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Analysis of the use of agile project methodology

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Abstract: From the perspective of the main goal, the real use of agile project methodology was analyzed, and then the levels of knowledge and use of the mentioned methodology were evaluated. Areas for potential improvement were identified and proposals for measures were created to increase the efficiency of future project implementation. Most companies today focus on delivering quality and gaining customer satisfaction and in order to accomplish this, the challenge lies in choosing between traditional development methodologies and agile development methodologies. However, both these approaches have positives and negatives, making the right choice plays a crucial role while starting a new project.

Keywords: agile project, process improvement, industrial engineering, methodology.

INTRODUCTION

Agile project management is an interactive way of managing projects. It is the opposite of traditional project management, the so-called waterfall approach. The agile approach to project management is applied in projects where there is a clear framework goal, but for various reasons it is impossible to precisely define all long-term requirements without continuous prototypes. It is therefore used when a detailed project plan including detailed requirements cannot be determined (which is typical of the traditional, waterfall approach). The agile approach to project management is interactive, flexible and incremental. In practice, this means close and constant (incremental) cooperation between the project team, which creates continuous prototypes, and the customer, who provides feedback on the basis of which the assignment is specified. *Agile* project management is therefore applied to very complex systems where detailed requirements are created or specified continuously based on experience with prototypes from individual iterations. In agile work methods, small portions of results (prototypes) are implemented in each development cycle in close cooperation with the customer.

The diagram (Fig. 1) illustrates the lifecycle process in *Agile* methodologies.

Internal documentation should be concise and provide key information. It is applied where the project is highly innovative, requires ongoing corrections and ideas, and everything can be continuously communicated with the customer. The agile approach to project management is close to lean techniques and approaches such as *Kaizen* or *Six Sigma*, because it has a strongly customer-oriented nature, all activities during development are purposefully focused on achieving the desired result, and thus waste is

minimized more significantly than in traditional procedures.

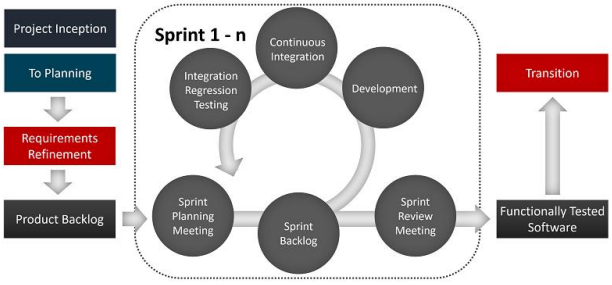

Fig. 1. The lifecycle process in *Agile* methodologies [14]

Scrum is a lightweight process framework for agile development, using a specific set of procedures that must be followed to ensure that the process is consistent with the framework. (Example: The *Scrum* process framework requires the use of development cycles called Sprints). "*Lightweight*" means that the overhead of the process is kept as low as possible to maximize the amount of production time available to produce useful work. *Scrum* processes enable organizations to smoothly adapt to rapidly changing requirements and produce a product that meets evolving business goals, which in turn benefits the organization by helping it increase the quality of its deliverables, better tolerate and respond to change, and keep the project plan and status under control [11].

The product backlog is the heart of *Scrum*. The backlog is essentially a prioritized list of requirements, stories, features, or whatever. Things that the customer wants, described in customer terminology. We call them stories or sometimes simply backlog items. Then, the backlog items are selected by priority into the sprint backlog and a *Sprint*, a development cycle, begins, resulting in the first prototype. Based on customer feedback, the requirements are refined and another *Sprint* occurs, resulting in another new prototype (Fig. 1). *Stories* contain the following items:

- *ID* - a unique identification, a simple automatically incrementing number,
- *Title* - a short, descriptive name for the story. For example, "See my transaction history",
- *Importance* - the importance of the story according to the product owner. For example, 10 or 150. The higher the number, the more important the story,
- *Baseline* - an initial estimate of the workload of implementing the task compared to other stories done by the team. The unit is story points, which usually roughly correspond to "*ideal man-days*",
- *How to demo* - a simple test specification of how this story will be demonstrated during the sprint demo,
- *Notes* - any additional information, explanations, references to other sources [13].

The waterfall approach is an approach to development or project management that assumes a clearly defined plan in advance, i. e. sequential procedures from analysis. It emphasizes planning, deadlines and a work schedule. It involves detailed planning of individual steps and subsequent adherence to the procedure for developing or implementing the project. The project team is given minimal room for changes during implementation, which is necessary for some projects. It is suitable and useful in projects that have a clear goal and a clearly definable procedure and division of work.

A *Gantt chart* is often used for their planning. The waterfall model is in contrast to the so-called *Agile* approaches, which are, on the contrary, more suitable for development projects that need a high degree of innovation and refinement during development [12].

Waterfall project management is carried out using five phases (Fig. 2) for *IT* projects: process changes related to changes in the information system, software, interfaces, etc.

- *Collection and consolidation of process requirements and their documentation (creation of the task).* Definition of *Scope* and project. In this phase, comprehensive information should be obtained about what this project requires. This information can be collected in various ways, from interviews to questionnaires to interactive brainstorming. By the end of this phase, the project requirements should be clear and there should be a requirements document that has been distributed to the project team,
- *Analysis and design of the solution (Business Blue Print).* Based on the task, the project team designs a comprehensive and integrated technical solution. The solution is described at the level of process changes, organizational changes, creation or changes to system settings, creation or changes to programs requiring development, etc. The subject of this phase is not the recording of coding. Software and hardware specifications are defined,
- *Implementation and testing (in the test environment).* A setup and test environment is created in which system settings, program development by coding, interface settings, reporting creation, etc. are carried out. After the setup and coding are completed, internal integration tests are performed by the implementers and the necessary corrections are incorporated. Subsequently, an official data sample for integration tests is defined and test scenarios for integration tests are developed. Subsequently, key users are trained by the

implementer. The final step of this phase is comprehensive integration tests performed by key users using the prepared integration scenarios and test data sample. If necessary (comments or errors from integration tests, corrections are made and the relevant part or the entire integration tests are repeated),

- *Preparation for productive operation.* A productive environment is created into which settings and programs from the test (development) environment are transferred after approved integration tests. Key users create training documentation for end users and then train them in the full specified scope according to the focus. According to the results of integration tests, master data is prepared and transferred to the productive environment. Subsequently, defined movement data is also transferred,
- *Go – live and support of productive operation.* The start of productive operation of the use of the system or software in a productive environment by key or end users. In the initial periods (months) from the start of productive operation, the implementer team usually provides the customer with ongoing support in a defined scope, which gradually decreases until it transitions to standard system (software) maintenance.

1 DIFFERENCES BETWEEN AGILE AND WATERFALL PROJECT MANAGEMENT APPROACHES

The waterfall (traditional) approach to project management takes functionality into account as a fixed quantity. This means that at the start of the project it is possible to define a complete detailed task (determine a detailed project plan) and the implementation is carried out by delivering only one prototype with complete functionality. To achieve acceptance of the resulting product, time and resources are variables that can be adjusted (Fig. 3, triangle - right).

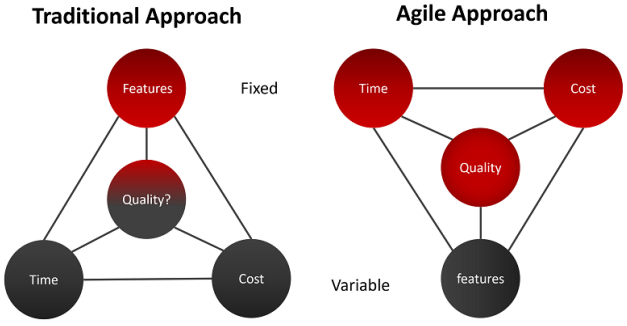

Fig. 2. Approaches [14]

Agile methodologies have the opposite approach, i.e. time and resources are set as fixed at the beginning of the project and functionality is variable, i.e. there is a constant ongoing refinement of the task. The delivery date of the first prototype is a priority, although the scope of functionality contained in it is only partial compared to the functionality of the final prototype. (Continuous creation of prototypes is necessary). The difference between agile and traditional software development concepts can be seen in the following Fig. 2.

After balancing the line and distributing the workstations among the workers, it was possible to plan and carry out a test of adding a worker to the line.

CONCLUSIONS

The choice of the topic of "analysis of the use of agile methodology" seems to be extremely relevant in today's project-saturated times (in industrial joint ventures). This topic is all the more important in the environment of a company that annually implements a number of projects of various sizes (including medium and large) with a high degree of complexity, integration and complexity, with project teams also consisting of customer representatives (*Japan*, *Europe*, *Taiwan*), who are world leaders in their specialization. The results of our work fully confirmed that *SteCo*, as the highest management body of *FSK* projects, fully competently, with knowledge of all the details related to project methodologies, decides before the start of each project (when defining it) on the use of a specific project methodology. The above eliminates the risks of possible increased planned costs, failure to meet planned costs, unjustified longer project duration, larger scope of ongoing project documentation (for example, when using agile project methodologies for a project with a clear need for a waterfall methodology solution), etc. It also manages all projects at the highest level.

The above results from many years of international experience in managing projects of various types.

The results of our work also made it possible to identify areas for improvement in project implementation and propose corrective measures: Based on the evaluation of the questionnaire in question, it appears appropriate to preventively retrain all members of project teams of current and planned projects on the topic of project methodologies.

Targeted control questions for comparing agile and waterfall project methodologies significantly contributed to the above knowledge. By "control" we mean verification of the correct understanding of the principles and aspects of the project methodology. The aim of the aforementioned training is not to interfere with the project methodology by key users, but to become more familiar with the methodology

used and thus provide increased support during the implementation of projects.

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