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METHOD OF THE IT-PROJECT TEAM CREATION BASED ON MAXIMIZING IT'S COMPETENCIES

The use of agile approaches in software development requires the project team to be multifunctional and self-organized in order to respond effectively to changing project requirements. Therefore information technology project team creation requires a special method. The purpose of the work is to develop a method of IT-project team creation by maximizing its competencies taking into account the features of agile approaches to project management. The paper proposes the issue of team creation based on maximizing team competencies under conditions of budget and laboriousness constraints. A method of a project team creation is proposed, which takes into account the requirements of the project, the characteristics of individual candidates, and the general competencies of the team as a whole, as well as the project's limitations on the budget and laboriousness of the project. The proposed approach consists of three stages. At the first stage, a set of candidates is determined, whose competency assessments meet the requirements of the project. In the second stage, team options are formed in accordance with the requirements of the project. The project team creation can take place in several statements. The first statement is to solve the problem of minimizing the distance between the vector of team competencies and the vector of requirements. The second statement of the problem is to solve the problem of maximizing competencies in terms of time and project budget constraints. The third solves the issue of choosing a team according to the chosen setting. Two possible objective functions of the issue are offered. One target function is to create a team that will include candidates with maximum competencies. Such a team will best cope with the requirements that are known at the start of the project. The second target function maximizes the total competencies of the team that exceed a given threshold. As a result, the team will be able to better cope with the changing requirements of the project. The proposed method makes it possible to create an effective software development team that meets the requirements of the project, the values and principles of agile approaches.

Keywords: IT-project team, Agile, Scrum, competencies maximization, method of an IT-project team creation, team composition.

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МЕТОД ФОРМУВАННЯ КОМАНДИ ІТ-ПРОЄКТУ НА ОСНОВІ МАКСИМІЗАЦІЇ ЇЇ КОМПЕТЕНЦІЙ

Використання гнучких підходів до розробки програмного забезпечення вимагає, щоб команда проєкту була крос-функціональною та самоорганізованою, щоб ефективно реагувати на вимоги проєкту. Тому, створення команди ІТ-проєкту вимагає особливого методу. Мета роботи – розробити Метод формування команди ІТ-проєкту шляхом максимізації її компетенцій з урахуванням особливостей гнучких підходів до управління проєктами. У статті розглянута проблема створення команди на основі максимізації командних компетенцій в умовах обмежень бюджету і трудомісткості. Пропонується метод створення проєктної команди, що враховує вимоги проєкту, особливості окремих кандидатів та загальні компетенції команди в цілому, а також обмеження проєкту з бюджету і трудомісткості. Запропонований метод складається з трьох етапів. На першому етапі визначається набір кандидатів, оцінка компетенцій яких відповідає вимогам проєкту. На другому етапі формуються варіанти команд відповідно до вимог проєкту. Створення проєктної команди може відбуватися в кілька постановок. Перша постановка полягає у вирішенні завдання мінімізації відстані між вектором командних компетенцій і вектором вимог. Друга постановка задачі – рішення задачі максимізації компетенцій з точки зору обмежень за часом і бюджету проєкту. Третій крок методу – вибір команди відповідно до обраної постановки. Пропонуються дві можливі цільові функції. Одна цільова функція – створити команду, в яку увійдуть кандидати з максимальними компетенціями. Вони найкраще впораються з вимогами, які відомі на старті проєкту. Друга цільова функція максимізує загальні компетенції команди, що перевищують заданий поріг. В результаті команда зможе краще справлятися з мінливими вимогами проєкту. Запропонований метод дозволяє створити ефективну команду розробників програмного забезпечення, що відповідає вимогам проєкту, цінностям і принципам гнучких підходів.

Ключові слова: команда ІТ-проєкту, Agile, Scrum, максимізація компетенцій, метод формування команди ІТ-проєкту, склад команди.

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МЕТОД ФОРМИРОВАНИЯ КОМАНДЫ ИТ-ПРОЕКТА НА ОСНОВНИИ МАКСИМИЗАЦИИ ЕЕ КОМПЕТЕНЦИЙ

Использование гибких подходов в разработке программного обеспечения требует, чтобы команда проекта была кросс-функциональной и самоорганизующейся, чтобы эффективно реагировать на изменяющиеся требования проекта. Поэтому, создание проектной команды информационными технологиями требует особого метода. Цель работы – разработать Метод формирования команды ИТ-проекта путем максимизации ее компетенций с учетом особенностей гибких подходов к управлению проектами. В статье рассмотрена проблема создания команды на основе максимизации командных компетенций в условиях ограничений бюджета и трудоемкости. Предлагается метод создания проектной команды, учитывающий требования проекта, особенности отдельных кандидатов и общие компетенции команды в целом, а также ограничения проекта по бюджету и трудоемкости проекта. Предлагаемый подход состоит из трех этапов. На первом этапе определяется набор кандидатов, оценка компетенций которых соответствует требованиям проекта. На втором этапе формируются варианты команд в соответствии с требованиями проекта. Создание проектной команды может происходить в несколько постановок. Первая постановка состоит в решении задачи минимизации расстояния между вектором командных компетенций и вектором требований. Вторая постановка задачи – решение задачи максимизации компетенций с точки зрения ограничений по времени и бюджету проекта. Третий этап метода – выбор команды в соответствии с выбранной постановкой. Предлагаются две возможные целевые функции. Одна целевая функция – создать команду, в которую войдут кандидаты с максимальными компетенциями. Такая команда лучше всего справится с требованиями, которые известны на старте проекта. Вторая целевая функция максимизирует общие компетенции команды, превышающие заданный порог. В результате команда сможет лучше справляться с меняющимися требованиями проекта. Предлагаемый метод позволяет создать эффективную команду разработчиков программного обеспечения, отвечающую требованиям проекта, ценностям и принципам гибких подходов.

Ключевые слова: команда ИТ-проекта, Agile, Scrum, максимизация компетенций, метод формирования команды ИТ-проекта, состав команды.

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Introduction. Nowadays, the Information technology industry market is actively and dynamically developing, which necessitates the formation of a comprehensive and strategic approach to ensuring a high level of implementation of projects and tasks. Implementation of IT-projects is a complex, multifaceted, and team process that requires coordinated and effective work of all its participants. This approach is closely related not only to the disclosure of the professional abilities and skills of IT specialists but also to the ability to combine the skills and abilities of project participants, their teamwork, on which the effectiveness of the entire project often depends. This process requires the application of modern approaches to the implementation of projects in the IT industry with the optimal use of the intellectual potential of professionals. An important feature of IT projects is that the customer's requirements may change during the project. This feature significantly complicates the task of forming a project team.

The project team creation can be defined as the selection of appropriate team members who carry out a specific project or task within a specified period. When creating a project team, it is necessary to take into account the level of professional competence of applicants regarding the requirements of the project, individual characteristics of team members, the team's ability to self-organize and maximize competencies. In this context, the task of effectively creating a software project team is quite relevant.

This article is structured as follows. The second section considers the state of research on the problem of a project team creation based on the analysis of publications. Then a statement of the problem and a generalized scheme of the proposed approach are highlighted. The fourth section discusses in detail the formalization of the tasks of a project team creation. At the end, there is a discussion of the results and conclusions.

Literature Review. The question of an effective procedure for a project team creation is quite actively studied by many scientists. Some authors consider the team creation in terms of improving communication in the team [1-5], others explore the creation of an effective team in terms of a competence approach [6-10]. Some researchers focus on studying the characteristics of relationships in the team [11, 12]. The study of team performance factors at the stage of its formation is the subject of a large number of publications [13, 14, 15].

In [1] the approach to the analysis of social networks for diagnostics of models of communication in a team is used. In [2], based on the theory of organizational learning and the theory of performance characteristics, it is investigated how the concealment of knowledge affects the results of the project team. As a result of the study, in [2] it was found that the concealment of knowledge negatively influences the work of the project team. However, the sample for the study was limited to high-tech Chinese companies, and the findings on Chinese projects cannot be applied to projects in other countries. The authors of the study [3] emphasize the determinants

that determine the effectiveness of the team. However, the methodology of collecting information is somewhat limited, which may lead to differences in perceptions of the effectiveness of the team before, during and after projects. The authors [4] focus on the features of cooperation and the impact of the effects of cooperation and collective knowledge on the results of the team. Unfortunately, in [4] the influence of the external environment on team members is not considered.

In [6] the authors present a method and tools for modeling competencies for project knowledge management. The model focuses on the cost of expanding the competence of the project team caused by the project development process. In [7], models are considered that allow teams to work better. The authors draw conclusions about the additional conditions that are necessary for the effective operation of the team. They note that having reliable solutions that guarantee relatively smooth operation, even when unexpected changes occur, is a necessary component of team efficiency. Difficult situations such as increased skill requirements or the absence of an employee, even for a short time, can lead to negative consequences [7]. In [8] the problem of agile team creation is considered, in which the ideal result is a set of inexpensive candidates who can jointly cover the necessary skills, while they can communicate effectively.

The work [9] is devoted to the interpretation of processes in development teams. The authors focus on issues of cooperation but do not study the issues of team creation. The research in [10] is devoted to determining the criteria used to select members of the software development team. The relationship between the use of these criteria and the success of the project is considered. The authors [11] propose a negotiation model between the leader and team members to implement the team creation process. Compared to a unilateral decision of the leader, the formation of a team on the basis of negotiations can bring more benefits to team members. It should be noted that this method has certain limitations when a team is created for the first time and there is no interaction between team members. In [12] the mechanisms of self-organization are investigated to determine the role of each person in the team. In order to better study the behavior and effectiveness of the team, the authors of the study [12] paid attention to obtaining mental models of team members for analysis and prediction. The authors [13] studied more than a hundred teams and concluded that in order for a team to work more effectively, it's necessary to have a proper leader to manage and communicate with all team members.

In [14] a prototype was developed for creating teams from the actual database of employee profiles. The article suggests a rotation of team leaders to help manage the team and its operations, but this can also cause problems in teamwork. [15] examines the relationship between innovation and team effectiveness, but the authors focus on aspects such as psychological security, conflict management, and team performance. Research [15] is limited to studying relationships and types of conflicts only at the team level.

It can be concluded that the issue of team creation and further effective management is relevant and is studied by many researchers. It should be noted that there is still no general approach to team creation. Some researchers focus on the psychological aspect, studying the interaction between team members and roles in the team. Other researchers focus on the knowledge and skills of both individual team members and the team as a whole. Based on the analysis of publications, the task of developing formal models and methods of an IT-project team creation is relevant in the context of improving the efficiency of project management, in particular with the use of agile approaches.

Problem statement. Given the uncertainty of final product requirements, it is impossible to plan all work from the beginning to the end of the project. This has led to the active development of flexible project management approaches, including the Scrum framework [16]. One of the important features of such projects is the autonomy of the project team, which is characterized by the ability to self-organize and the presence of cross-functionality of the team.

Given the value of agile project management approaches, it can be concluded that project team selection is one of the key success factors [17]. Therefore, the process of selecting candidates for the team and team creation should be given special attention. This paper considers the method of an IT-project team creation in terms of using agile approaches for IT project management.

The aim of the work is to create a method of an IT project team creation based on maximizing its competencies, taking into account the features of agile approaches to project management.

To achieve this goal it is necessary to explore the process of team creation, identify the main stages, and propose the formalization of the tasks that arise at each stage. Team creation is carried out in accordance with the requirements of a particular project, which involves the use of expert assessments. Thus, within the framework of this study, it is necessary to develop a method of an IT-project team creation based on maximizing its competencies, taking into account the features of the application of agile management approaches and the above-mentioned expert assessments.

The reference model. Consider the process of team creation in general. First, it is necessary to define and document project requirements. Typically, project requirements form the backlog of the product, which allows making preliminary assessments of the choice of the technology stack for project implementation, time, and project budget. This information is the basis for the formation of requirements for vacancies and the placement of vacancies to search for candidates for the team. Each candidate should be evaluated according to their professional qualifications and vacancy requirements. Besides, it is necessary to determine the compliance of the level of competencies of a particular candidate with the requirements of the project. The

selection of candidates can be implemented by the procedure proposed in [18]. The general scheme of the team creation process is shown in Figure 1.

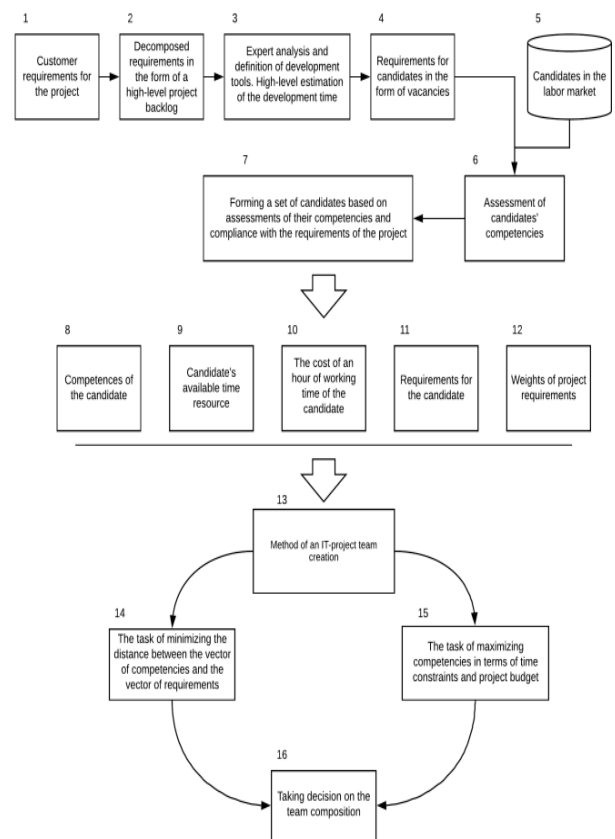


Fig. 1. Application scheme of the method of an IT-project team creation

Consider in more detail the steps.

Each stage consists of certain steps. Steps 1 and 2 analyze the requirements for the project product (Fig. 1). Decomposed and prioritized requirements form the backlog of the project product. To implement a product backlog, we need certain tools (technologies) with which the project team will develop a project product. In the 3rd step, based on the experts' opinion, the analysis and determination of tools for the development and assessment of the complexity of work and development time are provided. Based on the analysis of the project requirements and taking into account the selected development tools, the requirements for candidates in the form of vacancies are determined. Based on the data on existing candidates in the labor market and the requirements for candidates in this project in step 6, the assessment of the competencies of these candidates is made. In step 7, a set of candidates is created based on assessments of their competencies. A specialist can become a candidate if they meet the requirements of the project according to at least one criterion.

In the second stage (steps 8-12), input data is generated to create variants of project teams with the required competencies of each team member, taking into account his available time, the cost of an hour of his working time, and the requirements of the project. A set of

candidates can be considered a team option if it meets all, or almost all, of the project's requirements. If it is not possible to make an option, we continue to select candidates. If there is only one option – the team is created.

At the third stage, there is a task of an estimation of the created options of teams and a choice of the best one. At this stage, among the options of teams, a decision is made on the composition of the team, taking into account many criteria that reflect the competencies of the team, compliance with project requirements, cost, and time of implementation. In step 13, based on the available set of candidates, the express method of a development team creation is developed. The creation of the project team can take place in several statements.

The result of the third stage is a decision on the optimal combination of the development team that meets the requirements of the project customer. Thus, deciding on the selection of a team is a difficult task and requires a scientific approach to its solution.

IT-project team creation. Formalization of the task. As mentioned above, a project team creation can take place in several statements. The first statement (step 14) is to solve the problem of minimizing the distance between the vector of team competencies and the vector of project requirements. This problem is considered by the authors in another paper [19].

The second statement of the problem (step 15) is to solve the problem of maximizing competencies in terms of time constraints and project budget. Consider a clear statement of this problem. To formalize the above process, we introduce the following notation (Table 1).

Team creation requires specialists of different qualifications, determined by the requirements for candidates, taking into account the specifics of the project. To assess the candidate, we need to form a set of indicators (indicators, criteria), the values of which together characterize the properties of the candidate and allow us to assess it in regard to the requirements of the project, which are formed in the previous steps. Next, we will assume that it is possible to form a matrix of competencies of all candidates for the project team $Comp = (\bar{C}_{jk})_{\substack{j=1,n \\ k=1,m}}$, де \bar{C}_{jk} – the competency of j -th

candidate in regard to k -th requirement to the candidate in the context of the project, $k \in K, j \in N$.

Next, consider the proposed method of creating a project team. At the first stage we will determine the set of candidates on the basis of assessments of their compliance with the project requirements. In the second stage, we will form options for a potential team. If there are more than one option, we move on to the third stage, ie to the creating of the optimal team.

Consider the technology of forming criteria that determine the level of team effectiveness and are the basis for determining the composition of the team. First, for each indicator $k \in K$ we need to set a value that meets the

requirements in terms of a project. Let \bar{q}_k be a numerical assess of the requirements expressed by the indicator $k \in K$.

Table 1 – Notations and definitions

Notations	Definitions
$K = \{1, 2, \dots, m\}$	The set of indicator numbers, the values of which together characterize all candidates and allows to assess them in regard to all the requirements of the project
$Q = \{q_i : i = 1, \dots, \zeta\}$	General scale for assessing candidates' in regard to requirements
$\bar{q}_k \in Q, k \in K$	Clear assess of the requirements, expressed by the indicator $k \in K$ on the scale Q
$N = \{1, 2, \dots, n\}$	Set of candidates' numbers for the project team
$\bar{C}_{jk} \in Q, k \in K, j \in N$	Clear assess of j -th candidate by the indicator $k \in K$
$Comp = (\bar{C}_{jk})_{\substack{j=1,n \\ k=1,m}}$	Matrix of the candidates' competencies, where \bar{C}_{jk} – the competency of j -th candidate in regard to k -th project requirement
$X_g = (x_{ip})_{\substack{i=1,n \\ p=1,n}}$	Assignment matrix – diagonal matrix, elements of the main diagonal $x_{jj} \in \{0,1\}, j = 1, n$ define whether the candidate is selected to the g -th option of the team
$Comp_g = X_g \times Comp = (\bar{C}_{gjk})_{\substack{j=1,n \\ k=1,m}}$	Matrix of the candidate competencies of the g -th option of the team, where, $\bar{C}_{gjk} = x_{jj} \times \bar{C}_{jk}$
$time_j, j \in \{1, 2, \dots, n\}$	Available time of the j -th candidate for the project work, hours per week
$rate_j, j \in \{1, 2, \dots, n\}$	Cost of the working hour for the j -th candidate (salary rate)
$W = \{w_1, \dots, w_m\}$	Vector of the weight indicators of the importance of competence requirements in the context of the project
$Cost$	Labor costs of the team (budget), conventional units
$Laboriousness$	The laboriousness of the project, which was estimated at the stage of formation of requirements for team competencies, person-hours
ρ	Time of the project implementation, weeks

In the next step, after interviews with candidates, for each candidate it is necessary to form assessments of his competencies for each of the $k \in K$ indicators. To form a set of candidates based on the assessment of their competencies in accordance with the requirements of the project (Fig. 1), we need to compare the requirements for the candidate $\bar{q}_k \in Q, k \in K$ and assesses of the candidate's competencies $\bar{C}_{jk} \in Q, k \in K, j \in N$, which defined on the normalized general scale Q . If $\bar{C}_{jk} \geq \bar{q}_k, k \in K, j \in N$, the requirement to the k -th competency is done. The specialist is considered as a candidate if at least one criterion they meet the requirements of the project.

Next, we form options for a potential team. Let $g = \overline{1, G}$ is a team option. Let us make a matrix of assignments $X_g = (x_{ip})_{\substack{i=\overline{1, n} \\ p=\overline{1, n}}}$ as diagonal matrix, where the elements $x_{jj} = \{0, 1\}, j = \overline{1, n}$ at the main diagonal define either the i -th candidate is selected to g -th option of the team ($x_{jj} = 1$) or no ($x_{jj} = 0$). Then we can build a matrix of competencies of the g -th team option $Comp_g$, which can be given from the matrix of candidates' competencies as a product of the assignment matrix X_g and the competencies' matrix of all candidates $Comp$. Then, the team competencies matrix can be defined as:

$$Comp_g = X_g \times Comp = \begin{pmatrix} \bar{C}_{g11} & \bar{C}_{g12} & \dots & \bar{C}_{g1k} & \bar{C}_{g1,k+1} & \dots & \bar{C}_{g1m} \\ 0 & 0 & \dots & 0 & 0 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ \bar{C}_{gj1} & \bar{C}_{gj2} & \dots & \bar{C}_{gjk} & \bar{C}_{gj,k+1} & \dots & \bar{C}_{gjm} \\ \bar{C}_{gn1} & \bar{C}_{gn2} & \dots & \bar{C}_{gnk} & \bar{C}_{gn,k+1} & \dots & \bar{C}_{gnm} \end{pmatrix}$$

It should be noted that the non-zero lines of the competency matrix of the g -th team option correspond to the competencies of the candidates selected for the development team, and the zero lines correspond to the candidates who were not selected the g -th team option.

To form a set of candidates (block 7) we need to specify additional conditions, for example, which are discussed in the article [18]. Such conditions include the time during which the contractor can participate in the project, the cost of a working hour of a specialist, the weight of the requirements. Next, we will assume that the appropriate time and cost assesses are established during the interview with the candidates. In addition, requirements are set for the total cost of labor of team members $Cost$, for the *Laboriousness* of the project and project implementation estimation in ρ weeks. As additional conditions for the team creation are given: the resource of available time of each candidate $time_j$, cost of working hour for each candidate $rate_j$, and a vector of

importance indicators, which are used to assess the compliance with project requirements,

$$W = \{w_1, \dots, w_m\}$$

Then the team selection criterion can be written as follows:

$$X_g^{opt} = \arg \max_{x_{jj}} \sum_{k=1}^m w_k \times \max_j \bar{C}_{gjk}, j = \overline{1, n} \quad (1)$$

where $\bar{C}_{gjk} = x_{jj} \times \bar{C}_{jk}$,

$$\sum_{j=1}^n \rho \times time_j \times rate_j \times x_{jj} \rightarrow \min_{x_{jj}} \quad (2)$$

with constraints:

1) team competencies meet all project requirements:

$$\max_j \bar{C}_{gjk} \geq \bar{q}_k, j = \overline{1, n}, k = \overline{1, m} \quad (3)$$

2) team work time in the project meets the requirements for the laboriousness of the project:

$$\sum_{\forall j \in N} x_{jj} \times \rho \times time_j \geq Laboriousness \quad (4)$$

where $time_j$ – working time of j -th candidate per week, ρ – number of weeks, planned for the project implementation,

3) expenses on the team salaries should not exceed the allocated budget:

$$\sum_{\forall j \in N} \rho \times x_{jj} \times time_j \times rate_j \leq Cost \quad (5)$$

Thus, the solution to the problem is an option of the development team, the maximum competence of which for all $k \in K$ is the largest, provided that the choice is made among teams that fully meet the requirements. According to the chosen statement, the best team is chosen at the 16th step.

The selection of team members in accordance with the proposed target function will best fulfill the requirements for the project product, formulated at the start. If these requirements do not change, then such a team will fulfill the requirements for the product and fit into the time frame. The allocated budget will be enough to pay the members of the team. Compared with the method of selecting a project team based on minimizing the distance between the vector of competencies and the vector of requirements [19], the proposed approach allows us to choose the team that has the maximum possible competencies to meet the requirements. As a result, the cost of work may increase. The restraining factor, in this case, is the restriction on the team salary (4).

Given the great uncertainty of the requirements for the product of the project, as well as the variability of

these requirements over time, the project team should have redundant opportunities compared to the minimum necessary, which they see at the start of the project. If the competencies of the team members minimally meet the requirements of the project at the start, then when the requirements change, the team will not cope with the tasks not provided for in the starting backlog of the product. When changing product requirements, problems may arise due to the fact that the time that team members who have the necessary competencies may devote to the performance of tasks is insufficient to perform them. The complexity of the tasks may be higher than that which the necessary specialists can handle. In these conditions, to give more flexibility to the team, it is advisable to select team members from the condition of maximizing the number of competencies that meet the requirements of the project. The objective function of the problem will look like:

$$\sum_{j \in \{j: x_{jj}=1\}} \sum_{k \in \{k: \bar{C}_{gjk} \geq \bar{q}_k\}} \bar{C}_{gjk} \rightarrow \max_{x_{jj}} \quad (6)$$

The constraints of the issue (3)-(5) remain unchanged. As a result, an option of the team that has the maximum possible set of necessary competencies will be found. Such a team will best cope with changing requirements, as it will usually have a reserve of capabilities. Restrictions on time and budget will also be met.

Problems in the process of project implementation in this case may arise when there are requirements for competencies not provided at the start. To solve this problem will have to organize the selection of additional team members. This problem can be solved similarly to the original, ie using the first (1) or (2) objective function with constraints (3)-(5), or using (6) objective function with constraints (3)-(5) depending on the expected variability of the requirements for the project product.

In the article, the authors do not consider the task of filling vacancies in the company without reference to a specific project that requires executors. In the proposed method, the vacancy is filled as a result of solving the problem of optimizing the competencies of project team members. Filling vacancies in the organization without taking into account the requirements of a particular project and the competencies of other candidates for the team is a separate task.

Discussion. Small stand-alone teams play a central role in agile development. The article [20] examines the impact of teamwork quality on productivity, training, and job satisfaction in agile software development teams. The authors emphasize that the quality of teamwork is a major factor in improving the efficiency of the team, while the quality should be assessed by team members. This suggests that the selection of candidates for the team should be given much attention. In contrast to our study, the authors [20] focus not on the competencies of team

members, but on personal skills, emotional intelligence. It may be necessary for further research to consider such qualities as communicativeness, teamwork, ability to negotiate, etc., and consider them as components of the vector of competencies for both candidates and the team as a whole. At the same time, the authors of this article consider it necessary to study the formulation of the problem using fuzzy sets, which can increase the efficiency of the method used.

Conclusion. Creating an IT-project team is a complex and multi-stage process that provides alternative options for creating a team. As a result of the performed researches, two statements of the problem of creating an IT-project team based on clear assessments of candidates are developed and described. A method of creating a project team based on maximizing the competencies of team candidates has been created. The method takes into account the constraints on the cost of work and the laboriousness of the project. The scheme of application of the method of creating a project team, which has three main stages, is described in detail. At the first stage, a set of candidates is formed on the basis of assessments of their competencies and compliance of candidates with the requirements of the project. In the second stage, the options of teams are determined in accordance with the requirements of the project, taking into account the time constraints of the project and budget constraints. At the third stage, the optimal composition of the software development team is determined on the basis of certain tasks.

Two possible target functions of the issue are offered. The first target function is to form a team that will include candidates with maximum competencies. Such a team will best cope with the requirements that are known at the start of the project. The second target function maximizes the total competencies of the team that exceed a given threshold. As a result, the team will have a reserve of specialists to meet the project requirements, which may change.

With the help of the constraints of the task, the requirements for candidates are set, to have at least one competence, the indicator of which exceeds the threshold level, the team must cope with the given complexity of the project and invest in the allocated funds. The proposed method makes it possible to create an effective software development team that meets the requirements of the project, the values, and principles of agile approaches.

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