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ANALYSIS OF THE EFFECTIVENESS OF COMBINING THE ROLES OF SCRUM MASTER AND PRODUCT OWNER IN SCRUM-TEAMS

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ABSTRACT

Over the past decade, agile approaches, including Scrum, have become increasingly used in other spheres of human activity. Due to the peculiarity in the management structure of IT organizations, namely the possibility of personnel career growth in the models "junior-middle-senior" or "tech-lead-team lead-project manager", there is a temptation to combine various project roles in the work activity. Leadership positions are often held by people who were very recently technical specialists and, for the most part, did not receive special training as management personnel. The article discusses the issue related to the possibility of combining the functions of the scrum master and the product owner when implementing projects using Agile. The application of the logic of the role model of the manager according to I. Adizes is considered, as well as the correspondence of the roles of the scrum master and the product owner to the elements of the PAEI profile. It is proposed to consider such a characteristic of an effective project team as self-organization from the point of view of group dynamics and the need to distribute roles among team members. The paper puts forward a hypothesis about the need for both managerial training of project team members and the importance of studying soft skills, skills that are associated with the foundations of organizational and social psychology.

Keywords: Scrum; Scrum Master; Product Owner; PAEI-Model; Belbin Model; Role Model; Self-Organization; Group Dynamics; Team Effectiveness

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INTRODUCTION

Recently, the most common practice is to use "flexible" tools for project management. As in world practice, first of all, this approach began to be applied in the field of information project management, primarily in software development. Over the past decade, flexible approaches, including Scrum, have become increasingly used in other spheres of human activity. Moreover, "de facto" such an approach is not something surprising. However, "de jure", the use of Agile became "legal" relatively recently – after the introduction of changes to the Scrum Guide [1]. It is worth noting that such approaches to organizing the work of small groups have been known for a long time, but in the form of "standards" and "certification systems", this has become "mainstream" in the last ten years. At the same time, most companies that decide to use new approaches to business management usually implement Scrum, with a team in which few people have been trained, and even fewer, really understand what Scrum is and what exactly needs to be done [2].

LITERATURE REVIEW

The existing situation can be described using the well-known Dannig-Kruger effect [3]. But the real picture is more serious. Unfortunately, it should be said, at least, that one of the reasons for the failure of projects is their insufficient (and sometimes absent) training of specialists in the field of organizational and social psychology. It is also worth noting the growing interest of specialists in the field of project management, to issues that are associated with the study of group dynamics, namely, B. Takmen's model [4] and role models of Belbin [5] or Adizes [6].

Increasingly, experts are discussing the possibility of combining roles when using the Scrum framework. But, unfortunately, such discussions do not always have a scientific foundation. And, as a rule, the issues of the effectiveness of the organization of project teams in the aggregate of different approaches are not considered at all, i.e. taking into account leadership, role models, competence development and management of group dynamics in relation to specific project approaches. Sometimes you can see intuitive attempts to interpret some patterns in relation to a specific control model. For

example, the "mix" of the Takman group dynamics model in relation to the project timeline with a time scale in "sprints" deserves attention [7-8]. In this model, for the first time, two well-known approaches are combined (Fig. 1).

In works [9-10], which are devoted to the role models of project teams, an attempt is made to harmonize them. In [11-12] the mathematical substantiation of the existing connections in role models is carried out.

According to research [13-14], role design is the most motivating, if it is "correct", and demotivating, if it is "wrong," a factor in the development of organizations and specific project teams. In this regard, it is possible to put forward a hypothesis about the need for further development of such a direction, both in the development of information technologies and in the field of consulting and educational services. This is also evidenced by the growing popularity of services in the field of personnel certification and management systems, coaching and consulting services.

Despite the fact that most of the approaches and models are quite well-known in the professional environment, project managers are constantly looking for the benefits of combining such role models as "product owner" and "scrum master" or "project manager" and "product manager" or else any other poorly compatible role-playing "pair".

FORMULATION OF THE PROBLEM

Due to the existing peculiarities in the management structure of IT organizations, namely the possibility of rapid career growth of personnel in the models "junior-middle-senior" or "technical lead-team lead-project manager", there is a temptation to combine various project roles within the framework of work activities. Leadership positions are often held by people who were very recently technical specialists and, for the most part, did not receive special training as management personnel. In some cases, compliance with the position held is supported by the presence of an appropriate professional certificate. True, not all providers of the certification system require training in professional courses and work experience, including that confirmed by the reviews of participants in implemented projects, for admission to the exam. On the other hand, it is very common for specialists to observe many different certificates that are related, rather, to various types of activities than to the required role profile in the project. This situation does not provide young leaders with an understanding of the management mechanisms that they need to use in their daily work.

In this regard, there is a need to train novice specialists in the field of project management, the basic principles of team building and the distribution of roles in teams.

RESEARCH METHODOLOGY

One of the "silver bullets", which is referred to as a universal recipe for the success of a project team, is the team's ability to organize itself. But, as noted in [2]: "Obviously, it takes time to master Scrum. It has new roles and activities. And, what is especially difficult, it requires the adoption of new values. We have to give our developers the opportunity to organize themselves

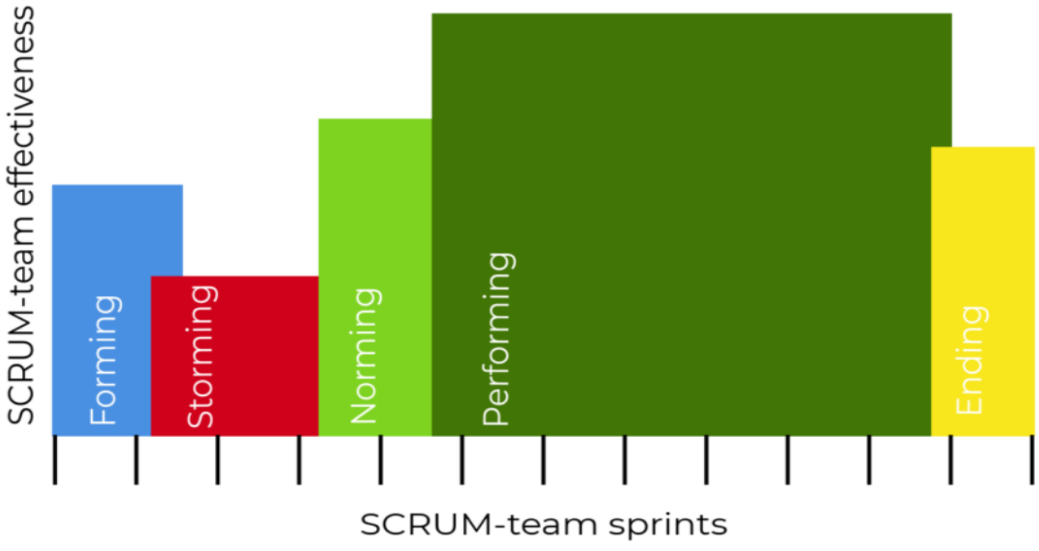

Fig. 1. **Schedule for the creation of the Scrum-team of the project**
***Source*: [7]**

to get the job done. It's easy to call Scrum meetings and call each other new Scrum roles. But in fact it is very difficult to really make Scrum". What can we say about those situations when it becomes necessary to implement projects in which the use of classic Scrum is no longer enough? One should hardly expect a quick self-organization from the project team. An exception is the case of an already established team. At the initial stage of team building, you need to understand the main roles and their interactions. For Scrum, these are primarily the roles of "product owner" and "Scrum master". The main approaches can be considered the model of I. Adizes [6], the model of B. Takmen [4], the Belbin role model [5], the Drexler-Sibbet model [16] and the role in Scrum [1].

In the case, which is considered in the article, with Scrum, you can use a simple, two-dimensional model PAEI by I. Adizes [6].

The PAEI model is used to demonstrate the basic idea of I. Adizes that one cannot be equally well developed in all four directions or role-playing styles (PAEI).

B. Takmen's model is necessary to understand the importance of managing the dynamics of the team's output to the most productive mode. In the logic of such an approach as Scrum, this can be associated with achieving and maintaining a high "speed" of the team during the sprint.

The Scrum roles are needed to create a mapping with the corresponding "roles" in I. Adizes's PAEI model. As practice shows, when working with project team members, the participants' assessment of the "best role model" for the product owner and the Scrum Master is very clearly decomposed into two different sets of roles according to I. Adizes. At the initial stage of team formation, a survey is conducted among its members. The team member provides a description of the PAEI roles and discusses how the members understand the roles of the Product Owner and Scrum Master in their organization. After that, the survey participants are asked to select two characteristics (out of four) for the roles of the product owner and the scrum master. These characteristics should correspond as much as possible to each of the roles. Polls are conducted for groups of 10 or more people.

DESCRIPTION OF RESULTS

As a result of surveys, in most cases, we get high values of indicators E and I for the role of the owner of the product and P, A for the scrum master. Moreover, the role of the product owner is within the customer organization of the product being created. In the case of the implementation of the roles of the product owner and scrum master within the organization-product developer, this polarization becomes more blurred. An example of profiles obtained as a result of an express survey of participants in one of the master classes conducted by the authors is shown in Fig. 2 (the solid line is the profile of the scrum master, the dotted line is the profile of the product owner, the total number of participants who took part in the survey is 36 people):

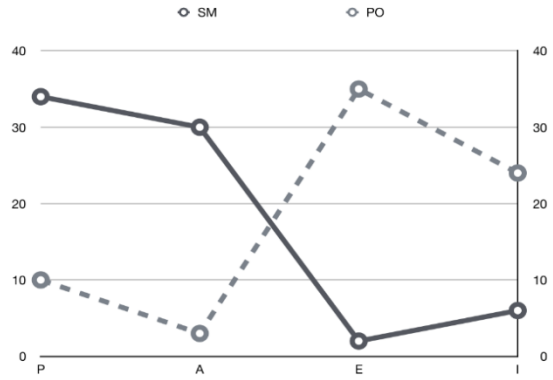

Fig. 2. **Profiles of the product owner and the scrum master in the assessment system according to the PAEI model of I. Adizes**

***Source*: compiled by the author**

More "subtle" harmonization within the framework of R. Belbin's role model leads to the formation of three sets in the profiles of role portraits of the product owner and the scrum master. Despite this, studies show the same result – profiles differ significantly. This demonstrates that it is simply unrealistic to expect the emergence of a real specialist whose role profile would meet the requirement of such an ideal "integrated" profile based on the sum of the role models of the product owner and the scrum master.

The use of this approach in practice shows that in real companies, especially when implementing internal projects, there is a shift in profiles. Research shows high values for E and A for the product owner role, and P and I for the scrum master role.

It is also worth noting that the need to accept roles by the project team members is also due to the fact that without this the communication process within the project team cannot be effectively established [7]. In [10, 12], it is proposed, on the basis of the Markov model of communications built by the authors, to consider the diagram of transient processes between the "sub-roles" of the project participants in the logic of the Belbin model (Fig. 3).

As can be seen in the diagram of transient processes, it is necessary to perform at least five "steps" in the constructed discrete model based on the matrix of transition probabilities, in order to optimize the process of role interaction and ensure the most efficient implementation of the project (p_{10}).

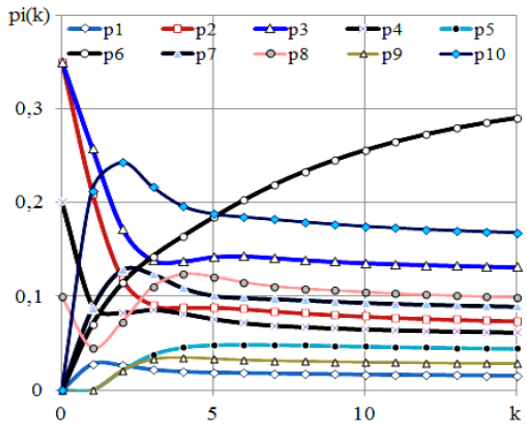

Fig. 3. **Transient processes in the communication system of the project team**
***Source*: [10]**

The diagram presented in Fig. 3 shows the transition processes between the following components of role-based communications in the project team: p_1 – "Organizer", p_2 – "Generator of ideas", p_3 – "Coordinator", p_4 – "Communicator", p_5 – "Motivator", p_6 – "Specialist", p_7 – "Executor", p_8 – "Controller", p_9 – "Analyst", p_{10} – "Project", with all properties and changing requirements. On the diagram, in descending order, after step 5 (steps can be interpreted as a "sprint"), the following hierarchy of project communications is built: p_6 – "Specialist" > p_{10} – "Project" > p_3 – "Coordinator" > p_8 – "Controller" > p_7 – "Performer"> p_2 – "Generator of ideas" > p_4 – "Communicator" > p_5 – "Motivator" > p_9 – "Analyst" > p_1 – "Organizer".

For a better understanding of the role dynamics, let us bring the names of the roles to the original English names according to Belbin Associates [16, 18]: p_6 – "Specialist"> p_{10} – "Project" > p_3 – "Coordinator" > p_8 – "Complete Finisher" > p_7 – "Implementer" > p_2 – "Plant" > p_4 – "Resourse Investigator" > p_5 – "Team Worker" > p_9 – "Monitor evaluator" > p_1 – "Shaper". An exception is an entity such as Project, which is absent in Belbin's model.

This logic of interaction between "team roles" and "object of management" corresponds to the practice of "utilization" of design work and information at the stage of project implementation. The logic in question can be linked to the logic of the successful implementation of the project, both from the point of view of Scrum ideology and from the point of view of group dynamics – both in the Tuckman model and in the Drexler-Sibbet model [17-18]. In these models, in the most important phases, everything is subordinated to the provision of specialists who directly create the product.

Interesting insights can be drawn by superimposing research findings on the training curriculum on scrum.org [19-20]. As can be seen from the topics proposed for the "in-depth study", the programs for the roles considered in the study of the article practically do not overlap (Fig. 4).

The diagram shown in Fig. 4 is a roadmap for the acquisition of knowledge and, accordingly, their confirmation by certification.

The proposed in Fig. 4 approaches resembles the logic of the well-known oriental approach "Shu-Ha-Ri" [22]. The approach presupposes a gradual mastery of the subject – whether it is a martial art in antiquity or the art of developing information systems in modern times. In both cases, it is suggested to first learn specific working techniques. In fig. 4 this is shown with a dashed line. First, the applicant is invited to become a developer, and only after that master the skills of a Scrum Master or a product owner. Moreover, the road to "product owners" in the recommended form goes from the position of "Scrum Master". That, judging both by the list of competencies offered for in-depth study by product owners in [19], and by the list of "7 Skills You Need to Be a Great Product Owner" [21], it is quite different from the list of "core competencies" scrum-masters offered in [24, 25].

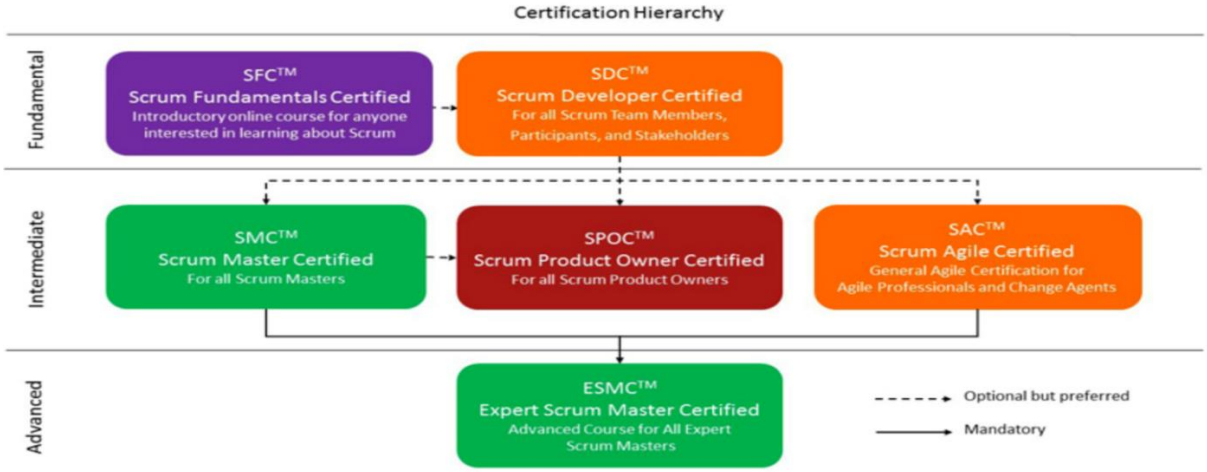

Fig. 4. **The logic of "mastering" in Scrum**
***Source*: [19]**

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Based on this contradiction, it is possible to develop a "comparison matrix" and, accordingly, design profiles in the Belbin role space for roles such as Scrum Master and Product Owner in the Scrum role space [26, 27]. For example, when creating such a comparative matrix in a small group, the following picture was obtained by an expert method (Fig 5).

DISCUSSION

The presented study results are rather descriptive in nature. However, the information obtained allows us to formulate a number of hypotheses that can be considered in further research:

a) analysis of other role models, such as, for example, the Drexler-Sibbet model, and the construction of corresponding mathematical descriptions for them based on the apparatus of Markov chains;

b) if the hypothesis is confirmed, work can be carried out to analyze the equivalence of roles and their combinations in various role and competency models;

c) to carry out a quantitative study, in particular, based on the analysis of the combustion diagrams of tasks in projects implemented by various teams of executors for the purpose of reaching the planned maximum performance. The main idea of such a study is that the first 5-6 sprints should not be expected from teams to unconditionally match planned productivity and actual, regardless of the qualifications of the project team members. An exception may be teams that in their entirety came to a new project after the successful implementation of the previous one. The team is already in a state of maximum efficiency;

d) modeling the profiles of scrum roles with expansion to the third role – a member of the development team (product creation), including using the Scrum competency model. This should lead to a model of three orthogonal groups of competencies and role constellations, similar to the logic of both the grouping of roles in the Belbin model and the logic of the ICB IPMA.

The presented research results indicate the orthogonality of the profiles of the "scrum master" and "product owner", both in the logic of the role model of I. Adizes and in the logic of the role model of R. Belbin. True, Belbin's role model theoretically allows for the existence of a carrier of opposite traits in one physical body. One way or another, but among the representatives of the professional community, especially among the coaches (coaches) on this topic, now you can already meet the owner of such opposite traits. Today, such a situation should be considered not only as acceptable, but even as "good practice", which will allow you to better understand the area of your activity. On the other hand, in real day-to-day activities, such a combination should hardly be considered a good idea, at least from the point of view of the logic of I. Adizes's PAEI model.

Scrum to Belbin roles	Roles >	Plant	Monitor Evaluator	Specialist	Resource Investigator	Teamworker	Co-ordinator	Shaper	Implementer	Completer Finisher		
	Group >	Thinking	Thinking	Thinking	People	People	People	Action	Action	Action		
Scrum roles elements V	FID	B1	B2	B3	B4	B5	B6	B7	B8	B9	Sum	
Enact the Framework	SM1	0	1	0	1	1	1	1	1	0	6	120
Keeping a Team in Flow	SM2	0	1	0	1	1	1	0	1	1	6	30,00
Radiate Information	SM3	1	1	0	0	1	1	1	0	0	5	
Effective and Healthy Teams	SM4	1	1	0	1	1	1	1	1	1	8	
	number of matches	2	4	0	3	4	4	3	3	2	25	70
	Belbin scale	5,60	11,20	0,00	8,40	11,20	11,20	8,40	8,40	5,60	70	2,80
Customer Delighter	PO1	1	1	0	0	0	1	1	1	1	6	134
Storyteller	PO2	1	0	0	1	1	1	1	0	0	5	13,40
Delegator	PO3	0	0	0	0	0	1	1	1	0	3	
Developer	PO4	1	1	1	0	0	0	0	1	1	5	
Knowledge broker	PO5	1	0	0	1	0	0	0	0	1	3	
Conflict resolver	PO6	0	0	0	0	1	1	1	0	0	3	
Effective escalator	PO7	0	1	0	1	1	1	1	1	1	7	
	number of matches	4	3	1	3	3	5	5	4	4	32	70
	Belbin scale	8,75	6,56	2,19	6,56	6,56	10,94	10,94	8,75	8,75	70	2,19

Fig. 5. **Analysis of the matrix of correspondence between the roles of the scrum master and the product owner and the elements of the role model of R. Belbin (developed by the authors)**

***Source*: compiled by the author**

CONCLUSIONS

Further research in this direction will be of scientific and practical interest, and the results obtained allow us to draw a general conclusion that attempts to combine the roles of the product owner and the scrum master in one "physical body" are unlikely to be effective. At least, simply due to the fact that in fact it will be another attempt to create a "universal soldier" – a person who can simultaneously have high performance for all four (for the Adizes model) or nine (in the case of using the Belbin model) roles. From a practical point of view, the results of the study also show that for effective project management, project managers and project team members need to have appropriate specialized training. This concerns both global levelsof management and issues of group dynamics of project teams, as well as issues of effective distribution of roles within project teams and the interaction of participants.

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АНАЛІЗ ЕФЕКТИВНОСТІ ПОЄДНАННЯ РОЛЕЙ СКРАМ МАЙСТРА І ВЛАСНИКА ПРОДУКТУ В СКРАМ-КОМАНДАХ

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АНОТАЦІЯ

Впродовж останнього десятиріччя гнучкі підходи, і серед них Scrum, стали все більше застосовуватися у всіх сферах людської діяльності. У зв'язку з існуючими особливостями в структурі управління IT-організаціями, а саме можливістю кар'єрного росту персоналу в моделях «джуніор-мідл-сеньйор» або «техлід-тімліда-керівник проекту», виникає спокуса суміщення в рамках робочої діяльності різних проектних ролей. Керівні позиції часто займають люди, які зовсім недавно були технічними фахівцями, і, в більшості своїй не проходили спеціальної підготовки з точки зору управлінського персоналу. У статті розглядається питання, пов'язане з можливістю поєднання функцій Scrum-майстра і власника продукту при реалізації проектів, які використовують гнучкі інструменти. Розглядається застосування логіки рольової моделі менеджера за І. Адізесом, а також відповідність ролей Scrum-майстра та власника продукту елементам профілю PAEI. Запропоновано розглядати таку характеристику ефективної проектної команди як самоорганізованість з точки зору групової динаміки та необхідності розподілу ролей серед учасників команди. У дослідженні висувається гіпотеза про необхідність як управлінської підготовки членів проектної команди, так і про важливість вивчення та розвитку «м'яких навичок», навичок, які пов'язані з основами організаційної та соціальної психології.

Ключові слова: Scrum; Scrum майстер; власник продукту; PAEI модель; рольова модель за Белбіним; самоорганізація; групова динаміка; ефективність команди

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