

AGILE AND WATERFALL PROJECT APPROACHES IN E-COMMERCE PROJECTS: COMPARISON OF TWO CASES

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ABSTRACT

As digitization proliferates in almost each business area e-commerce has already become an indispensable sales channel together with other sale channels or just by itself. With this ever rising trend, leading software providers have been developing, selling and consulting on e-commerce software packages using different project management methodologies. The most common project management methodologies for e-commerce projects are waterfall and agile project management approaches. In this study, the progress and outcomes of two similar e-commerce projects using waterfall and agile methods were compared. In both projects, a large retail company's E-Commerce Platform (ECP) was designed and implemented with the involvement of international consultants from the software providers. The project with the waterfall model failed and caused the company abandon e-commerce altogether, on the other hand the project with the agile approached was launched with minimum problems and is currently operational. Using unstructured interviews with the key personnel involved in these projects, this study identified the main problems and came up with recommendations for similar e-commerce projects.

Keywords: waterfall, agile, e-commerce, project management

1. INTRODUCTION

As digitization proliferates in almost each business area e-commerce has already become an indispensable sales channel together with other sale channels or just by itself. According to US Census bureau [1] total e-commerce sales for 2017 were estimated at more than \$450 billion, an increase of 16.0 percent ($\pm 1.2\%$) from 2016. Total retail sales in 2017 increased 4.4 percent ($\pm 0.4\%$) from 2016. E-commerce sales in 2017 accounted for 8.9 percent of total sales. E-commerce sales in 2016 accounted for 8.0 percent of total sales.

As this rapid increase suggests, for any retailer not having an e commerce channel is a sign of stagnation and eventual demise. Corollary to this statement, failure of e commerce projects have similarly detrimental effect for a retail organization. In managing e commerce projects several project management methodologies are used, but two of the most common are Waterfall and agile (Scrum). In this study, the progress and outcomes of two similar e-commerce projects using waterfall and agile methods were compared. In both projects, a large retail company's E-Commerce Platform (ECP) was designed and implemented with the involvement of international consultants from the software providers.

First conceptualized in 1970 by Dr. Winston W. Royce, waterfall model posits that the software development life cycle follows a sequential order of steps, similar to stepwise cascading waterfall [2]. In practice waterfall model consists of Analysis, Design, Coding, Testing, Posting and Maintenance phases. From the beginning of the project it is essential that the previous phase is completed so that each phase can start. As its name suggests, the waterfall is a model that moves down from the top. Any changes to the project will not be accepted after the project has started, thus all requests must be clearly identified before going into the design phase. Another important characteristic of waterfall model is that testing is done after all development is complete and the role of the tester is only included in the project during the test phase [3].

Agile method which has its roots in Agile Manifesto, written by Kent Beck and 16 friends in 2000, has become the most used project management methodology for software development [4]. While the waterfall model keeps the documentation in top priority, the Agile Project management model has a slightly different priorities. In this model, the targeted product is divided into smaller product fragments and an iterative development plan is made. After each occurrence, the test team commences the tests by commissioning. At any stage of the product, the owner of the product, ie, the product owner can intervene in the product, and the CR can be found in the request changes. Thus, we will respond to the demands of the client at every stage of the project. With each test made, it becomes healthier in relation to the previous one. Another definition of this approach can be said to be the tense existence [5].

2. CASE STUDIES

In this paper, the team members from two different e business development projects were interviewed and the learnings about their projects were presented. One of the cases resulted in failure but the other one was a successful project. Both project have similar characteristics. Information was gathered through face-to-face and telephone conversations with the key people involved in these projects.

2.1. Case 1

Company 1 was a Turkish retail company which uses e commerce sales channel to reach its customers. Company 1 had many competitors in the same field in which it operated. Their primary objective was to become the leader or so called the Amazon of Turkish market. The Company has decided to make technological investments using the existing website in line with this target. Company 1's existing e-commerce site had been written in ASP.Net and its enterprise resource planning (ERP) software was from a large international company. Modules used in this ERP system included warehouse management system, general accounting and order management. Although the ECP package program is sold under the brand name of a well-known ERP company, it can be integrated into different ERP systems. This was one of the main reasons the Company 1 chose the ERP program at the first place, the other one ERP programs popularity in many different countries. Another important aspect of the program was the BackOffice module or the product management system module. This module had convenience and flexibility in terms of product management and user experience.

Company1 decided to start the project with Consultant 1 which was an international company. Consultant 1 decided to bring its technical team from its branch in Italy for the project. Consultant 1 chose Waterfall as project management model. Interviewing the technical team and business unit of Company 1, Consultant 1 team spent 1.5 months to prepare the analysis document which outlines the customer requirements. This step was the most crucial step in the Waterfall model. The analysis document was prepared in English and presented to the Company 1 for approval. After the approval process, development process started. Initially planned for 5.5 months, development process was marred by many rejects after the test and reworks. Then the project finish was extended 3 months, and the consultant brought in another 3 personnel to support testing. After these 3 months of development and testing, development process was finished and User Acceptance Testing (UAT) phase was commenced. In UAT phase, finished work was tested by the client and it became evident that some of the business decisions and processes were misinterpreted by the Consultant 1 and developments based on these decisions and processes were incorrectly done.

Another problem is that there was no one on the Company 1 side as a product owner and nobody was held accountable the process and flow errors. The lack of a product owner's position in the project and the lack of experience among the team members caused them missed the symptoms of approaching failure. When numerous problems have been noticed, the project has been withdrawn from the UAT stage and taken back into development phase. The new development has been added to the project another 3 months for the test and UAT process. The project, which is planned to be completed in 8 months, is extended to 14 months. At the end of 14 months and after investing millions of dollars, Company 1 decided to abandon the project and declared it a failure. Shortly after the project had failed, the company shut down its e-commerce site and ended its operations.

2.2. Case 2

Company-2 was also a retail company who has an e-commerce channel in addition to store based sales channel. They are is the leader in their field in Turkey. They decided to make technological investments in the existing site because the company wanted to expand its vision and customer base. Company 2 has decided to start the project with Consultant 2. Consultant 2 has decided to use Agile as project management model. In this way, the product will be submitted iteratively at every stage by presenting it to the customer's approval. During the technical analysis stage, a scope document was created, and a backlog list of stories and tasks was made ready. The backlog list consists of an average of 250 units. By talking with the technical team, each task is determined during the estimation period. After the tasks are completed, the contents of the sprints are filled with the appropriate tasks according to the requests and terminological order, and 10 sprints are planned to be 25 tasks per sprint on average. After the technical analysis, the first sprint started to run in July. First the ECP Back office module, which is the first part of the product, has been put into operation as planned. Once the BackOffice module is activated, the existing product management module still supported the current ASP.Net sites, so the database part of the product management module is left active. Thus, the deployment of the BackOffice module did not adversely affect the sites. The second phase of the work was accelerated to work on the backend and frontend, and the remaining sprints focused on ECP E-Commerce development. After each iteration, the product was presented to the customer's approval and after the necessary presentations were made, the authority to access the test environments was provided so that the customer, can examine the product. As of summer of 2018, the project was considered successful by the Company 2.

3. CASE STUDY FINDINGS

In this section we identified the key areas that affected the performance of each project:

3.1. Consultant and Client Collaboration

Company-1 and Consultant-1 have been in contact only during the customer requirements, analysis and scope document phases. Because of this, customer was uninformed about the project progress and deviations from the goal and misunderstandings and misinterpretations were not noticed. On the other hand Company 2 and Consultant 2 has communicated transparently through each phase of the project, avoiding possible errors and deviations from the project requirements.

3.2. Product Ownership

Company 1 did not assign a single person as the product owner. Consultant 1 dealt with different people for different phases like analysis and the scope document. As the project progressed, the errors and dead ends encountered were only dealt on paper and the possible bottlenecks could not be relieved. Company 2, on the other hand assigned the product owner and Consultant 2 acted with the approval of the product owner in every problem encountered. The error rate was thus minimized.

3.3. Requirements

Consultant 1 only received customer requirements during the analysis phase of the project and these requirements were not evaluated by the client until the UAT stage. Missing or misplaced requirements were not noticed. Consultant 2 prevented the deviations in the customer requirements by incorporating the client into project at every stage of the project.

3.4. Team Inadequacy (Tester Problem)

Consultant 1 has encountered too many defects in the test phase and has increased the number of test personnel from 1 to 3. But still the project failed. Unlike Consultant 1, Consultant-2 has made improvements to the test team at every stage of the project. This allows the test team and technical team to work in parallel, preventing the workload on the test team from becoming disproportionate.

3.5. Continuous Integration

Consultant 1 tried to have all modules live at the same time and every defect caused all modules taken back to development stage. The Consultant took a rolling approach where first the back office module became live so that the customer will be able to spend the more time to adapt the new system. Parallel to this process, infrastructure and frontend development continued.

3.6. Early Detection of Failure

Consultant 1 firm could not realize that the project would fail with the Waterfall model, before the 8th month which was the planned end of the project. In project 2, the probable project failure could have been noticed during the first phase of the project. In this case, the company 2 would have been saved from unnecessary time and money loss.

4. COPYRIGHT

Time and resource planning must be done correctly before starting the project. It may be difficult to avoid failure if the planning is not done correctly. Cost and time saving are very critical issues for large and long-term projects. When the waterfall progresses with the project management model, it is noticed after the entire cost and time is spent even if the project fails. Today, an agile management model is used to recognize this in advance and minimize the cost spent. The work is divided into small particles and step-by-step customer advices are made and released. It can easily be determined whether the project is failing or not, or whether there is a deviation from the targeted plan. Another advantage of the iterative project management is that the customer has increased the acceptance and confidence level of the customer by offering the product in small particles.

In major projects like ECP, it is the main reasons that negatively affect the success of keeping the sponsors and business units away from the project. It is very important to work together on such large projects and negotiate with the business unit in every decision. Customer requirements and product development should go parallel.

It is important to regularly conduct activities in agile management to assess the progress of the project, share business units and sponsors, criticize team competencies and take quick action. While the agile project model offers this possibility, the waterfall project model does not provide such possibilities.

5. REFERENCES

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