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Implementing Scrum Method in International Teams—A Case Study

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Abstract

The paper aims at presentation of problems connected with agile project management methodology implementation (*i.e.* Scrum) in an international project team. Basing on the case study the paper indicates the most crucial problems, as well as offers solution proposals. The problems were identified during the scrum methodology implementation in the international project team.

Keywords

Adapting Scrum, International Project Teams, Agile, Case Study

1. Introduction

IT project environment changeability and related IT project requirement changeability triggered off the development of new IT project management methodologies. IT project teams are required to implement new software or improve an existing one [1] with an increasing speed in a constantly changing project environment. The answer of practitioners for a continuously changing project environment is the Agile Software Development Manifesto [2] published in 2001. Since then the growing number of organizations develop software according to the Agile principles, and one of the most frequently applied methodology from the Agile family is the Scrum approach (e.g., [3], Coplien [4], and many others [5]-[10]).

Implementation of agile practices in projects realized by international teams is relatively a new trend. According to the authors of the present paper, the process of agile methodology implementation by international teams has not been fully investigated. In the relevant literature one can find works on agile project management method implementation; however, few authors analyze the process of implementation in the context of international teams. The review of these sparse papers touching upon the issue of agile project management method implementation in international environment in more direct or indirect way is as follows: [11] presents research results determining the key success factors of agile IT project management method implementation. The research was carried out by means of the online questionnaire sent to software development practitioners all over the world. The following factors were perceived as significant: implementation including training, management commitment, access to external resources, and organization's size; [12] outlines practical experiences and conclusions when defining and implementing of the Agile Model-Driven Development process by means of MDD chain tools. The key for the proper agile methodology implementation in the scholars' opinion is an effective

end-to-end iteration (from a system engineer to system testing); [11] deals with benefits connected with the application of Agile and Scrum practices in the process of dispersed software development. It proposes two team structures adequate to implementation in dispersed teams; [13] uses the combination of interviews, observations, and archive data to reconstruct agile project management methodology implementations in IT projects. The collected data indicate the significant impact of four fields (requirement management, organizational learning Scrum implementation in verification and validation activities). On the basis of case study covering one year, [14] presents recommendations for accelerating the process of agile method implementation in IT project management. As [15] indicates, agile method project management implementation in various organizations can pose numerous problems.

As it is evidently seen, the literature does not provide much information nor solutions concerning agile methodology implementation in international teams; however, it points out clearly that one can adopt a hypothesis that such implementation is not easy. Therefore, the authors of the present paper not only indicate the problems faced by one of the international project teams when implementing Scrum in the large organization, but also propose some solutions at the same time. As a consequence of growing Scrum popularity (see [16] [17]), the increasing number of organizations will face similar challenges. The thorough analysis will allow for more effective agile management methodology implementation in similar project teams.

The paper consists of four chapters. The first one outlines the project and organization where Scrum is implemented. Another describes the research method and data sources. The third chapter deals with the problems identified during the methodology implementation and proposes some solutions. Summary and conclusion can be found in the fourth chapter. Due to capacity restrictions, one decided to omit the Scrum methodology description. It can be found in the references.

2. Project Description

The investigated project was realized in the R & D department of the organization providing services on the telecommunication market. The project, carried out for the order of the Asian customer, consisted in development of the existing clearing platform (created by the examined organization). Due to large amount of errors and significant lag of the first implementation phase of the clearing platform (realized in the waterfall model of software development) the organization's management decided to carry out another release according to the Agile principles. As a project management methodology, one chose Scrum. Three project teams were engaged in the project: two European teams (in various locations) and one Asian team. Each project team included resources from 6 various countries. English was the leading language in the project. For all resources and the junior management it was the first project implemented by the agile methodology. Each of resources taking part in the project and customer's representatives were provided with two-day training on Scrum. To enhance the implementation of agile project management methodology the organization's management decided to locate all resources in one location for the period of three sprints (one sprint lasting 15 working days). Each team consisted of nine members and one appointed Scrum Master. Additionally, the 4-member Product Owner Team was added to the project team supporting the work of all Scrum teams. The Scrum methodology implementation process was coordinated by three coaches/experts who did not participate directly in the project works. Their duties included providing of trainings for the team and watching over the appropriate Scrum implementation.

3. Research Methodology and Materials

A case study was applied as a research method. It is of particular usefulness, especially in the field of management. [18] claims that single case study descriptions presenting the best solutions or practices provide proposals of practical solutions concerning management problems to organizations or managers. The present case study is a classic, single case study according to the definition in [19]. Single case studies are valuable in particular in situations when the analyzed problem is often encountered in practice, but there is no access to given cases due to the novelty of a problem and the organization's reluctance to be subject to such research. The three data and information collection methods were applied in the research. The first one was direct observations of one of the authors modeled on the studies of [20] presented by [19] as a single case study analysis pattern. The author spent three months in the team project as an external coach/expert supporting the Scrum implementation in the project. During this period the author carried out informal individual interviews with the international project team

members concerning the Scrum implementation, participated in the wide array of project activities and trainings for the project team members. Most of them were not aware that they were subject to research. Due to establishing interpersonal relations with the team members, as well as being the independent coach/expert (lack of formal hierarchical relations with the project team members) one successfully obtained sincere comments and deeper understanding of all relations, dependencies, and problems encountered by the project team. The second research method was interviews with the rest of coaches/experts responsible for the Scrum management in the teams. The last method consisted of a formal brainstorming session conducted with the project team members, the management of the department where the teams were located and the development teams. The synthesis of the brainstorming results was reported to the senior management of the organization. The session was carried out and moderated by one of the authors of the present paper. The project team was to diagnose problems they encountered and improve its work.

4. Problems Connected with Scrum Implementation in an International Project Team

After the analysis of the obtained material the five most important problems related to Scrum implementation in international project teams were extracted. The selection of the most fundamental factors is the subjective assessment of the authors of the present paper. These factors were selected on the basis of their own observations, interviews, the brainstorming session, the authors' general knowledge of the project management area and their practical experience. **Table 1** presents the Scrum implementation related problems indentified in the investigated project and the source of their diagnosis.

All problems will be described one by one together with their solutions implemented during the project.

4.1. Lack of Code Development Standards

Problem description: During the project the project team indicated the necessity to standardize the way of software code development. Every development team member had their own way of code recording resulted from their nationality, education, and professional experiences. Non-unified method of code recording prolonged the working time when the developers had to refer to the code fragments created by other developers or if the newly created code fragment required changes in the older part of the system. The lack of developer's signatures and code description required time-consuming analysis of the entire code fragments by a new developer.

Proposed solution:
- Introduction of obligatory signature in code fragments. As a consequence the analysis of archive code fragments is reduced to a short conversation with a code's author.
- Introduction of weekly meetings called "Coding Dojo". They were to standardize the code recording and develop common coding standards, and increase abilities of given development team members by sharing experience. The idea of Coding dojo was described, inter alia, by [21] [22].

4.2. Lack of Working Environment Standards

Problem's description: After the project works began it turned out that various project team members (coming from difference countries) had different computing platforms; the differences concerned software and ca-

Table 1. Scrum implementation related problems.

No.	Identified problems	Source of data
1	Lack of code development standards	Project team
2	Lack of working environment standards	Project team
3	Inappropriate Scrum implementation	Project team/coaches
4	Overwork	Project team/coaches
5	Communication problems	Coaches

Source: own elaboration.

pacity. They caused significant delays, particularly during first sprints. Some of the development team members could not perform their tasks due to lack of the adequate software or too low performance and capacity.

Proposed solution: One proposed "the must have list" determining minimum hardware requirements and necessary software. Such list should be prepared by the most experienced developers in the project team and published before a project starts. Every project team member should validate their hardware and software resources with respect to given project's requirements. The solution will provide increased efficiency during first sprints.

4.3. Inappropriate Scrum Implementation

Problem's description: Another rather essential problem faced by the international project team was daily Scrum. Flexible working hours, different approach to punctuality (culture-dependent to some extent according to the authors of the present paper), and necessary participation of various team members in other meetings caused chaos and work disorganization.

Proposed solution: Application of Scrum methodology and its principles is a factor which to a large extent enhances work and project success [23]. During their work the project team identified Scrum principles as a factor improving performance. One proposed fixed hours of meetings, the project team members were motivated for active participation in these meetings, and in their personal calendars there was a fixed time devoted to daily Scrum.

4.4. Overwork

Problem's description: Another problem reported by the project team members was a large number of duties unrelated to project tasks the members were assigned during the project implementation period. Two major task groups outside the project scope included:

4.4.1. Participation in Additional Technical Trainings for the Team Members

The project team was created on the basis of resources coming from various organizations. In general, software consisted of three major layers. Each of these layers was developed in different technologies. When Scrum was implemented, it was impossible to create a team developing software fragments in just one layer. Scrum assumes software development in potentially shippable product increment. With reference to the above, it was necessary to create cross-functional teams developing software in all system layers. It was necessary to train some team members in the scope of technical abilities. Trainings decreased capacity of given Scrum team during sprints.

4.4.2. Burdening of the Project Team Members with Tasks from Other Projects

Some of the project team members participated also in works related to the previous software release. Due to the fact that the previous version was in its testing phase, correction of errors diagnosed during the implementation phase was parallelly assigned to some of the project team members which was time-consuming and decreased the capacity of the given Scrum teams.

Proposed solution: The proposed solution consisted in full transparency of the work performed with respect to the project. Every additional task performed by the project team member was to be added on the Scrum board and included in Sprint Backlog. The amount of work unrelated to the project was summed up and presented on the Sprint Review meetings. The entire team capacity was decreased by the value of additional tasks. During the project implementation the management understood that in order to accomplish the project within the deadline particular project team members should be unburden with other tasks unrelated to the project or additional resources should be added to the project. Making the outside-project work performed by the project team members visible allowed for fast diagnosis of the problem and reduction of additional burdens placed on the project team.

4.5. Communication Problems

Problem's description: In the intrateam communication various levels of English became a problem. Some of the project team members communicated effortlessly only in their mother tongue. Language skills in teamwork are crucial.

Proposed solution: Before fixing of development teams one should take into account communication skills in

a project's applicable language. It requires organizations to adopt aware HR policy and constant investments in employee development, not only in technical skills, but also linguistic abilities.

5. Conclusion

Culture issues are critical in system and application development. This aspect is often omitted [24]. Cultural aspects in global organizations and their projects are an extremely broad issue. The authors of the present paper presented five most fundamental problems the international project team faced when implementing Scrum. The problems and proposed solutions can be applied during Scrum implementations in other international project teams. The list of challenges and proposed solutions is not restricted to one organization; therefore, it can be useful for various organizations. The very introductory character of the presented study and the necessity of continuation are known to the authors. Moreover, another crucial area not covered by the present paper is the Scrum methodology implementation in projects realized by dispersed (in meaning of location) international agile project teams.

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