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PROJECT MANAGEMENT IN TURBULENT TIMES OF COMPLEXITY OF SOCIAL AND TECHNOLOGICAL SYSTEMS

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Purpose: The aim of the article is a Viewpoint based on the General Review of the state of knowledge regarding current trends in project management, taking into account the high volatility of the environment and the increasing complexity of social and technological systems.
Design/methodology/approach: The article presents a narrative review of the literature and refers to the results of the author's own research.
Findings: With the increasing volatility of the environment and the increasing complexity of social and technological systems, the importance of using hybrid project management and the process approach to management in organisations will increase.
Practical implications: Nowadays, a vast majority of organisations manage projects in a traditional way. Observations contained in the article will contribute to the potential attention of decision-makers and the implementation of new management methods in organisations.
Social implications: Projects are not only inscribed in the activities of the organisation but also their results affect the quality of life of the population. By improving the efficiency of project management activities, it is possible to significantly affect the quality of people's lives.
Originality/value: The article presents the significance of hybrid project management and the process approach in turbulent times of complexity of social and technological systems in a systematic and review way.

Keywords: Project management, new technologies, uncertainty, complex environment.

Category of the paper: Viewpoint.

1. Introduction

Over the years, project management has been subject to constant changes (Kerzner, 2013; Spalek, 2013c; Trocki, Bukłaha, 2016). These changes were undoubtedly related to the need to improve the organisation's activities (Trocki et al., 2012, p. 15; Spalek, 2016a) in order to build a competitive advantage (Martens, Franklin, Mauro, Silva, De Freitas, 2018). As results of the

author's previous research have shown[1], the improvement of project's activities can be considered in terms of process and structure. The first is related to the dynamic functioning of the organisation, while the other is relevant to the static functioning. Recently, the importance of the process approach to project management has increased, as enterprises are experiencing a far-reaching dynamisation of activities linked to the introduction of breakthrough technological changes. Therefore, it may be concluded that technological progress plays and will continue to play an increasingly important role in creating changes in project management. However, it may take a moderating and mediating or inductive form. The moderating and mediating character becomes apparent in situations where the development of new technologies affects the modification of the methods used so far (Davidson, Chiasson, 2005; Yen, Li, Niehoff, 2008) or their wider dissemination (Tiwana, McLean, 2005; Wang, Wang, 2019). Moreover, technological progress imposes the emergence of new ways of project management, an example of which may be an agile approach to project management (Wyrozębski, 2016).

The subject of the influence of modern technologies on project management has already been elaborated by researchers, although it was mostly focused on information systems and their application possibilities to improve tools and techniques in project management (Liberatore, Pollack-Johnson, 2003; Sambamurthy, Zmud, 1999). It was only at the constituting of the last decade that attention began to be more closely paid to the impact that technological progress may have on the activities of the organisation, including project management (Kwak, Anbari, 2009). With the further development of modern technologies and their wider use in enterprises, determining this impact becomes more and more desirable (Gomes, Oliveira, Chaves, 2018; Roberts, Piller, Luttgens, 2016). This was confirmed by the author's research[2] carried out in 2019, which reveals that currently, technologies associated with social media and Industry 4.0, including those very closely linked to modern technologies, have the greatest potential impact on project related activities in enterprises.

Summing up, it should be noted that contemporary project management should take into account far reaching changes in the activities of enterprises, which are brought about by the expansive development of modern technologies, with particular emphasis on those related to social changes.

[1] The research was conducted as part of NCN grant no. N504 678740 and cooperation with the Project Management Institute, the key conclusions were published in: Spalek, 2012, 2013a, 2013b, 2014.

[2] International empirical research was carried out on a sample of 264 respondents (project managers or members of project teams) from enterprises running IT, production and construction projects. The research results are presented in the article: Spalek, S. (2020). Współczesne wyzwania technologiczne a zarządzanie projektami w organizacjach. In: E. Sońta-Drączkowska, I. Bednarska-Wnuk (eds.), *Wybrane aspekty zarządzania procesami, projektami i ryzykiem w przedsiębiorstwach* (pp. 103-114). Łódź: Publishing House of the University of Łódź.

2. The impact of environmental variability on project management

As it has already been addressed, along with a growth in the dynamics of activities in organisations, the importance of the process approach to project management has increased. The high volatility of the environment has also resulted in the emergence of the concept of Agile Project Management (APM) alongside traditional (waterfall) project management and Hybrid Project Management (HPM) combining the two previously mentioned approaches. Moreover, the concept of projectification (Maylor, Turkulainen, 2019) was introduced, associated with an increase in the number of projects and their importance in the activities of the organisation. Therefore, there was a need to define a system framework for project activities in organisations.

Along with the ongoing dynamisation of the organisation's activities, the process approach more and more often constitutes the basis for the functioning of the organisation (Nowosielski, 2009, p. 11), with particular emphasis on project management (Trocki, 2012a, pp. 66-67). This statement is of particular importance in the context of project management in turbulent times of complexity of social and technological systems. Moreover, the latest international scientific studies indicate the important role of processes in project management (Antony et al., 2019; Bordley, Keisler, Logan, 2019; Crama, Sting, Wu, 2019; da Costa, Amaral, Fernandes, Rozenfeld, 2019; De Benedittis, 2019; Dolata, 2019; Jalocha, 2019; Karlsson, Kurkkio, Hersinger, 2019; Li, Hall, 2019; Midler, 2019; Tarraco, Bernardes, Borini, Rossetto, 2019). Therefore, it is advisable to focus on the process aspect of project management, as a response to the increasing dynamics of activities undertaken in organisations.

Following Michał Trocki (2019a, pp. 10-11) and following the provisions of ISO 21500:2012 *Guidance on project management* (ISO, 2012) standard, project activities should be defined in terms of processes as a complete and coherent set of processes that create three groups:

- project management processes,
- product processes,
- support processes.

It is significant that only the first group of processes, i.e. project management processes, is the exclusive domain of project management, the other two are not unique to project management (ISO, 2012, p. 8; Trocki, 2012, p. 68).

The structure of management processes can be considered from two perspectives (ISO, 2012; PMI, 2017): as groups of processes occurring at different stages of the project execution and as groups of subject related processes, which are processes reflecting homogeneous issues (Trocki, 2012b) also referred to in the literature as areas of knowledge in project management (Wyrozębski, 2017, p. 101; Nogalski, Szpitter, Jabłoński, 2016, p. 21). The first group includes processes related to management in the key areas of the project, i.e. integration, stakeholders,

scope, resource, time, cost, risk, quality, procurements and communication. The other group includes processes related to stages of the project management cycle, i.e. initiating, planning, implementing, controlling and closing.

When analysing the intensity of the occurrence of processes at individual stages of the project management cycle, it may be noticed that the particular intensity of management processes occurs at the stages of planning and then successively for controlling and executing. This observation shows the importance of organising, which is largely related to the three stages mentioned. While, organising is understood as: (1) planning and coordinating individual stages of activities, (2) creating a team for joint action or establishing an institution, organisation, etc., (3) being a factor determining the arrangement and functioning of the elements of a whole (PWN, 1997-2019). In the context of changes brought about by complex social and technological systems, organising as part of the project management processes has a special place in them. The importance of organising was already indicated by Tadeusz Kotarbiński (1999, p. 348), who stated that organising is a combination of elements of collective actions (subjects, things, purposeful processes and actions) into a whole, so that the structure of the resulting entity contributes to the achievement of the common goal of these items. In this way, Kotarbiński foresaw the 'material and immaterial' idea of organising that is focused on creating value for the customer, which can be successfully implemented in a symbiosis of modern social and technological systems. The current trends in management also indicate the important role of organising, and it is precisely with the use of the relationship between the various resources of the enterprise (Pabian, 2017; Rokita, 2009; Zakrzewska-Bielawska, 2012).

3. Multiple complexity of systems and project management

It is assumed in the literature that Traditional Project Management (TPM) means the use of tools and techniques in the waterfall management of project stages, with particular emphasis on scheduling as well as budget and quality management in the project (Masciadra, 2017; Spalek, 2016b). As Manfred Saynisch (2010) pointed out in their 2010 article, traditional project management (TPM) cannot autonomously meet the challenges of increasing complexity in social, economic and technological systems. This statement is also very relevant today. This does not mean that the use of waterfall project management should be discontinued. As yet, in some types of projects it works perfectly. However, over the years, traditional project management has also undergone significant modifications. In its constituting, special attention was paid to the triangle of constraints, also known as iron or gold, which included managing time, costs and the scope of the project. Currently, this concept is still the focus of researchers (Pollack, Helm, Adler, 2018), although it is often extended to the business aspects of projects (Kloppenborg, Tesch, 2015). In addition, increasing attention is paid to managing change

(Ansari, 2019), stakeholders (Toor, Ogunlana, 2010), communication (Yang, Chen, An, Cui, 2015) and project integration (Marques, Gourc, Lauras, 2011), with particular attention on knowledge management in these areas (Camison-Haba, Clemente-Almendros, Gonzalez-Cruz, 2019).

The concept of agile project management (APM) was born on the wave of criticism from traditional project management. The turning point in the emergence of the concept of agile project management is the 2001 Agile Manifesto (Cohen, Lindvall, Costa, 2004). However, both before and after that date, researchers focused on agility beyond the framework of information systems (Thomke, Reinertsen, 1998; Ramesh Devadasan, 2007). It should be noted that in its assumptions, APM rejects the main role of the triangle of constraints. In this concept, it is assumed that the most important aspect is to match the product or service to the customer's requirements in the best possible way. Therefore, the most important issues are: communication with the customer, interactions in the project team, functionality of the solution and flexible response to changes in requirements. Other aspects of project management are subordinated to them. At the same time, while being part of IT project management, commonly accepted methods of agile project management have been developed – such as SCRUM (Santos, Flentge, Begin, Navarro, 2011) – in other industries, agile project management may take various forms (Conforto et al., 2014). As such, it still remains a more general concept that is adapted to specific enterprise applications (Nicholas, Steyn, 2017).

Comparing the principles of traditional and agile project management, it can be concluded that TPM is better based on a *hard* (tools and techniques) approach to project management, while APM emphasises the *soft* aspects of cooperation between people in the project. It is worth emphasising that both approaches are aimed at providing a solution for the customer. The application of TPM or APM may be limited by the environment in which the project is operating. However, projects implemented with the use of agile methods are more suitable for implementation in dynamic project environments (Serrador, Pinto, 2015).

After the initial period of an uncritical approach to agile project management and attempts to popularise this practice, voices appeared pointing out the limitations of this concept (Boehm, Turner, 2005; Katayama, Goldman, 2011). It is especially difficult to apply the principles of agile project management in large and very formalised organisations. Problems with the appropriate selection of members for project teams should also be indicated, who, having the appropriate knowledge and experience, would be ready to work in very dynamic, self-organising teams. Moreover, in agile project management we deal with a very high degree of trust between the project team and the customer, while in many organisations there is a high level of distrust resulting from previously implemented projects or business relationships.

Trying to meet the challenges resulting from the dynamisation of the environment, increasing variability of customer requirements and technological progress, the organisations were also forced to adapt the way of project management to the new realities. When the TPM adaptation possibilities and limitations in the application of APM reached the limit, selected

solutions from TPM and APM were used. This approach offered an opportunity, especially for large enterprises outside the IT industry, to adapt products and services faster without the need to introduce deep and costly organisational and personnel changes. This was made possible by the use of agile practices for selected product elements or stages in the project life cycle, while applying an overall flowchart of the traditional approach to project management. Over time, this approach became popular under the name of hybrid project management (HPM) (Wysocki, 2011, pp. 405-408). It can be concluded that the organisation using HPM derives solutions from both TPM and APM, and the scope of their application may differ depending on the enterprise and the specifics of the project.

It is worth noting the results of international longitudinal research conducted since 2012 by Ayelt Komus of the University of Koblenz on the use of individual project management methods in companies (Komus et al., 2020). The results of this research clearly show the growing importance of HPM. Thus, in 2012, 27% of all researched projects were managed in a hybrid way, and in 2019 as much as 43%. It is significant that HPM is also more frequently adapted in sectors other than IT. Its importance in the new products development is also growing – this level is currently estimated at 20%.

HPM can be both used at the project and programme or project portfolio level. Whilst, the project portfolio is understood as a set of projects grouped in terms of benefits for the organisation, as a result of the implementation of these projects various products or services are created. The programme is understood as a set of projects whose common goal is to provide a given product or service. As part of a single project, it is possible to apply TPM and use APM only for the implementation of selected tasks for which there is a significant variation in customer requirements or there is a high uncertainty of the methods and tools used. On the other hand, utilisation at the portfolio or programme level is the selection of those component projects that will be implemented using agile methods, while using TPM at the programme or portfolio level.

4. Conclusion

Summing up, it should be noted that with the increasing complexity of modern social and technological systems, hybrid methods of project management, combining traditional and agile project management approaches, are growing and will continue to grow in importance. Moreover, the high volatility of the environment imposes the combining of process and project related approaches in organisations increasingly often.

The above observations constitute a strong premise for project managers in organisations to redefine the existing traditional approaches to project management in organisations.

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