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ARISING NEED OF TEACHERS TO ACTIVELY USE PROJECT MANAGEMENT KNOWLEDGE IN PRACTICE: THE CASE OF THE CZECH REPUBLIC

ABSTRACT. European Union subsidy policy gives schools the possibility to improve their budgets and fund various education development projects. Projects have to be carried out by teachers, which increases the need for education in the field of project management. To increase the efficiency and success rate of education development projects it is possible to use the risk register presented in this paper. This paper is based on a research project undertaken in the Czech Republic between 2012 and 2013. The main objective of the project was to increase the effectiveness of the realization of education development projects in regional education in the Czech Republic. A risk register is great tool to help inexperienced project managers avoid risks regardless of the methodology used for managing the project. This paper presents a risk register created especially for development education projects funded from public finance and which can be used during teachers' education.

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Introduction

During past two decades project management has become one of the most popular management concepts mainly because of its applicability across industries (Whittington *et al.*, 1999; Bryde, 2003; Lenfle, Loch, 2010). Various authors (e.g. Aram, Noble, 1999; Jaafari, 2003; Ives, 2005) agree that a key benefit of project management is its flexibility and ability to deal with complex problems, uncertainty and chaos. Its wide applicability and flexibility, as well as its capacity for quick response and numerous tools and techniques that can be employed during all phases of projects, enabled project management to displace traditional structures such as divisional and functional structures (Kerzner, 2010; Davies *et al.*, 2011).

The Project Management Institute (PMI), one of the top professional associations in the world, identified seven project-intensive industries in which it expects the greatest growth of need of the project manager role. PMI (2013) states that just in those seven industries, between 2010 and 2020, nearly 16 million project managers will be needed worldwide. This

demonstrates that the spread of project management practice has not stopped and that there is the potential for further application of project management across industries.

The continuous spread of project management is connected with a major problem – the project failure rate is high. Studies (Chong, 1993; Zimmerer, Yasin, 1998; e.g. Johnson, 2009; Pfeifer, 2010; Chen, Bozeman, 2012) show that, in general, approximately 7 out of 10 projects fail. Of these failed projects, 60% to 70% are caused by human factors, particularly insufficient leadership by project manager and poor risk management. With the rising number of project-based companies and institutions mentioned proportions of project failures have not been improving. Authors (Winter *et al.*, 2006; Atkinson, 2008; Ojiako *et al.*, 2011; Egginton, 2012) agree that project manager education needs a paradigm shift because the current methods of education no longer reflect needs of the practice.

On the one hand institutions across sectors have become aware of the importance of project management education and training (Winter *et al.*, 2006; Egginton, 2012). On the other hand, institutions doubt the economic effectiveness of investment in employee education and training (McLinden, 1995; Wang, 2003; Lien *et al.*, 2007). The crucial question for institutions is whether project management training would have an impact on project failure rates (Starkweather, Stevenson, 2011). The main focus of project management training on so-called hard skills has been questioned and authors agree on the importance of soft skills in relation to improvement of project failure rates. Another key discipline that is emphasized is project risk management (Pant, Baroudi, 2008; Buganza *et al.*, 2013; Ramazani, Jergeas, 2014).

Risk management should be an integral part of project management. In project management we deal only with pure risk; that is, the risk of not completing the project (Davies, 2006; Tichý, 2006; Smejkal, Rais, 2006; Chapman, Ward, 2007). An enormous number of projects (approximately more than half of unsuccessful projcests) are unsuccessful for reasons given in the appropriate application of risk management to anticipate and solve. As regards the public sector, it is even more pronounced (Pfeifer, 2010; Chen, Bozeman, 2012).

Project risks can be classified as follows. The first division is based on the fact whether the risk arises within the project or company or whether it comes from the environment (Smejkal, Rais, 2006; Tichý, 2006; Kafka, 2009). These risks are further divided into:

- *Internal risks* coming or arising within the project or entity which realizes the project. These risks may be favourably affected by the project manager's appropriate intervention.
- *External risks* coming from the external environment and which the project manager cannot control. These risks may be managed by choosing the appropriate tool. These risks are, for example, exchange rate changes, weather, and crime.

Another division is according to the possibility of the project manager to influence risks (Smejkal, Rais, 2006; Kendrick, 2009). The risks are divided into:

- *Influenceable risks* which the project manager can treat with one of these approaches – prevention, reaction, transfer to a third party – but not the acceptance approach.
- *Non-influenceable risks* which are those that the project manager cannot manage or treat. This group includes a number of risks, such as risks arising from legislation (tax amount, the Act on Procurement Contracts, changes in the evaluation methodology).

There are a number of other options for risk classification by various authors (Mun, 2010; Coleman, 2011; Ambrož, 2011; Ostrom, Wilhelmsen, 2012). For example:

- *according to the particular area* in which the risk arises (ecological, environmental, economic, technological, social, political, legislative, etc.),

- *according to time* (short-term vs. long-term, periodic or sporadic, spasmodic vs. continuous, slowly evolving vs. surprising),
- *according to the relation to business activities* (operational, market, investment, financial, innovative, health),
- *according to the dependence on development* (systematic: affecting the whole economy, and specific: arising only for a particular industry, company or project).

All of the project manager's decisions are subject to certain risks that must be taken into account as shown, for example, by Chelst, Bodily (2000); Amura (2008); and Kull, Talluri (2008). According to our experience the success rate of projects can be increased just by using the risk register that has been created as a result of conducted research and which is introduced in this article.

1. Problem formulation

Lately, the need for project managers has been growing in sectors in which there is no tradition of project management and the roles of employees are accumulated. Knowledge and practical application of project management skills is not usually required from teachers. However, due to development trends in the European Union, teachers are slowly realizing that they need to be able to use project management in practice. In association with European Union grant policy there is a need for teachers' education in the field of project management. The problem is that these projects must be developed and then implemented by the teachers themselves. The cost of hiring a professional project manager is not eligible per the EU subsidy policy. Teachers in project manager positions interviewed during the project are people with great enthusiasm and innovation potential and they have to learn the basics of project management on their own, often only during the work on projects.

In this particular case teachers are involved in both teaching and project activities and they usually have to learn the basics of project management very quickly all by themselves. Teachers are becoming project managers and they have to know how to deal with specific problems of project management and especially how to deal with and manage project risks. The current practice of project management education cannot be applied in this case because there is neither time nor funding for teachers to study university programs focused on project management or to attend special project management courses. The key question in this specific case is *what is the ideal way to educate teachers in the field of project management? Or, what methods should be used to educate teachers in this field?*

An alternative to special project management courses attendance that bridges the gap between the most used current practice and the demand of educational institutions can be broader application of blended learning, web-based learning or school-based teacher learning communities (McLoughlin, Luca, 2002; McLoughlin, Talbert, 2006; Ashleigh *et al.*, 2012).

This paper deals with the efficiency and success rate of education development projects realized by schoolteachers in the role of project managers. There are three basic project management methodologies, PRINCE2 metodology, IPMA (International Project Management Association metodology) and PMBOK (Project Management Body of Knowledge), commonly used in EU. Project managers can receive an internationally recognized certification after passing a course and successful certified exam within these methodologies. The IPMA certification puts the greatest emphasis on the personality of the project manager. PRINCE2 certification emphasises the process of preparation and management of the project; the persons carrying out these activities are not important. PMBOK lies in the middle with a focus on the project manager as well as on processes. At least one school representative should ideally have a certificate in project management because the conditions to get EU grant are being tightened. From the perspective of the

project's realization effectiveness the type of certification is not important since all the mentioned methodologies recommends utilization of some kind of risk register (the risk register is not explicitly defined in methodologies).

The aim of this paper is to present a risk register composed of the risks which occurred during education development projects in the Czech Republic, which can be used as an alternative source for project management practice in educational sector and also can help during teachers' education.

The aim of the conducted research is to identify the primary challenges and risks which the project managers face. An e-learning course focusing on the identified problem areas of educational project management has been the first project output. Providing the information necessary for adjusting the decision-making processes of relevant authorities has been the second major output. The risk register suitable for use in regional development education projects is the main topic of this article and is considered as third major output of the research project.

2. Research methodology

The project was carried out by a group of 13 researchers from the Economics Faculty of the University of West Bohemia in Pilsen. The project was undertaken between 2012 and 2013 in the Czech Republic.

According to the project plan, 9 Czech regions were visited. The goal was to visit at least 100 educational entities and analyse at least 300 different projects with a maximum 3 projects per entity, using semi-structured interviews with responsible project managers (as it turned out, more than 95% were non-professional project managers, namely regular employees – teachers or headmasters). So as to obtain data from 300 projects it was necessary to visit 118 entities. The projects were selected with respect to the possibility of obtaining and identifying maximum information and risks. There were no restrictions related to the selection of projects for analysis.

In terms of financial means (threshold values are set according the Czech legislation):

- 18% of projects were small (below €8,000);
- 19% of projects were medium (between €8,000 and €40,000);
- 63% of projects were large (over €40,000).

There were 175 projects supported by the European Social Funds, 48 projects were EU educational projects called Leonardo and Comenius, 35 projects were supported by local authorities (either the region or town), 28 projects were bilateral projects of educational entities from two countries and 14 were financed in another way(private funding). There were 29 general secondary schools, 83 vocational secondary schools, one primary school and five other educational organizations visited within the project. The sample structure reflects limited number of secondary schools in regions dealing with projects and willing to participate in survey. Primary school and other educational organizations were involved due to their participation within some of the analyzed project. Their responsible personnel were also interviewed to enrich the potential risk list. As can be seen from the information presented, the diversity of the selected sample of projects is considerable. This variety of analysed projects from different entities was intended to identify the widest range of problems which the project managers in regional education could encounter.

Semi-structured interviews were used as the research method for data collection. Responsible personnel were interviewed and a questionnaire prepared on the basis of the methodology of IPMA (2012) was used for gathering the data. The following publications regarding research methodology were used in questionnaire preparation: Gavora (2000);

Chráska (2007); Reichel (2008); Punch (2008); Wiersma, Jurs (2009); Creswell (2009); Creswell, Clark (2011).

The risk register was prepared according to the content analysis method. The main qualitative output of the analysis is a list of risks recorded during the interviews. The number of occurrences of similar risks was selected as the main quantitative unit. Two sources were used for creating the risk register: the questionnaire in which all risks arising in the given project were documented and one of the open questions which each respondent was asked. The question was worded as follows: "What were the biggest (key) problems (3) that you encountered in the preparation, implementation and closing stages of the project?"

An interesting output for comparison and enhancement of the risk register was a risk map that was created in the focus group at the end of the research project. This method is popular in qualitative research and is mostly used in sociology and marketing research. The focus group method is described, for instance, by Hair *et al.* (2000); Mazza & Berre (2007); and Gray (2009); Lamb (2012). In the case of this research, there was a discussion of the project interviewers who had gained large cumulative experience during the interviews with respondents and studies on current projects. Almost all risks mentioned in the focus group were already in the register and there were only few minor improvements in *Table 3*.

Semi-structured interviews turned out to be good tool to gather a large amount of interesting data. The author strongly recommends pilot testing and evaluation of the outputs of semi-structured interviews to provide feedback for adjusting the prepared set of questions. Due to the qualitative nature of the data and slightly different way of asking questions by each interviewer, the analysis and comparison of gathered data was quite a challenging task.

This was the first research project on this scale regarding this topic in the Czech Republic and neighbouring countries and there is no other study to compare results with. This project's results are therefore a valuable source of data for future research in similar areas.

3. Risk register

This part of the paper introduces the risk register created on the basis of the content analysis of the research project data. Such a register may be used as inspirational material in other projects in the education sector where it can at least serve as a checklist of potential risks in the stages of feasibility studies and project planning. Use of the risk register is described, for example, by Pacific (2006); Proske (2008); Merna, Al-thani (2008); Hnilica & Fotr (2009); Dolezal *et al.* (2012) and Januška & Špicar (2015).

For the purpose of this article, the risk register is divided into three parts according to the total number of occurrences of risks in individual projects. Of course, this does not cover all potential risks since each project is unique, but it definitely helps with the identification of common risks encountered by project managers at other schools. Specific risks of each new project need to be assessed individually by a project team.

Risks are divided in the following tables according to the number of occurrences:

- *Critical risks*: occurring in more than twenty projects (*Table 1*).
- *Significant risks*: occurring in more than ten projects (*Table 2*).
- *Common risks*: occurring in at least one project (*Table 3*).

Table 1. Critical risks: occurring in more than twenty projects

Occurrence	Risk	Description
89	The approval procedure of monitoring reports, delayed payment	Long duration of the approval of monitoring or final reports results in delayed funding which causes problems with cash flow.
58	Demanding administration	Administration demands connected with projects are very high. It is necessary to take high personal and time demands of administration into account when planning project.
50	Tenders, preparation, implementation, cost, complexity	Tenders bear enormous risks for the project implementation and the actual achievement of project objectives.
50	Time	A poor assessment of the activity duration, failure to meet the deadlines, delays, changes in terms, etc.
49	Lack of interest of target group	Problems with attendance at the courses, poor choice of target group.
43	Changes in the rules, conditions or methodology during the project	Changes in the program rules, conditions methodology during the project and changes of the project evaluation method during the project.
37	Budget cutbacks	Cuts in funding for the project, disallowing certain expenses.
33	Cash Flow	Problems with cash flow and immediate lack of funds.
27	Staff turnover	Employment contracts expire, maternity leave, retirement, employee leaving, etc.
26	Region clerks (incompetence and frequent changes)	Qualifications and competences of assessors, frequent changes on the position of region clerks. Unwillingness of clerks to decide and take responsibility for the project by accepting the final report. Inability to advise on specific questions, they are escalated to somewhere else, which leads to significant delays.
24	Additional funding	The need to raise funds for items that are not eligible project costs (e.g. material after completing the project).
24	Working with people, communication, teamwork	The authority of the project manager, collaboration within the project team, communication and availability of individual members of the team, etc.
23	Sustainability	Unexpected development, poorly set parameters of sustainability. (e.g. loss of interest of potential students for the study field).

Source: own research.

Table 2. Significant risks: occurring in more than ten projects

Occurrence	Risk	Description
1	*2*	*3*
18	Employee motivation	Low interest by employees in participating in the projects. Failure to comply with the terms, failure to complete the assigned tasks.
17	Unexpected costs	Necessary expenses are not foreseen in the project budget (extra work, unfavourable prices, and exchange rates).
15	Financing in advance	The need to obtain sufficient funds to finance the project in advance. Projects are paid by the contracting authority after the acceptance of monitoring or final reports.

1	*2*	*3*
15	Poor communication with the regional office	Problems with communication, long reaction time of regional office, differences in interpretation, inconsistent terminology.
14	Employees overload	Employees are overloaded; they already have a full-time employment contract. Project work vs. teaching work ratio. Maximum full-time contract is 12 hours for teaching and 8 hours for project administration.
14	Formal errors in the projects	Formal errors in the projects, failure to meet formal requirements results in significant problem with approval of monitoring report and delayed payment. (e.g. poor following of graphical or general manual)
14	Language barrier	Bad choice of language for communication in the project, problems with communication with foreign partners.
14	Lack of discipline of project partners	Cooperating partners fail to fulfil their obligations (e.g. a private company went bankrupt).
14	Different perceptions from the perspective of authority and the applicant (unclear criteria)	Unclear interpretation of the criteria between the contracting authority and the applicant results in failure to meet the authority demands; cuts in funds, disallowance of costs and outputs.
12	Insufficient funds for salaries	Inability to finance, for example, the project manager position from project funds.
11	Non-relevant formalities	Too much emphasis is put on irrelevant formalities in the project documentation.
10	Ratio of soft / hard money (projects)	Necessity to keep a percentage ratio in project finance. E.g. 17% of the budget can be used for investment. Both types of money cannot be drawn at the same time. Investments should be made more at the beginning of project. If all the money is not fully drawn, this criterion may not be met.
10	Insufficient quality of human resources	Lack of skilled employees who are able to handle the work required.

Source: own research.

Table 3. Common risks: the presence in at least one project

Occurrence	Risk	Description
1	*2*	*3*
9	Fulfilling monitoring indicators	Ill-defined monitoring indicators and problems with fulfilling them.
9	Poorly written and complicated manuals	Guides are confusing and do not explain clearly and concisely the desired theme. Complexity of formal specifications.
8	Vocabulary (terminology)	The need to use single terminology in the project and in monitoring and final reports.
8	Illness	Short-term loss of a key employee, substitutability of employees.
8	Time pressure, limited time for regional projects, changes in project schedule	Short term for a detailed project preparation. Projects should be announced more in advance.
8	Overvaluation or errors in budget	A poorly prepared project plan and therefore mistakes and inaccuracies in the project budget.

1	2	3
7	Monitoring reports	Time expenditure and material intensity of compiling monitoring or final reports.
7	Inconsistency of evaluators	Evaluators of the same project hold diametrically opposite views.
6	Logos, colours, graphics	Inspections of quality, colour, logotypes size.
6	Accrual of indirect costs	Problems with using indirect costs.
6	Legislative assault on the project	Legislative assault on the project, investigation and subsequent delays of the project.
5	Project termination	At the time when the projects ends, the account balance must be 0. But after this time there are a number of following activities bringing extra costs.
5	Changes in legislation (e.g. VAT)	Legislative changes that significantly affect the project and it is not possible to expect them in advance or prepare for them in advance.
5	Defining responsibilities, powers, authority	The problems associated with a lack of authority, competence or responsibilities of project management.
5	Tightening up legislative requirements by regions	Legislative requirements of the region are unfoundedly tightened up (e.g. limits for tenders).
4	Benefit software	It is very difficult to work with the Benefit software.
4	Failure to spend the whole budget	Budgets in projects are divided into chapters with strict percentage ratio and if the whole budget is not spent, there is a problem with not meeting the ratio.

4. Discussion and research limitations

Majority of analyzed projects (74%) were funded from EU funds, therefore financial risk are primarily connected with EU funding policies. This limits the risk register more significantly to EU public funded projects implemented by public entity (school). Research project took place in Czech Republic therefore there can be impression that introduced risk register reflects mainly the risks project managers face in Czech Republic. This implication can be applied only to a few identified risk connected directly with Czech legislation and environment (e.g. Tenders, Benefit software, Changes in legislation and VAT). Majority of identified risks in risk register can arise in any education development project regardless country (assuming EU region but mostly Visegrad countries where the school systems are similar and where schools deal with comparable projects and new countries joining the EU where the situation from the viewpoint of school teachers and their involvement in educational projects may be similar). Significant limitation of presented research is in environment for managing subsidies and public funds in Czech Republic which can differ from other countries. Clerks at regional level (NUTS II) are responsible for project control and funds distribution for secondary schools (primary schools are managed at municipality level and universities are managed at state level). Number of risks is connected with this arrangement like:

- The approval procedure of monitoring reports, delayed payment.
- Region clerks (incompetence and frequent changes).
- Poor communication with the regional office.
- Different perceptions from the perspective of authority and the applicant (unclear criteria).
- Non-relevant formalities.
- Poorly written and complicated manuals.
- Time pressure, limited time for regional projects, changes in project schedule.

- Inconsistency of evaluators.
- Tightening up legislative requirements by regions.

A wide range of projects was selected with respect to the possibility of obtaining maximum information. There were no restrictions related to the selection of projects for analysis. The goal of the research was to identify the maximum number of possible risks that project managers can encounter.

Each project is unique and project managers need to consider all possible risks regarding the specific project. The presented risk register should in this case serve as a check sheet or inspiration for project managers to identify all common general risks connected with education development projects. Also, the risk register should help teachers in the role of project manager to facilitate the project management learning process.

According our findings, EU educational projects called Leonardo and Comenius are safest type of projects from unexpected risk point of view and they experience lowest number of risk among all other projects. Projects with private funding are also relatively safe projects because they avoid all risk connected with public funding and public control.

Within the group of projects with public funding there are no big differences between possible risks regarding the scale of the project except of the risk – Tenders, preparation, implementation, cost, complexity. Small projects under 8000 EUR does not face this risk due to the fact that according Czech legislation the threshold for public tender is 200.000 CZK which is approximately 8000 EUR. Cash flow risk is also not that important within the small projects.

According our findings, project managers can mostly influence the success rate of the project by close communication with authorities. A second large group of risks emerges from the personnel area. Project managers should ensure that the project does not rely on one key person and that there is at least limited substitutability in the team.

Last and most important from our point of view is project planning. There is huge gap in proper project planning due to the fact that teachers are not professional project managers and tend to manage the projects and risks on ad hoc basis. Managing a project without proper planning can be compared to sliding down the rapids without a life jacket or raft. You are in cold water, disoriented and hitting the rocks. The probability that you can overcome the rapids without any harm is very low. With a project plan we can imagine same situation with raft and paddle. The task is still very challenging but at least you can see few steps ahead and you can change the direction you are heading. There is still no guarantee of success but the chances are significantly higher. The 5 years sustainability showed itself as a huge insolvable problem in case that the sustainability parameters are poorly defined in the project plan. It is extremely difficult to estimate results in 8 years horizon (3 years of project and 5 years after project closure). Long term projects are of course also more vulnerable by personal risks.

The potential of using the risk register during teachers' education in project management is enormous because teachers in the project manager role can easily face the risks summarized in the register. Thanks to the risk register, teachers can prepare for potential risks and prevent their occurrence.

Conclusion

In the Czech Republic and other countries, teachers are forced to carry out the role of project manager in smaller-scale projects at their schools. The position of project manager of education development project is not full-time position and schools cannot afford to hire a professional project manager, leaving the responsible teacher in the role. This fact raises a huge need for teachers to obtain at least basic knowledge about project management. In the presented research project one of the goals was to create a risk register that would summarize

real risks that occurred during education development projects in the Czech Republic. An e-learning course on project management targeted at teachers and a monograph about this topic were other outcomes of the project (Eger *et al.*, 2013).

One way how to increase the success rate of projects is by using a risk register. The risk register is valuable for all members of the team developing projects in the education sector, primarily in the EU, but it can be used as the inspiration for planning any education development project. This is the first research project on this topic in the Czech Republic.

Teachers' education in the field of project management has become a key topic in the Czech Republic. The possible ways of education have been questioned because of the long timeframe of education courses or a lack of funding that can be allocated in teachers' education. The risk register was created as a tool that can be used when the teacher (project manager) has no knowledge of project management and no time for an education course. The risk register also can be used as a list of potential risks that can occur during the project. It gives the project manager time to prepare possible arrangements that would be applied if the risk actually came to pass.

Based on the research, it was found out that risks are not addressed in the plan of many projects but only dealt with when they occur. For example, Kendrick (2009) lists a number of arguments of project managers as to why they avoid planning. If, however, the project managers are aware of all potential risks, they will be able to eliminate many of them already in the planning stage of the project. This will lead to the significant increase of the success rate and effectiveness of implemented projects. The introduced risk register should therefore serve managers planning the project as the inspiration or a checklist of risks which they may encounter.

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