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MANAGEMENT OF IT PROJECTS USING AGILE, SCRUM, AND KANBAN METHODOLOGIES

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Annotation. The article examines modern IT project management methodologies, which offer new approaches to organizing management activities aimed at enhancing team efficiency and achieving project goals. General assessments of the Agile methodology are provided, and the influence on the development of corporate culture and the formation of new skills in personnel is analyzed. It outlines the advantages and disadvantages of each flexible methodology in the context of selecting the most suitable one for successful project implementation.

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Key words: management, IT project, Agile methodology, Scrum, Kanban, making decisions.

Introduction

The analysis of the current conditions of global development indicates a continuous increase in the volumes of digital technologies used in production, the IT sector, science, and business, leading to new demands for modeling and project management. Even large companies, which have considerable inertia and potential sustainability, actively implement management methods and tools based on the flexibility and adaptability of basic, auxiliary, and management business processes.One of the most important aspects of maintaining competitiveness in the IT services market is effective management of a company that has the ability to adapt to rapid changes in the field of information technology, take into account consumer demands, and combat market saturation with goods. At the same time, management processes must ensure the rapid, high-quality, and economically advantageous execution of tasks.

In Ukraine, the number of competitive IT companies engaged in software development is on the rise. The constant advancement of technology, progress in software creation, and an increase in uncertainty and risks have led to a need to improve project management methods, seek new ways to organize management processes, and transition to agile methodologies. The global economy is developing rapidly, primarily through innovative projects. In turn, innovative projects typically have a high level of uncertainty. Consequently, the implementation of IT projects has widely adopted flexible or adaptive management methodologies, which enable quick responses to changes and risks arising during the development of IT projects and directly adapt the project itself to the needs of the market or the environment in which it is being developed.

Flexible methodologies such as Agile management and methods like Lean, Scrum, and Kanban allow for effective organization of the workflow to create high-quality software while also ensuring rapid adaptation to new requirements. Given this, studying flexible approaches to project management in the IT sector becomes relevant. The Agile family includes iterative and incremental management methods such as Scrum, Lean, Kanban, Crystal, eXtreme Programming (XP), and others. The Project Management Institute (PMI) and Agile Alliance have developed one of the most dynamic standards — Disciplined Agile [1], as well as the PMI Agile Certified Practitioner (PMI-ACP) certification program aimed at standardizing knowledge on flexible methodologies [3, p. 214].

An overview of the main characteristics of Agile management allows for the systematization of key advantages and the identification of disadvantages of this approach, contributing to a comprehensive understanding of effective management of companies and projects.

The application of flexible methods in managing IT projects is the subject of research by many scholars and experts. The use of Agile tools and practices, as well as the formulation of algorithms and principles for organizing project activities, has been explored in the works of scholars such as O.A. Smetanyuk, A.V. Bondarchuk,

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D.P. Kucherov, M.Y. Hvozd, Y.O. Zlydnyk, V.Ye. Chukhlib, L.L. Veduta, M.A. Dmydenko, I.O. Peryt, and many others.

The aim of the publication is to define the fundamentals of managing IT projects using agile methodologies (Agile) and the key tools Scrum and Kanban.

Research Results

Due to high competition in the IT services market and in the context of globalization, IT companies are constantly seeking ways to improve their operations. To ensure sustainable development, it is essential to respond quickly and flexibly to changes in the organizational environment. This places a priority on the search for innovative and advanced management approaches that enable companies to operate faster, more effectively, and economically in conditions of constant dynamics. Researchers emphasize that IT projects have their specific features, particularly the focus on achieving clear goals, coordinated implementation of interrelated actions, and time constraints with defined start and end dates [1, p. 9]. Such specificity requires a clear distribution of roles, cyclicality, and parallelism of tasks, which is achieved through the optimal use of resources and efforts.

O.A. Smetanyuk and A.V. Bondarchuk highlight the importance of agile methodologies in managing IT projects as they aim for dynamic requirement formation and ensure their implementation. This approach guarantees effective interaction within teams and collaboration among specialists from various fields. Given the constant changes in product requirements, effectively completing tasks without agile approaches becomes impossible [3, p.108].

The main idea of the agile approach in software development is prioritizing the interaction of developers over processes and tools, as well as close cooperation with the customer, where flexibility and the ability to change become crucial rather than rigid adherence to the initial plan. This creates conditions for team self-organization and adaptation to new challenges. Agile methodology fully aligns with modern trends in the development of internal marketing in IT companies, where employees are considered internal clients. This allows for motivating employees to ensure high-quality services and products, which in turn increases the company's competitiveness.

Agile methodologies are a series of approaches to software development based on iterative development, dynamic requirement formation, and constant interaction of self-organizing teams with specialists of various profiles. IT projects, unlike others, have specific factors that affect success, in addition to common constraints regarding time, budget, and resources. They include solving unique technological challenges related to the use of software, operating systems, hardware, and cybersecurity, which increases complexity and the level of risks.

The choice of project management methods is linked to the project life cycle, which includes initiation, planning, execution, and completion. For a long time, the traditional management model was the waterfall model, which provided a sequential transition from one stage to another without the possibility of making changes until the product development was completed. However, agile methodologies such as Scrum, Kanban, and Lean have become popular today. The choice of a specific methodology depends on the project's characteristics, its scale, stakeholders' needs,

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and the client's requirements. However, changes in the project may require a transition to another methodology for better adaptation to its specifics.

Agile methodologies became popular after the adoption of the Agile Manifesto in 2001, which defined the core values and principles on which development should be based. Among these principles are: individuals and interactions are more important than processes and tools; working software is more important than comprehensive documentation; customer collaboration is more important than contract negotiation; and responding to change is more important than following a plan. This methodology allows for timely identification and consideration of customer requirement priorities, ensuring process transparency and providing clients with a clear understanding of the project's progress. It enhances team effectiveness by eliminating unnecessary role divisions that typically hinder specialists' development and impede new employees' professional growth. According to the principles outlined in the manifesto, a key focus in project management is on interpersonal interaction both within the team and with the client. Documentation is supplementary and not a priority. The ability to respond quickly to changes is a defining feature of Agile methodology.

Agile is based on the principles of empirical management, which involves managing through constant observation, experimentation, and adaptation. This approach contrasts with traditional, predictive methods that attempt to plan every detail of a project in advance. Instead, Agile allows planning based on real data and results obtained during project execution.

To achieve maximum effectiveness from Agile management, it is essential to adhere to principles that reflect the characteristics of this modern management tool. The content of these principles emphasizes the value of Agile as a management methodology. Research conducted by O.O. Kim and V.V. Kozlova demonstrates significant effectiveness in using Agile methodology: teams work more productively, reduce the volume of unproductive work, and thanks to iterative cycles, project errors are identified and corrected at early stages [5, p.98].

One of the most widespread agile methodologies is Scrum, which was developed for projects that require rapid adaptation to change. This method is characterized by high dynamism, and the team is constantly focused on achieving maximum product quality. It is based on the concept of sprints—short development cycles, typically lasting from 1 to 4 weeks. Breaking a project into sprints allows a small team to effectively complete tasks and achieve better quality results in a short time. Scrum is based on three principles: adaptation to change, transparency of processes, and regular inspection to control quality. During the work process, there is constant interaction with clients, which allows for gradually adapting the product's functionality to their needs. This approach ensures phased planning for project execution and the identification of potential risks.

A significant advantage of Scrum is the ability to promptly and economically adjust existing plans and eliminate errors. Phased execution of the project allows for a more qualitative approach to product development and monitoring its progress.

The Scrum team consists of a Product Owner, Scrum Master, and Developers. The Scrum working algorithm within information projects includes the following

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stages: forming small, multifunctional teams capable of self-organization, achieved through the distribution of responsibilities among team members. Self-organization implies that the team professionally and responsibly carries out all necessary actions to create a product that meets the requirements. The team knows how to achieve the desired result.

Dividing the work into small, clearly defined tasks allows the team to effectively manage a large project by working on individual parts in short iterations to realize the overall concept. The Scrum practice allows for identifying the advantages and disadvantages of this tool.

Among the advantages, the following can be highlighted: client orientation, adaptability and flexibility, the possibility of making changes at any time, obtaining a potentially working product at the end of each sprint, self-organization, professionalism, multifunctionality and responsibility of the team, as well as transparency of work and absence of financial risks.

However, there are also drawbacks: rigid rules and the necessity to adhere to specific procedures (meetings, discussions, etc.), significant responsibility on the Scrum Master, which affects the team's performance, difficulties in prioritizing and completing tasks, considerable dependency on the client whose requirements are not always clear and unambiguous, and the potential decline in productivity after successful sprints.

Another common methodology is Kanban, which emerged between 2006 and 2008 and is oriented towards small projects or long-term projects without a clear specification. Kanban does not limit the duration of iterations and allows changing task priorities at any moment. The main task of this methodology is to balance the work of specialists and distribute the team's workload. In the general context, Kanban is a task management and workflow organization methodology that helps achieve set goals effectively. This approach belongs to the Agile family and ensures openness and flexibility in task execution.

Kanban is based on the visual organization of tasks, using boards to display the stages of project execution, which helps increase work efficiency and provide a quick response to changes.

For effective work with Kanban, it is essential to establish workflow stages. In this methodology, these stages are represented as columns, and tasks are illustrated with special cards. The card moves through stages just like a part moves between machines in production, and at each stage, the percentage of task completion increases. As a result of this process, a product ready for delivery to the client is obtained.

Like any other system, Kanban is based on fundamental principles that ensure effective work organization and team cohesion. The principles of implementing Kanban in an organization include several important aspects. The first is an emphasis on quality—quality management is carried out by combining traditional and agile approaches, joint analysis and design of business processes, as well as the use of templates and tools for statistical and dynamic analysis.

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Next is the reduction of the number of unfinished tasks, which helps reduce the workload. Frequent releases, ensured by the decrease in unfinished tasks, contribute to improving quality and allow for regularly releasing high-quality products. Balancing requirements and throughput is also important: the team or individual employee independently determines the rate of growth and speed of completing new tasks, while the pull system provides a balance between workload and throughput. The last aspect is prioritization, which allows maximizing business productivity.

There are certain differences that distinguish Kanban from other methods, including Scrum. New tasks can appear in the backlog at any stage, with no stage of "waiting for the sprint." The use of Kanban occurs step by step in the sequence of "Planned," "In Development," "Completed," etc. It is important to note that Kanban does not require strict adherence to timelines, as this process is linear and simple to organize. There are no roles in the team similar to those of a Scrum Master and Product Owner.

Kanban provides more effective control over processes, the use of advanced Agile technology practices, and cost optimization for highly efficient project management. One of the important tools for monitoring errors, optimizing workflows, communication, and project management is the software product Jira. With its help, several key measures can be implemented:

- Planning the team's work (defining sprints, creating user stories and tasks, distributing responsibilities).
- Tracking priorities and discussing workflows.
- Ensuring transparency of work.
- Monitoring product releases and their implementation.
- Reporting that contributes to efficiency, problem discussion, and visualization of results.
- Self-defining the project content.

Jira is a system that allows tracking the process of task movement on an interactive board, monitoring their completion. It is not only a bug tracker but also a convenient tool for project management, especially for agile teams. The functional capabilities of this program are quite extensive, and in case of a lack of features, they can be expanded with plugins. Thus, the combination of agile approaches and tools used for their implementation allows for improving the quality and efficiency of project management.

In conclusion, we emphasize that agile project management using Scrum and Kanban methodologies contributes to higher efficiency, transparency, and flexibility. Agile approaches allow teams to respond quickly to changes, engage customers in the development process, and facilitate continuous improvement of products and services. The implementation of these methodologies in practice significantly enhances the success of IT projects, making them adaptable to dynamic requirements and external changes.

Conclusions. The implementation of Agile approaches in IT project management requires a comprehensive strategy, including both selecting the appropriate methodology and preparing the organization for change. Key success

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factors include management support, a willingness to adapt processes and structures, and ensuring constant communication between teams and customers. Agile enables organizations to respond effectively to changes, reduce risks, and improve the quality of the final product, which is especially important in the dynamic field of IT.

Thus, the combination of Scrum and Kanban methodologies can effectively and timely respond to changes that arise during the implementation of IT projects. These approaches successfully enable the integration of Agile principles in managing project teams, aimed at increasing the productivity of IT companies and optimizing the use of time and resources. Among IT specialists, the bug-tracking system Jira is quite popular, as it allows for organizing project management, documenting errors, and effectively distributing tasks among team members.

Each of the modern flexible methodologies that belong to the Agile family has its strengths as well as certain limitations. The choice of the appropriate methodology cannot be a one-size-fits-all solution, as it must consider the specifics of the project, its complexity, and the unique requirements and conditions. It is essential to select an approach that most effectively meets the needs of both the team and the client, taking into account the project's scale, its dynamics, and the degree of uncertainty.

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