THE PLACE OF RISK MANAGEMENT IN AGILE METHODOLOGY

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Abstract: Risk Management is an organized decision-making process that efficiently plans, assesses, handles, monitors, and documents risk to increase the likelihood of achieving project goals and decrease the likelihood that a risk would become a future problem. The introduction of agile project management as a methodology in organizations poses new challenges to risk management. Although some of the conventional methods can be applied, it is important to take into account the specific characteristics of the agile methodology. This implies a more dynamic application of a set of methods and techniques for identifying, analyzing, assessing, and affecting risk. Risk management is a complex activity requiring a specific approach in terms of the capacity of an organization and the characteristic features of projects. Risk management is an important part of the integrated project management framework. It is not a coincidence that this process is included in the methodologies of the Project Management Institute and the International Project Management Association as well as in a number of standards.

Risk management is a complex activity requiring a specific approach in terms of the capacity of an organization and the characteristic features of projects. This means that even when standard rules, procedures, methods and techniques for project risk management exist, they need to be adapted to each particular case, analyzed and verified in the course of their implementation. Thus, this process can be highly effective.

Organizations' expectations of enhancing their effectiveness through risk management pose new challenges to project risk management methods and techniques. The dynamics of environmental factors – internal and external – is the main prerequisite for the attention managers pay to this process.

It is important to note that each project is specific and standardized risk management systems would be not only difficult to implement, but also ineffective. The agile approach to project management implies agile risk management. This means that standard risk management methods, techniques and limitations need to be adapted to the specifics and complexity of a project on the one hand, the requirements of stakeholders, and the team and organizational capacity, on the other.

The report focuses on issues related to agile project management, the integration of risk management into the project management process, and some contributing points of the agile methodology to improving the effectiveness of the project management process. Risk is presented as an unforeseen event that may have a positive or negative impact on project goals. The main advantages of agile risk management in a project and the possibility of integrating it with the overall project management are highlighted.

Keywords: agile risk management, project management, risk management process

1. INTRODUCTION

Risk management is an important part of the integrated project management framework. It is not a coincidence that this process is included in the methodologies of the Project Management Institute and the International Project Management Association as well as in a number of standards.

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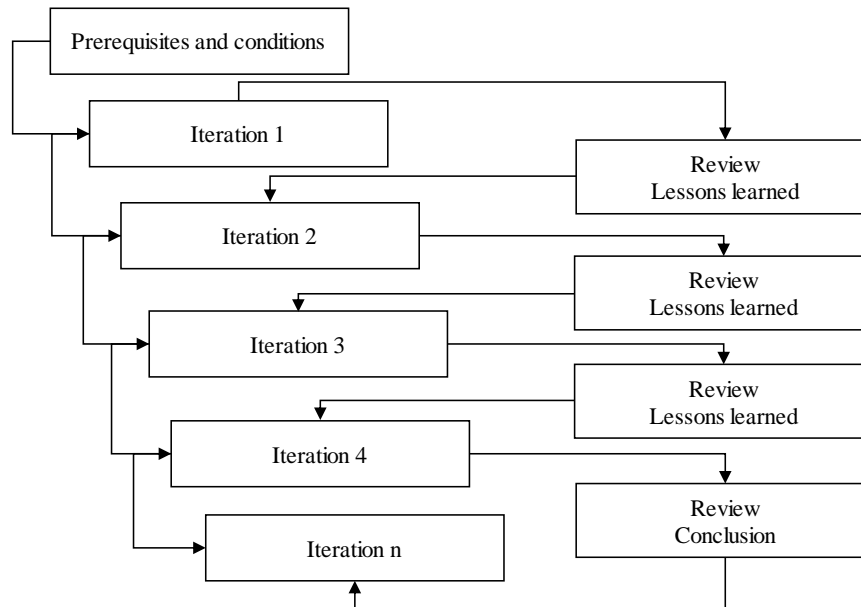
2. AGILE METHODOLOGY

Fig. 1. Cycle model of Agile methodology

The Agile methodology involves very fast iterative cycles of planning and development. They allow the project team to continuously evaluate the product and receive immediate feedback from customers or stakeholders. The team learns in the process of working and improving the product, as well as its work with each cycle. Once the simplified planning is completed, requirements definition and solution design, continuous planning, requirements definition, design, construction and testing activities are initiated. This approach is like cyclic waves. It allows immediate product modifications when new requirements emerge.

In 2001, a panel of experts adopted The Agile Manifesto (Beck, 2001). They draw attention to the importance of:

• People and relationships between them, placing them far above the processes and tools in the organization.
• Running software, ie working solutions, not comprehensive documentation.
• Collaboration with clients, not formal contractual relationships.
• Flexibility by rapid response to change, not plan regulation.

Without neglecting the processes, tools, documentation, contractual relationship or plan, the focus is on intangible assets that add value to each organization.

Although the Manifesto and the values and principles described in it are aimed at the software industry, Agile methodology is also applicable in other economic fields in the coming years. In a study on the needs of the Thirteenth Annual Report, Agile (CollabNet VersionOne, 2019) surveyed respondents from different sectors: technology, financial services, professional services, insurance, public sector, healthcare and pharmacy, industrial production, telecommunications, energy, education, retail, transportation, media and entertainment, non-profit organizations, etc.

More than 78% of respondents indicated that they were adopting a flexible methodology, and over 97% stated that their organizations were practicing flexible methods for the development of organizations and teams. The reasons cited as factors for implementing the Agile methodology are related to increased productivity, improved ethics and team morale and relationships, reduced project risk and reduced project implementation costs.

The introduction of flexible project management as a methodology in organizations also presents new challenges for risk management. Risk is increasingly significant in a number of project management standards and methodologies. Risk management is perceived as a choice between achieving a specific goal through alternative means and results, in terms of probability and uncertainty. The definition is related to the expected change and its positive or negative impact on the subject (Boyne, 2003). Although some conventional methods can be applied, it is important to take into account the specifics of the Agile methodology in the light of risk management.

The integrity of the risk management process in the overall project management is an essential prerequisite for its effective management. For this purpose, on a design, and often on an organizational level, a risk management system is developed. It is considered to be a working tool only if it is part of a holistic approach to risk management. This approach suggests a management vision and a sense of the need for this system, engaging all hierarchical and functional levels with the process, providing resources, describing the progress of the process, and capacity building. The introduction of agile project management as a methodology in organizations poses new challenges to risk management. Although some of the conventional methods can be applied, it is important to take into account the specific characteristics of the agile methodology. This implies a more dynamic application of a set of methods and techniques for identifying, analyzing, assessing, and affecting risk.

It is important to note that each project is specific and standardized risk management systems would be not only difficult to implement, but also ineffective. The agile approach to project management implies agile risk management. This means that standard risk management methods, techniques and limitations need to be adapted to the specifics and complexity of a project on the one hand, the requirements of stakeholders, and the team and organizational capacity, on the other.

The need to implement Agile is related to the continuous change in trends, mainly in software companies, which establish a new understanding of processes, namely, they are perceived as multi-level, intensified by many participants in reverse systems. (Lehman, 2001). The fast feedback and dynamics of the iterations underpin the application of the methodology.

In the scientific community, the issue of the importance of preconditions that allow the successful implementation of flexible project management practices, tools and techniques is discussed. A survey conducted (PMI, 2014) among 41 participants from different industries grouped these factors into four categories: organization, process, project team and project type (Table 1).

Table 1.Prerequisites for implementing the Agile project management methodology in organizations

Organization	Process	Project team	Project type and others
Organizational structure	Reconfigurable	Team independence	Plan the product conversion sequence
Organizational culture	Process Automation	Self-decision by the team	The urgency of completing the project
Learning organization	Modularity of processes	Team Leadership	Clear objectives
Training organization	Easy access to information	Dedication to the team	Complexity of the project
Agile style work environment	Formality	Agile team knowledge	Novelty of the project
Adopt an Agile methodology	Continuous development of key events	Team experience / expertise	Supporting systems
Adequate remuneration for implementing Agile	Process parallelism	Project manager experience	Client involvement
Attention to speed	External integration	Team size	Collaboration
Performance measurement		Localization of the team	Participation of suppliers
Knowledge management system		A multidisciplinary team	
Multidisciplinary teams			
Compete for resources			
Strong implementation support			
Decentralization of decision making			

Adapted from: PMI, Can Agile Project Management Be Adopted by Industries Other than Software Development?, https://www.pmi.org/-/media/pmi/documents/public/pdf/research/research-summaries/conforto_agile-pm .pdf

Implementing projects by detailing specific tasks of limited duration, focusing on the quality of the outcomes of each task, the availability of informal communication and agile interaction, the transparency of information in terms of availability, quantity and quality, the promotion of creativity and participation are only part of the advantages of agile project management. These characteristic features of applying the agile project management methodology are the basis of risk minimization.

3. AGILE RISK MANAGEMENT IN A PROJECT

According to COSO (COSO, 2004), the concept of risk consists of three key characteristics: event, probability and uncertainty. An event is an internal or external situation affecting the achievement of organizational and project goals. A probability is the likelihood that events occur. Uncertainty relates to the likelihood and impact of future events on an organization and a project and their goals.

Risk represents vulnerability to trouble. A risk is a factor, a condition, a combination of factors and conditions in real life where there is a probability of loss, an unwanted outcome (result). In order for a risk to exist, this probability is not necessarily measurable. It is enough that it exists. An unfavorable outcome – this is a result marking a deviation from the desired outcome, the one that is expected. (Bogdanova, 2012)

Risk management process within organizations aims at identifying potential negative events and specifying adequate ways to respond to them in order to meet organizations' risk appetite, thus providing reasonable confidence that an organization's goals will not be endangered and will be achieved.

Risk management is perceived as a choice among achieving a particular goal through alternative means and outcomes under conditions of probability and uncertainty. The definition is associated with the expected change and its positive or negative impact on an entity. (Boyne, 2003)

Risk management is a dynamic iterative process closely integrated with organizational and project goals, i.e. goal setting is the basis of risk management.

As a process risk management involves several interrelated stages: identification, assessment, risk analysis, developing response strategies, and monitoring. These stages are part of the integrated risk management framework in project-oriented organizations.

Often, projects characterized by a high degree of complexity while at the same time are managed by using the agile project management approach do not develop risk management procedures. (Cohn, 2019) They are compensated for with increased ongoing control, accountancy, and duly team problem solving. This reduces operational risks resulting from current errors, negligence and weaknesses. The advantage of similar timely reduction of risk is that organizations do not allocate substantial resources to this process. However, it is not possible to approach strategic risks in the same way. Threats outside an organization exist that cannot always be currently captured. In addition, responses to them should be preventive. Since these risks cannot be fully controlled, they are approached through a set of measures aiming to minimize the negative impact on projects and project and organizational goals. In this case, even with agile project management, a mechanism is applied to ensure early diagnosis of potential risks, and preventive actions with minimizing potential negative impacts.

An important factor in managing risk when applying the agile methodology is to identify the positively influencing unforeseen factors and accordingly to benefit from their favorable effects on project and organizational goals, i.e. a wider definition of risk associated with unforeseen circumstances, positive or negative, which arise in the course of project implementation is adopted here. This unconventional view allows for a higher value of project outcomes and effects as a consequence of emerging risks that have a positive impact on project goals.

It is important for the adequate risk management to analyze project goals in the context of diagnosed risky environment. Agile project management focuses on this environment from the point of view of applicable risk management practices on the one hand and the capacity and an organization's risk appetite on the other. Determining project boundaries and the range of potential risks is also part of the agile project risk management. Identifying activities and tasks that may be at risk also provides an adequate, agile risk response. The aim is to apply responses when the greatest probability of risk is identified. We are not talking about preventative or implementation related responses. It is about a dynamic, agile process running only in the presence of signals given by internal and external environment for potential risks.

The good practices of agile methodology resulting in the IT industry are: (Goncalves, 2019)

- Daily Upcoming Meetings - These are held daily by the team. Within them, members can share the information they need with each other. These meetings are designed to keep all team members at the same information level. The key to every meeting is brevity. During the daily meetings, each member must answer the following three questions: What did I do yesterday?; What will I do today?; What are the problems hindering my progress?.

- Consumer Stories - A brief description of the feature desired by the end user. There are three elements to a user story: a written description, story planning (usually written on a map); talk about the story for a better understanding; a series of tests to confirm the story. The stories are written from the perspective of the end user and use a language they understand. Stories act as a bridge between developers and clients; both sides clearly understand them.

- Automated Testing - Introducing formal and comprehensive automated testing is an important part of the agilely process. The tests detect and eliminate defects at their source and thus deliver a working software package to the client. Developers can create test code under a secure network, using the various frameworks available, while developing software code. This method protects other features when making changes to the software. It is also a faster and more efficient way to find bugs in the program.

- Automated Buildings - A key principle of Agile methodologies is to have running software at all times. In practice, the only way to do this is by regularly and automatically compiling, building, deploying, and testing all software development. This is usually done many times a day and at least once every time the developer "checks" the code as a major part of the development.

- Agile Planning: Development, Iteration and Task - There are three levels of Agile Planning: Development, Iteration and Task. In the initial stages, project developers and clients meet to discuss the basic user stories that are needed for the software. The initial focus of the meeting is on the functions it needs to have in order to evaluate and prioritize what needs to be done. Development planning is a client-planned session. Both customers and developers are choosing a date for the first product series. They decide which stories to include in each issue. Developers focus on story evaluation efforts, while clients focus on story selection. There are various forms of evaluation efforts that are determined by the needs and wants of clients and development teams. Iterative planning requires a concerted effort between clients and developers to initiate part of the release plan. During reps, the client defines and prioritizes user stories, while developers evaluate how much effort is required to develop each user story. The timeline is much shorter for reps, taking only weeks instead of months. Task scheduling is done after iteration planning. The stories are broken down into a series of possible steps by the development team. To-do lists are developed and published in the project room so that they are clearly visible to all party members. Common tools used during this planning session include notes and whiteboards. Each developer voluntarily performs a task and gives an assessment.

- Pair Team Programming - In pair programming, two developers work as a team on a single programming task. One is the driver, the person who enters the code, and the second is the navigator, the one who plans the next steps in putting the code into the whole picture. A common weakness in pair programming is the loss of human resources to accomplish the task. Two people should not do the work that one person can do. However, programming that uses more human resources justifies the cost in terms of output. A study found that pair programming requires 15% more effort, but produces 15% less defects. Developers believe that reducing errors is worth the extra resources used. Another benefit is that working in pairs is not required to be full-time. Teams can set their own rules and schedules when deciding if it is better to pair and when.

- Continuous integration - During continuous integration, development teams enter their code into the system several times a day. A series of tests are run before the code is added to ensure that it will not damage other existing tests or features in the system. The developer must first perform all system tests and resolve any problems before integrating with other codes. The more often the code is integrated into the software, the faster and easier it is to track and detect errors.

- Retrospective Meetings - These are meetings that take place at or near the end of the project. They allow all parties involved to look back and evaluate the work done during the project. The whole team looks at the work well and the work is not well done, the opportunities for improvement and for transferring the lessons learned from the individual iterations are analyzed.

Regardless of the industry in which the companies operate, they face similar problems and challenges as those of software companies when developing innovative products. In most cases, they carry out innovative projects using experienced and mixed teams managed by experienced project managers. In addition, there is a tendency for less formalized processes and therefore empowerment of a team with a degree of decision-making autonomy.

There are favorable conditions for the implementation of Agile methodology in organizations in different industries, both in terms of team size and process formalization, manager experience, transfer of good practices, minimization of documentation, sharing of responsibility, use of approach to updating the plan on a weekly basis.

Potential barriers to integrating Agile project management techniques, methods and approaches to conventional ones can be cited:

- the need to set up full-time specialized teams;
- difficulties in joint deployment of project team members;
- restrictions on the creation of large multidisciplinary teams;
- the need to involve clients with a high level of competence in project development;
- low interest in the involvement of some stakeholder groups.

Risk management consists of a particular sequence of activities applicable to both traditional and agile project management. The process includes as follows: risk identification, assessment and analysis, developing response strategies, monitoring and reporting. These activities, performed in a short timeframe and towards specific, simple and clear tasks, lead to significant reduction of the negative project risk and contribute to the occurrence of positive unforeseen events. It is important to note that risk management is thus simplified and becomes a much easier to be understood and properly implemented process by anyone involved in project implementation.

Reducing the cost of risk management is a major asset of agile project management. The use of cumbersome management systems and formalized procedures is avoided. Preliminary control is sporadic, with emphasis on early diagnosis and agile response.

All this makes the agile project management methodology and risk management in a dynamic project environment more and more up to date.

Expectations are that practice in this direction is yet to be developed and gain popularity and followers in other sectors other than Information and Communication Technologies.

4. CONCLUSION

The contribution of agile project risk management can be sought in several directions:

1. Improved organizational and team capacity for managing projects' negative risks and obtaining positive effects from favorable risks respectively.

2. Increased awareness of the nature of risks and the potential likelihood and impact on organizations and projects when they occur.

3. Shared experience and learned lessons from one project to another with regard to risk management.

4. Delegating authorities and accordingly enhancing the competences of decision-making teams, setting priorities and overall risk management within projects.

5. Applying different approaches to risk management, especially in transnational projects.

6. Reducing the administrative burden and documentation of overall project management due to informal risk management.

7. Increasing the effectiveness of the risk management process due to its agility and adaptability to specific tasks and outcomes.

It is not possible for risk management to be a process independent of the project management process. Although in conventional risk management methodologies management is part of the project management, with agile methodology, things are slightly different. This is because agile project management methodology does not apply standardized processes and procedures. It leaves a project to develop naturally and in line with stakeholders' requirements.

REFERENCES

Beck, K. B. (2001). *Manifesto for Agile Software Development.* Извлечено от
　　　https://pdfs.semanticscholar.org/3eda/bb96a07765704f9c6a1a5542e39ac2df640c.pdf

Bogdanova, M. P. (August 2012 r.). Efektivno upravlenie na operativniya risk v balgarskite kompanii. *Dialog E-Journal*, стр. pp. 172 – 185.

Boyne, R. (2003). *Risk .* Buckingham: Open University Press.

Cohn, M. (2019). *Managing Risk on Agile Projects with the Risk Burndown Chart*. Извлечено от
　　　https://www.mountaingoatsoftware.com/blog/managing-risk-on-agile-projects-with-the-risk-burndown-chart

CollabNet VersionOne . (2019). *Releases 13th Annual State of Agile Report.* Извлечено от
　　　https://www.stateofagile.com/?_ga=2.135467313.1631638742.1568378276-1084683618.1568378276#ufh-i-521251909-13th-annual-state-of-agile-report/473508

COSO. (2004). *Enterprise Risk Management - Integrated Framework.*

Goncalves, L. (1 May 2019 r.). Извлечено от What is Agile Methodology?: https://luis-goncalves.com/what-is-agile-methodology/

Lehman, M. (. (2001). Rules and tools for software evolution planning and management. *Annals of Software Engineering*.

PMI. (2014). *Can Agile Project Management Be Adopted by Industries Other than Software Development? .* Pennsylvania .