Project controlling in the adaptive perspective of project management

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Abstract:

The aim of the article is to deal with the application of the agile project management concept from the perspective of controlling processes. The author presents the basic elements of the SCRUM methodology as well as main project controlling issues. Based on above, specific aspects of the SCRUM methodology that refer to the recommendations resulting from strategic and operational controlling in project management are identified. This in particular concerns the structure of the project work, the key roles and actions of stakeholders, and the meetings and reports recommended in this approach for the process of obtaining information, especially at the project implementation stage. The author concludes with the comparison to monitoring and control recommendations commonly found in cascade project management approach.

1. Introduction

Currently, two typical approaches to project implementation can be distinguished in project management – the **classic approach** (cascade, traditional) and the so-called **adaptive approach** (agile, flexible, light, situational), on the basis of which the project management methodologies applied around the world can be classified. They do not contradict each other – their objective is the same. They are supposed to lead to effective implementation of the objectives set for the project through consequential and comprehensive support of the project manager and the project team, while simultaneously taking into consideration the interests of the key stakeholders of the project (e.g. the customer or the sponsor). They differ in terms of project implementation conditions, for which a given methical approach is recommended.

The **adaptive approach** to project implementation was created on the basis of criticism of the classic approach, when it turned out that there are numerous projects that do not have the characteristics mentioned below. Those projects included, above all, highly innovative projects, with many prospective obstacles in their implementation, leading to alternative courses of works, where the planning process is based on incomplete or unreliable knowledge sources, with an imprecisely defined final objective, and with changes in the project structure inscribed in its course. In connection with ineffective application of recommendations of the classic methodologies in implementation of such projects, new solutions in this respect were sought out. Thus, the agile approach was developed, in which project implementation is preceded by only preliminary preparatory works, and its execution consists in pursuit of the assumed objectives on the basis of current assessment of the situation and the accompanying circumstances on the basis of the approved general principles of procedure.

The adaptive methodologies such as DSDM Atern, eXtreme Programming or MSF, are based on an approach, in which correct and detailed planning of works at pre-implementation stages, though desired, is not possible nor feasible[1]. They apply,

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[1] See more: e.g. Rubin K.S., Essential Scrum, Addison-Wesley, Melbourne 2012; Jackson J., Agile Project Management, KASHVI Publishing House, Delhi 2017; Tudor D.J., Agile Project and Service Management, TSO London 2016; Thomsen C., Hansen J., Enterprise Development with Visual Studio .Net, UML, and MSF, Apress Media LCC, New York 2010; Stellman A., Greene J., Learning Agile: Understanding Scrum, XP, Lean, and Kanban, O'Reilly Media, Sebastopol 2014.

above all, to unique and innovative projects, which lack sufficiently specific information for the planning stage. For this reason, effective control of such projects is of key importance for their success. Therefore, descriptions of these methodologies contain quite precise guidelines concerning project controlling, above all with regard to the principles of control, and less precise with regard to the roles performed in this process, as well as the tools and techniques that support the procedures of project controlling. One of the representatives of this approach is the SCRUM methodology, which the author decided to describe from the point of view of project controlling.

2. Description of the methodology

General assumptions of this approach were presented by Hirotaka Takeuchi and Ikujiro Nonaka in the article *The New Product Development Game*, published in Harvard Business Review in January of 1986, while a description of SCRUM's application to production of software was for the first time formulated by Ken Schwaber and Jeff Sutherland in 1995, in the article *SCRUM Software Development Process*, presented during the international conference devoted to creation of computer software OOPSLA (Object-Oriented Programming, Systems, Languages & Applications) in Texas, USA (http://www.scrumguides.org/history.html). Although it was originally created for the purposes of implementation of IT projects, its use currently goes far beyond the IT industry alone (Deemer, Benefield, Larman and Vodde, 2012; Komus, 2012). It is based on the assumption that, due to multilayered nature and uncertainty of the final result, it is impossible to precisely plan the entire project at the pre-implementation stage. Therefore it is recommended to determine (quite precisely) - at the stage of defining and planning of the project - the customer's expectations with regard to the project's final result and to specify it in detail at the implementation stage through a number of meetings determining subsequent stages of creation of the system. On the basis of these reviews the customer – in consultation with the contractor – can shape the scope of the project, change the initial determinations and analyse whether further project implementation is justified. Conclusions of these analyses should become the basis for the implementation of the subsequent stage

of the works and provide the basis for a detailed assessment of the project's effects.

The SCRUM methodology is based on an iterative (rolling, incremental) method of task execution, with compulsory assessments of progress in regular 30-day iterations (so-called sprints), constituting complete business concepts. It may be compared to milestone reports or strategic periodical reports. They are supplemented by information acquired from daily 15-minute reviews of the current work of the executive team (so-called daily scrum), which involves determination of the scope of work to be done until the next meeting and discussion on the challenges that are currently faced by the project team. Such structure of the project control enables continuous acquisition of information on the project and its adjustment to the currently desired objectives on the current basis. Interestingly, since this methodology does not envisage a clearly specified role of a project manager, the team makes all decisions collectively, assessing the project's progress and the business case. This approach significantly differs from the traditional perception of the place and role of project planning, the role of a project manager, the function of the business case, and the frequency of control, represented in such methodologies as PRINCE2 and PMBoK.

Projects implemented on the basis of the SCRUM approach require less planning than typical projects based on extensive schedules, since the people working on delivering the expected benefits provide insight in the progress of their works at the end of each sprint (Schwaber, 2005). According to the philosophy of the SCRUM methodology, the minimum plan necessary for describing a project consists of a "vision" and a so-called "product backlog". The vision describes the reasons why the works on the project were undertaken and the desired end state. For the system used inside the organisation, the vision may describe how a specific operation will vary after implementation of the system. In the case of software created for the purposes of external sales, the vision may describe new features and functions of the software, the way they may be used by the customers, as well as the expected impact of this software on the market. The product backlog defines functional and non-functional requirements that the system should meet in order to achieve the vision according to the established estimates and priorities. Due to their significant role in

project controlling both vision and product backlog will be described in detail in the appropriate part of the text. Since SCRUM projects are usually too complicated to be described in detail when they are born, they are instead monitored and lead in such a way, so that they could yield the best results. At the same time, the depth of control is adapted to the level expected by the decision-makers, both with regard to operational and strategic controlling.

3. Roles in the SCRUM methodology

As opposed to the classic methodologies, only three roles can be distinguished in the SCRUM approach: the product owner, the project team, and the ScrumMaster, between whom the whole responsibility related to project management is divided. Although they are all connected with one another, each has separate duties in the project and may have different expectations regarding the project's effects and different idea about the criteria of success. Each one plays simultaneously a significant and different role with regard to project controlling. These roles, most strongly related to the generated products of the project, are supplemented by activities of other significant stakeholders interested in having an effect on the course of the project.

The **product owner** creates the foundation required at the beginning and during the project implementation, by collecting the initial general requirements from the customer, preparing return on investment objectives and creating release plans. The list of requirements is called the product backlog. This role in the project is responsible for using the product backlog to ensure creation of the most valuable functionality possible at the beginning and its development later on; this is achieved by regular determination of priorities of the product backlog in order to subsequently place the requirements concerning the next iteration in the correct order. The product owner is responsible for:

- delivery of value to the customers through the product,
- identification and definition of product functionalities,
- assignment of priorities to functionalities according to their value for customers,
- making decisions on the dates and the content of subsequent releases of the product,

- updating of the set of functionalities and their priorities in subsequent sprints,
- acceptance or rejection of the completed work,
- evaluation of whether the project team implements the relevant functionalities from the point of view of the customer's expectations and vision.

He also protects the project team against outsiders interfering in the course of the project works. The product owner seeks to punctually obtain the expected effects of the project that he can present to the customer, under the currently valid business case.

The **project team** is responsible for development of functionalities of the works commissioned by the product owner. Teams do not have a project manager, they manage and organise themselves, work on different functionality, and are responsible for finding a way to turn the product backlog into growth in functionalities within each iteration. The team usually consists of: analysts, designers, programmers, testers, administrators and others. Similarly as in the MSF methodology, the SCRUM team members bear group responsibility for success of each iteration and the entire project. They are expected to be fully committed to the currently implemented project and to abandon multitasking. They need information about the daily progress of works to be able to set out the subsequent steps, and to update and evaluate the progress of the project in 30-day long cycles at the latest.

The **ScrumMaster** is responsible for the SCRUM process, for familiarising every person involved in the project with the SCRUM methodology, for implementation of the SCRUM approach in such a way, so that it would fit within the corporate culture and the procedures binding within the organisation, while and at the same time delivering the expected benefits. He is also responsible for ensuring that each executive team member acts according to the SCRUM principles and practices applied therein. What differentiates him from a project manager is the fact that he measures and monitors the requirements set for the project, without focusing on transposing them onto specific tasks, falling under the responsibility of the project team. He is an advisor, a mentor and an expert, but he does not participate in the project works himself. To an even greater degree than in the case of the product owner, his task is to act as a "protective buffer" of the project team against outsiders interfering in the course of the

project works. This role helps the team and the product owner select the proper project assessment instruments.

4. Approach to the issues to controlling in the SCRUM methodology

Since no clear definition of project controlling has been created to this day, for the purpose of this article, the author will understand it as a set of methods, procedures and techniques used in organisations, ensuring support of the process of project management with appropriate information, necessary at particular stages of project management (defining, planning, execution, completion) for making rational decisions at all levels of decision-making within the project (Bukłaha, 2016a; Bukłaha, 2016b).

Strategic project controlling deals with evaluation of the strengths and weaknesses of projects in relation to the current development strategy of the organisation. It examines the initial feasibility of projects, their profitability and effectiveness from the point of view of the adopted guidelines, creates ranking lists of projects, analyses convergence of their objectives with the strategic objectives of the organisation. **Operational (operative, current)** project controlling is focused on adjustment of project implementation in short time horizons (usually up to one year). It concentrates on planning, execution and control of projects selected for implementation at the stage of strategic controlling. On the one hand it is usually based on analysis of the relation between costs, revenue and profit or income and expenses, on the other may concern project scope, progress, resources used, quality and risk issues.

Guidelines within the scope of strategic controlling are mainly the responsibility of the organisation's management or the units authorised thereby (e.g. Steering Committee), whereas in the case of operational controlling, they are the domain of project managers and (less frequently) members of project teams.

When analysing the approach of the SCRUM methodology to control and assessment of the project, it can be concluded that the main aim of these activities is to provide business values with the highest priority from the point of view of expectations of the customer (the product owner), and the main points where the success parameters are defined are the product backlog and the conclusions of

the meetings, during which subsequent sprints of the project are planned (Deemer, Benefield, Larman and Vodde, 2012; Schwaber, 2005). It is worth emphasising that the SCRUM methodology does not have a separate place within its structure that focuses on the process of control and assessment, both with regard to the business case, as well as the current and strategic project monitoring. All these elements are included in practically every stage of the project. There are no formally recommended templates of assessment forms, reports or questionnaires, although subject literature recommends inclusion of certain sets of information in this respect. Even the role of a project manager does not exist, and the final shape of the requirements is in fact made more specific during the completion phase rather than at the project planning phase. All this results in the fact that the agile approach to project management follows its own philosophy of approach to control and assessment of whether implementation of the works is justified and sensible.

According to the SCRUM methodology, a project begins with a vision of the system that is to be created. The vision may be initially unclear, maybe outlined using the market categories rather than the system categories, but it will get more precise along with the progress of works under the project. Its formation and description is the responsibility of the product owner, who is accountable to the project sponsor for delivering the vision in a manner that would maximise his (the sponsor's) expected return on investment. In this aspect, the product owner is similar to the project manager, delivering the business case to the Steering Committee in the classic perspective of project implementation. He is also responsible for the content, the setting out of priorities and the availability of the product backlog. One of the elements resulting from the agreed vision of the system is product backlog. It constitutes a list of functional and non-functional requirements related to the system or the product being developed in the project, which – when they turn into a functionality – will represent this vision. In the product backlog, priorities are set out so that the elements of this list that will generate a certain value are always at the beginning of the list of priorities, and a division of these elements onto particular releases is proposed. Assignment of priorities to elements of the product backlog constitutes the initial point, and the content, priorities and assignment of the product backlog to

particular releases usually changes the starting point of the project, which should be expected. Changes in the product backlog reflect changes in business requirements and changes in the pace of the team turning the product backlog into the functionality. The product backlog is never fully complete, and the one used in the project plan constitutes merely the initial estimation of the requirements. The product backlog develops along with development of the product and the IT environment, where the product will be subsequently used. It is also dynamic – the management is subject to constant changes with regard to identification of the relevant needs of the product, its competitiveness and usefulness. It is in fact the only document presenting a description of all works ordered to the project team in the order of priority for the customer. Thus, it is an operational expression of the customer's vision, a certain result of the business case, prepared for particular stages of works, which – although unclear at the start of the project – will solidify along with its progress. The product backlog is the basis for control and assessment of progress in the project. On its basis, plans of particular stages (sprints) are updated, each time along with a review of the vision and the customer's expectations.

In the SCRUM methodology, communication that enables assessment of the project at various stages is focused around several elements typical of this approach. These are:
− sprint planning,
− daily SCRUM,
− sprint,
− sprint review,
− sprint retrospective.

Together, sprint planning, daily SCRUM, sprint review, and sprint retrospective constitute the basis for assessment of the project implemented in accordance with that methodology.

Fig. 1. Elements of controlling and structure of the SCRUM methodology
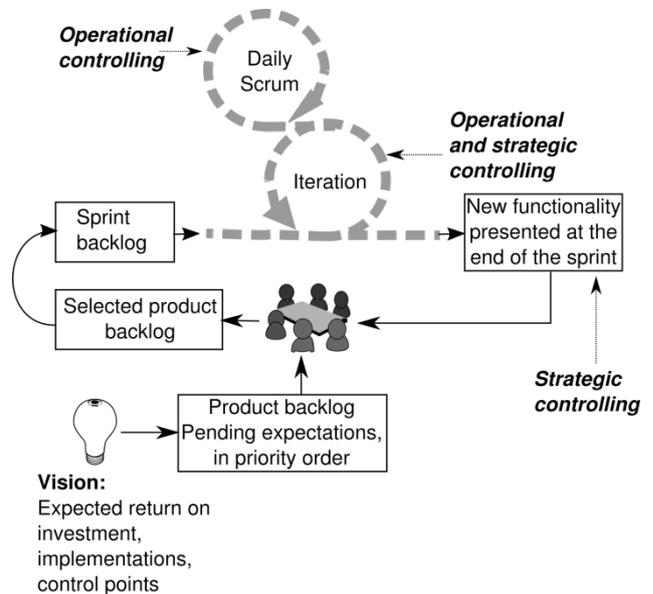
Source: own elaboration based on (Cobb, 2012).

The **sprint planning** consist of two parts. Within the first hours, the product owner presents the highest priorities of the product backlog to the team. The team then asks questions concerning the content, objective, importance and intention of the product backlog. When the team gets enough information, but before the end of the first four hours, it selects such part of the product backlog, which - according to the team members - can be turned into full growth in product functionality that can be released until the end of the current sprint. The team undertakes towards the product owner that it will do whatever is in its power to achieve expected progress. During subsequent stages of the sprint planning, the team plans details of its activities. Since the team is responsible for managing its own work, it needs an initial plan in order to start the sprint. At the end of the second part of the sprint planning, a list of tasks is obtained, called the sprint backlog, as well as an assessment of tasks and allocations to specific tasks, which commences implementation of the functionality by the team. The task list cannot be fully complete, but it must be sufficiently filled in to reflect the joint responsibilities of the entire team and introduce it to the first part of the sprint, during which this team will specify more tasks and place them in

the sprint backlog. The tasks comprising this plan are placed in the sprint backlog; the tasks in the sprint backlog appear in the course of the sprint.

Every day, the team gathers for a 15-minute meeting, called the daily SCRUM. The purpose of this meeting is to each day synchronise the work of the members of the entire team and fix a schedule of meetings that are necessary for the team to continue their works on the project. They are conducted by the ScrumMaster and are a "synchronisation" of the current exchange of information on everyday work, progress and observed difficulties. During this meeting, each team member answers three questions:

– What have I managed to do since the last meeting (namely since yesterday)?

– What do I intend to do until another meeting (namely until tomorrow)?

– What obstacles are standing on the way to achieving the assumptions of a given sprint and this project?

Through daily monitoring of the remaining work, the project team manages the progress of its work. Regular meetings motivate the project team to more effective work, due to their frequency and the need for each project team member to publicly answer the above questions. They are the basis for the operational controlling processes in the implementation of the current project.

All work is performed in **sprints**. Each sprint is an iteration of thirty successive calendar days at the latest. It is believed that this is the amount of time needed by the team to create something that may particularly interest the product owner and the customers, and to bring it to a state, in which it can be released. It is also the maximum time that most stakeholders can wait without losing interest in the project progress and without simultaneously losing faith in the fact that the team is creating something significant. Each sprint begins with a meeting, where the product owner and the team gather in order to work together on what is supposed to be done during the subsequent sprint. While selecting product backlog items with the highest priority, the product owner communicates to the team what should be done in the subsequent sprint, and the team informs him of the part of the desired functionalities that can be completed in the subsequent sprint.

If the sprint proves to be unfeasible, the Scrum-Master can bring an unplanned end to the sprint and initiate the planning meeting for the next sprint. The

ScrumMaster can make such a change on his own initiative or at the request of the team or the product owner. The sprint may prove to be unfeasible, if the applied technology turns out to be ineffective, if the business conditions change in such a way that the sprint has lost business grounds, or if the team's work is interfered during the sprint by someone from outside the team. If, during the conducted assessment of the progress, the project team concludes that it is unable to perform all elements of the product backlog, the performance of which it has undertaken, during the sprint, it may consult the product owner and agree on the elements that can be removed from the current sprint. The process in the case of a possibility to perform a greater scope of works resulting from the product backlog is analogical. Activities under sprints are an element of operational and strategic controlling, since, on the one hand, they allow the project team to verify the obtained results and plan the next iteration of work and, on the other hand, they allow the key stakeholders (in particular, the customer and the project sponsor) to periodically obtain information about the process of creation of partial and final products of the project.

At the end of each sprint, a **sprint review** meeting is conducted. It is, one of the most important elements of strategic controlling and assessment of the project's progress. During the review, the team presents the project functionalities achieved in a given sprint to the product owner and to the representatives of the project stakeholders. According to the methodology, the stakeholders are the people who sponsor the project, who are to use the functionality completed by the project, and who are affected by the project in any other significant manner. The review is intended to gather people and help them jointly define what the team should do later on. The sprint review begins with one of the members presenting the sprint goal, the obligations made for achievement of the product backlog, and the completed product backlog items. Particular members of the team can then discuss the course of activities in the present sprint. A greater part of the sprint review is devoted by the team members to presenting the functionality, answering questions of the stakeholders concerning the presentation, and writing down the required changes (Schwaber, 2005).

The product owner has a discussion with the key stakeholders and the team about potential rear-

rangement of product backlog items, on the basis of the feedback received from the key stakeholders. They may indicate a functionality that has not been delivered at all or has not been delivered in the expected manner, and ask for determination of priorities for this functionality in the product backlog. They may also indicate any new functionality they deemed justified in connection with the presented accomplishments of the team and ask for determination of priorities for this functionality in the product backlog.

After the sprint review and prior to the beginning of the next sprint planning, the ScrumMaster carries out a **sprint retrospective**. All the SCRUM roles participate in this meeting. During this meeting, limited to three hours, the ScrumMaster collects feedback from all members of the team in the form of answers to the following questions:

What went well during the last sprint?

What could be improved in the next sprint?

Then he encourages the team to correct (within the framework of the SCRUM process and under the principles applied therein) the creation process so as to ensure that its next sprint is more effective.

There are three pillars in the SCRUM methodology, significant from the point of view of the issues of project controlling. These are: transparency, inspection, and adaptation (Schwaber and Sutherland, 2013). Establishment of a controlling system in the project according to this approach requires consideration of each of these aspects of control and assessment of partial and comprehensive results of the works. **Transparency** means that the aspects of the process of sprints execution, which affect the result, must be visible for those who control and assess the work progress. The second pillar is **inspection**. Various aspects of the process of work execution must undergo inspection frequently enough to detect any unacceptable deviations therein. Frequency of inspections must take into account the fact that processes can be changed during each control at the end of the sprint. The third pillar of control is **adaptation**. If, on the basis of the conducted inspection, it is observed that one or several aspects of the process are beyond the acceptable limits and that the target product will be unacceptable, the further product creation process must be accordingly adjusted. Adjustment must be carried out as soon as possible, in order to minimise future deviations and maintain the expected business case of the project.

A project implemented in accordance with the SCRUM methodology is controlled by means of frequent project inspections, followed by the necessary corrections. This is performed both at the level of daily SCRUMs of the team, as well as current and retrospective reviews of a given iteration of the sprint. On the one hand, the meetings assess the progress of the sprint and the current challenges, and, on the other hand check the achieved functionalities, the grounds for further execution of the works, and the need for introducing any necessary corrections resulting from the situation of the project or expectations of the customers. These assessments can be performed orally (presentation of progress and functionalities, discussions) or in the form of formal reports on the meetings and reviews of the project. Such change reports are created, among others, at the end of each sprint. They are supposed to sum up the progress of the project, the observed changes and the adjustments applied to the plan.

Fig. 2. The operational control processes in the SCRUM methodology
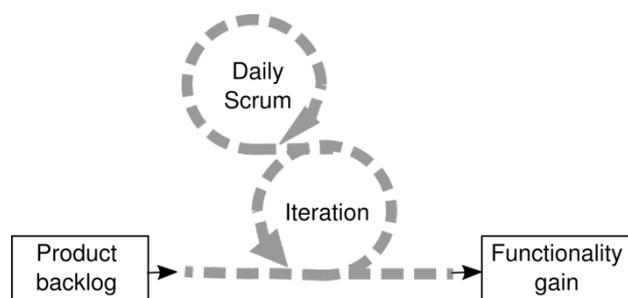
Source: own elaboration based on (Schwaber, 2005).

Periodical reports are supposed to show how much the project is similar to the initial plan, and what changes have taken place within the project and how they influenced it. The SCRUM methodology gives freedom with regard to the form of such reports, recommending the information contained therein to be as useful as possible for the decision making process of the parties interested concerning the project's future.

From the point of view of strategic controlling, the project assessment process during the planning phase and the subsequent SCRUM sprints focuses on three issues:

− What changes are expected by the project stakeholders after its completion?

− What progress has been made at the end of each sprint?

– Do the project stakeholders still perceive the project as a valuable investment, and why should they believe that the people offering implementation of the project are able to deliver the expected benefits?

The project plan is the way to synchronise the expectations of stakeholders with the expectations of the team and the basis for the project reporting. In the case of stakeholders who are the target users of the project functionality, the plan helps them organise their work so that they would be ready to use the functionality in the condition it is implemented. In the case of stakeholders who sponsor the project, the plan defines their detailed expectations towards allocation of the funds and the deadline for the benefits of the project to become noticeable. At the end of the sprint, stakeholders participate in sprint reviews and compare the current progress of the works with the planned course of the project. Changes during the project implementation and adjustments in the plan introduced during the sprint planning are consulted with the key stakeholders. For those, who cannot participate in sprint reviews, project reports are prepared, which compare the actual results with the plan – both with its initial version, as well as with the one that has been modified since the project entered the implementation phase.

5. Summary

When analysing the approach to control and assessment of progress in the project applied in the SCRUM methodology, we can notice its focus on change management and the uncertainty of preliminary stages of work planning assumed in advance. As compared to project monitoring and assessment of results, main emphasis is shifted from the planned schedule and general base documents to the conclu-

sions arising from the current work performance by individual project teams. According to this approach, the feedback loop and information exchange period is shortened, above all between the recipient of the project products (the product owner, the customer) and the contractor (the SCRUM team), between the list of expectations of the former and the executive possibilities of the latter, and between the intended and the actual level of return on investment. The SCRUM methodology, as opposed to the classic approaches, focuses not only on guaranteeing increase in business values, but also on ensuring values with the highest priority, in line with the definition of the customer (the product owner). The product owner and the project team gathered around him deliberate on the scope of the expected benefits, and then the team jointly assesses what can be done within thirty days in terms of delivery of high priority business values. When acting in accordance with the SCRUM methodology, it is tested early and frequently whether the system being created will deliver the expected values, and what these values will look like (Schwaber, 2005, p. IX). This helps in permanent modelling of the system so as to successfully deliver these values in the form, in which they are expected at a given time (resulting from the business case, the vision and the needs) in the opinion of the main stakeholders of the project.

It is certainly necessary to conduct further research in the future, concerning the area of controlling in relation to project management methodologies, both representing the classic approach, as well as the adaptive approach to project implementation. This will allow for improvement in the existing principles, tools and techniques used in this scope, which will surely be reflected in a growing number of projects successfully achieving the set goals.

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Controlling projektów w adaptacyjnym ujęciu zarządzania projektami

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Szkoła Główna Handlowa w Warszawie

Streszczenie:

Celem artykułu jest analiza zagadnień controllingu projektów z punktu widzenia adaptacyjnego (zwinnego) podejścia do zarządzania projektami. Autor przedstawia podstawowe założenia metodyki SCRUM a także kluczowe pojęcia z zakresu controllingu projektów. W oparciu o powyższe szczegółowo identyfikuje te aspekty koncepcji SCRUM, które odnoszą się do zagadnień strategicznego i operatywnego controllingu w zarządzaniu projektami. W szczególności dotyczy to takich obszarów jak: struktura prac projektowych, kluczowe role i działania interesariuszy projektu oraz zakres i treść spotkań zespołu a także sprawozdań zalecanych w tym podejściu w ramach procesu uzyskiwania informacji, zwłaszcza na etapie wdrażania projektu. Autor kończy swoje rozważania porównaniem powyższego zakresu analizy do zagadnień controllingu w odniesieniu doklasycznych (kaskadowych) koncepcji zarządzania projektami.

Słowa kluczowe: projekt, controlling, SCRUM, zwinne zarządzanie projektami, podejście adaptacyjne.
Kod JEL: L15, M10, M42, O22