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SCRUM METHODOLOGY IN PROJECT MANAGEMENT ON ENTERPRISES IN THE CONDITIONS OF DIGITAL TRANSFORMATION

The article emphasizes the importance of innovative development in the context of project development and implementation to increase enterprises' competitiveness. The significance of pharmaceuticals in countries' economic systems is noted, and the primary statistical data on the industry are considered. The primary project management methods are analyzed. The historical origins of the Scrum methodology are investigated, and its main elements are identified, namely the classification of roles in the team and key concepts. All stages of the Scrum process are considered, from the appearance of an idea by the Product Owner to the full implementation of the project. The possibility of using the Scrum methodology in project management at pharmaceutical enterprises is substantiated using the example of searching for raw materials suppliers to produce a finished medicinal product (FMP). The relationship between the pharmaceutical industry and the digitalization of production is shown. The main aspects of the development of the pharmacological sector as a result of the implementation of the European integration reform are considered. The key benefits of implementing the Scrum methodology in pharmaceutical companies are analyzed, and the most common tools for its support and development in the Ukrainian business environment are also identified.

Keywords: *project management, Scrum methodology, project team, development of drugs, pharmaceuticals, digital transformation.*

JEL Classification*: D83 M10, O32*

SCRUM-МЕТОДОЛОГІЯ В УПРАВЛІННІ ПРОЄКТАМИ НА ПІДПРИЄМСТВАХ В УМОВАХ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ

У статті підкреслюється важливість інноваційного підходу до управління проєктами як ключового чинника підвищення конкурентоспроможності підприємств, зокрема у фармацевтичній галузі, що зазнає істотних змін в умовах цифрової трансформації. Зазначено вагоме значення фармацевтики в національному господарстві, подано огляд її сучасного стану з урахуванням основних статистичних показників. Розглянуто тенденції розвитку галузі під впливом євроінтеграційних процесів, акцентовано на необхідності впровадження ефективних моделей управління проєктами в межах жорстко регламентованого виробничого середовища. У межах дослідження проаналізовано сутність поняття «управління проєктами», окреслено сучасні підходи до реалізації проєктної діяльності та особливості їх застосування у фармацевтичній сфері. Особливу увагу приділено SCRUM-методології як інструменту гнучкого управління, що забезпечує прозорість процесів, високий рівень командної взаємодії та оперативне прийняття рішень. Описано історичні передумови виникнення SCRUM, охарактеризовано його основні елементи — ролі в команді, ключові артефакти та події, що забезпечують ітеративний і адаптивний характер управлінського циклу. Розглянуто повний цикл SCRUM-процесу — від формулювання ідеї у Власника продукту до завершення реалізації проєкту. На прикладі проєкту з

пошуку постачальників сировини для виготовлення готового лікарського засобу продемонстровано можливість ефективного застосування SCRUM у фармацевтичному виробництві. Показано зв'язок між цифровізацією виробництва та трансформацією підходів до управління в галузі. Узагальнено ключові вигоди впровадження SCRUM: прискорення реалізації проєктів, гнучкість планування, підвищення якості управлінських рішень. Визначено найбільш поширені інструменти підтримки SCRUM у вітчизняному бізнес-середовищі, з урахуванням наявного досвіду адаптації цифрових інновацій до фармацевтичного контексту та галузевих викликів, з акцентом на подальшу інтеграцію хмарних платформ, систем цифрового захисту даних та інструментів оптимізації управлінських процесів.

Ключові слова: *управління проєктами, проєктний менеджмент, Scrum-методологія, проєктна команда, розробка лікарських засобів, фармацевтика, цифрова трансформація.*

Statement of the problem. Modern science offers a wide range of project management tools, a significant part related to digitalization. Thanks to digital transformation, these methodologies have been successfully applied in other areas, particularly in the pharmaceutical industry. Pharmaceutical companies play a key role not only in terms of their economic significance but also because of their social impact on society. In the digital age, introducing modern technologies and innovative approaches to project management can be a determining factor in increasing the efficiency of pharmaceutical companies. Research into the possibilities of integrating digital tools into project management processes in the pharmaceutical sector will contribute to the optimization of operational processes, increasing competitiveness and ensuring the industry's sustainable development in the face of global challenges.

Analysis of recent research and publications. The theoretical basis for implementing Scrum methodology in project management of pharmaceutical enterprises is the work of authors who studied project management and the adaptation of agile methods to the specifics of various industries. Among such scientists, it is possible to single out Cherchyk L. [1], Blaga N. [2], Zhygalkevych Zh. and Chuhlib V. [3], Mykytyuk P., Brych V. [4], who studied the theoretical foundations of project management. In addition, the information base of the study is publications on the digital transformation of pharmaceuticals and the application of management methodologies, in particular Scrum, including publications on the Scrum Alliance platform [12], Pharma and Healthcare Industries Overview reports [6], and others.

Identification of previously unresolved parts of the general problem.

The domestic scientific literature does not sufficiently examine in depth the possibilities and features of implementing various methodologies in the project management process depending on the specifics of the industries. Given the importance of pharmaceuticals for society and the role of project management at enterprises in this industry, the issue of implementing new tools becomes relevant.

The objectives of the article. The article aims to study the possibilities of using Scrum methodology in project management at pharmaceutical enterprises. To achieve the primary goal of the study, the following tasks were set:

1) clarification of the category of "project management";

2) systematization of the basics of Scrum methodology as one of the approaches to the practical implementation of project activities;

3) analysis of the main ideas and principles of the methodology;

4) justification of the possibility of using Scrum in pharmaceuticals, considering its specifics.

Summary of the main results of the study. The activities of enterprises are a multifaceted process that covers various areas of their functioning. At the same time, both tactical and strategic actions are carried out. A correctly formed strategy, which includes several tactical actions and is based on goals formulated using the SMART method, allows the enterprise to function most effectively and achieve planned results. One of the directions of the development strategy is the development of projects, the implementation of which is preceded by the stages of formulation, planning, and direct implementation. The next step is its implementation into the general system of the enterprise's functioning, and the result is an assessment of planned and actual indicators.

The variability of the external environment puts enterprises in a position where they must constantly adapt, implement changes, and improve to remain competitive. Developing something new allows them to maintain their competitive positions and increase them. In this context, designing is a tool for innovative development.

Project management is viewed from various perspectives, including:

1. a system of functions: This approach focuses on performing basic management functions, such as planning, organizing, motivating, and controlling to achieve project goals.

2. the process of making management decisions: In this context, project management is viewed as a sequence of interrelated decision-making stages that ensure achieving objectives effectively.

3. an organizational system: This approach emphasizes the importance of the management structure, which includes the composition and relationship of management bodies, the regulation of their functions, duties, rights, and responsibilities, as well as management technology aimed at achieving the ultimate goal of the project [1].

According to N. Blaga, the essence of project management is coordinating people's activities and effectively using material and financial resources at all stages of project implementation using modern management methods and tools to achieve set goals. [2, p. 16].

Zh. Zhygalkevych and V. Chuhlib define project management as a management direction that covers areas of an organization's activity where the creation of a product or service is a unique set of interrelated actions. They also

note that the implementation of project management at enterprises and the comprehensive adjustment of internal management processes can positively affect the development of the enterprise's economy [3, p. 127].

According to P. Mykytyuk, V. Brych, Y. Mykytyuk, and I. Trush, project management is a process of coordinating the team and project resources using specific methods that ensure the successful completion of the project and the achievement of its goals [4, p. 10].

Therefore, project management is a multifaceted activity combining functional, process, and organizational approaches to implement projects in the modern business environment effectively.

All the classic management functions characterize this activity area, ensuring efficiency occurs using the most appropriate and modern tools.

Depending on the size of the enterprise, one, several, or many projects can be managed simultaneously, each of which can be at different stages.

The pharmaceutical industry is one of the key ones in any country's economy. This is because it ensures the well-being of the country's population and forms a healthy nation.

World statistics and domestic indicators reflect a fairly dynamic development of the industry (Fig. 1).

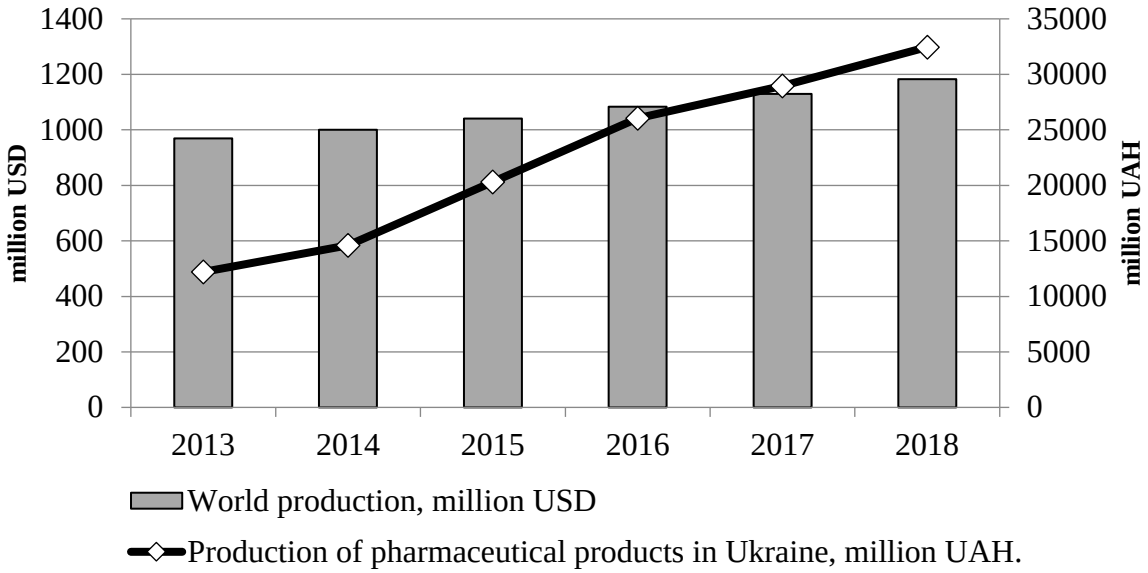

Fig. 1. Economic indicators characterizing the pharmaceutical industry of the world and Ukraine, 2012-2018[1]
Source: [5; 6]

Data for Ukraine are given for January-November 2018, and data on world production in 2018 are presented following expert estimates. Based on the data, the stable growth of the world's monetary production of drugs should be noted. Thus, from 2013 to 2018, the production volume increased by 19,88%. The growth of this indicator is facilitated by the increase in morbidity due to the increased influence of technogenic factors and the environmental state, the tendency towards "aging of the population" in developed countries, the growth of income levels in developing countries, which stimulates the use of more expensive drugs, and the growth of the world's population.

Thus, 2013-2018 is characterized by a constant growth in the production of pharmaceutical products in Ukraine. Domestic production increased from 12202,9 million UAH in 2013 to 32461,4 million UAH in January-November 2018; that is, the indicator increased by 266% over the given period. Thus, the positive dynamics characterize the industry's growing role in Ukraine's economic complex and pharmaceutical enterprises' development.

The production growth rate in 2018 was about 12,1% compared to 2017. However, the record growth was in 2015 – production increased by almost 40%. The production volumes are given in monetary terms, and given that about 70% of production raw materials are imported, the final cost becomes dependent on the UAH exchange rate.

The development of finished medicines ensures the development of the industry. Already at the research stage, the project is in the hands of specialists from the project management unit.

Recently, there has been an active growth in the production of pharmaceutical products, which reached 64%. Despite the war conditions, it is critically important to support the export of medicines to provide them to Ukrainians who were forced to leave Ukraine (Table 1).

Table 1

Export of pharmaceutical products, 2017-2021, million USD

Year	2017	2018	2019	2020	2021
million USD	193,9	217,2	251,6	269,0	317,8

Source: compiled by authors based on [7]

2023 drug sales increased by 25%, amounting to UAH 130 billion. Let's consider the total volume of drug sales by manufacturer in Table 2.

Table 2

Drug sales by manufacturer, 2022-2023, UAH billion.

Year	2022, %	2023, %
Total sales volume: Ukrainian producers, billion UAH.	36	37
Total sales volume, foreign manufacturers, billion UAH.	64	63
Total sales volume, Ukrainian manufacturers, packages, billions	65	63
Total sales volume, foreign manufacturers, packaging, billions	35	37

Source: compiled by authors based on [8]

Among all sold packages of medicines, 63% are products of Ukrainian manufacturers, while in financial terms, a larger share – 63% – is accounted for by imported drugs [8].

The pharmaceutical industry is closely linked to the digitalization of production, including warehouses, production lines, promotion, and electronic document management. In addition, an electronic health system and the digitization of interaction between manufacturers and the government are being actively implemented [7].

The pharmaceutical industry of Ukraine has always played a key role in ensuring the population's health, developing medical solutions, and satisfying domestic demand. However, since 2022, after the beginning of the Russian invasion, it has faced entirely new challenges. The year, which was supposed to be another stage of development, has turned into a period of testing, requiring adaptation to new realities, the search for survival strategies, and the identification of opportunities for further growth in the face of military challenges.

Military actions caused serious problems for domestic enterprises, including disruptions in the supply of raw materials, destruction of production facilities, disruption of logistics chains, and a significant impact on investment opportunities. In addition, the issues of harmonization of domestic legislation and regulatory cooperation with the EU remain relevant. European integration opens up prospects for access to European markets and will contribute to bringing the activities of domestic enterprises to European standards [9].

Managing a particular project is entrusted to a group of specialists – a team. Various methods are used to organize activities within the group, the most common of which are [10]:

1) *Agile* – the project is divided into subprojects, the implementation of which is not sequential but parallel. This model was first explicitly presented to representatives of the IT industry. Its main components:

- interaction with people is more important than tools and processes;
- the most important thing is the result of the project, not detailed documentation;
- cooperation with customers is of primary importance, not contract negotiations;
- readiness for change is essential, not adherence to the plan.

2) *Lean* – the basis for applying this method is the constant alternation of analysis of all processes to identify bottlenecks and make changes by identifying alternatives. The main task of the method is to maximize value for the consumer while minimizing costs. An important aspect is the conceptual approach to researching the product's value and creating improved strategies.

3) *Kanban* – the main task is to balance the activities of specialists within the team to achieve everyone's employment. At the same time, the efficiency indicator is the average execution time of a particular stage. The feature is the visualization of work processes using Kanban boards with cards on which tasks are formed.

4) *Six Sigma* – problems are solved using the DMEDI methodology, the basis is careful measurement of processes and constant control. This method is used to eliminate errors and improve processes, to control product quality, and not to manage the project.

5) *PRINCE2* – identifies 7 project management rules, 7 processes defining the stages of the project life cycle, and 7 aspects of control. The principles, rules, and aspects are interconnected and fit into 6 constraints: money, benefits, risks, time, scope, and project quality.

The Scrum methodology was first described in an article by Japanese professors Ikujiro Nonaka and Hirotaka Takeuchi entitled "The New New Product Development Game", published in the Harvard Business Review in 1986. In this article, the authors examined approaches to developing new products in companies such as Honda, 3M, and Canon and proposed the concept of teamwork, similar to the game of rugby, where the team moves as a single unit, passing the ball to each other [11]. The Scrum methodology was developed and used in software development. However, it is pretty universal (Fig. 2).

According to the research data of the Scrum Alliance organization, shown in Fig. 2, about 40% of projects at the surveyed enterprises in the production sector are implemented using Scrum. About 30% - in the field of research and development [12]. In management, about a quarter of projects were implemented using Scrum. Given that the indicators in the field of development, as well as management, have such a high value, and the efficiency of project management was about 73%, the use of the methodology in projects for the development and launch of new drugs on the market by pharmaceutical enterprises in Ukraine is quite real.

So, Scrum is an agile development methodology with a non-standard distribution of roles in the team and a unique organization of iterations. It is often used in various business industries to develop successful business projects.

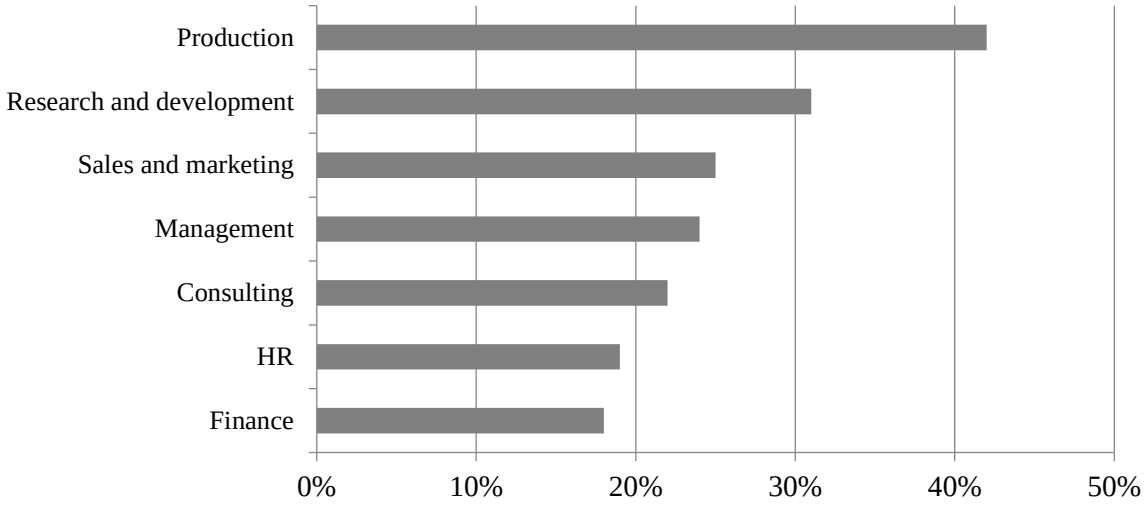

Fig. 2. Using Scrum methodology in project activities in areas other than IT
Source: [12]

There are three leading roles in a Scrum team [13]:

- Scrum Master – manages the entire process, is a facilitator, namely, holds meetings, monitors compliance with the principles of the Scrum methodology, protects the team from factors that may distract from the implementation of the tasks, allows all participants to perform their work without obstacles;
- Product Owner – a person representing the interests of end users and other stakeholders who understand the value of the product for the business;
- Developers – a cross-functional team that performs all technical tasks.

Research by the Scrum Alliance organization showed that in 8% of surveyed companies, scrum teams consist of 1-4 people, in 13% – of more than 10, and, accordingly, in 78% – of 5-9 people. The average value is about 7-8 people.

The key concepts in Scrum are “product backlog” and “sprint”. Product backlog – an ordered list of requirements and functionalities that must be implemented in the product. Sprint – a fixed iteration lasting from 2 to 4 weeks, during which the team works on implementing selected backlog elements. Using Scrum in pharmaceutical projects requires adapting the sprint duration to consider the industry's specifics since the standard of 2-4 weeks may be insufficient to complete complex tasks.

Scrum is a flexible framework for project management consisting of specific roles, events, and artifacts. The main stages of the Scrum process include [13]:

1. Sprint Planning: At the beginning of each sprint, the Scrum team holds a meeting to define the scope of work for the sprint. The product owner presents the priority items of the product backlog, and the development team evaluates and plans that can be implemented during the sprint.
2. Daily Scrum: Every day, the development team holds a 15-minute meeting to discuss progress, plans for the day, and potential obstacles. This helps with coordination and identifying issues early.
3. Incremental Work: During the sprint, the development team works to create a potentially release-ready increment of the product, adhering to the Definition of Done.
4. Sprint Review: At the end of the sprint, the team presents the work results to stakeholders. Achievements are discussed, feedback is received, and, if necessary, the product backlog is adjusted.
5. Sprint Retrospective: After the sprint review, the team conducts a process analysis, identifies successful practices and areas for improvement, and forms an action plan for the next sprint.

The Scrum process is cyclical and iterative, allowing for continuous improvement of the product and the team's workflow. This iterative approach lets the team respond quickly to changing requirements and minimize project risks.

Consider the application of Scrum to finding suppliers of raw materials for the production of finished products within the framework of a project. The Scrum master forms a list of tasks necessary for selecting a supplier, which includes finding suppliers; sending requests and receiving proposals; evaluating suppliers based on the data provided; screening out unacceptable suppliers; conducting a tender; preparing and agreeing on a tender protocol; preparing and deciding on a supply contract; signing a contract.

These tasks involve specialists from different departments, such as procurement, research, legal, and finance. The main executors are procurement specialists and the project manager. The application of Scrum in this process involves iterations (sprints) to achieve consistent results. Each sprint focuses on completing a specific set of tasks, allowing the team to receive feedback and adjust its actions constantly. Regular meetings (daily stand-ups, sprint planning, sprint review, and retrospectives) will enable you to effectively coordinate work, quickly respond to changes, and improve processes.

A key element of successful project implementation is a team responsible for the efficient and timely execution of tasks. A high level of professionalism and effective communication within the team are mandatory for achieving project success. Scrum helps the team remain flexible and adapt to changes, an essential factor in supplier selection.

The implementation of Scrum in the pharmaceutical industry can significantly increase the efficiency of management processes, but it is necessary to take into account the specifics of this area:

- Regulatory requirements: The pharmaceutical sector is highly regulated, and Scrum teams must meet quality and safety standards at all stages of development and production.
- Interdisciplinary collaboration: Drug development requires interaction between different specialists. Scrum helps form cross-functional teams to coordinate and achieve goals effectively.
- Risk management: Developing new drugs is associated with high risks. Thanks to its iterative approach, Scrum allows you to identify problems and adapt to changes quickly.
- Stakeholder engagement: Considering the interests of regulatory authorities, the medical community, and consumers is essential. Scrum provides the opportunity to regularly receive feedback from these groups and adapt the project to their needs.

Adapting Scrum to the pharmaceutical industry requires considering regulatory requirements, effective risk management, and active collaboration between specialists. This will allow for the successful development and implementation of new drugs.

Thus, using Scrum in a pharmaceutical project allows for maintaining the flexibility and adaptability necessary for effective process management under strict regulatory requirements and high uncertainty, which are characteristic of this industry.

In 2024, Ukraine was proposed to implement a European integration reform of the pharmacological sector, which indicates the following aspects of the development of the industry:

1) reform of the pharmaceutical regulatory authority;
2) localization of pharmaceutical production in Ukraine, in particular with the involvement of industrial parks;
3) development of clinical trials;
4) availability and affordability of medicines;
5) access to the EU market;
6) digital integration with the EU [14].

One of the main priorities for 2025 for pharmaceutical industry specialists is the integration of innovations and technologies, i.e., the use of highly secure and scalable software solutions for serialization and traceability processes. One of the recommendations is the transformation of pharmaceutical activities using the SATT Platform – a modern set of cloud technologies built based on Microsoft Azure, for the modernization of the pharmaceutical enterprise. This platform allows the effective combination of costs and innovations, optimization of resource management, and reduction of the financial costs of the enterprise. Integration with Microsoft Azure helps to increase the return on investment and reduce operating costs. In addition, the SATT Platform uses the most modern security tools, protecting confidential information from cyber threats. This platform not only provides security but also improves data management thanks to end-to-end serialization, aggregation, and traceability functions. A comprehensive approach to information protection makes it especially valuable for the pharmaceutical business [9].

In Ukraine, the SCRUM ideology is gradually being introduced into various business areas. To ensure stability in the market, domestic entrepreneurs should analyze their project management model, consider SCRUM tools as an alternative to the classic project management model, and find ways to implement them today.

Conclusions. The research conducted in the work allows us to draw several conclusions:

1. Project management is one of the most popular research subjects precisely because of the growing role of projects as tools for enterprise development. It represents not only a theoretical basis but also practical guidelines for implementing all management functions in the project implementation process.
2. It was found that the Scrum methodology is one of the approaches within the project management framework, which is based on the philosophy of flexibility: it does not oblige the use of all elements; the principles are recommendations, not rules. That is why project teams can choose what will allow them to implement the project most effectively.
3. It was determined that this approach allows for precise regulation of task completion time. Scrum is also characterized by a high level of interaction between project participants and their ability to influence the establishment of time limits for implementing a specific task within the sprint.
4. All stages of the Scrum process during the project implementation are described. It is noted that the activity algorithm itself is universal, as are the roles of persons participating in the project implementation. Its use is quite possible in the pharmaceutical industry despite the IT origin of the methodology.
5. For the transformation of pharmaceutical activities, it is advisable to use the SATT Platform, the optimal investment cost; it eliminates unnecessary costs and maximally protects the company's data from cyber threats.

So, SCRUM is based on the principle of self-motivation, which, with proper management support, allows you to increase productivity significantly. This approach is most effectively used in software development and digital technologies. At the same time, individual SCRUM methods can be adapted to improve the company's work in any field. In Ukraine, SCRUM initiatives are actively developing, and conferences and forums are held to help entrepreneurs optimize business processes and achieve more quickly.

The key element of the Scrum methodology is precisely human resources. Competent distribution of work and their high-quality execution within the established deadlines determine the success of the entire project. Therefore, when using Scrum, team management should be the next research direction in this topic.

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