Software development with Scrum – Telenor Serbia E-Business Success Story

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***Abstract*— In order to achieve modern business requests such as shorten time of advancement and launching the new products and services as well as end users inclusion in product development process, specific methodologies need to be applied.**

This paper presents application of the Scrum methodology in software project realization. It is the real world Telenor Serbia E-business software project described from every aspect of the Scrum implementation beginning with the project start, then through pilot project, sprint execution, usability testing and concluding remarks. This may be used as an example in other businesses and companies in order to improve project realization and business operations.

I. INTRODUCTION

General project management concept has proven itself through numerous successful projects and in that way, may be applied in project realization in any area. Thus, PMBOK (Project Management Body of Knowledge) standard, as project management methodology basis, may be applied in any area. Concerning specificities of certain projects, like in software development projects, many companies use other methodologies such as: PRojects IN Controlled Environments (PRINCE2), agile methodologies, Rational Unified Process (RUP) framework or Six Sigma methodologies. [1]

This paper concerns agile methodologies, and especially the Scrum methodology. The fact that during the last decade of the past century information technology (IT) projects had success rate of 16.2% [2], was taken into account. According to [2], this success percentage increased to 35% till the 2006. This may be attributed to the developed and applied methodologies in IT projects realizations.

Agile methodologies present adaptive software development, which means that projects are mission driven, based on components and use time cycles in order to achieve preset deadlines. [3, 4, 5, 6, 7] Furthermore, all the agile methodologies (Scrum, Extreme Programming (XP), Feature Driven Development (FDD), Lean Software Development, Agile Unified Process (AUP), Crystal, and Dynamic Sistem Development Method (DSDM)) have iterative flows and increment software deliverables in short iterations. [1]

The main goal in this paper was to report a successful use of Scrum in a company that has not previously used it and, as a result, an improvement in its business operations. The Scrum methodology was described through the real Scrum roles, Scrum flow and Scrum artifacts (product backlog and sprint backlog) of the E-business project realized in the Telenor Serbia company. This is described in the following chapters from: How it all started, through Pilot project, Sprint execution, Demo day and Usability testing to the Conclusion.

Described project does not represent only one of the kind, with determined duration, but the Scrum as accepted way of work for all e-business initiatives, i.e. requests. It is an ongoing project. Conclusion remarks show how many features have been realized, and how many sprints have been done since the beginning of the implementation. Used tools contain information classified as "confidential" and may not be externally shared.

II. RELATED WORK

In the modern world, USA mostly, agile methodologies are greatly used. One of the biggest indicators about this is number of business ads where experts from this area are mentioned [8]. The data about agile methodologies implementation in Serbia dates from 2010. They are mostly available at portals of IT companies [9], banks [10], news [8, 11], and agencies for trainings [12, 13] or expert conferences [14] about agile methodologies. There is a research [15] about agile methodologies analysis in software companies that confirms Scrum implementation in Serbia. However, there are no sources, or they are unavailable, about Scrum methodology application experiences in Serbia. This emphasized importance of this paper, which by described experience may positively influence on bigger Scrum methodology application in our country, as well as on increasing success rate and company competitiveness, which uses this methodology.

III. HOW IT ALL STARTED?

There was a need for faster software products delivery and, on the other hand, the need for starting implementation immediately. Considering this in 2014, E-business team of Telenor Serbia decided to implement agile way of work in order to execute online initiatives. The pace of advancement and launching the new services and products as well as including the end users in product development process, are essentially important for the success in the field of e-business. In that way extraordinary users experience and high quality product would be provided at the same time. Previously used project management concept included traditional methodologies with phased approach (waterfall model) have not provided satisfying results. This concept implies

that all the requirements are predefined and that end user gives inputs at the barely start and then during the test phase, after more than a few weeks or months of analysis and implementation, which is not enough user involvement. These reasons influenced on the decision to apply totally different approach.

E-business team wanted to launch the new self-care portal for Telenor mobile network users in short time, but in the moment of project initiation only the part of the user requirements was known. Online market demands that the development from idea to the final product lasts only a few weeks. Considering the fact that the e-business market is extremely dynamic and things may be changed on the daily basis, it was necessary to enable continuous development, which will provide totally new requirements realization as well as, changes during the implementation process if it is needed, without delays in ongoing projects or initiating the new ones. It was necessary to implement requirements as they appear, based on market change or needs of other stakeholders. There were a lot of requirements, between twenty or thirty per month, but such requirements never seemed important enough to start the special project realization. That is why those requirements have never been realized, or had a realization with enormous delay. In order to avoid that delay in requirements realization where implementation lasts a few weeks or even months, traditional project management and planning process had to be abandoned at all costs. Telenor favors end users and wants to put people and user experience in the first place, and extraordinary user experience could only be delivered through constant and fast end users feedback and usability testing during the implementation process. This would enable the most effective way of high quality products development that at the same time totally satisfies end users demands. E-business team considered its needs and plans with the project portfolio office as well as with the software development department. Limited number of internal resources and large number of ongoing projects at the company's level imply that the traditional approach does not enable self-care portal realization in timely and economic satisfying manner. It was clear and without cost analysis that buying the on the shelf commercial solution does not pay off and this option was not at the table at all. Giving up of the new portal realization was not considered too, and the new solution needed to be found. Decision was made to try with the agile methodology application.

IV. THE PILOT PROJECT

In order to continue the work it was necessary to get approval from the company's top management. The challenge was even bigger because in that moment, company's knowledge about agile approach in initiatives execution was only theoretical, without any previous experience (except one software developer that was certified ScrumMaster). Due to time constraint there were two parallel fronts: gaining top management approval and learning by doing (learning about the methodology, researching, training, etc.). ScrumMasters organized internal workshops for sharing knowledge between colleagues. Two ScrumMasters and one Product Owner were certified additionally, and there were a lot of help from the other business units inside the Telenor Group that had pre experience in agile approach. Gaining the knowledge about the methodology lasted for two weeks, and at the same time top management gave their consent for the start of six months pilot project. After six months evaluation of success rate will be done as well as the decision about further steps and continuing of application.

Product Owner role was assigned to the manager of the E-business team (the main business stakeholder). The greatest support to the Product Owner during the selection of features, that should be developed were many marketing experts from different e-business areas. One certified programmer took the role of the ScrumMaster. Considering assignments at the other ongoing projects, company did not have enough resources for software development, and it was decided that during the pilot project company engage outsource company for the development services. Instead of engaging market research agency, it was decided to save money and costs and gain better results through immediate and real time feedback and usability testing with future users during the development process.

V. THE FIRST SPRINT

The objective was to launch the new portal in beta version as soon as possible, to realize only the set of features necessary for launching, and the rest of features as well as the future requests should be realized on the fly. Two weeks after the initial idea it was time for the first sprint. In order to arrange sprint planning together with the business stakeholders Product Owner prepared Product backlog (the list of required features).

ScrumMaster is not obligatory participant in Product backlog creation, but he/she may assist and be consulted if it is needed. Workshop for Product backlog update usually lasts one working day and then every business stakeholder adds his/her requirements to the list. Taking into account importance and order of realization they set priority for every requirement. Requirement in the Product backlog explains the need considering business approach, and it has:

- feature name,
- system that needs to be changed (where it should be),
- feature description and interaction between the system and the end user (user story),
- detailed description with the business rules that should be implemented and guidelines for the user interface design (description),
- example of the drawing or the print screen, which is optionally, and
- priority that is needed.

Based on the completed Product backlog the entire Scrum team, i.e. Product Owner with his/her team, ScrumMaster and development team perform grooming of the Product backlog. In the start they eliminate requirements whose realization is not possible, or the ones not enough well defined, in order to avoid losing time on its reconsideration during the sprint planning. Grooming lasts for a few hours, or one working day at most. The next step is the one-day workshop for sprint planning that includes the entire Scrum team, as well as the business stakeholders, owners of the features from the Product backlog.

The sprint duration is previously defined and usually lasts up to two or three working weeks. It starts with requirements analysis from the beginning according to the list with requirements sorted by priority, starting with the ones with the highest priority. Every stakeholder, i.e. requirement owner represents his/her requirement (user story, description, etc.). At the same time user story represents success criteria that is used, after the sprint execution, as success verification of requirement realization.

When business stakeholder represents his/her requirement, ScrumMaster explains, i.e. translates this requirement to "technical language" for the development team in order to represent work scope, technology that will be used (programming language, platform, etc.) and what they should do exactly. In case that feature realization includes development that is not in responsibility of the development team (for example, development team develops portal, and feature demands integration with backend system that needs change too) Product Owner is responsible for resources that are needed from the Company and who will execute this development. When development team members confirm that they understand feature completely, the duration assessment for the feature realization starts. Duration assessment means that every member of development team raises card with number that symbolizes estimation of days needed for him or her to realize each individual feature. Every development team member gives his/her personal assessment without consulting other team members. If there are no deviations between individual assessments, the assessment that is agreed among development team members, which is realistic for the specific feature, is taken into account (average value of given assessments or the highest one).

If there are great differences, team members with the extreme assessments explain their evaluation. After this, assessment that has the most valuable explanation is taken into account. Duration assessment is done for the entire Product backlog. In case that some of the features are impossible to realize, or they are not enough clear, too complex or have correlation with the activities that are not in the Scrum team authority and it will not be completed in time, they get lower priority level, and its realization is possible later. In case that there is a feature that cannot be realized even during the entire sprint, it decomposes on simpler requirements. After duration assessment needed for realization of every feature, team creates sprint backlog based on number of the development team members, time needed for the feature realization and previously defined number of days for the sprint execution. Bonus i.e. backup features are chosen too. Development team needs to know what to do in case that some feature completes earlier, or if its realization is for some reason cancelled. The output of the sprint planning workshop is Sprint backlog including tools for tracking of realization (burndown chart) and it is regularly updated by the ScrumMaster during the sprint execution. Later, during the sprint execution, team members are choosing the tasks and making agreements about assignment of concrete tasks.

VI. SPRINT EXECUTION

Every day of sprint execution is the same and starts with the daily standup meeting. It is a short meeting that gathers Product Owner, ScrumMaster and development team. The meeting lasts ten minutes at most and development team members inform Scrum team about the work that is done the day before, activity plan for that day and, if it is needed, they discuss about any problem they have in realization in order to make decision and take steps for overcoming the problem. If some of the development team members have a problem that cannot be solved by Scrum team itself (for example, enable access to the testing environment), ScrumMaster takes over responsibility for solving the problem so the team can continue with work.

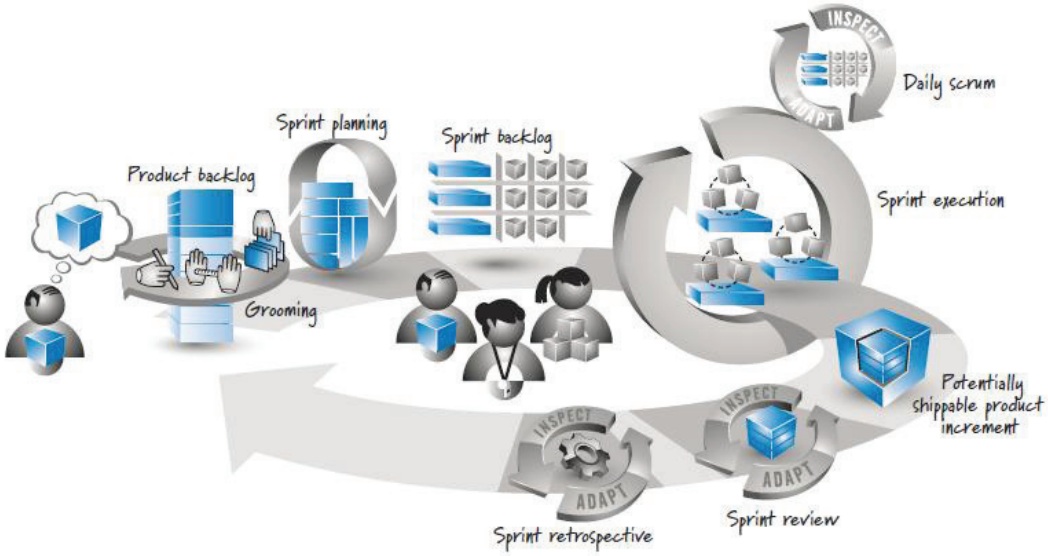

Figure 1. Scrum activities and artefacts

Product Owner may use his/her influence to help problem overcoming as soon as possible. In the beginning, Microsoft Excel spreadsheet was used for progress tracking purposes, but in the meantime it was replaced by open source tool named *Trello* that appeared as more useful and easier for updating. Also, this tool enables interactivity and communication between Scrum team members in situations when a team member needs additional information about requirement from the business stakeholder. The member of the development team may use *Trello* on daily basis and send question to the business stakeholder without development delays till the next day standup meeting. If development team member start feature realization that lasts for three days, and during its realization requirement change appears, demanded by business stakeholder, then this stakeholder and development team member may consult each other if it is possible to implement changed feature in the previously set timeline. If this realization is not possible, then at the next day standup meeting Product Owner and Scrum team together are making decision about extending the deadline for realization of this feature. Consequence of this decision may be to cancel realization the last requirement (requirement with the lowest priority) in the list from this sprint. Also, business stakeholder has possibility to decide about:

- canceling realization of that feature in the ongoing sprint – this is in case when its realization without change does not have meaning;
- continuing realization of the next requirement in the list, or if it is acceptable
- continuing feature realization as it was planned in the first place.

Change request in the middle of the sprint is not well and it should be avoided at all costs in order to maintain pace of the development team. After the feature realization, member of development team marks this feature as completed and goes on with the next requirement according to the plan. Then, business stakeholder checks developed feature and, in case of noticing the bug he/she marks that in *Trello*. By doing that business stakeholder notifies development team member that worked on the feature development to make necessary corrections. In that way, during the development and in real time, testing and corrections are made as well. This decreases the risk of having any bugs that could jeopardize success of the entire sprint to the lowest possible level. Sprint execution has pre-defined duration and ends on the planned date, no matter if all features are realized in time or not. If during the sprint execution all the features are realized before deadline, development team takes predefined bonus i.e. backup goals and starts their realization. During the sprint execution Product owner and his/her team work on creating and gathering new requirements that will be candidates for realization in the future sprint. Figure one shows the most common Scrum activities and artefacts.

VII. DEMO DAY

After the last day of sprint execution Demo day is organized. It is an event that gathers all members of Scrum team, as well as business stakeholders. Demo day duration depends on time needed for demonstration of realized features. Scrum master and development team members demonstrate realized solution; show final product that is actually working software that runs in testing environment. At the same time verification is done too. It has to be checked if the feature is realized in accordance with the User story, other criteria agreed during the sprint planning and changes during the sprint execution. Product owner confirms if the feature is realized as is should be, i.e. that the requirement is successfully completed. If all planned requirements are realized successfully, without bonus requirements, sprint is declared as successful. If even one planned feature did not realized successfully sprint is unsuccessful and those features transfer to the next sprint. Feature deployment may be realized right after sprint execution if it was a small improvement or a patch that is not connected to other activities (for example, launching product at other channels, marketing campaign, etc.), but its launching may be planned for the later specific date. Right after the sprint execution there is a new cycle, starting with grooming, sprint planning, etc.

VIII. USABILITY TESTING

After the feature development and deployment there is a usability testing conducted by Usability expert who works with end users. Usability testing goal is to identify possibilities for feature improvements based on the way that users use features and feedback from the end users. If it is necessary to make certain correction or feature improvement, it would be defined as requirement for some of the following sprints.

IX. CONCLUSION

During two weeks only, E-business team succeeded that from bringing idea to making decision, gain enough basic knowledge, necessary approvals from the top management and to start with agile approach application. The first sprint started at the beginning of the second quarter in 2014, and its goal was to launch the new selfcare portal as soon as possible. Beta version of the portal was launched for less than two months, after three successful sprints. Pilot project was declared as successful after six months, because it is satisfied three previously defined success criteria:

1. Deliverables on platform in the scope;
2. Use findings to create guidance for other similar initiatives, and for creation of development handbook;
3. Explore how agile methodology functions in Telenor.

The fact that Scrum is convenient for software project development mostly is used in this project realization. This means that there is no parallelism, which enables simultaneous work on many different projects. For example, if company has one senior expert for business support development systems, who works at four or five ongoing projects at the same time with 10-20% of availability, he/she cannot be member of the Scrum team. It is not possible to accomplish portfolio project roadmap with projects that follows waterfall methodology. To overcome this organizational challenge it was needed to engage external developers.

After described project Scrum become default way of work for all projects in the e-business area. In the beginning of 2015 there is fourteenth sprint in the role, and by late January over 170 new features were realized at Telenor selfcare portal, web shop, smartphone application,

etc. Without agile methodology application and Scrum approach the most of these features would never be realized. Now, there is a continuous and effective development with team members who are completely committed to the e-business initiatives, unlike before, when experts from different areas were assigned to too many different projects, which disrupted their focus and efficiency. Development team is externally engaged and availability of internal resources that depends on other projects practically does not influence the plan and activities of the E-business team. For the first time there is a fast and direct business communication, i.e. marketing service with programmers at the daily basis, and in that way there are no delays or errors due to bad and untimely communication. New features are launched constantly, and involvement of end users directly into the development process enabled launching the high quality solutions, that brings extraordinary user experience to even higher level.

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