An Empirical Study on Scrum Application Patterns in Distributed Teams

Extended Abstract

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ABSTRACT

In this study we dig for scrum application practices in distributed offshore development teams of a multinational company which has in-source offshore development centers across the world. Main location of the research is the Turkey center of the company.

CCS CONCEPTS

• **Software and its engineering** → **Agile software development**; **Programming teams**;

KEYWORDS

Distributed software development, agile methodologies, distributed scrum teams.

1 INTRODUCTION

Offshore software development is rapidly increasing in global software industry. In literature, major reasons for off-shoring are identified as cost reduction, global talent resources, cheap labor in developing countries, and access to new markets [5].

Agile software development is started to being used in offshore software development extensively; in this study we focus on Scrum methodology. Because of the geographical distribution issues in offshore development, Scrum framework principles are frequently tailored for distributed Scrum teams.

There are some previous works that study such tailoring practices in distributed teams when applying agile. In a similar study, Kausar and Al-Yasiri [2] presents the practices mainly focused on outsource development in geographically limited locations. Study by Prikladnicki et al. [3] states that internal off-shoring needs to be

examined more thoroughly in the literature. In the area of offshore development a recent study by Bass examines practitioner interviews surveyed in nine international companies [1]. In our research we have collected information by using a web based survey, from different centers and software projects of a German international software company. Company under survey, has in-source offshore software development centers across the world.

2 RESEARCH METHODOLOGY

In order to identify the possible research questions that is valuable to assess in distributed scrum teams, initially we have applied a SWOT analysis with five different distributed scrum teams. We used SWOT analysis to highlight and address problematic issues in Agile processes [4]. We used the SWOT results to derive the research questions and related survey questions to identify the possible causes of weak points in applying scrum over a distributed teams, and possible tailoring opportunities.

As an example to our usage of SWOT results in deriving research questions can be given as follows. One of the prominent result provided by SWOT analysis were focused on the necessity of providing more frequent feedback within distributed scrum teams. This situation directed us to derive research questions about the frequency of feedback and practices about feedback in distributed scrum teams. Aligned with our analyses, a recent study by Mansooreh et al. [6] indicates the importance of site visits in global software development.

Based on the results of the swot analysis we identified six research questions and derived a total of 32 survey questions[1] from the research questions to analyze research questions in more detail. We applied the survey to SWOT analysis participants as well but our participant group was not limited to them.

The research questions (RQ) in our study are provided in the next section together with the response analyses. We present the questions over an online survey to Scrum team members of the company located in both headquarter and offshore centers.

2.1 Demography of the Survey Participants

Survey responses are collected from 24 different member of 24 different projects. Within the respondents 46% of them were working as developers, 17% were scrum masters, 21% were architects, 4% were scrum coaches and 12% of them were testers. Majority of the participants were contributing in the early phases of the development life cycle, enabling a stronger analysis on the affect of distributed agile

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[1] Our online survey can be accessed at https://s.surveyplanet.com/ryviX-wzf

practices on development level rather than management level. Average year of experience of the respondents was 8,95 years. Average team size of the project was 9 members. Majority of the participants were from Turkey. For our survey participants we didn't favor a team distribution pattern over another, for some teams only the scrum master and the product owner was in a different location than the rest of the team, for some others designers and developers located in different countries. The distribution characteristics of the teams we applied our survey to is addressed by research question three.

3 SURVEY RESULTS

RQ1: How often do scrum teams give feedback to Product Owner about the project status?

67% of the respondents say that they give feedback directly to the Product Owner (PO) almost every week. Feedback is mostly given via demo sessions (92%). Self organizing team structure is one of the core principles of Scrum. It can be seen that distributed teams also apply this principle without tailoring since there is not a feedback hierarchy for the 88% of the projects.

RQ2: Which quality techniques are applied and how in distributed Scrum teams?

Survey results indicate that both offshore team and headquarter is responsible for quality management. 96% of the projects use a code repository but there is not a common practice on the team member to manage the code repository. 92% of the projects use product backlog where the rest use conventional requirement management approaches. 96% of the projects applies code review but there is not a common practice on how to apply it. 37% of the projects do not apply peer programming which is mainly applied by co-located development team members in distributed teams. 71% of the projects applies static code analysis as a code quality practice and there is not a common practice to determine a fixed team member responsible from static analysis.

RQ3: How are team members located in distributed Scrum teams?

In 67% of the projects, development team members are distributed. Scrum Master is co-located with the development team (63%). Product Owner is separated from the development team (63%). Majority of projects have a dedicated tester 67% and the dedicated tester is mostly co-located with the development team (81%). Respondents vary about the proxy Product Owner role, 46% of the responds indicate that there isn't one. More than half of the projects indicate that there is not a team member which does not fit any scrum role (58%).

RQ4: What are the communication channels in distributed Scrum teams?

All of the respondents say that site visits improve the communication between distributed team members but it is seen that site visits are not frequent. 50% of the respondents say that site visits occur once in a year. Face-to-face communication via Phone call and video call is mostly preferred and used in distributed teams.

RQ5: How agile meetings and ceremonies are applied for distributed Scrum teams?

Daily scrum is applied everyday in 75% of the projects. Daily meetings last less than 30 minutes for the 92% of the projects, they last less than 15 minutes for 67%. Meetings are done via video conference by 50% of the projects and via on-site stand-up by 42%. There is no consensus if the PO always, sometimes or never joins the daily meetings. Sprint review meeting is applied via video conference for 63% of the projects and it almost always lasts less than 2 hours (96%) but less frequently lasts less than 1 hour (38%). Product Owner and Scrum Master joins to the review meeting for all the respondents.

RQ6: How does time-zone difference affect distributed Scrum teams?

Since timezone difference is 2-3 hours between Turkey and Germany, 55% of the respondents claim that time zone difference does not have any effect. We also collected free text solution proposals for the time zone problem from the respondents. Prominent solution ideas were adjusting the meeting times for Product Owner and sending team ambassadors to the cross location's meetings.

3.1 Threats to Validity

In our study, responses are collected from different offshore centers but all of them was taken from the same company. There can be some company specific patterns. Because of this reason, the dependability of our study can be increased by applying an expanded survey to multiple companies.

4 CONCLUSION

In this paper we present the results of a survey that focuses on key points in applying scrum on distributed teams. Along many other results, the importance of site visits and frequent feedback comes forward in distributed scrum, site visits improve the communication but not occurs frequently. Another important finding is that, Scrum Master is co-located with the development team to ease the communication and to ensure that Scrum is applied in a correct way.

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