Vadyba
Journal of Management
2020, № 1 (36)
ISSN 1648-7974

LIFE CYCLE SPECIFICS OF EDUCATIONAL PROJECTS IN THE CONTEXT OF SLOVAK EDUCATION ENVIRONMENT

Kateřina Bočková, Gabriela Gabrhelová, Daniel Lajčin
DTI University

Abstract
Understanding of the project life cycle is one of the key areas of project manager knowledge. The primary reasons are the different requirements of project management in individual phases of the project reflected in the expectations of stakeholders, in project settings in within the activities scheduling, in subsequent execution of activities and in related involvement and workload of project team members, in cost management and time schedule. A frequent problem is therefore that the project itself is often perceived only through its implementation phase and omits the period and activities before and after outputs completion, which also have their specificities requiring attention and management.
In addition to different perceptions of the project life cycle, the question is also its standardization in terms of breakdown into phases with more precise description of their content. Each methodology has its own view and rationale for the breakdown, and from the point of view of the best-known standards and norms we encounter a breakdown from three to six phases. It is important to add that it is not possible to apply individual methodologies across all types of implemented projects, which increases the importance of the role of the project manager in the whole process. He should understand and correctly apply appropriate project management methods in conjunction with the expected inputs and outputs for the relevant project phase. Requirements for inputs and outputs are identically included in standards and norms differently - from basic recommendations to comprehensive definitions of the content of prepared documents and applied procedures.
One of the possible criteria for the classification of educational projects is the type of financing. This is an important determinant of the assumption of life cycle deviations for projects financed by the EU Structural Funds, projects financed by private sources and otherwise financed projects.
The essential of this paper is to evaluate the life cycle of educational projects financed by the European Union Structural Funds and to propose recommendations primarily aimed at improving project management from the perspective of the contractors entering the projects.
The essential will be developed through the following sub - objectives: To identify (from the perspective of the contractor) the life cycle specificities in educational projects financed by the European Union Structural Funds. To identify (from the perspective of the contractor) the life cycle specificities in educational projects financed by the European Union Structural Funds against the chosen methodological basis. To propose recommendations for improving the project management of contractors entering educational projects based on identified similarities and deviations.
In the theoretical part of the paper we will use the content-causal analysis, in which we will concentrate on literary resources dealing with the issues of project life cycle. In the analytical part we pay attention to the identification of the life cycle of educational projects financed from the EU Structural Funds from the perspective of an external contractor participating in various phases of their life cycle. The methodology of the analysis itself is based primarily on the methods of induction and deduction, comparison and synthesis. All obtained results are processed by method of synthesis with detailed description in discussion. The aim is to identify similarities and deviations from the project life cycle specified in the IPMA International Competence Baseline, version 4 (IPMA ICB).
The analysis of educational projects financed by EU Structural Funds allowed us to formulate a set of statements expressing the basic deviations perceived from the perspective of the contractor at selected phases of the project life cycle
We assume that the life cycle of the educational project shows its specifics regarding the type of financing, the implementation of the proposed recommendations can be expected to improve project management in them.
The formulation and verification of the assumption is based on the principle of ceteris paribus and we do not expect any other additional effects on the analysed educational projects.
KEY WORDS: Educational project; project life cycle; project management; European Union; IPMA International Competence Baseline.

Introduction

Understanding of the project life cycle is one of the key areas of project manager knowledge. The primary reasons are the different requirements of project management in individual phases of the project reflected in the expectations of stakeholders, in project settings in within the activities scheduling, in subsequent execution of activities and in related involvement and workload of project team members, in cost management and time schedule. A frequent problem is therefore that the project itself is often perceived only through its implementation phase and omits the period and activities before and after outputs completion, which also have their specificities requiring attention and management.

In addition to different perceptions of the project life cycle, the question is also its standardization in terms of breakdown into phases with more precise description of their content. Each methodology has its own view and rationale for the breakdown, and from the point of view of the best-known standards and norms we encounter a breakdown from three to six phases. It is important to add that it is not possible to apply individual methodologies across all types of implemented projects, which increases the importance of the role of the project manager in the whole process. He should understand and correctly apply appropriate project management methods in conjunction with the expected inputs and outputs for the relevant project phase. Requirements for inputs and outputs are identically included in standards and norms differently - from basic recommendations to comprehensive definitions of the content of prepared documents and applied procedures.

One of the possible criteria for the classification of educational projects is the type of financing. This is an important determinant of the assumption of life cycle

deviations for projects financed by the EU Structural Funds, projects financed by private sources and otherwise financed projects.

The expected outcome of this paper is to focus on the project management aspects in the individual phases of the project life cycle in terms of theory with respect to the chosen standard / methodology for educational projects financed from the European Union Structural Funds.

Research Methodology

The essential of the paper is: **To evaluate the life cycle of educational projects financed by the European Union Structural Funds and to propose recommendations primarily aimed at improving project management from the perspective of contractors entering the projects.**

The essential will be developed through the following sub - objectives:

- Sub-objective 1: To identify (from the perspective of the contractor) the life cycle specificities in educational projects financed by the European Union Structural Funds.
- Sub-objective 2: To identify (from the perspective of the contractor) the life cycle specificities in educational projects financed by the European Union Structural Funds against the chosen methodological basis.
- Sub-objective 3: To propose recommendations for improving the project management of contractors entering educational projects based on identified similarities and deviations.

We have formulated the following assumptions depending on the essential and sub - objectives of the paper. Upon their formulation and verification, we assume the ceteris paribus assumption and do not assume any other additional (internal / external) impacts on the analyzed projects:

- **P0 (initial assumption): The educational project life cycle reports its specifics regarding the type of financing, the implementation of the proposed recommendations can be expected to improve project management in them.**
    - Assumption P1.1 (link to sub-objective 1): The life cycle of educational projects financed by the European Union Structural Funds reports certain specificities from the perspective of a contractor. The assumption was based on formal demands placed on the implementation of projects determining their specificity. The objectivity of the formulated statements will be ensured by the average of the questionnaire survey (1 - yes, 2 - rather yes, 3 - rather no, 4 - no) below the reference value of 2,0.
    - **Assumption P2.1** (link to sub-objective 3): The educational project life cycle management will be improved by the application of established recommendations.

In the first part of the paper we used the content-causal analysis, in which we focused on literary resources dealing with project management and project life cycle. We used the resources of both domestic and foreign authors, scholarly articles, monographs, scientific articles and journals, conference proceedings, professional publications and other available sources of information. These documents were arranged using a historical-logical method into a complex whole.

In the analytical part, the attention is paid to the primary identification of the life cycle of educational projects financed from the EU Structural Funds from the perspective of a contractor participating in various phases of their life cycle. The whole part is divided into several successive partial units. The basis is the analysis of the life cycle of educational projects with respect to their financial criteria: To identify the life cycle of an educational project financed by the EU Structural Funds, the general knowledge of authors obtained from the preparation of project applications and from the implementation of educational projects from the Operational Program Education (realized by various types of schools: basic schools, high schools, and universities). There are 28 projects in this group.

Based on the outputs of the project life cycle analysis, the following will be implemented:

- The formulation of the statements on the specifics of the educational project life cycle regarding the type of financing. The statement will be specified in view of the different requirements for project implementation based on the type of financing and the associated ownership structure. These will be subsequently verified with consultants of contractors / self-employed persons participating in the projects of the surveyed category. The addressed respondents were asked by e-mail and communication application to express their agreement or disagreement with the formulated statements in the questionnaire. The questionnaire contained a total of 10 statements. The consent was requested on a scale of 1 to 4 with the following parameters: 1 - yes, 2 - rather yes, 3 - rather no, 4 - no. The questionnaire was sent to 150 people in total, assuming a return of at least 60 percent. Data collection took place in the period 25.06.-10.07. using email correspondence and phone conversations with a real return of 73%. The objective was to objectify the formulated statements by removing those whose average response rate exceeds 2.0 as a possible disagreement with the statement. These were excluded from further analysis.
- The comparison towards the selected methodological base / standard to identify similarities and deviations: For comparison, we will use the basic framework of the content of project life cycle and outputs defined in the IPMA ICB. If deviations are identified, they will be presented in the form of a description in the relevant field.
- The formulation of proposals / recommendations to streamline project management within the project life cycle of an educational project financed by the European Union Structural Funds. We start from the premise that the

implementation of project management elements in locations with identified deviations from locations with identified similarities, or from a defined methodological standard, can improve project management results.

The methodology of the survey itself is based primarily on the methods of induction and deduction, comparison, analysis and synthesis. All obtained results are processed by method of synthesis with detailed description in discussion.

Literature Review

Project management can be understood as a process that is according to Basl et al. (2002) or Westland (2007) one of the business processes. The natural framework for exploring links and processes for project management is the project life cycle, and a structured view of it is very important, as reported by Chapman & Ward (2003), Thomson et al. (2011) or Khang & Moe (2008. ISO 21 500 (2013, p. 36) states that *"the life cycle of a project covers the period from the start of the project to the end."* Although we are talking about the project life cycle, it is not really a cycle. In order to be a cycle, it would have to be a closed cycle, which is not possible for a project – it is a sequence of certain phases and stages in one direction on the timeline. The closure of such a cycle is not physically possible.

Throughout its life cycle, the project itself is often misunderstood only through its implementation phase, mainly because its results are most exposed to the outside. Other phases of the project, which are of equal importance, are omitted. At the same time, each phase has its specifics regarding the primary focus and content. This should be understood as a priority by the project manager in order to efficiently set up the related processes and adjust the overall (financial, time and personnel) allocation (Pinto & Mantel, 1990), (Bonal et al., 2002), (Archibald et al., 2012).

Generally, a project phase can be understood as *"the part of the project life cycle that is suitably distinguished from other phases, usually as a group of related activities, associated with the achievement of significant output. The phase may comprise several stages"*, as stated in Petráková (2019). The theory does not clearly define the exact breakdown of the project into phases; there are several approaches of different authors, e.g. Pinto & Prescott (1988), Labuschagne & Brent (2005), Patanakul et al. (2010) or Kloppenborg & Petrick (1999) and Archibald et al. (2012), standards and norms. By default, they adjust their number primarily due to the importance factor attributed to partial activities within each phase. None of them can be perceived in isolation, there are strong links and direct consequences between them.

The most well-known approaches dealing with and characterizing the project life cycle are the following:

- PMBoK® by Project Management Institute ("PMI"),
- PRINCE 2 (PRojects IN Controlled Environments),
- International Competence Baseline ("ICB") by International Project Management Association („IPMA"),
- ISO 10006,
- ISO 21500.

Complementary approaches from UNIDO and IIL may also be included.

The form of project life cycle definition varies by industry, but also within the same industry it is different for various organizations and businesses, says Korecký & Trkovský (2011, p. 61) and Sargent et al. (2006). This is also confirmed by Doležal et al. (2009, p. 155), who states that *"each organization should, according to its nature and the nature of each project, identify its own life cycle, or the characteristic life cycle of the projects, which realizes."* PMBoK (2013) cites, that the number of phases and their names are not strictly given, but are tailored to different needs, management, organization or project.

We distinguish the whole range of project life cycles; it is not possible to work dogmatically with one published in the standard or norm. Svozilová in her publications (2011a, p. 37) or (2011b, p. 147) applies systems theory to the project life cycle definition, arguing, that there are several project life cycle definitions. Máchal et al. (2015, p. 104) write, that the number and structure of project life cycle phases will vary from project to project, industry to industry, organization to organization. Some projects may only be single-phase, while others may have two or more phases. Another project life cycle typology is presented by Pitra (2008, p. 174), Štefánek (2011), Schwalbe (2011, p. 70), PMBoK (2013), Kerzner (2018), Chapman & Ward (2003) or Jaafari (2000), Wynn (2003) and Kanda (2011) in general for some industries. PMBoK (2013) lists different forms of project life cycle for the military, pharmaceutical and IT industries.

Regardless of the chosen approach, it can be stated, that the project life cycle and project management are, according to Doležal et al. (2009, p. 12) and Jiang & Heiser (2004) based on certain generic principles, which are as follows: *"teamwork, systematic approach, integration and continuous improvement, and quality improvement"*. The project manager should actively use these elements and must be able to apply them correctly depending on the needs of the relevant project phase. Finally, he can significantly influence the final product of the whole project. In general, each subsequent phase is directly dependent on the previous phase. In addition to breakdown the project into phases and establishing responsibilities, it is so important to look at the project from the perspective of the elements that are recommended by the long-term project management to be covered at each phase. The length of the individual phases cannot be generalized.

Each project is individual, and the duration of the phases can vary significantly. At the same time, for selected project types, the duration of the phases can be estimated or adapted to contractual requirements. A typical example are projects financed by the European Union Structural Funds, where the minimum and maximum duration of the implementation phase is

contractually agreed by the Managing Authority or Intermediate Body under the Managing Authority.

Despite the existence of sufficiently valid outputs describing the project life cycle issues mentioned above, there is no comprehensive and uniform theoretical and practical view of the solved issues in the intersection of other aspects of project management and economic-managerial practice. In literature, e.g. Ghaffari et al. (2014) or Oellgaard (2013) and Ng & Walker (2008) and project practice, there is terminological inconsistency that equates the project life cycle and the project management life cycle, emphasizing the fact that the project life cycle is the same for all projects. However, this argument contradicts the basic definition of the project, which is dominated by the emphasis on uniqueness. In addition, in many information sources we found incomplete information about the possibility of applying different project life cycle models and project management life cycles, which in turn is in contradiction with the statement to apply one standardized project life cycle to all types of projects.

We conclude that there is no more comprehensive elaboration of the project life cycle, its types and models in relation to the industrial practice of the Slovak national economy, we therefore identify a large gap between the theory and practice of applying project life cycle types and models as one of the important aspects of project management.

Results

The analysis of educational projects financed by EU Structural Funds allowed us to formulate a set of statements expressing the basic deviations perceived from the perspective of the contractor at selected phases of the project life cycle:

- Statement no. 1: Preparation of the application for financing is a separate project; within the educational project life cycle it can be perceived as a wicked life cycle.
- Statement no. 2: Despite the detailed planning of the activities, their timing is largely dependent on the relevant Managing Authority / Intermediate Body under the Managing Authority, which may cause significant delays in the execution of individual educational project activities and thus significantly affect the overall efficiency of educational project implementation and the life cycle length.
- Statement no. 3: Deviations from the contractually agreed triple imperative are not allowed in the delivery of educational projects financed by EU Structural Funds; these are severely penalized by a reduction in the contribution.
- Statement no. 4: Public procurement, which is a mandatory part of analyzed educational projects, is administratively and time consuming, thus significantly affecting the course of individual phases of the project life cycle.
- Statement no. 5: The composition of the project team is largely determined by the project call, which determines the professional positions in the educational project. Of course, the receiver has the right to assemble the project team exclusively from external sources, but this is not standard. External assistance is used only for specific positions, ensuring the supervision of output quality or positions within the administrative team. In order to run the educational project effectively, experience and knowledge of the relevant operational program / implementation of educational projects from the Structural Funds is necessary. Internal capacities without the necessary knowledge and motivation can demotivate the project and the entire project team and guide them in the wrong direction.
- Statement no. 6: In analyzed educational projects, the idea is adapted to the announced call.
- Statement no. 7: The project life cycle of analyzed educational projects can be generalized in relation to the priority axis.
- Statement no. 8: Analyzed educational projects do not have the option of choosing the form of delivery waterfall vs. agile.
- Statement no. 9: For analyzed educational projects, the only award criterion is price.
- Statement no. 10: The fundamental deviation is in the view of the educational project life cycle by the contractor - the project life cycle from the contractor's perspective is only a part of the whole project life cycle, which is determined by the contracting party.

Based on the respondents' answers, we ruled out statement no. 8, the average of which exceeded the set reference limit of 2.0 and indicated possible disagreement of respondents. On the contrary, the applicants' replies to the arguments of 1,3,4,7 and 10, where we see the highest match (i.e. average of responses in the interval <1; 1.5>) will be prioritized in the formulation of recommendations.

In the context of IPMA ICB project lifecycle phases definition, we have visualized the educational project life cycle for analyzed projects in a schematic (see Table 1). The scheme contains basic activities from the perspective of the client and areas of contractor's participation in them. The two activities, in more detail, represent the worn partial life cycles within the overall life cycle of the educational project. Otherwise, the involvement of an external company is also possible in all other activities.

In a more detailed comparison of the content requirements and expected outputs according to the IPMA ICB, in a total of 11 statements, we identified significant deviations in up to 9 of them. The deviations in the outputs are relevant for each phase of the educational project life cycle. See Table 2 for details.

Table 1. Average life cycle of the analyzed educational projects financed from European Union Structural Funds

SUBMITTER	**Pre-project phase** • Idea • Feasibility study • **Preparing an application for a non-refundable financial contribution (A)**	**Implementation phase** • Implementation according to the application form • **Procurement (B)** • Reporting	**Post-implementation phase** • Termination • Reporting
SUPPLIER A	**Pre-project phase** • Internal / external project preparation management	**Implementation phase** • Preparation of the project application form	**Post-implementation phase** • Application form evaluation
SUPPLIER B	**Pre-project phase** • Familiarization with the delivery according to the tender	**Implementation phase** • Delivery according to the tender	**Post-implementation phase** • Delivery of outputs

Table 2. Comparison of life cycle of the project financed by EU Structural Funds with the ICB IPMA Competence Baseline

Phase	Stage	Output	Similarities	Differences	Comments
Pre-project	-	Topic		yes	the theme is often based on the call, i.e. it is a secondary project idea
	-	Opportunity study		yes	to a limited extent, SWOT is part of the application form
	-	Feasibility study		yes	to a limited extent, the core points are part of the application form
Implementation	Start	Project charter		yes	not prepared, selected documents are prepared particularly
	Start	Log frame		yes	to some extent, the description is contained in the Project Description, but without any methodological instruction documents are still being prepared in the pre-project phase
	Preparation/ planning	WBS		yes	the project budget includes a breakdown of activities and sub-activities, which are primarily broken down by accounting classification of items the budget is still being prepared in the pre-project phase
	Preparation/ planning	Implementation plan		yes	is not a mandatory part, the project manager prepares the plan separately for his needs
	Preparation/ planning	Timetable		yes	only the timetable for the implementation of the activities is to be sent without any details the project manager prepares the schedule separately for his needs
	Realization	Reporting	yes		the Managing Authority / Intermediate Body under the Managing Authority expects three types of reports, but these are insufficient for project management and it is necessary for the project manager to have separate records
	Finalization	Final report	yes		the structure of the final report is given by the position of the Managing Authority / Intermediate Body under the Managing Authority, it is primarily based on the three-imperative and values of indicators in the contract

Post-implementation	Feed-back	Independent evaluation		yes	it is not implemented at all

The greatest determinant of discrepancies is mandatory EU / national documentation, strictly prescribing the content and form of documents abstracting several important aspects. These, as they are not mandatory, are not prepared by applicants on their own initiative.

Conclusion

From the point of view of prioritized verified statements (with an average of less than 1.5), we can recommend: The area of educational projects financed by the EU Structural Funds requires project management adapted to the specific life cycle specifications of these projects. Despite their possible standardization, we recommend not underestimating the preparation of the necessary documents and paying maximum attention to implementation. Already in the pre-project phase during which the application form is being prepared, we recommend including at least the level of consultation in the process. Preparation of the application form is a complex activity requiring interaction with a dedicated person by the applicant, preparation of the budget and the application itself. It can therefore be understood, and it is necessary to treat it and similar activities as a separate project. A well-prepared application form, processed according to the requirements of the call and according to the applicant's wishes, will consequently simplify the whole process of educational project implementation and related public procurement. The possibilities of procurement are set already during the preparation of the application form, when it is possible to prepare a preliminary schedule of public procurement on a monthly basis without specifying more precise dates. After confirming the exact budget of the educational project based on the evaluation of the project application by the Managing Authority / Intermediate Body under the Managing Authority, the receiver will only adjust the prepared timetable for categories not recognized in the evaluation of the application. The proposed approach will significantly streamline the implementation phase of the educational project, as it will shift the time for preparing public procurement from the implementation phase to the pre-project phase.

One of the most important areas of project management in analyzed educational projects is the minimization of project triple imperative variations, contractually agreed between the Managing Authority / Intermediate Body under the Managing Authority and the receiver. We recommend to the project (and financial) manager to create detailed records to monitor the progress and current status of the educational project. These are not required by the aid provider, but the application of the basic principles of project management from private to public projects eliminates possible fines and reduction of the contribution to the receiver in the final settlement of the project.

There is no doubt about the topicality of the life cycle of the project, which is being examined by many domestic and foreign authors, e.i. Doležal et al. (2009) or Štefánek (2011) and Kerner (2018) or Pinto & Prescott (1088) and the continual development of opinions on it. It is a part of our private and professional lives due to the realization of projects in both spheres, but there is no clear approach to the division of the project life cycle into phases together with an exact definition of their content. Therefore, in the theoretical part we tried to approach the most well-known approaches of individual methodologies, standards and norms.

The essential was to evaluate the life cycle of educational projects financed from the European Union Structural Funds and to propose recommendations primarily aimed at improving project management from the perspective of contractor entering the projects. To achieve this, we have defined three sub-objectives and one related assumption. The focus was on the identification of life cycle patterns in their individual phases broken down by type of educational project financing, i.e. from the EU Structural Funds.

An important aspect was the perspective of the contractor involved in a certain part of the life cycle in analyzed educational projects, which may not fully correspond to the whole project life cycle. Comparing the findings of the life cycle analysis of the educational project financed from the EU Structural Funds to the chosen IMPA ICB in context with specified and verified statements enabled us to formulate recommendations aimed at improving project management. We believe that full implementation of the IPMA ICB will help eliminate potential risks and project variations, or, at the outset, set assumptions and limitations to ensure that key stakeholders are aware of them.

By its focus and timeliness, the paper brings impetus for further research in the given area, as it can be divided into parts, which can be also dealt separately. We believe that its content will also contribute to the knowledge of project management on a practical level, as it synthesizes the knowledge from the implementation of several projects.

References

A Guide To The Project Management Body Of Knowledge (PMBoK Guide). (2013). Newtown Square, Pa.: Project Management Institute. http://app.knovel.com/hotlink/toc/id:kpGPMBKPM1/guide_

to_the_project_management_body_of_knowledge_pmbok_guide_5th_edition.
Archibald, R. D., Di Filippo, I., & Di Filippo, D. (2012). The six-phase comprehensive project life cycle model including the project incubation/feasibility phase and the post-project evaluation phase. PM World Journal, 1(5), 1-40.
Basl, J., Glasl, V. & Tůma, M. (2002). Modelování A Optimalizace Podnikových Procesů. Plzeň: Západočeská univerzita v Plzni.
Chapman, C. B., & Ward, S. (2003). Project Risk Management: Processes, Techniques And Insights. 2nd ed. Chichester: John Wiley.
ČSN ISO 21500 (010345) Návod K Managementu Projektu. (2013). Praha: Úřad pro technickou normalizaci, metrologii a státní zkušebnictví.
Doležal, Jan, Pavel Máchal, & Branislav Lacko. (2009). Projektový Management Podle IPMA. Expert. Praha: Grada.
Ghaffari, M., Sheikhahmadi, F., & Safakish, G. (2014). Modeling and risk analysis of virtual project team through project life cycle with fuzzy approach. Computers & Industrial Engineering, 72, 98-105.
Jaafari, A. (2000). Life-cycle project management: A proposed theoretical model for development and implementation of capital projects. Project management journal, 31(1), 44-52.
Jiang, B., & Heiser, D. R. (2004). The eye diagram: A new perspective on the project life cycle. Journal of education for Business, 80(1), 10-16.
Kanda, A. (2011). Project management: a life cycle approach, New Delhi: PHI Learning.
Kerzner, H. (2018). Project Management Best Practices: Achieving Global Excellence. Fourth edition. Hoboken: Wiley.
Khang, D. B., & Moe, T. L. (2008). Success criteria and factors for international development projects: A life-cycle-based framework. Project Management Journal, 39(1), 72-84.
Kloppenborg, T. J., & Petrick, J. A. (1999). Leadership in project life cycle and team character development. Project Management Journal, 30(2), 8-13.
Korecký, M., & Trkovský, V. (2011). Management Rizik Projektů: Se Zaměřením Na Projekty V Průmyslových Podnicích. Expert. Praha: Grada.
Labuschagne, C., & Brent, A. C. (2005). Sustainable project life cycle management: the need to integrate life cycles in the manufacturing sector. International Journal of Project Management, 23(2), 159-168.
Máchal, P., Ondrouchová, M., & Presová, R. (2015). Světové Standardy Projektového Řízení: Pro Malé A Střední Firmy : Ipma, Pmi, Prince2. Manažer. Praha: Grada.
Ng, C. H., & Walker, D. H. (2008). A study of project management leadership styles across life cycle stages of an IT project in Hong Kong. International Journal of Managing Projects in Business, 1(3), 404-427.
Oellgaard, M. J. (2013). The performance of a project life cycle methodology in practice. Project Management Journal, 44(4), 65-83.
Patanakul, P., Iewwongcharoen, B., & Milosevic, D. (2010). An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success. Journal of General management, 35(3), 41-66.
Petráková, Z. Projektové riadenie – nástroj zvyšovania efektívnosti stavebných projektov. Last modified (2019). http://www.vutium.vutbr.cz/tituly/pdf/ukazka/978-80-214-3786-9.pdf>
Pinto, J. K., & Mantel, S. J. (1990). The causes of project failure. IEEE transactions on engineering management, 37(4), 269-276.
Pinto, J. K., & Prescott, J. E. (1988). Variations in critical success factors over the stages in the project life cycle. Journal of management, 14(1), 5-18.
Pitaš, J. (2018). Národní Standard Kompetencí Projektového Řízení. V Brně: VUT v Brně ve spolupráci s SPŘ.
Pitra, Z. (2008). Podnikový Management. Vzdělávání Účetních V ČR. Učebnice. Praha: ASPI.
Sargent, R. G., Nance, R. E., Overstreet, C. M., Robinson, S., & Talbot, J. (2006, December). The simulation project life-cycle: models and realities. In Proceedings of the 2006 Winter Simulation Conference (pp. 863-871). IEEE.
Schwalbe, K. (2011). Managing Information Technology Projects. Rev. 6th ed. International Edition. Boston: Course Technology/Cengage Learning.
Štefánek, R. (2011). Projektové řízení pro začátečníky, Brno: Computer Press.
Svozilová, A. (2011b). Zlepšování Podnikových Procesů. Expert. Praha: Grada.
Svozilová, A., (2011a). Projektový management 2., Praha: Grada.
Thomson, C. S., El-Haram, M. A., & Emmanuel, R. (2011). Mapping sustainability assessment with the project life cycle. In Proceedings of the Institution of Civil Engineers-Engineering Sustainability (Vol. 164, No. 2, pp. 143-157). Thomas Telford Ltd.
Westland, J. (2007). The Project Management Life Cycle: A Complete Step-by-step Methodology for Initiating Planning Executing and Closing the Project. Kogan Page Publishers.
Wynn, D. E. (2003). Organizational structure of open source projects: A life cycle approach. In Abstract for 7th Annual Conference of the Southern Association for Information Systems, Georgia.

RECEIVED: 3 January 2020 **ACCEPTED: 14 May 2020**

PaedDr. Ing. Kateřina Bočková, Ph.D., MBA, assistant professor, has long been practically dealing with the issue of project management from the position of project manager, but above all in the educational process at universities and in the framework of professional training courses designed for project managers. She is an author of scientific monographs and scholarly books published in the Czech Republic and abroad, researcher and co-researcher of scientific and educational projects, author and co-author of peer-reviewed articles and contributions to WoS and Scopus, as well as other scientific studies and pedagogical outcomes according to professional practice and specialization. Department of Management and Economics. DTI University. Sládkovičova 533/20, 018 41 Dubnica and Váhom, Slovakia, +421 905 972 227, e.-mail: bockova@dti.sk

Doc. PaedDr. Mgr. Gabriela Gabrhelová, PhD., LL.M., MBA, professor, studied at the University of Prešov in Prešov, where she also completed her PhD study program. In her research, teaching and publishing activities she has long been involved in managerial education, adult education pedagogy and managerial competence development. She is the author of many valid

conference and magazine publications, several important monographs. She is a director of DTI University and a board member. She is a professor of pedagogy. DTI University. Sládkovičova 533/20, 018 41 Dubnica and Váhom, Slovakia, +421 905 972 227, e.-mail: gabrhelova@dti.sk.

Doc. PaedDr. Ing. Daniel Lajčin, PhD., LL.M., DBA, professor, graduated from the University of Prešov in Prešov. He is currently the CEO of an international holding company focused on education and information technology. He is Chairman of the Board of Directors of the DTI University in Dubnica nad Váhom and a member of the Scientific Board of the DTI University in Dubnica nad Váhom. He is a university teacher in the field of management and economics. He has a very rich publishing activity in the same field. In his pedagogical, scientific and research publications he focuses on management and economics with an emphasis on innovation management. He is the author and co-author of many monographs, books, textbooks and articles. DTI University. Sládkovičova 533/20, 018 41 Dubnica and Váhom, Slovakia, +421 905 972 227, e.-mail: lajcin@dti.sk