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I.A. Litnitskiy

## PROJECT MANAGEMENT OPTIMIZATION THROUGH INTEGRATION OF AGILE APPROACH

И.А. Литницкий

## ОПТИМИЗАЦИЯ УПРАВЛЕНИЯ ПРОЕКТАМИ ПУТЕМ ИНТЕГРАЦИИ AGILE ПОДХОДА

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Innovational IT projects are an urgent topic for the last few years. The world is changing, constantly improving technologies have become a part of our lives.

Project management tools in the field of IT are significantly different to the ones used in traditional industries. Today's IT projects require project managers with the profound knowledge and practical skills enabling to manage constantly changing requirements of stakeholders. The aim of the article is to take a closer look at the advantages of Agile approach over traditional models when it comes to project management in IT field.

PROJECT MANAGEMENT. AGILE APPROACH. TRADITIONAL MODELS. IT PROJECTS. PROCESS OPTIMIZATION.

Инновационные ИТ проекты становятся все более актуальной темой. Мир меняется и постоянно совершенствующиеся технологии входят в нашу жизнь.

Инструментарий Управления Проектами в сфере Информационных Технологий существенно разнится от используемого в традиционных областях. Современные ИТ проекты требуют участия менеджеров, обладающих знаниями и практическими навыками, достаточными для управления постоянно изменяющимися требованиями заинтересованных участников проекта. В статье рассмотрены преимущества Agile подхода по сравнению с традиционными подходами при управлении ИТ проектами.

УПРАВЛЕНИЕ ПРОЕКТАМИ. AGILE ПОДХОД. ТРАДИЦИОННЫЕ МОДЕЛИ. ИТ ПРОЕКТЫ. ОПТИМИЗАЦИЯ ПРОЦЕССА.

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IT projects failures are quite common, in reality not that many projects fulfill clients' expectation on 100 % in regards of time and budget. That's why organizations apply a lot of effort trying to minimize risks leading to project failure.

Frequently fiasco of IT projects (and other projects aimed at unique product development) are caused by usage of Traditional approach in project management (e.g. Waterfall), which can already be considered as outdated tool for present day projects. In other words, numerous IT companies firstly spend significant time and financial resources on gathering and consolidation of all requirements to the new system, then they attempt to design ultimate solution in advance, which could be laid as the basis for programming detailed evaluation. In connection with this evaluation (including evaluation of the budget) is often inaccurate, there are unexpected problems, requirements and risks when development moves into the implementation

phase, which greatly reduces the accountability of projects. The following basic assumptions typical for the project in IT field preventing adequate project development:

*Assumption 1: It is possible to determine full set of requirements (project, technical, product) in advance*

This assumption can be correct only in case of small IT projects where technical requirements to the new product are unambiguous and its determination doesn't cause difficulties both among developers and project managers.

*Assumption 2: Initially defined requirements are not being changed throughout the project*

There is an inevitable discrepancy between the beginning of a software development project and its final results, and even if it were possible to define a complete and accurate set of requirements in advance, ever-changing business environment causes constant requirements change.

*Assumption 3: It is possible to carry out assessments with a high degree of accuracy*

Research in this area shows that the average fixed scale projects cost almost two times more than it was indicated in the evaluation. Besides the problem of constantly changing requirements, the reason for this could be artificially low initial estimates, first priority of which is to approve the contract.

*Assumption 4: Realization (development) phase is just a mechanical process of conversion of architecture into code*

Software development sustains losses due to conduction of attempts to assimilate it with construction industry processes in regards of predictability of each project phase. However, in practice programming is much less straightforward than managers see it [4].

To sum up all the written above, it is possible to make a conclusion that in most cases IT companies fail their projects due to its management style or in other words traditional approach. As a result, modern IT companies practicing traditional practices in tough competition environment sooner or later face certain challenges. Nowadays rigid management model inherent to traditional approach doesn't align with the market dynamics, its project work suffers of the strict requirements, improper planning, inability of project team to adapt to changes. Most of the time both clients' and users' requirements are constantly changing throughout the development cycle in a way that by the time of product market launch, the product itself dramatically differs of what was planned in the beginning. In addition to that, absence of adaptation tools significantly affects the scope of resources by the end of the project both in time and in financial matters.

That is the reason why many companies consider of project management style shift from Traditional towards Agile approach. Many studies have shown that most successful projects are those that follow principles of flexibility, thus proving that the methods based on rigid models are not always the best (in particular, when it comes to change management, emergency project execution or even meeting constantly changing market needs) [5].

Agile management implies iterative and periodic process during which all the stakeholders actively work together in order to fully understand the scope of work, define requirements, prioritize features and functions.

Agile method is to be used when the following conditions are fulfilled:

- Meaning of the project is clearly defined
- Client is actively participating in development throughout the whole process
- Client, designer, developers and project managers are closely located or they sustain regular communication which has to be regulated
- Incremental development based on functions is possible
- Visual documentation is preferred to the formal one

Agile method of development consists of many short iterative cycles of planning and development, allowing the team to continually assess evolving product and get instant feedback from users and participants. The team learns and improves the product and the method of work in each successive cycle. After well-established planning, determination of needs and corresponding solutions, phase ends, and the project goes through the iteration with more detailed planning, needs analysis and implementation, taking the form of waves [1]. The process described is shown on the Fig. 1 below:

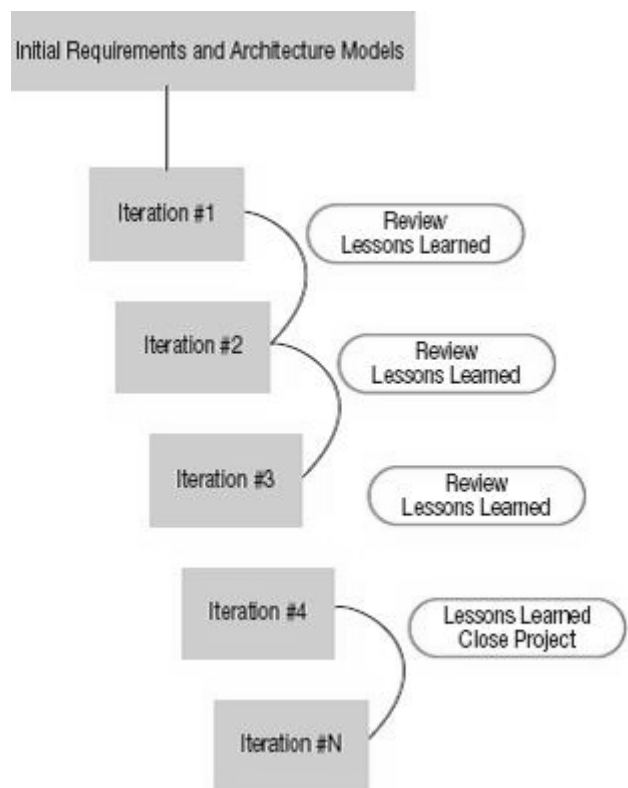


Fig. 1. Agile approach mechanics

In that way Agile approach allows to implement instant changes and corrections when new requirements appear. Agile method requires a group of people working at full capacity, in meantime client and/or user must also participate. Developers in their turn should be coordinated with each other and with the client.

Agile method of development is carried out by the small group of stakeholders with proper communication system regulated in advance. The core team is usually composed of several developers who are writing code in pairs (full quality management), client / user, the architect (s) in the field of IT, business analytic and project manager. The work is performed within a series of sessions where team writes the code, then tests the working units of the system, and then the process repeats. The level of documentation tends to a minimum, as the team basically relies on informal communication [3].

That is what differs Agile from Traditional method where significant amount of time and effort is applied to detailed planning of the whole process in advance, which is aggravated by extensive documentation of needs and requirements. Teams, practicing Agile approach, determine and set priorities for the functions which are being developed on the basis of their value in the business. Such an approach is useful in case if proposed product can be delivered to the client step by step. If this is impossible, the functions and properties can still be developed and then integrated into the original version of the system.

Effectiveness of Agile project management integration was proved on a real case of a company occupied with software development for eye tracking devices (name of the company can't be disclosed due to NDA).

#### 1). General assessment.

After conduction of optimization measures for the development of innovational IT products, the following set of positive changes was indicated.

A survey, carried out among the developer team, showed increased level of staff satisfaction and overall motivation of working process and the end result. In this case, the level of conflict among developers has been significantly reduced, affecting the efficiency of their interaction. In contrast, positive trends were observed in the communication within and between teams. Survey also revealed a positive reaction to the

introduction of changes to the software development process, the communication process takes the larger proportion, but it reduced time spent on the direct implementation of the software. Furthermore, a significant reduction in errors was observed, both conceptual and structural, for example, as the tracking «bugs» software (IssueView) shows that the level of bugs have been reduced by 35 %.

The proposed optimization has allowed effective implementation of detailed planning and the distribution of work between the executors (or groups of executors) for parallel execution considering necessary expertise.

Furthermore, the overall optimization was evaluated by means of CMMI (Capability Maturity Model Integrated) model. Identifying consistency level of project management processes a company has [2].

Whereas, before optimization, the company was located in 3<sup>rd</sup> level on CMMI scale, after the optimization it shifted in between 4<sup>th</sup> and 5<sup>th</sup> level. Thus, as a result of optimization, the company achieved fundamental positive changes, described below.

Control over the processes and created products is achieved by narrowing spread process performance to acceptable quantitative limits. Significant differences in process performance can be distinguished from random differences, especially within the established product lines. Productivity of some of production process is based on a common understanding of organization of work roles and responsibilities.

Due to the fact that the production process is clearly defined, the management gets an accurate picture of the technical progress in all projects. Also, the entire organization is completely focused on the continuous improvement of the production process. Productivity of the software development organization can be characterized as a predictable, controlled, focused on continuous improvement as organization seeks to improve the productivity thereby increasing the performance of processes of their projects.

#### 2). Quantative assessment

As the basis for quantative assessment of conducted optimization, labor intensity of each elementary process has been evaluated through comparison of two similar scale projects aimed at integration of new feature to already existing piece of software. These projects have different

Table 1

**Expenditures of labor, required for implementation of projects before and after optimization**

Processes	Work (hours)	
	Project A	Project B
Definition of technical requirements	80	112
Definition of project risks	40	40
Definition of product risks	50	50
Creation of initial architecture model	60	36
Creation of development plan	36	26
Feasibility study	8	64
Creation of test plan	28	36
Realization of SW	896	560
Execution of test	10	8
Documents preparation	16	16
Submission of the final product	32	32
Total (hours)	1256	980

clients and are located in close temporal proximity, so that influence of the learning curve on the development process can be eliminated. The project is implemented by developers

identical by quantity and composition. Quantitative assessment of «Project A» implemented before the optimization and «Project B» implemented after the optimization is described in the Tab. 1 below:

The average salary of the project team member is 32 euro. Accordingly, the difference in labor input was:

$$(1256 - 980) \cdot 32 = 8832 \text{ euro.}$$

Based on these results it can be concluded that the optimization is effective.

In order to assess the effectiveness of the Agile approach integration into companies' project management system, consumption of time and financial resources as well as quality indicators of planning and control processes, were evaluated for the current practice of project management and the proposed model of process organization. The calculation results showed that the application of the proposed model allows organizations to save time and costs of implementation of planning and control, as well as increase the quality of projects in terms of transparency of process organization, efficiency and accuracy.

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**LITNITSKIY, Ilya A.** – Saint-Petersburg State Polytechnical University.  
195251, Politekhnikeskaya str. 29. St. Petersburg. Russia. E-mail: ilya.litnitskiy@gmail.com

**ЛИТНИЦКИЙ Илья Алексеевич** – аспирант кафедры международного бизнеса Инженерно-экономического института Санкт-Петербургского государственного политехнического университета.  
195251, Россия, Санкт-Петербург, ул. Политехническая, д. 29. E-mail: ilya.litnitskiy@gmail.com