delivery of projects, one-at-a-time project completion limitation, and the product owners difficulty in prioritize only one project as the most important. The EDM group decided to move to the Agile methodology after a successful migration was completed by the Time Series Solutions group and the EDM group has been using it since April 16th/2009. Only one member of the team had worked with an Agile environment in the past, so overall, it was a new experience for most of the team. The team would like an investigation on the migration to determine each members feelings about the new process and possible areas of improvement.

This report discusses the advantages and disadvantages of the Agile development process using Scrum compared to the old waterfall method using qualitative responses from members of the team as well as recorded quantitative data on the performance of the team. This report

will examine the observed advantages, disadvantages, and areas of improvement using the data that was collected.

2.0 Analysis

The analysis of the migration to Agile is broken down into three sections: the observed advantages, disadvantages and areas for improvements.

2.1 Observed Advantages

The single largest advantage of the migration to Agile is increased productivity of the team. This increased productivity can be seen from a variety of quantifiable data analysis. As shown in [Figure 1](#), the number of units completed per sprint (usually 10 business days) was steadily rising until sprint 3. It should be noted that the units noted do not reflect any work done on production support issues that were not related to the current team stories. The reason for the drop in units completed starting in sprint 4 is that it was at this point that a large part of the team split off to form a temporary team that would mostly deal with general technical development processes such as build scripts, automated testing, and working on other tools and processes. While this work is quite helpful for the team it did result in a drastic cut in resources available on the other stories. A major advantage of the Agile migration was that despite the cut in resources and with the help of the improved development processes, the team still was able to deliver around 22 units of work per sprint. In addition to this, a couple of stories per sprint needed only to have their documentation finished to be considered completed and their units to be counted as completed. Sprints 5 and 6 were also one day shorter due to a holiday and a team offsite. Sprints 7 and 8 also had fewer resources due to some team members going on vacation. The most drastic increase in

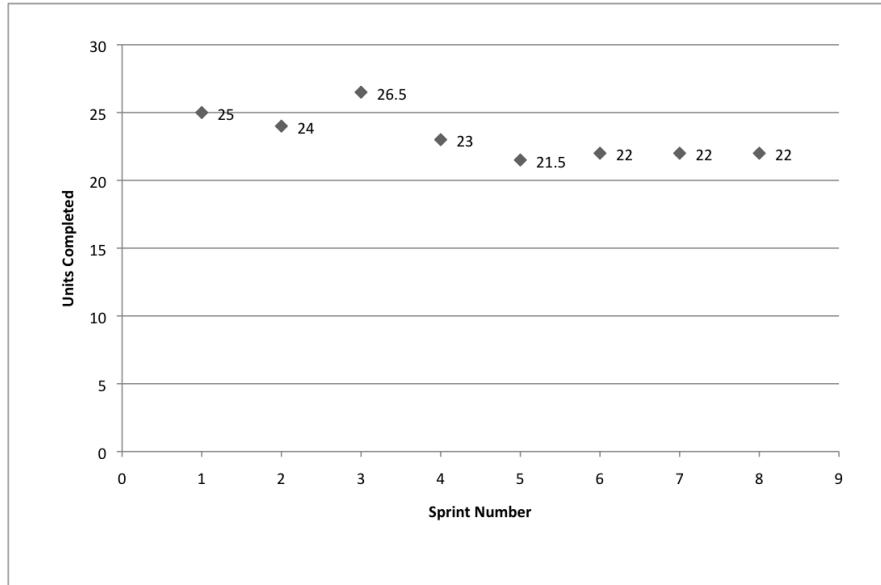


Figure 1: Units of Work Completed Per Sprint

productivity, however, was the team’s turn-around time for product deployments. Before the Agile migration, most deployments took, on average, approximately four days. By the end of the evaluation period, the team was able to complete deployments in under **two hours**.

The observed advantages were not just quantifiable. An anonymous survey was sent to everyone on the team to ask about what they felt were the advantages and disadvantages since moving to Agile. All but one of the responses were extremely positive. Everyone on the team remarked on how they enjoy the increased teamwork that has resulted from the migration. A large number of members also valued the increased communication that has resulted, not only communication between team members, but also through the involvement of the product stakeholders that are present at every team meeting and story acceptance. This story acceptance that must occur before it goes through the full quality assurance process was also highly praised. Another large, yet subtle advantage that was remarked on by some of the developers was that there has been much greater knowledge sharing and less “silos of knowledge” across the team. This can also be seen in how the team was able to accomplish around the same number of units of work even when developers with the

most amount of knowledge on a certain section of the project are away. Pair programming and pairing in general were the direct causes of this, even though the ideas are not gaining complete acceptance across the whole team (pair programming especially).

2.2 Observed Disadvantages

While there are many advantages since the migration there have been a few issues as well. The issues mentioned are directly from the anonymous survey that was sent out to each member of the team. The issue that was mentioned the most by team members is the feeling that there is not enough time for planning or design discussions and the current time planning that is only done for a sprint (or two) at a time is not enough. What followed from this was that many team members do not like the lack of (design) documentation in the Agile methodology. The feeling is that this makes it harder for new starters in the team to independently gain general knowledge on the product rather than “jumping in blind”. A point mentioned by one of the developers was the feeling that the speed of putting out a solution was more important than the quality of the solution and that this could create more work in the future.

There were also a lot of responses that talked about the quality assurance area of development. It was mentioned multiple times that there is a lack of time for thorough testing of the product before it is deployed to production. This was an issue mentioned more than once. It was also mentioned a couple times that the process regarding defects/bugs is not clearly defined.

The responses from the product owners were that they found it difficult to prioritize stories. This resulted in the unpleasant task of explaining to other teams that their stories could not be completed right now because they were of lower priority. The fact that the vast majority of CPPIB does not understand the Agile process and are extremely skeptical of it (especially

teams using the traditional waterfall approach) also created issues. Another issue that the product owners felt was also holding back the team's potential, was that since the delivery of entire solutions across multiple teams is still waterfall, there are large bottlenecks in the overall process.

2.3 Observed Areas for Improvement

The areas for improvements in the current migration will follow directly from the observed disadvantages as well as other improvements that are not directly related to disadvantages/issues that have been mentioned by the team.

The first area of improvement is one that has been mentioned by almost all the team members in the survey or from emails is the issue of design discussions/documentation. A way of improving the current issue of longer term design than what is currently done for sprints is greater engagement with the product owners to the story backlog. The issue of more time for full design discussions could also come from having a greater number of stories that are design related only. A possible issue with this is that it could result in a lot of wasted effort so a clear deliverable and a time-box on the design discussions with proper documentations would be crucial.

Teamwork/pairing is another area that could use improvements. One of the improvements that were discussed but not entirely followed through on, was on having the current work environment being rearranged to a more Agile style to facilitate more pairing between team members. This is an area that should be more actively worked on and the team should get feedback from the recent reorganization of the Data Services work environment to help in doing their research. Data Services has recently changed their workplace so that the cubicles are broken to only be half height to increase communication between team members. They also have changed the shape of their desks so that they are no longer "L-shaped" and so

that it is easier for two people to work at once on the same computer.

The last area of improvement is a very large one and would take significant effort. This would be the issue of adapting the full production delivery cycle at CPPIB to a more Agile methodology. Currently there are extremely large bottlenecks when working with other teams, and by increasing coordination there would be a net benefit across the entire company. The team must wait for other teams that are in a waterfall process and it's hard to get them to work outside of it. This causes further problems because the "inputs" to the team and the deployments are both done in a waterfall style so the total benefit of the Agile methodology is not well represented. A way of accomplishing this would be to hold Agile workshops that other members of CPPIB can visit, as well as invite people to visit during one of the daily meetings so that they can get an idea of what Agile is and to actually see it in action.

3.0 Conclusions

The migration to the Agile methodology has generally been a success, with large increases in productivity, teamwork, and knowledge sharing.

However the team felt that more time was needed in design discussions/documentation, that the defect process needs to be clarified, and that it is difficult to work with other teams that are not familiar with Agile and/or extremely skeptical and that this adds bottlenecks to the potential of the current Agile implementation.

The areas of improvements follow directly from the disadvantages as well as general acceptance of the Agile methodology at CPPIB.

4.0 Recommendations

To promote pairing and to increase knowledge sharing, the team's work environment should be rearranged to be more in line with Agile practices.

The team should have more design stories in their sprints, with the caveat that there should be a clear deliverable and the proper documentation done together and that the discussions be time boxed.

The team should also invite other members of CPPIB visit during the daily standup meetings so that they may get a feel for what Agile is and how it works. The team should also hold workshops so that, in the future, Agile may spread to other departments so that there is greater coordination.

By following these recommendations, the EDM team should notice a further increase in the effectiveness of their Agile migration.