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АНАЛИЗ ПОДХОДОВ РАЗРАБОТКИ СИСТЕМЫ КОМПЕТЕНЦИЙ КОМАНДЫ ПРОЕКТА СОЗДАНИЯ ВИРТУАЛЬНОГО ЛОГИСТИЧЕСКОГО ЦЕНТРА СТРОИТЕЛЬНОЙ КОМПАНИИ

Поставлена задача развития компетентности проекта создания виртуального логистического центра строительной компании. Исследуются подходы к идентификации и развитию индивидуальной и организационной компетентности. Для проекта рассмотрено наполнение 28-и компетенций согласно модели Международной ассоциации управления проектами. Предложена комбинированная модель развития организационно-индивидуальных компетенций.

Ключевые слова: управление проектами, строительная логистика, компетентность проекта, организационно-индивидуальные компетенции.

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DEVELOPMENT OF THE STRUCTURE AND CONTENT OF SCRUM-TECHNOLOGIES OF CONTROL OF FAST-FLOWING MEDICAL PROJECTS WITH CRITICAL RISKS

Показано, що після перерозподілу ролей учасників медичного проекту, пов'язаного з тим, що продукт проекту – життя людини – безцінний, а проект знаходиться у виключній зоні ризику, з'являється можливість використовувати SCRUM-технології в управлінні проектом хірургічної операції. Запропоновано систему оптимізації процесу прийняття проектних рішень в медицині. Система випробувана в хірургічній практиці з позитивним ефектом.

Ключові слова: *SCRUM-технології, учасники проекту, планування Спринтів, швидкоплинні медичні проекти, критичні ризики.*

1. Introduction

SCRUM-technologies first appeared in the IT field, mainly in the implementation of projects to create computer programs. But there are other projects in which SCRUM-technologies are almost the only way to achieve the desired goal.

SCRUM project management technologies are most often used when the project has the following properties:

– it has orders of magnitude shorter than «normal» projects;

– the project team is much less structured: everyone can do everything and can be involved in the implementation of any stage of the project;

– the project manager is located inside such Team and works at the level of other Team members;

– the stages of project implementation, which are called Sprints in SCRUM-technologies, are refined after the completion of the previous stage, with the definition of the quality of their implementation and with an eye on the achievement of the mission and the objectives of the project as a whole.

In some cases, these factors are supplemented by a high risk hazard that accompanies the project. At the same time, both risk factors – the likelihood of occurrence and the cost of risk losses – are at a very high level. In the work such projects were called «fast flowing with increased risk hazard and strict responsibility for the results of their implementation». The most prominent representatives of such projects are medical, in particular, surgical operations.

The urgency of work in this direction is also determined by the fact that surgical operations are constantly becoming more complicated due to the use of modern instruments and instruments, which are becoming increasingly difficult to manage without modern information technologies.

Management of such operations as a project based on SCRUM-technologies allows to anticipate a greater percentage of risks, promptly prevent and counteract them.

2. The object of research and its technological audit

The object of research is a project that, while preserving all the basic properties of the project (uniqueness, limited time, economic and material resources, carried out by the Project Team for a given purpose in interaction with the turbulent environment), has a number of specific features. These features make it possible to distinguish project management in a special class of project activity.

First of all, this is a quick flow of the project. If «ordinary» projects, for example in construction, can last for years, then the duration of fast-flowing projects, as a rule, is limited to hours, and sometimes – minutes. Therefore, the wrong choice of the structure and content of the project at all stages of its implementation can have irreversible consequences.

Secondly, it is a high responsibility for the result of the project activity. Wherever such projects are carried out – in energy, transport, in the process of combating emergencies – as a rule, their mission is preservation of human life.

The third feature of the considered projects is the increased level of risk events accompanying the project in comparison with the usual ones. In such projects, there are often latent, unexpected risks that can't be foreseen in advance. Therefore, measures to prevent or compensate for their consequences must be taken in the shortest time in the project activity process, using all available resources.

A vivid example of such project activity is a medical surgical operation that contains all the procedures described above and is certainly a fast-flowing project with a high degree of risk and responsibility. Here, the design approach is the innovative content of the operation, and SCRUM-technology is the modern and the only form of its implementation that is available in these conditions.

On the other hand, this approach is revolutionary, it has never been used in world practice, which complicates the implementation of the comparative analysis. Because of this, it is possible to answer the question, as it was in medicine before applying the project approach to operations, and it is impossible – how this approach works for other specialists in the field of project management.

One of the most problematic places in the research object is the forced need to redistribute the roles of all project participants. The project team should be relatively small, and therefore – mobile and multifunctional. The owner of the product of the project, if it is a patient in the operating room, is at the same time the most interested person in the successful completion of the project and the most «detached» from making any decisions in choosing the structure and content of the project technologies.

3. The aim and objectives of research

The aim of research is increasing the effectiveness of proactive management of fast-flowing projects with critical risks by improving the quality of the project's product by developing and implementing methods for implementing SCRUM-technologies for managing the structure and content of project activities.

To achieve this aim, it is necessary to solve the following tasks:

1. To develop the concept of planning and management of individual stages (sprints) of the project.

2. To develop a decision support system in proactive management of the structure and content of operations in surgical medical practice based on SCRUM-technology.

3. To run a practical test of the system and evaluate the effect of its tests.

4. Research of existing solutions of the problem

In recent years, project management has become very widespread, because it allows to constantly «stay close» with the process, anticipating possible problems during the latter and eliminating the consequences arising from its implementation risks. However, not all processes can be carried out under such management, as they do not fit into the existing framework of the concept of «project management».

In particular, problems arise in the management of fast flowing, but at the same time, very responsible processes. The latter include processes performed by a relatively small team of multifunctional performers. Among the main directions of elimination of these problems, identified in the resources of the world scientific periodicals, can be identified:

– SCRUM-technologies for project management, which include a rigid division of the entire process into separate stages (Sprints) [1–5];

– new roles of Project Team members in planning and performing work on individual Sprints [6–10];

– deciding on further actions after the completion of each Sprint, taking into account all the risks prevented and identified in previous Sprints [11–15].

In particular, the paper [1] is devoted to the SCRUM process technology, which includes a set of methods and predefined roles. SCRUM naturally (which follows from the content of the project) is distributed to Sprints – original finished subprojects [2]. During each Sprint (the duration of which is determined by the Team), the Project Team ensures the functional growth of the project product.

Examples of such projects may be projects for the creation of a software product [3], support for security in super-constructions [4], for example, nuclear facilities or emergency response in the latter [5]. This includes projects to restore damaged parts and assemblies of vehicles during the movement, projects of medical intervention in the human body, and the like.

The authors of [6] show that in all these examples the Project Team is relatively small and, despite the fact that its participants have a narrow specialization, they are forced to carry out all the work of the project by almost a common team. For example, during an operation, the anesthesiologist does not «go home» after completing the anesthesia, but on equal terms continues his active presence in almost all Sprints until the active phase of the operation is fully completed [7].

A set of properties that are implemented in each Sprint is defined by a document called *product backlog*, which has the highest priority in terms of requirements for the performed work. However, as follows from [8], this priority is not always easy to establish. For example, in the

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case of medical intervention, human life, of course, has the highest priority. However, the succession of Sprints, leading to the preservation and improvement of the quality of life, is not always obvious. In this case, it is necessary to identify and analyze all the risks on the way to the final goal and on them to determine the structure of the SCRUM-technology and the content of all its Sprints.

Another important contradiction follows from the analysis of [9, 10]. The matter is that the *backlog items* are defined during the *sprint planning meeting*. During this meeting, the Product Owner should inform about the tasks that he wants to be performed. During a surgical operation, everything is not so. The owner of the product under anesthesia and, at best, something to identify can be his relatives. It remains for the Project Team itself to determine how much they can do to complete the necessary parts of the process during the next Sprint.

Another common feature in the given examples is that the beginning of the project is initiated by some «pre-risk» event. These include violations of the technological process and safety systems, unacceptable changes in the performance of aggregates of technical systems, human diseases and the like [8].

As the authors note [1, 2], *Sprint Planning Meeting* in the «classic» SCRUM-technology occurs at the beginning of each new Sprint. It is assumed that during the Sprint run, the tasks of the Project Commands are not changed. But in case of critical risks this is not always observed, because some risks during the Sprint implementation can lead to its change to a complete stop and/or replacement [11]. In this case, even the beginning of the project may coincide with the onset of the crisis or is within its development (urgent response), and may occur later when favorable conditions (planned response) come. In the latter case, it is hoped that the project processes will take place under more favorable conditions.

For example, the Project Team (a group of surgeons of a certain profile) starts the operation and determines that the primary diagnosis was incorrectly placed, which means that further surgical intervention requires specialists of a completely different profile [12, 13]. Such risks must be accompanied by a serious analysis of the entire Team and an adjustment of the structure and content of further work [14, 15].

Thus, the results of the analysis allow to conclude that the use of SCRUM-technology in the management of the surgical operation project is very promising. However, for this it is necessary to develop new methods for adapting the structure and content of SCRUM-technologies for managing fast-flowing medical projects to the critical risks accompanying this process.

5. Methods of research

The new methods used in this study stem primarily from the completely new distribution of roles in the SCRUM project management technology of «surgical operation» mentioned above, compared to the existing ones. Let's look again at the traditional distribution of roles in SCRUM-technologies [9].

SCRUM master is conducts meetings and monitors compliance with all SCRUM principles, resolves contradictions and protects the Project Team from distractions. This role does not imply anything other than the correct conduct of the SCRUM process.

The project manager is more likely to relate to the project owner and should not appear as a SCRUM master.

The owner of the product is a person who has a direct interest in a quality final product, he understands how this product should look [10]. This person does not work in the Project Team, he works on the client side, but this person works with the Team. And this is the person who sets priorities for tasks.

The Project Team is a multifunctional team of developers and executors of the project, consisting of specialists of different profiles: for example, surgeons, manipulation and operation sisters, engineers, anaesthetists, laboratory technicians, etc. The size of the team is ideally between 3 and 9 people. The team is the only fully involved development partner and is responsible for the result as a whole. No one, except the Team, can interfere with the development process during the Sprint.

Users.

Customers, Vendors are the persons who initiate the project, and for which the project will be profitable. They are involved in SCRUM only during the Sprint review meeting.

Managers are people who manage personnel.

Expert consultants.

In the case where the final product is human health, it is difficult to classify the patient's place in the above list of roles. Obviously, he is closest to the *owner of the product*, because, of course, «has a direct interest in a quality final product». But this person does not «work with the Project Team», except, indirectly – through objective indicators of his condition. This, a completely new role in SCRUM-technologies, radically changes the alignment of forces during the execution of the surgical operation (Fig. 1). Partially this role is transferred to the Project Manager, and in part, to the conditional «Relatives» supervising the operation from the outside.

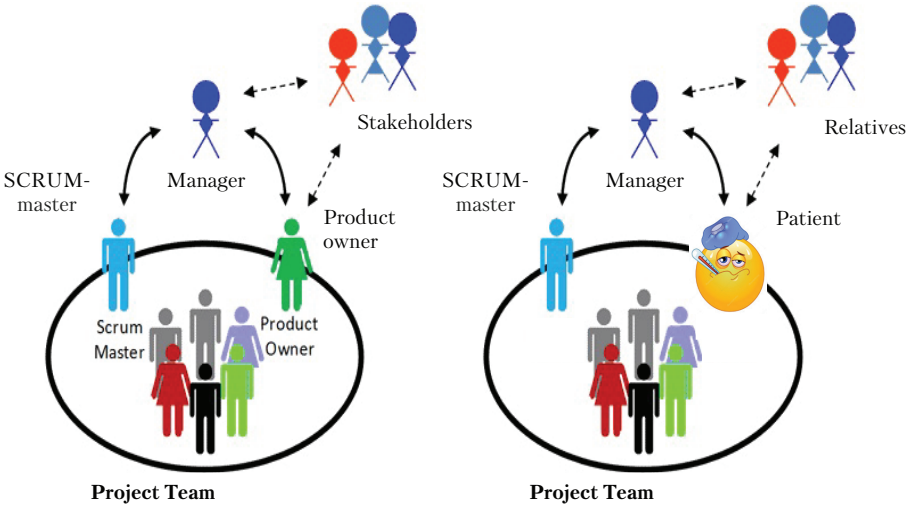

Fig. 1. Distribution of roles during the implementation of SCRUM-technology management of the «normal» project (1) and the project of surgical operation (2)

The second most important feature of the SCRUM project management technology of «surgical operation» is its apparent transience, which exceeds the speed of traditional operations, even though these traditional technologies are positioned as high-speed [8]. In combination with significant risks and the highest responsibility, this complicates the usual methods of researching SCRUM-technologies, involving to them the existing methods of statistical comparative experiments in medicine over a significant number of patients [13].

6. Research results

6.1. The concept of planning and management of individual stages (Sprints) of the project. Sprint begins with an analysis of the current state of the object's parameters [12]. Further, tasks are selected from the list of what should be realized. The obligations for which the Team undertakes to fulfill. Based on the selected tasks, the functionality of the Sprint work is created. All functions are divided into tasks, each of which is evaluated by the Team. The team constantly, taking into account the risky environment, evaluates the amount of work that needs to be done to complete the task. When the Sprint *N* is implemented, the information is transformed in an original way: the input is «processed» into the output by means of work performed by the Team and influenced by internal and external risk events that took place.

Information processing, that is, the work itself, is performed by the Project Team, which in SCRUM-technologies also combines manager support for the latter (Fig. 2).

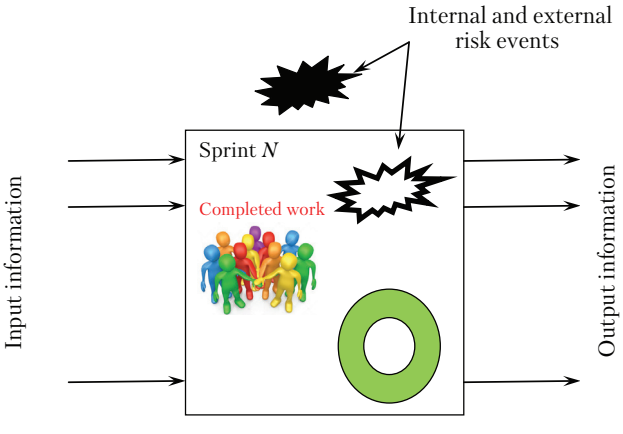

Fig. 2. Scheme of information «transformation» during the management of the intermediate Sprint

An example of such information in medicine can be a set of objective, continuously measured parameters of a person-patient (temperature, pressure, heart rate and other characteristics of the cardiogram, blood components, etc.).

In aviation, this is the temperature and pressure in different areas of the engine, fuel consumption and balance, altitude and speed of flight, air parameters in the cabin.

As can be seen from the scheme shown in Fig. 2, the three main factors determine the course and the result of the execution of work on each Sprint, and, consequently, on the project as a whole:

– professionalism in the execution of work by the Project Team;
– risky events that accompany the project;
– managerial support (management) of the project.

The first factor relates to the professional activities of the Project Team members; it remains to be hoped that the qualifications of the Team members correspond to the functions superimposed on it. With serious errors in this area, they can be identified as a risk and attributed to the second factor (Fig. 3).

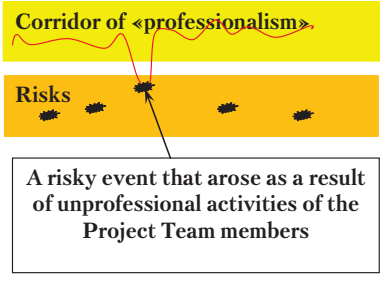

Fig. 3. Moving of «professionalism» factors to a group of risk factors

The second factor is the risks of the project. In the work they are examined from two sides: risks that did not lead to risky events (for example, risk of cardiac arrest), and risk events that occurred (for example, unscheduled bleeding) and which need compensation. The former were evaluated in the probability parameters, and the latter in the medical and financial «cost of the issue».

The third factor is management support or, in fact, project management will be considered in micro- (individual Sprints) and macro- (overall project) levels as a further development of the known PDCA methodology [16]. To do this, let's represent the sequence of Sprint management stages in the form of a cyclic diagram of the AMMA «Analysis» – «Method» – «Model» – «Action» (Fig. 4).

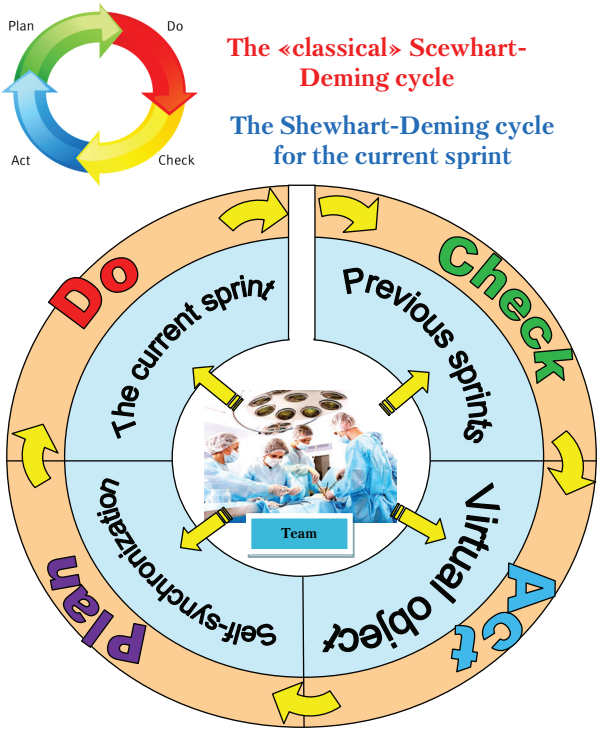

Fig. 4. A cycle of stages of the current Sprint of the general SCRUM-technology of proactive management of fast-flowing projects

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The cycle of the stages of the current Sprint is complete if the corresponding Sprint does not end with its interruption. Such interruption can occur in at least three cases:

– after the start of the current Sprint work, it turns out that these jobs need not be performed (for example, after an operative access it turns out that the primary diagnosis was incorrect, or the operational situation does not correspond to the expected situation);

– after the start of the current Sprint work, it turns out that in order to achieve its goal or the purpose of the whole project, it is necessary to urgently perform additional work not provided for in the plan;

– until the completion of the current Sprint ended:

a) operational stock of materials (donated blood, medicines, dressings, etc.);

b) funds to purchase these materials, electricity or information on overcoming unexpected crises that may be contained in the literature, on the Internet or in the experience of other relevant professionals who may be located on the other side of the globe.

In any case, after the interruption of the work of the current Sprint, the analysis of the information received from the current situation is again performed and a decision is made to which Sprint: a planned or not planned plan needs to be made to transition, or to stop the project in general.

Check provides processing of information received from the previous Sprint (from calculations to brainstorming), determining the main directions for further development of the project and preventing latent risks with severe consequences.

Next, new models and methods of development of events are selected (or created). The project team calculates the probabilities of achieving the objectives of the current Sprint, discusses side effects and «surprises» that can overtake the project. Then the final decision is made and the actions that make up the essence of the current Sprint are performed.

«Analysis» – «Method» – «Model» – «Action» cycle, and with it the current Sprint is completed, and the transition to the next Sprint is carried out. An important task is adjustment of the structure of the SCRUM technology and determination of the Sprint to which the transition is necessary.

Next, let's consider the analysis of the results of previous Sprints in the management of Sprints SCRUM-technologies. At the beginning of each new Sprint, a new situation analysis is performed, the results of which may differ materially from the planned at the beginning of the project as a whole.

After all, according to S. Bushuyev law, the creative component of the fate of any project activity can't go down to zero, since the turbulent environment in which this activity is carried out always hinders this [17].

The life cycle of any SCRUM-technology begins with the planning of its progress, as well as planning for the necessary work to carry out this technology. In the course of such move, depending on the complexity of the product of the project, the share of creative project activity increases under the influence of the turbulent environment.

Accordingly, the turbulent environment makes each project unique, which is carried out according to SCRUM-technology, that is, it provides one of the main features of the project activity.

When it comes to a complex project, the share of the creative component becomes very significant. First and foremost, this is due to the fact that during the execution of such project risk events occur. Therefore, one factor, the growth of which leads to an increase in the share of creative project activity, is the time of project implementation.

It may seem that for fast processes such share is small, because most of the risky events simply will not work. However, the high probability of each risk event and the extremely high price of its consequences (remember the same surgical operations) «work» in the other direction, substantially increasing the creative part.

On the other hand, if the SCRUM-technology provides for the implementation of Sprint types of the same type, the fate of the creative share may, on the contrary, decrease [18].

When there is an impact on the state of SCRUM-technology execution more than one, or even all factors, it can be a synergistic combination of the result of the action of the latter. In this case, individual factors that act on the project implementation process strengthen or weaken each other, and their total impact is greater or less than the sum of their individual impacts [19].

6.2. Decision-making in proactive operation management based on SCRUM-technology. Proactive management of the structure of SCRUM-technologies for managing fast-flowing projects with critical risks is designed to support such level of predicted probability of achieving the set goal, which will ensure this achievement with a minimum of losses.

Any path chosen under the influence of any forecast model, unfortunately, does not guarantee 100 % success, but the strategy to move along the path with the greatest forecast probability looks the most promising.

Increase in project implementation time can be associated with a turbulent environment, the impact of which slows down the process. Slowdown can be brought to a complete halt of the project.

In the latter case, it may be a matter of returning to such project later (for example, transferring an operation). Let's consider this case as one of the options for restoring the product of the project, since its belated implementation can no longer be carried out on the basis of primary projects and plans. Indeed, at the new stage there are already new materials, technology, human resources, material support, etc., and all this requires new engineering or medical support: new elements and new technologies.

Thus, the work under restoration was generally understood either as a direct current restoration or updating of the project product after a while, which is impossible without changing the initial plan and technology of the project activity. It is assumed that at the beginning of the second type of recovery much changes in comparison with the beginning of the primary recovery (Fig. 5).

These changes are not always obvious, they do not lie on the surface. To identify them, it is necessary to analyze the environment again. After all, during the period of idle time, the existing medicines, suppliers, equipment, executors, legislation, etc. could have changed significantly. It is also necessary to reassess the general condition of the patient and the current functional characteristics of his organs.

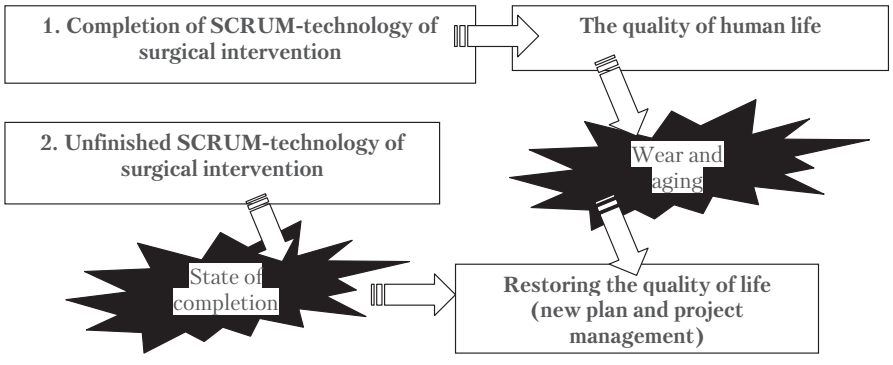

Fig. 5. Change of the project turbulent environment at the beginning of the project product recovery

With this evaluation of the recovery project manager, as a rule, one can expect «big surprises» – which, in terms of project management, are certainly risks. These risks are not ordinary [17], but unexpected, which have a very indirect relation to the environment [18, 19].

Under the structure of SCRUM-technologies we mean such objects:

– a lot of Sprints, including technologies and functional links between them;

– a lot of work in the project, consuming different resources and ways of delivery of the latter.

A typical (planned) Sprint structure of the SCRUM project management technology of «surgical operation» is shown in Fig. 6.

During the execution of each Sprint, an event may occur that is perceived by the Project Team as a signal that the probability of a certain crisis event has increased dramatically. Let's recall that the talk is about proactive project management.

In this case, one of the listed actions of the Project Team or any combination thereof is possible.

1. Do not make any changes to the original plan.

2. To perform additional work within the current Sprint and continue to the next (according to the plan for the project) Sprint.

3. To add a new (not foreseen by the original plan) Sprint, after which will go to the next planned Sprint.

4. To completely change the planned set of Sprints going after the current one.

5. To stop the project and exit it through Sprint completion.

The concrete action (or a combination of them) is chosen according to the probability of achieving the main goal of the project. These probabilities are calculated from the models of the corresponding actions or are «appointed» by the expert council of the Project Team.

As follows from the experience of surgical interventions, one of the most important characteristics by which it is possible to evaluate the effectiveness of a medical SCRUM project is time.

Naturally, this should preserve or even improve the medical characteristics of the operation. It is about preserving the vital signs of the patient's body (temperature, pressure, heart rate) within the permissible norm. In addition, they should subsequently improve with respect to the control group of patients for whom the SCRUM project management technology of «surgical operation» was not applied.

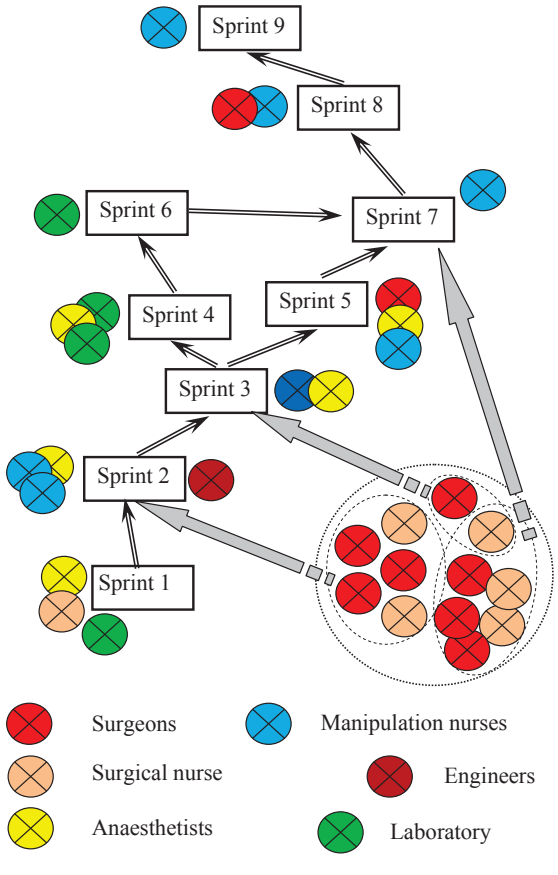

Fig. 6. Structure of SCRUM-technology of project management of «surgical operation»:
sprint 1 – preliminary preparation of the patient, anesthesia; *sprint 2* – operational access; *sprint 3* – online reception; *sprint 4* – current analyzes; *sprint 5* – treatment of the operating field; *sprint 6* – biopsy; *sprint 7* – operational output; *sprint 8* – intensive supervision (resuscitation); *sprint 9* – ward monitoring (rehabilitation)

The speed of the operation as a whole depends on the speed of individual Sprints, and the rest are hostage to the many risks faced by the process, both from the patient and from the surgical team, external links, pharmaceutical supplies, medical equipment, and the like.

The main difference between project management and this mechanism is that after each stage, an emergency transition to the subsystem of iterative planning of SCRUM-technology content is carried out in a planned manner and at any time in an emergency situation (Fig. 7).

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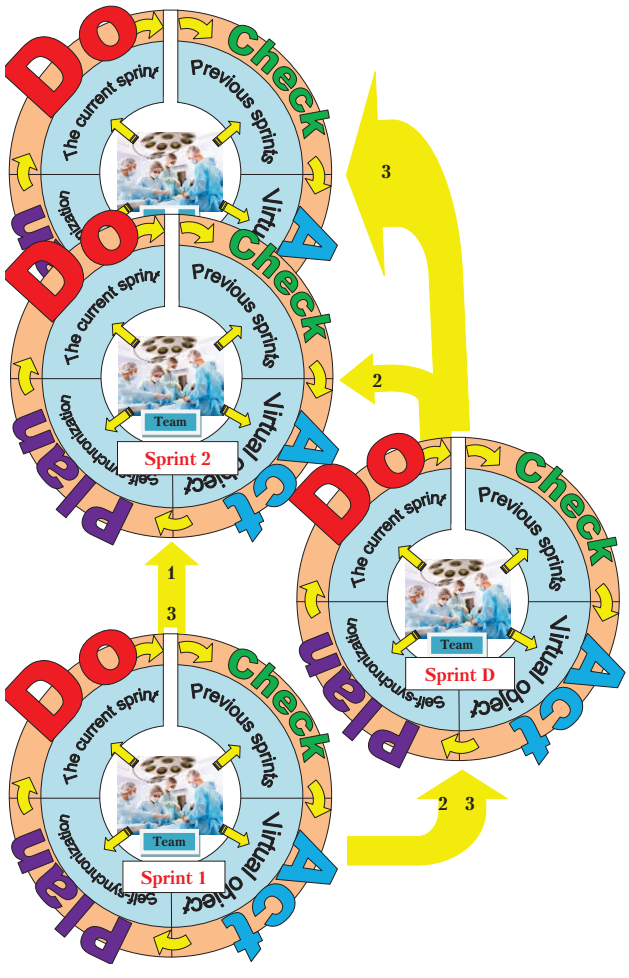

Fig. 7. Changes in the sequence of Sprints in SCRUM-technology for managing fast-flowing projects:
1 – no changes in the preliminary plan for implementation of SCRUM-technologies; 2 – adding a new Sprint (Sprint D) to the Sprint chain of SCRUM-technology; 3 – parallel execution of two Sprints: a new (Sprint D) and a well-known (Sprint 2)

6.3. Practical tests of the research results with an assessment of their social advantages over known methods. In the Center for Reconstructive and Rehabilitation Medicine (University Clinic) of the Odessa National Medical University, the system for optimizing the process of making project decisions in the proactive management of projects and programs in medical practice was tested.

The system was used to manage the program of selection of the treatment strategy and tactics for the operative and chemotherapeutic treatment using the method of *hyperthermic intraperitoneal chemotherapy* (HIPEC). HIPEC is a type of hyperthermic therapy used in combination with surgical intervention in the treatment of progressive abdominal cancers [12]. In this procedure, warmed-up anti-cancer drugs are administered and circulated in the abdominal cavity (abdomen) for a short period of time.

The possibility of effective use of new project-oriented methods and models for the successful proactive management of the medical intervention process of responsible use was confirmed.

In the experiments, 19 HIPEC operations were performed, 10 people (among them 6 women) aged 54 to 67 years were operated using the results of the present studies, i. e., using project management within SCRUM-technology. 9 people (control group, among which – 4 women) with an age of 48 to 63 years were operated in the «usual» way.

The output of the system – indicators of the quality of the performed operations – the following indicators were accepted: the resectability of the primary tumor, improvement of the quality of life (according to the SF-36 questionnaire) in the postoperative period and the number of patients whose lifespan exceeded 1 year after diagnosis and the start of a special treatment.

The tests lasted 1 year and 2 months. The results during this time were accumulated and subjected to statistical processing according to the method described in [20].

The tests of the system show that its use allowed improving the operational accesses for the installation of drainage systems for chemo-perfusion into the abdominal cavity. Critical temperature parameters (40.5–42 °C) and exposure time (1.5–2 hours) of perfusion liquid on tumor cells and abdominal cavity organs are developed.

A comparison of the indices of special surgical treatment with HIPEC in 19 patients with disseminated common abdominal tumors performed using SCRUM project management technology and in the control group of patients according to the previously accepted method shows the following officially confirmed positive statistical clinical effect:

– by improving the operative access for the installation of drainage systems for chemo-perfusion into the abdominal cavity, the resectability (removability) of the primary tumor increased to 65 % (2.3-fold compared with the control group);
– 43 % of the SF-36 questionnaire improved the quality of life in the postoperative period;
– the number of patients whose life expectancy exceeded 1 year after diagnosis and the start of special treatment increased by 23 %.

7. SWOT analysis of research results

Strengths. Strengths of the research results are increase the effectiveness of proactive (pre-emptive occurrence of risk events) management of the course of surgical exposure to humans. This effectiveness is determined by two factors: a decrease in the likelihood of risk events and the price (in medical and monetary terms) spent on their compensation, if these events did occur.

Weaknesses. The weakness of the research object is the need to involve medical specialists in the Project Team who additionally have knowledge and skills in the field of project activities, understand the mission and goals of the projects, are able to think in terms of the «structure» and «content» of SCRUM-technologies of management.

Opportunities. The proposed approach was practically tested using the surgical technique of hyperthermic intraperitoneal chemotherapy (HIPEC) in the operative treatment of disseminated abdominal tumors. The prospect of using the results of the research consists, first of all, in expanding the field of medical application of these results to other surgical techniques for treating other diseases.

Threats. Negative effect of internal and external factors on the object of research that is unavoidable in medical intervention. To eliminate such threats, the manager and the Project Team should be ready at any time to switch to «manual control» of the project.

Additional costs can be associated with the purchase of additional hardware and software for computer sup-

port of SCRUM-technologies of management, as well as training of medical personnel in SCRUM-technologies.

The use of SCRUM-technologies for project management in surgical practice has no analogues. In comparison with the «usual» surgical operations, it is possible to increase the duration and quality of life of the patients undergoing surgery.

8. Conclusions

1. The concept of planning and management of separate stages (Sprints) of the project of management of a surgical operation is proposed, which consists in the fact that the role of the Owner is excluded from the list of executors of the project. In medical practice, the Project Owner is the patient himself, therefore this role is partially transferred to the Project Manager and in part to the new category «Relatives of the patient».

2. A new system for supporting decision-making in the proactive management of the structure and content of operations in surgical medical practice based on SCRUM-technology is proposed. The peculiarity of the system is that it allows to estimate the probability of occurrence of internal and external significant risk events and to change under the influence of this assessment the originally planned sequence of Sprints in SCRUM-technology.

3. Comparison of the indices of special surgical treatment with HIPEC in 19 patients with disseminated common abdominal tumors performed using SCRUM project management technology and in the control group of patients according to the previously accepted procedure shows officially confirmed positive statistical clinical effect.

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РАЗРАБОТКА СТРУКТУРЫ И СОДЕРЖАНИЯ SCRUM-ТЕХНОЛОГИЙ УПРАВЛЕНИЯ БЫСТРОТЕКУЩИМИ МЕДИЦИНСКИМИ ПРОЕКТАМИ С КРИТИЧЕСКИМИ РИСКАМИ

Показано, что после перераспределения ролей участников медицинского проекта, связанного с тем, что продукт проекта – жизнь человека – бесценна, а проект находится в исключительной зоне риска, появляется возможность использовать SCRUM-технологии в управлении проектом хирургической операции. Предложена система оптимизации процесса принятия проектных решений в медицине. Система испытана в хирургической практике с положительным эффектом.

Ключевые слова: SCRUM-технологии, участники проекта, планирование Спринтов, быстротекущие медицинские проекты, критические риски.

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