

# *Transitioning from a Waterfall to an Agile Software Development Cycle*

*Jesús Alberto Piñero del Valle  
Master's in Engineering Management  
Hector J. Cruzado, PhD  
Graduate School  
Polytechnic University of Puerto Rico*

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**Abstract** — *Popular Inc Software Development Cycle is under the Waterfall methodology, resulting in longer periods for delivery of solutions and unsatisfied stakeholders. The project focuses on implementing the first project in Popular under the Agile methodology to demonstrate the results and effectiveness that the methodology would bring. Due to the milestones and due dates, a small project was selected to be used for the pilot of implementation of the Agile methodology. It was important to be a small project since as part of the analysis the project phases would be simulated in the Waterfall methodology too. The final product was delivered on 01/20/2020, not only meeting its proposed end date but also finishing 10 days earlier. Being one of the most successful projects in the company, with a shorter waiting time for the delivery of the solution and a significant amount of saving in terms of the budget used. Popular will now need to focus on reinforcing the process and start spreading the Agile SDLC and Culture not only in the IT division but in the whole company. Agile more than a methodology is a culture, be fast, lean, precise and effective.*

**Key Terms** — *Agile, Information Technology (IT), Software Development Cycle (SDLC), Waterfall.*

## **INTRODUCTION**

Banco Popular is the bank with more assets and active customers in the banking industry of Puerto Rico. Currently, around 90% of their Information Technology (IT) services are delegated to a company called Evertec, which the bank has a partnership with. Every time the bank wants to acquire new technology or modify or replace current technology, by contract Evertec has the first opportunity to decide if they will provide the solution. If Evertec can't provide a solution, then

Popular can reach other vendors for proposals or develop the solution in-house. With that said, the current issue that the bank is having is the time it takes to have a final solution delivered or the time it takes to complete a project.

The information technology department is working on a Waterfall methodology for all their projects. This methodology is useful for small projects where the scope and effort are well defined from the beginning. But in most cases for Popular, projects tend to be humongous because the impact it will have in all our customers and the integration with Evertec. The bank doesn't exactly know everything that Evertec has in place for solutions, resulting in finding unknown issues in the road of the projects that could affect negatively the deliverables. The waterfall methodology basically consists in performing all the analysis before starting the project development, identifying all the requirements and the impact the solution will have in the systems architecture. But it is a double cross since, in order to finish the required analysis, the solution must be identified to see how it will interact with current solutions, but the solution can't be identified until all the analysis is completed, resulting in a chicken-egg situation.

This project will transform how Popular is currently working to move to a culture and SDLC more agile and efficient. The agile methodology allows to segregate the scope of the deliverables in little iterations that will be repeated during the project. For example, on week 1 the analysis begins; on week 2 the development of the current analysis performed will start; on week 3 the development will continue and more analysis on what the milestones of the next sprint will be started, in parallel; on week 4 is the testing and deployment to production and planning of next release; and on week 5 the development will start

again with the new analysis made. So, this methodology allows to do analysis by steps and same with the development. The major benefit is that after sprint 1 is completed (between 1-2 months) the customer will have something tangible to review of the final solution.

This provides space to review and validate that the solution is going in the right direction. If not, feedback is received, and the product can be modified as needed. Also, while the project is running, Agile allows to receive new requirements or changing requirements since analysis and planning is being done every two to three weeks. In planning, if priorities shifted, priorities could be established. This will result in faster delivery and more important parts of the solution first. Agile is flexible and all about communication and understanding of the methodology.

Agile has a lot more of benefits that will be discussed along the project deliverables. This project entails to reduce the time of the SDLC in Popular proposing Agile as the methodology to be used. This project was developed and tracked under the Scrum, which is part of the Agile methodology. Hopefully the project will provide a better vision on the benefits of moving to this methodology and the changes in culture that it will cause. It is a fact that this will reduce time, since from previous experiences using Agile the changes in time, quality and flexibility are amazing.

## **LITERATURE REVIEW**

Transitioning from a Waterfall to an Agile Software Development cycle is very common in these days since companies are looking for flexibility, agility and delivery of products that will satisfy the business needs. Before starting the roll-out of this project, the first thing is that the team must understand is the definition and concept of Agile. Some practitioners refer to Agile as a method, but it is an approach, more a framework, whereas Scrum might offer a method for software development projects [1]. Large companies are moving to agile looking for productivity, flexibility,

changing requirements. Agile provides the space to start working on an idea that is not completely defined but will be during the implementation process. This allows to brainstorm during the process, using the product being developed and enhancing it on every sprint. The agile approach towards software development is increasingly being implemented in software development organizations. The advantages, such as productivity, team satisfaction, and fit to user requirements are tempting. This, although drawbacks have also been recognized, such as lack of upfront planning, lack of documentation, and lack of predictability.

Within a single organization Agile can be seen and more traditional approaches being used side by side. A reason might be that this is temporarily, when the organization is in transit from a more traditional towards a more agile approach [2]. Understanding the benefits of Agile in the company culture is key, since in addition to a change in the development cycle, it will require a change in culture. Project Managers often struggles with the Agile methodology because it changes the Paradigm of a defined project plan before starting the project. In Agile the scope is defined but the project plan can vary during the process and in most of the occasion's projects are completed before the stablished due date. Agile approaches to software development focus on simplifying and improving software process. Customers, developers and the final product are central. This is based on values identified in the Agile Manifesto: People and their interactions over processes and tools, working software over comprehensive documentation, Customer collaboration over contract negotiation Responding to change over following a plan [3]. Agile development methodologies such as Agile Scrum follow an iterative development process. They define a flexible product development strategy in which a development team works as a unit to achieve a common goal. The team organizes itself and works closely together (preferably) on the same location or otherwise online [4]. Hybrid development organizations emerge when agile and

traditional development approaches are combined. In such an environment, one can determine which approach or combination of approaches fits best. Advantages and drawbacks of the approaches can be balanced [5].

## ANALYSIS

Due to the milestones and due dates, a small project was selected to be used for the pilot of implementation of the Agile methodology. The project needed to be small in order to complete it under the trimester time frame. Also, it was important to be small since, as part of the analysis, the project phases would be simulated in the Waterfall methodology in order to know if the objective of the project were met.

A project proposal was submitted to Popular's Senior Management Team for their approval. The presentation focused on the benefits that Agile will bring in a short and long term to the company. Agile will reduce the time to deliver a solution for around a 40% of the time that Waterfall takes. In addition, the biggest benefit of Agile is that will allow the stakeholders to review the solution being developed along the process in the different deployments. This will allow to receive feedback from the Stakeholders and ensure that the project was on the right track and will always allow changing requirements, changes in priorities and continuous deployments to production.

As part of the proposal a project plan was created with the timelines for the project under both methodologies. The Project Plan displayed that the stakeholders will be able to receive their first portion of the solution for feedback around 01/02/2020 while for Waterfall the final solution would be deployed on 05/01/2020 without receiving any feedback from the users. The Budget requested for the project for the Agile methodology, \$159,600, was 50% of the estimated budget for the project under Waterfall.

For the foundation of the Agile culture in Popular, the certified Scrum Master prepares a level 1 process that defined how the process will be

adopted to Popular situation with IT. The process adheres to the limitations of the Master Agreement and was tailored specific in coordination with the process of the Enterprise Architecture team, which is the process that triggers the projects.

To continue spreading the Agile Culture, an Agile Council was created consisting of the Scrum Master, an Agile Coach, Enterprise Architecture Manager, Division Manager, Group Manager, IT Security Manager, Infrastructure Manager and Data Manager. The purpose of the council was to oversee the Agile transformation and ensuring that the project was being carried in the correct direction. The council has the final word to say go or no go after the pilot is completed and will serve during the project life to help remove any roadblock in the way.

Before beginning the implementation of the project, a series of Agile workshops and trainings were prepared. Those trainings needed to be detailed and agile in order to prepare any resource to work under this methodology in a short period of time. The strategy was to separate a complete full week of work dedicated only for the Agile trainings and workshops to prepare the resources for the new concept.

Before starting the project, it was important to identify which of the Agile frameworks was going to be used for the management of the project. Between the available frameworks Popular was leaning to use the Kanban or the Agile frameworks. Since the Scrum Master had previous experience working with Scrum, this was the selected framework. Scrum is a framework that states to manage a project using shorts sprints of two to four weeks, to provide a sample of the product faster. Also, the Daily Scrum Meetings will serve as a perfect tool to help the Scrum Master to manage the first Agile project easier. These meetings consist of What was completed, what are the net plans and is there any roadblock. The Scrum Master must ensure the project is going under the right direction and ensure to remove any roadblock in the way.

Furthermore, a quick analysis was made with the project plan to identify all the resources needed

for the project. The results were a Project Manager, a Product Owner, a Scrum Master, a Developer and a QA Tester. Since it is a small project, it is enough with one developer and one QA Tester. These resources will be completely dedicated to the project and all the other duties will be delegated. Once the team was completed and trained, the project kick-off was held to the complete Popular Technology Division to explain the objective of this project. The kick-off meeting was the final milestone of the Sprint 1 of the project plan, resulting in the end of the Sprint. This was showing to Popular already that the Agile planning was allowing to meet and even complete the milestones before their due dates.

The Agile analysis in the project was directing the team to focus the analysis for the business and technical requirements of the product on the priorities of the Backlog and not creating a burden to try and define all the requirements at the beginning. Waterfall foundation is to complete the analysis phase completed before implementing and any change during the process would be implemented after the delivery of the product as a Change Request, creating poor delivery of solutions.

In Agile during the progress of the project, after the end of each Sprint the requirements were revisited, and new requirements were included. The planning meeting held before the beginning of the Sprints promoted the space to discuss with the Product Owner the feedback of the product, the new requirements and changes needed to be done. In every session the priorities change and the requirements were changed. Demonstrating and proving that the analysis done may change during the project. Having the ability to modify the milestones and welcoming new changes without the formal process of a Change Request represented a humongous amount in saving and time for Popular being the biggest takeaway of this project.

It was important to take note on how the development and testing process was being impacted. Agile provide shorter Sprints, meaning shorter testing. This requires that the developers get

trained and gained an expertise in Versioning management. Agile requires creation of versioning and branches in order to allow the project to continue moving (developing or testing) without having to wait for the completion of a prior task.

## RESULTS

Popular celebrated the first completion of a project under the Agile methodology. The Project was completed successfully and better than expected. The adoption of the Agile culture in the team easy and smooth, where the trained peers were promoting the culture to other projects they are now involved.

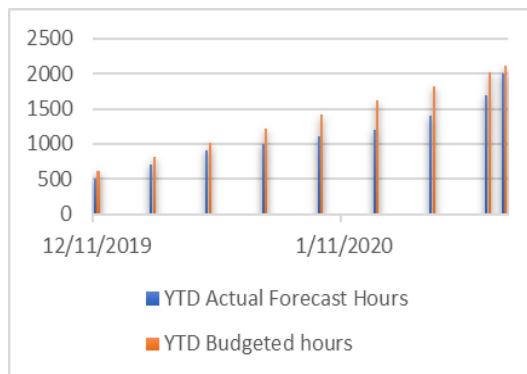
The final product was delivered on 01/20/2020, not only meeting its proposed end date, but also finishing 10 days earlier. Not considering that lot of days were lost due to the holidays and earthquakes situation. The fact of completing a project that was on the roadmap for Q2 so earlier in the year, demonstrated to the SMT the power and benefits that Agile could provide to the company. The final solution met the stakeholders needs and even some requirements were left behind at the end because after some testing performed, they will no longer be needed. And the last important aspect, the compliance team performed an audit of the project process to ensure that we were following the established policies and procedures and not a single observation was made. This demonstrated that Agile foundation is scalable and could be applied from now on to bigger projects.

Table 1 shows the actual amounts of budget used for the project. It can be seen that only 92% of the Actual budget was used on the project, which may be a result of over-budgeting for the lack of knowledge and due to the elimination of no longer needed requirements. But even though there was over budgeting, the results were favorable to Popular. This represents a positive impact, since according to the Project Management Office between 75%-80% of the projects end over budget.

**Table 1**  
**Final Budget Used**

Types of Costs	Number of Hours	Metrics	Percentage
Budgeted Hours	2,120	Budgeted Hours Spent to Date	92%
Actual Hours to Date	1,950	Project Complete (estimated)	100%
Estimated Total Hours to Completion	1,950	Estimated Final Percent of Budget	92%

During the final Sprints of the project a variance the amount of budget used was noticed, but since Agile welcome changes, some changes were made to the workplan in January to complete and met the due dates. The resources worked overtime the last three weeks of the project to ensure and complete the work. The team was able to measure the impact and predict from a time before that the difference between actual and budget will be reduced in the last week with the overtime, as shown in the Figure 1.



**Figure 1**  
**Budgeted Hours vs Actual Hours Spent**

## CONCLUSION

In conclusion, even though the project had its obstacles it was a total success. Being the first time that Popular works under Agile and completing the project before the due date and under budget represents a bright future for the SDLC. The objective of Changing from a Waterfall to an Agile methodology in the SDLC is a given. The results

presented to the SMT automatically triggered the immediate approval to start migrating all the projects to the Agile methodology. Popular will now focus on get the Agile process promoted to a Level 2 of maturity and start playing with bigger projects. Agile prove by itself the benefits of being able to hear the feedback of your stakeholders at the correct time, the savings that comes with Agile. Deployments were done faster than ever in the history of Popular. This will be a key to implement projects that are regulatory faster to prevent findings and/or observations.

Even though at the beginning some resources were receptive to the change, the adoption and flexibility of the methodology changed their mind. Popular will now need to focus on reinforcing the process and start spreading the Agile SDLC and Culture not only in the IT division but in the whole company. Agile more than a methodology is a culture, be fast, lean, precise and effective.

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