AGILE PROJECT MANAGEMENT AS ONE OF THE CRITICAL SUCCESS FACTORS IN PROJECT RISK MANAGEMENT IN MACHINERY INDUSTRY IN SLOVAKIA

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Abstract: The essential of presented paper is to state that using agile methods as a part of project risk management in Slovak machinery companies in Dubnica and Váhom would increase the chance of project success. Presented paper is divided into two sections which are the theoretical and practical parts. The theoretical part is based on the analysis of relevant information sources in the area of risk management, especially in the context of agile methods. After that, the practical part of the research will structure as follow: The introduction chapter will represent obvious project management process in the analyzed companies. The analysis of own experience was used to process this part. Then the survey results and analysis chapter will present our findings during the face to face interviews with the 25 project managers in 5 machinery companies in Dubnica and Váhom and will analyze these findings. By the knowledge that is going to be obtained throughout these chapters, we are going to end up with the recommendations for the companies.

Key words: Project management, risk management, agile methods, machinery, Slovakia.

JEL Classification: L64, M53, O22

1. Introduction

Imagine it’s late after midnight and your car is the only one left in the parking lot. It’s there because you’re still in the office in the dark and a light beam reflects on your face, shoulders slumped, palm pressed to your forehead, deep in thought. Even though it sounds like a mysterious scene from a David Lynch movie, it summarizes the life of a project manager. Then let’s continue with the story: You’re in the middle of a project, consumed with worry, and the fact, that you’ve barely seen your bed in the past week, is one indication that things aren’t going so well. Your project is a little bit out of control; you’re not sure you’ll make your deadline. Too many loose ends still need to be pinned down. Moreover, your boss has expressed reservations about how things are going. You feel isolated, the clock is ticking and you’re uncertain about what to do next.

This out-of-control project scenario plays out often in companies large and small as well. Halfway into a project, risks, that should have been apparent, start emerging. Some typical pitfalls include e.g. higher than expected risk, variable scope, need for status reports, inadequate planning, inadequate administration, poor team organization, communication problem in the team, cost problem implementing phase, countering resistance to change (Nokes, Kelly, 2007).

These pitfalls require companies to be better prepared for the risks in their projects. Even though, companies have been trying to be better prepared for the external risks in the projects recently through trying to improve the traditional project risk management methods that they have been using before, but this change was not very successful, more radical changes is definitely needed. On the other hand, agile as a concept, has been influencing risk management methods, which
makes the project managers, project management teams and project management methods more flexible during last years all over the project management world. When traditional methods focus on one variable in a system and hold the other variables constant, agile methods take everything into consideration as variables in the projects. Especially, sprint concept, which is based on the system of iterations throughout the project life cycle and so the project risk management life cycle is a common concept, that is used as part of agile methodology on the projects.

Agile methods are important because we are not living in an environment that everything is stable. Higher instability means higher number of factors with uncertainty and higher risk in the companies just like everything else in life. This introduces us to the concept of risk in the businesses and projects.

Basile (1990) defines business risk as “a course of action or inaction taken under conditions of uncertainty, which exposes one to possible loss in order to reach a desired outcome” and adds, that decision makers usually have three different ways to deal with the risk: obtaining further information; securing control of factors, that may determine outcome; and reducing the impact of any negative consequences by sharing the risk (Basile, 1990).

Motivated by the information which was mentioned above, the goal of presented paper is to state, that using agile methods as a part of project risk management in Slovak machinery companies in Dubnica and Váhom would increase the chance of project success.

1.1. Material and Methods

Our research questions and sub-research questions to be used in presented paper are as follow:

RQ 1: Are the risk management methods in analyzed companies agile project management methods oriented?
RQ 2: What are the external risks in analyzed companies that affected the projects recently?
RQ 3: Are the project risk management methods enough to prevent or minimize the effect of external risks on the projects in analyzed companies?
RQ 4: How can project risk management be improved through agile methods in analyzed companies?

In order to answer those questions, some research methods were needed to collect data. Also, there were used some analysis techniques to analyze the data.

Presented paper is going to be divided into two sections which are the theoretical and practical parts. The theoretical part is based on the analysis of relevant information sources in the area of risk management, especially in the context of agile methods. After that, the practical part of the research will be structured as follow:

- The introduction chapter will present obvious project management process in the analyzed companies. The analysis of own experience was used to process this part.
- The survey results and analysis chapter will present our findings during the face to face interviews with the 25 project managers in 5 machinery companies in Dubnica and Váhom and will analyze these findings.
By the knowledge that is going to be obtained throughout these chapters, we are going to end up with the recommendations for the companies’ subsidiary.

To be able to schedule the meetings, we used the internal meeting scheduling software in the companies. Every meeting is going to be scheduled with an hour duration. The software also allows to attach the documents (such as Microsoft Office documents) to the invitation e-mail that will be sent. Therefore, the questions will be sent to every project manager 2 days before the scheduled meeting in an attached Wordfile. We took the advantage of knowing project managers personally.

All questions asked to project managers were formulated in the context to evaluate the research question RQ1, RQ2 and RQ3 as follows:

1. What is the life-cycle of the project risks management in company?
2. What are the practices applied for every different phase of project risk management life-cycle?
3. Is there a flexible or strict schedule during the project risk life-cycle management?
4. What are the consequences of project delay?
5. Have you ever heard about the concept of iteration in a project?
   a. If yes, how are they used in the company?
6. What is the frequency of project team meetings?
7. What is the general schedule (to do list) of project team meetings?
   a. What are the practices used and how they are used during a meeting?
8. Are there any special practices to detect the project risks and possible issues?
9. Do you have a special meeting in the end of a project to detect lessons learned during the project?
10. Are there any special training programs for the project team members?
   a. If yes, what are the practices that are applied for education of risk management methods on the project?

Because our second research question is looking for the external risks that have affected the projects in the company recently, we decided to use a PEST analysis as a background to the questions to be asked to the project managers.

According to that, question to be asked to the project managers to answer our second research question, is as follow:

1. Projects of your company are running with the foreign countries and it is an known fact, that this kind of projects have more external risks. Can you, please, explain the external risks/issues (categorized by political, economic, social, technological risks/issues) that has affected your projects that you have worked/ have been working on?

Questions to be asked to the project managers to answer our third research question, are as follow:
1. You have explained us the methods you have been using during the life-cycle of project risk management and also the external risks that you have face with for the last time. Was the project, that was exposed to the mentioned external risk, successfully completed?

   a. If no (in case of delay or fail), what was/were the reason(s) of it?

Finally, we answered our fourth research question through the survey results and analysis made for the previous three research and one sub-research question and we demonstrated these ideas under the “Recommendations” part of this paper.

2. Project Risk Management

You step out of your office for lunch and approach the curb. Before you cross the street, you look to the left and right. Then you proceed. This routine activity is an example of risk management. While checking for traffic doesn’t guarantee you will safely reach the other side of the street, it greatly improves your chances. However, you have one chance to use to cross the street and it should be done in the best way possible after all. Kendrick (2009) emphasizes this chance by stating that “When managing a project, you get one chance to get it right.”

When applying risk management principles to an upcoming project, it is critical to understand, that risk management is something people do every day, whether by fastening their seat belt or checking the rear-view mirror twice before they change lanes. Risk is part of life and managing risk is a part of a reasonable life. As people delve into the intricacies of risk management, it’s occasionally useful to return to this starting point: risk management may appear complex, but it’s an element of daily routine (Bočková et al., 2019, Štefánek & Hrazdílová Bočková, 2012).

Managing the risk involved in a major project, however, is an issue of an entirely different scale. Every project has risk, but human nature tends to avoid looking at risk and to focus on goals, such as completing the project. There is only one opportunity to get a project right, yet newspapers daily offer many examples of overruns, setbacks, delays and even projects, those grind to a halt until problems can be solved. These reports suggest, that proper risk management planning is not always the normal course of business. Another thing to think about in this case, whether the characteristic of the risk defined involves internal or external features (Betáková & Dvorský, 2016).

Risk is definable in many ways. It can be tried to be defined in terms of the possibility of bad events. Also, it can be taken as an approach of decision making by using the probability of good and bad outcomes (Damodaran, 2007). Similarly, risk can be defined as “the chance of loss or an unfavorable outcome associated with an action. Uncertainty is not knowing what will happen in the future. The greater the uncertainty, the greater the risk” (Crane et al., 2013, Stamatis, 2017).

Related to the definition of risk, it is necessary to obtain, what the risk management is. There is a consensus about the definition of risk management. For instance, Hubbard (2009) or Hillson (2009) defines risk management as “the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities”. In a similar manner, Kendrick (2009) or Wideman (1992) and Chapman & Ward (2003) emphasize the importance of risk management by stating that “The strength of risk management lies in being able to think ahead about all of the things that could possibly go...
Risks must be defined and analyzed in the project selection phase and during the whole project lifecycle to be able to address changing conditions and project priorities. As new risks are identified, strategies and plans must be developed to address them. It is needed to be developed different strategies and plans as different kind of risks identified throughout the project (Buttrick, 2009).

2.1. Classification of Project Risks

In project management, there is usually a tendency to classify the risks into two different groups: external and internal risks. The understanding of the internal and external risks in project management is a necessary part of the project plan. Internal risks are easier to identify and manage while external risks are more elusive. Also, there is a general feeling that risk management should be a part of the project management in the early stages of the projects for both, internal and external risks (Mulcahy, 2003). Alquier et al. (2000) and Buttrick (2009) classify the risks as external and internal risks as well.

When looking internally, risks to the project may involve the financial solvency of the company, the ability for the company to have required equipment and other resources on hand in time to support the project. Personnel issues such as the sickness or unanticipated termination of a key team member also can be considered as internal risks to the project (Alquier et al., 2000), (Kendrick, 2009). Internal risks can also involve infrastructure problems such as the availability of servers, software, and IT support as well as more elementary ingredients such as the supply of electricity to team members. Obviously, the volatility of essential infrastructures will vary depending on the location of the team, so it may or may not warrant consideration during the risk assessment process (Buttrick, 2009), (Schuyler, 2001).

External risks are outside the control of the project team and its host organization. Because of this, external risks are generally more difficult to predict and control. Factors such as a key vendor going bankrupt, economic upheaval, wars, crime, and other events may directly impact the project's effectiveness (Alquier et al. 2000).

Buttrick (2009) also adds that some risks may be difficult to foresee and gives some examples related to that such as a mine in a foreign country providing essential elements for the project being taken over by a revolutionary government. This kind of event directly threatens the project, but often takes project managers by surprise because of a deficient analysis of external threats. Also, Buttrick (2009) defines the project risk analysis and management as “a continuous process that can be started at almost any stage in life-cycle of a project”. Correlatively, Alquier et al. (2000) or Mulcahy (2003) emphasize, that the final performance of the project depends primarily on risk analysis and management a “risk driven approach is necessary” especially during the early phase of the project life cycle. They also state, that there are two type of risks on the brink of external and internal; besides, they add that the integration between the external and internal risks are important, as well.

2.2. Life Cycle of Project Risk

Since project risk management is an iterative process, it must be going through the process routinely for ensuring about the identification and addressing every single new risk. For instance,
PMBOK (2013) defines the process of project risk management which includes conducting risk management planning, identification, analysis, responses, and monitoring and control on a project; most of these processes are updated throughout the project. In the same way, Newton (2008) states, that “managing project risk deals with the activities involved in identifying potential risks, assessing and analyzing them, finally monitoring them throughout the life of a project”.

Similarly, Weiss& Wysocki (1992) also state, that fundamental risk management steps during the project life-cycle start with identifying the risks and opportunities.

Doležal et. al. (2012), on the other hand, define the phases of project risk life-cycle as follow:

1. Identify and assess risks and opportunities.
2. Develop a risk and opportunity response plan and have it approved and communicated.
3. Update the different project plans affected by the approved risks and opportunities response plan.
4. Assess the probability of attaining time and cost objectives and keep doing it during the project.
5. Continuously identify new risks, reassess risks, plan responses and modify the project plan.
6. Control the risk and opportunity response plan.
7. Document lessons learnt and apply to future projects; update risk identification tools.

Besides, according to Máchal et. al, (2017), risk management is a ongoing process taking place during all phases of the project life-cycle, from initial idea to project close-out. At project close-out the lessons learnt in risk management throughout the project are an important contribution to the success of future projects. Even though Newton (2008) has the idea to use similar project life-cycle as Weiss & Wysocki (1992) used, he states, that different projects have different sort of risks since every project has its unique features related to the nature of the work, that will be done, and therefore, it is often up to the project manager to outline these risks ahead of time and include them as part of the overall plan of project. In order to do that, a project manager should be ready to identify the risks first and may be dealing with all of them at the same time.

Many authors address the issue of risk management and the life-cycle of project risk management, for example, Kendrick (2009), Weiss & Wysocki (1992), Norris et al. (1992), Benjamin (2017), Pritchard (2015) and Hillson (2009) or Buttrick (2009) and within a synthesis of their treatises, we can generalize the steps of project risk management as follows:

- **Phase 1: Risk Identification.**
- **Phase 2: Risk Analysis.**
- **Phase 3: Planning.**
- **Phase 4: Monitoring (Tracking and Controlling) Risk.**
- **Phase 5: Reaction to Risk.**
3. Project Management in Analysed Companies

Analyzed companies are working on the projects which provide support to the customers and other subsidiaries in all around Europe, Middle East and India. Knowledge (or in other words in the company, transition) transfer projects are the most important ones among them. These projects are sometimes parts of the bigger projects which were usually started in different countries but not in Slovakia.

Responded project managers are working between the sending side and the receiving side to provide communication between stakeholders (Project Executive, Delivery, Service Integration Leader, Sending First Line Manager, Receiving First Line Manager, Lead Project Manager, other project team members), prepare the documentation (including preparing the documentation which is related to planning, define the risks). Sending side (IMT-CUSTOMER) is represented by the Project Executive, Delivery Project Executive, Service Integration Leader, and First Line Manager. On the other hand, receiving side (DC) is represented by the First Line (Receiving) Manager and Team Leader of the first line manager. These project managers are responsible to provide communication between the sides, prepare the documentation and manage and track the projects with the help of their team members and the lead project manager.

According to the Figure 1, the project life cycle starts with Planning and continues with Execution and Controlling and finally ends with Closing. It would be necessary to define some document names (what they stand for) and the purpose and the way to use them at this point:

- PDR (Project Definition Report): Provides information about the scope and plan of the project.

- CBC (Cross Border Checklist): The internal web-page that defines the information about the project such as the features of the role, the candidate, risks, financial data and most importantly, it contains scan of the documents that are signed by the customer - which is also called customer consent.

- Cutover Checklist: The last document that reviews the actions that were made during the knowledge transfer projects (needs approval from the first line managers).

- DPEs are the people who are responsible for the budget of the projects and can be participated to contribute the process of preparation the appropriate ways of risk mitigation plan. Even though DPEs more likely focus on the budget and financial reports, they also work directly as the representatives’ company with the clients. However, they are responsible for the budgeting of transition projects. In the case that the transition projects are part of other big projects, there are also some people who are responsible from the financing of the different parts of the projects.

- SIL is the person who is the right hand of DPE and helps him to proceed with the projects.

Figure 1
Every project team consists approximately of four project managers and one lead project manager who manages those four managers. Also, there is a first-line manager who is responsible for the project team(s). First-line managers may be responsible for more than one project team. However, a first-line manager is not involved in the project-life cycle directly. He is responsible for collecting data about the completed projects, to analyze them, to prepare statistics and reporting them. He is also responsible for the escalated project managers.

4. Survey Results and Analysis

4.1. Agility on Project Risk Management Methods

By summarizing the findings of the survey among 25 project managers in the context of evaluating the first research question, we reached the following statements and conclusions: The agility of the project risk management methods in analyzed companies is low and they are more similar to the traditional waterfall practices for following reasons:

1. The project risk management life-cycle starts with risk identification and continues with risk analysis, risk mitigation planning, risk responding and risk closure and has a sequential order as in waterfall methodology.

2. Practices applied during the different phases of the life-cycle have no agility. They are not based on waterfall practices either. The central problem is that there is a lack of communication between the team members and both leader project managers and the project managers have too much autonomy which has caused by the fact that most of the practices that can be important to apply are optional. This problem reflects to the communication between the team members and the stakeholders as well.

3. There is a strict project life-cycle and in case of any project delay the project managers can easily be escalated which create a big pressure on them.

4. Only a small portion of the project managers are familiar with the iteration concept and try to use it at the same time. There is no official way to use the concept.
5. Team meetings are made on weekly basis in general. There is only one type of meeting.

6. The general schedule that is followed during the team meetings is about discussing the issues and possible solutions between the project team and project team leader. Also, all actions taken during the meeting depend on the lead project manager. However, the project team leaders cannot take the advantage of optional issues detection and most important solutions of them cannot be made properly and this causes team meeting scope to be too narrow.

7. There are quality training opportunities (mandatory and optional ones) existing and they are available to all employees of the analyzed companies, but the knowledge obtained during the trainings is not applied to the project praxis.

   All these reasons prove, that the current practices do not give adequately successful results for project risk management in analyzed companies and some changes on these practices are needed.

4.2. External Risks

External events have affected the projects in analyzed companies dramatically: During the survey with the project managers, only 46% of the issues were caused from the internal issues and 54% of the issues were caused from the external events which is a high rate.

   Related to that, we found out, that the external risks differ depending on the country, that the teams are working with. For instance, on the one hand, teams working with Nordic Countries, UK, and Turkey (15 responded project managers) have explained, that they have been dealing with really serious external risks and issues recently, but on the other hand, teams managing projects with France and DACH countries have stated, they have been dealing only with the internal risks during the project life - cycle and they do not have serious impacts on the projects such as project delay or project erosion. Another finding is, that the external events, those have affected the project recently (during last three years), were Brexit, oil crisis in Norway, and increasing terror attacks in Turkey. These events were unexpected and have influenced the countries economically, socially and politically.

   Related to that, the answer of the third research question is, that the project risk management methods are not sufficient to prevent or minimize the effect of external risks on the projects in analyzed companies because the projects, which were exposed to the effect of the external risks, were cancelled, but there were some possibilities to prevent the cancellation of the projects which were run with Norway and UK.

4.3. Summary of the Advantages and Disadvantages on Project Management Practices in Analyzed Companies

After completing all survey results and analysis, according to the information, that we obtained, we would like to illustrate the advantages and disadvantages on project management and related to that, project risk management in analyzed companies.
Figure 2 represents the summary of the survey results and analysis by categorizing them as advantages and disadvantages. Positive aspects are listed in the advantages section, negative aspects are listed in the disadvantages section.

**Figure 2**
*Advantages and Disadvantages on Project Management*

The advantages of the companies are based on the high quality education offered to the employees in all analyzed companies, the openness of the first line managers and lead project managers to improve the processes on projects, and the possibility to find ways to suppress the difference between the high quality education trainings and the execution of the projects. However, there are also eight disadvantages listed in the companies which were explained as the reasons of the low agility level and the fact, that external risks can affect the projects in these companies, because first of all, these are the international companies and usually international projects are ongoing there and the other reason is, that current weaknesses make the company less vulnerable against them.

### 5. Recommendations

Our fourth research question was: How can project risk management be improved through agile methods in analyzed companies.

The origin of the issues, those have been occurred in analyzed companies, is the fact, that the project life-cycle and project risk management methodology are either generally still based on the traditional approaches or there is no specific approach used due to the high level of autonomy given to the project team members including the lead project team members; in other words, the low agility. These weaknesses make analyzed companies to be threaten by the external risks more than it can be since it is an international company.

We will represent some suggestions to improve the current practices used on project management with some agile practices. In this context, we will separate the recommendations as recommendation for the first line managers, who are responsible for the project teams, and recommendation to improve the current practices in the company.

#### 5.1. Recommendations for First Line Managers
The first line managers are on the top level of hierarchy at the project management department in these companies. Even though they are not involved in the projects directly, they have high power of sanction on project managers. They can use it to make project teams to apply new practices on their projects.

- **Mandatory Agile Educations:** There is a chance to close the gap between the high quality of the trainings/educations and the way the project teams work on the projects. Also, the first line and lead project managers are open to new ideas and practices to be applied in their teams. Related to these, even though there are four online educations of agile, they are not mandatory. In this context, our first recommendation is, that the first line managers must make those four agile educations mandatory. First education is about the introduction to agile methodology; definitions of the concepts and why/how they are used in the projects. The second education is specifically focus on planning project releases, iterations and specially on the way of use of sprint concept. The third education program is about leadership and behaviors on agile project management methods. Finally, the fourth program consists of 12 different videos from a big conference about agile.

- **Practical In-Class Education Problem on Agile:** A practical training just like PM Green 10 should be started to be provided as one of the practical training programs in the company subsidiary. The way to do it in the company is that to have a meeting with the first line managers as a project team and make a detailed presentation about the new training program. If the first line manager excepts it, then he/she talks with the committee which is responsible for the trainings and apply for new practical training program to be accepted and applied. If it is accepted, then either the current instructor should first be trained with the new knowledge required or a new instructor must be assigned for the program. After that, a trial period is needed for it to be applied. Because there are four quarters used for performance evaluation in the company throughout a year and quarters consist of three months, we believe that a quarter would be enough for a trial period in terms of understanding the performance of the instructor and feedbacks from the project managers.

- **Mandatory Implications:** Meanwhile, the first line managers should oblige the lead project managers to try these practices in their teams during the trial period and if it works, then if it brings benefits to the companies, it can be made the official process for all the project teams. To be able to understand the way the new process works or not can be understood via online feedback system of the company. Because after every practical in-class activity, the employees must write a detailed feedback about the training program. Also, workshops mentioned can be a good place for the all teams and first line managers to get together and work on the practices. But what would be important about these meetings is, that the teams can have questions and answers session to share their experiences, as well. First line managers can be there as an observer. Even though it can create some pressure on lead project manager to be observed, we believe that it can be a better interpretation to define it as a motivation.

- **Motivation of Employees:** In addition to these, since the employees have to complete at least 40 hours of online and practical education as the minimum requirement of annual performance evaluation which can either be used to have some free presents on an online market of the company or can be added to the salary of the employee in the end of year,
having extra four online mandatory education (it is 9.5 hours in total) would also give project managers additional motivation.

5.2. Recommendations to Improve the Current Project Management Practices

In agile methodology the risk identification is everyone’s responsibility. If the team members observe a risk at the organizational level, they should be encouraged to speak up rather than waiting to bring it to the table. This requires a good communication between the project team members and stakeholders, a good team meeting schedule and a good team management by the lead project manager. Due to these, we believe that combining the current project risk management cycle with sprint concept, which is a concept under scrum method of agile, would be a good starting point to do that.

The new process which is combined with sprint methodology should be a part of new practical in class training program which was explained before. Instructor of the course (who is also the instructor of PM Green-10) should adapt the new process into the current system and teach it to the project managers. In the second possible scenario, a new instructor which has already knowledge about agile practices can be assigned. Sprints start with the meeting of sprint planning and continues with stand-up meetings, sprint review meeting and sprint retrospective respectively. The lead project managers divide the work between the project team despite the lack of the meeting all together and it is made via e-mail. The problem starts after this part which is the most important for the detection and tracking of risks and issues.

Therefore, stand-up meetings, sprint review meeting and sprint retrospective must be applied to the risk management methodology in order to increase the chance of project success. The educated and trained lead project managers and project managers in every team should try to follow this process which as follow:

- **Kick-Off Meetings:** First of all, the first thing that has caused issue was that the risk identification is usually made separately between the project managers and once they gather every week, they demonstrate their findings during the meetings and listen to the recommendations from the lead project manager during the meeting. Risks are determined during a meeting called “kick-off meeting” with the receiving and sending managers from IMT and DC sides. Similarly, during the risk analysis part, general procedure is to make the analysis with the lead project manager but informing him/her about to way of analysis is again optional. In our case, that “Kick-off Meeting” can be taken as the equivalent of the “Sprint Planning” meeting of Scrum. We believe that it is a “must” to include DPE in the kick-off meeting because he is the person who has a straight relationship with the client from the country that processes the project with analyzed companies, and he/she is also responsible from the budget. Although the practices of this part were explained by Rebovich & White (2016) or Tsoler & Sosis (2009) as the part that the project manager (in our case, lead project manager) divides the work between the project team members, we believe in addition to that, in the case that DPE can be included into this meeting, the project should ask questions about the client and about the budget with looking out of the confidentiality. TaskBoard can make contribution of identifying the risks as well which will be explained more detailed in the recommendations for risk analysis phase.
When we go back to Kick-off Meeting, for instance, the possible issue of the lack of budget in the big project with Norway was actually guessed by DPE but there was no project manager around to ask him about the budget, define that risk and support him about it.

Also, the documentation problem with UK could be detected through a meeting with the client and DPE that includes this risk of Brexit in the early phase of the project by changing a section on the tool of CBC and uploading the scan of a signed document. Albeit the simplicity of the possible solution, skipping to have such a meeting since the lack of communication in the team has caused the project to be cancelled.

- **Risk Analysis and Team Meeting Frequency Phase Improvements**: Next, the risk analysis phase can be improved with the daily stand-up meetings. They also can make partially contribution to improve identifying, and tracking the risks, as well. Especially, visual expression of the tasks through starting to use Task Board would be useful to improve the way work is done, support project management team to focus on the right things, improve the communication between team members by the daily discussions and reinforce the sense of teamwork and finally seeing the big picture by analyzing the small pieces of the project can improve the detecting the possible risks and issues.

As it was explained before, the external issues which have affected the projects with UK and one big project with Norway were caused through the lack of information in the project team. As part of agile methodology, dividing the work into small pieces and analyzing them clearly during the stand-up meetings with the help of Task Board could have made the detection of these issues even before they turned into issues from risk easier.

Then, the meeting frequency issue (which is weekly made as it was mentioned) can be solved by starting to apply stand-up meetings, too.

- **Improvements on Flexibility of Project Life Cycle Through Early Detection of Project Risks**: One of the most important issues and the project managers complain the most was the flexibility of the project life-cycle. The projects generally must be finished in 90 days and being in delay conclude with the escalation of the project managers but if they ask for the extension within 10 days after the project is assigned to the team, then they can have permission for a longer time. Because the project delays are usually caused through the unexpected issues occurred throughout the project life-cycle, then it is important to identify, share and analyze the risks in the early phases of the cycle (on our case, in 10 days). Then, the solution that was offered for better identification and analysis through sprints can also be the solution of this case.

- **Improvements on Risk Responding Phase and Risk Tracking/ Monitoring**: During the risk responding phase, managers first try to find the owner of the risk so this part also covers risk mitigation planning and high number of the stakeholders make project managers cannot include all of them in the meeting at the same time and especially the most important person, the DPE usually avoids these meetings.

  Besides, the project managers should focus on the solutions during the phase of responding instead of complaining about them. These solutions can be stated as follow:

  - The high communication level as a project team (including all four team members and the lead project manager).
Informing and warning (if it is necessary) the DPE (Delivery Project Executive) of the project.

- Being in communication with the SIL (Service Integration Leader) who is easier to communicate.

In order to be able to bring these activities to pass, project risk responding should include sprint review meetings. They are made after every sprint. During this meeting, the project team illustrates which maintenance items they completed. Because one of the problems of this phase is that the project managers cannot decide “Who is the owner of the risk?”, the connection between the risk identification, risk analysis, risk tracking, and risk responding must be solid and then well-defined, analyzed and tracked risks would help project managers to decide who is the owner of the risk during the sprint review meetings. It is important to remember that as Atlman (2017) or Davis (2013) stated, main tasks items that are not completed shall not be demonstrated. Otherwise, this might suggest that these items are finished as well. Instead, incomplete items/remaining activities shall be taken back into the main tasks list, re-estimated and completed in one of the following sprints.

DPEs should be invited to sprint review meetings. However, since it is easier to get in touch with SIL and SIL has the same knowledge as DPE, it might be a better idea to invite and inform him/her during these meetings. We believe that it would provide a better communication and collaboration between the project team and stakeholders. Then, in this case, the project team should primarily focus on the following stakeholders: The sending manager, the receiving manager and the SIL. However, we believe that since the problems exist in the previous phases of project risk management, DPEs tend to less and less communicate as the project risks and providing such communication and collaboration would make DPEs to be motivated to be part of these meetings.

We would like to add that all of these activities then may increase the use of effectiveness of Risk & Issue file which was prepared in a really great way with all the details that are needed to define, analyze and track the risks as it was explained before. Because, the file is valuable if the risks are well defined and analyzed. Thereby, the evaluation and prioritization of the risks can be made in a healthier way and risk tracking/monitoring can be improved.

- Risk Closure Phase Improvements:

Finally, lessons learned part of the risk closure phase is completely optional and there is no specific rule in analyzed companies. When a project is closed, it is optional for lead project managers to have a “lessons learned” session with the whole team and only French Team members have explained to me that they have these sessions periodically. The whole other 4 team members have told that they do not have lessons learned sessions. Instead, there is an internal tool that the Project managers have access to, and they have the freedom to share their experiences in the tool. However, only the first line managers have access to see that page so the other project managers cannot see those shared experiences.

Instead of that, Risk Closure phase would be the phase that Sprint Retrospective activities
will start to be used in analyzed companies. For instance, the lead project manager can facilitate this meeting. The team should discuss the just-concluded sprint and determine what could be changed that might make the next sprint more productive. They should focus on three topics during the meeting as Davis (2013) states: “The things that went well during the sprint cycle; the things that went wrong during the sprint cycle; the things could they do differently to improve.” After that, when the cycle starts again, the identification and following phases of the project life-cycle can be made easier and faster. Besides, it must be mandatory for the team to share these stories in the internal tool of the company on one condition: these stories must be reachable to all the teams. Thus, the outcome and experience which will be obtained through Sprint Retrospective can be moved to Kick-off Meeting and as it was mentioned before can increase the productivity of it over time by the incremental knowledge in the team(s) and in the company.

The general idea to be recommended is, that the risk management life-cycle should turn into an iterative process instead of the sequential flow. The project life-cycle should start with the risk identification and must be followed by risk analysis, risk responding, and risk closure. However, because the sprint activities are applied to the life-cycle, then there will be an iterative relationship between the different phases. Because daily stand-up meetings exist now, then this is going to cause risk analysis part to be a daily iterative process. In addition to these, tracking of the risks can be made throughout the whole project life cycle thanks to Task Board after the time that it starts to be used. The cycle is going to repeat systematically and the experiences and information, those will be obtained through risk closure activities, will affect positively:

1. the following risk identification activities,
2. the following projects.

6. Conclusion

Current project risk management methods in analyzed machinery companies in Slovakia, Dubnica and Váhom, are not agile methods oriented and most of the practices are like waterfall methodology. The findings, those proved that, are the sequential project risk life-cycle, the problems that are caused from the lack of communication between the project team members and also their communication with the stakeholders during the different phases of project risk life-cycle, the general strictness of the project life cycle, lack of iteration concept use in the projects, the lack of different type of meetings in the project teams, the gap between the well quality trainings and the execution of the projects.

The external events that have affected analyzed companies the most recently were the economic crisis in Norway, Brexit and terrorist attacks. All the projects in the UK team, which are part of another big project, the project related to Nordic team, and the projects that were ongoing with the subsidiary in Turkey were cancelled after they were exposed to the related external issues.

Therefore, the project risk management methods are not enough to prevent or minimize the effects of external risks on the projects in analyzed companies.

Our recommendations as part of the answer of the last research question consisted of making the online agile educations mandatory and adding also in-class practical training about
themcombinedwiththecurrentmethods;increasingthecommunicationlevelbetweentheproject
teammembersandthestakeholdersthroughreorganizingtheprojectrisklife - cycleandthemeeing
scheduleswiththeiterativeapproachofagilescrummethodology’ssprintconceptandusingmore
visualssuchasTaskBoardduringthemeetings whichwouldmakeidentificationandanalysis of
risks in a healthier way. Besides, these approaches explained should be a part of the in-class
education and trainings.

All these practices would increase the chance of success of the projects in analyzed
companies by making the project management department of it more prepared for the
external events in the age of volatility and so make the company better off in the future.

We can conclude that all the objectives of this paper have been fulfilled

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