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The importance of project risk management in practice

Daniel Simon, Patrik Viktor
Obuda University

Abstract

Nowadays, companies find themselves in an increasingly fast-changing, turbulent environment in which development and the proper management of environmental changes are crucial. Development through the execution of projects, facilitates the work of companies. It allows more accurate planning, time and cost estimation. In many cases, however, future events are hard to predict, and the success of projects can be jeopardized by a number of factors that are difficult to overcome unprepared. The aim of the research is to explore widely the available, risk analysis methodologies that are designed to assist the work of project teams on the way of successfully identifying and addressing the factors, influencing projects. With the help of online questionnaire research, more than 180 highly qualified project managers were interviewed to demonstrate the effectiveness of the risk analysis strategies identified in the secondary research, which work perfectly in theory. Thus, within the framework of the primary research, based on the opinion of real project managers, the importance of risk management, the difficulties of its implementation, and the consequences of the lack of a risk strategy were explored.

Keywords: risk management, project management, risk, estimation

1 Introduction

In recent years, ever-accelerating market development, growing customer demand, and turbulent environmental changes are forcing companies to evolve and to properly address environmental factors. Although, project management and project execution itself, is an activity that has only existed for 60 years, more and more companies are choosing the benefits of projects in order to successfully manage corporate innovation and other investments. Project-based thinking facilitates the operation of the company, as more precise time and financial plans are created during the planning processes. In addition, projects also have a precise determination of responsibilities within the project team. This way, the organization is able to plan and determine the reality behind the implementation of each project, much more confidently and effectively for the future. However, the future is often unpredictable and in many cases the construction phase is influenced by negative or even positive factors that the project team was not able to prepare for in the planning phase.
The research aims to explore a wide range of risk analysis and management techniques designed to facilitate the work of project teams in order to be able to identify risks as successfully as possible. Within the framework of primary research, the advantages and disadvantages of these methods are

explored with the help of an online questionnaire completed by 180 project managers with many years of experience. Based on the asked project managers' experience, the importance of risk management and practical difficulties are analyzed. Prior to the research, the following hypotheses were formulated based on the researchers' experiences.

H1: In the planning phase of the review projects, the analysis of risks receives the expected attention, however, the continuous monitoring of risks during the implementation of the projects loses its importance overtime.

H2: Continued risk management is lacking most in areas that use the waterfall model for project execution.

H3: The project team would devote more energy to identifying and monitoring risks if conditions allow.

2 Secondary research

The purpose of executing projects is to supply a specific series of activities that have a time and cost plan and are ultimately creating a specific end product. This can be either software development, the introduction of a quality management system, or even the construction of a factory building. The scope of the project includes all the factors that the customer expects from the delivered product, and the project baseline usually includes the classic iron triangle of the projects. The iron triangle determines the product itself, and the amount of time and cost available to create it. It is an important fact about the iron triangle, that if any of its factors move, it will affect the other two as well. This is why it can be a huge problem if unforeseen factors arise during the implementation of a project, the solution of which often requires more time and money that were not calculated in the project plan beforehand.

The area of risk management includes the exploration of these unforeseen events in the planning phase of the project, and then, their management and monitoring during the implementation phase. The aim of risk management is to explore widely the events that may affect the implementation of the project, to determine their priority, the probability of their occurrence, and then to find a response to overcome them in time, thus removing the obstacle to project success. Although there are numerous definitions of risk as a concept, the approach represented in this research was described by the Project Management Institute. Based on their perception, it is important to emphasize that risk in project management means a factor or event influencing in a positive or negative direction, which in some way changes the pre-planned aspects necessary for the implementation of the project. The occurrence of a risk at the planning stage is not certain, however, the magnitude and probability of its appearance can be estimated in many cases by appropriate means. The most important point of the definition is therefore that, contrary to the general idea, risks do not necessarily have to cause a negative effect. It can also be an event that can facilitate the implementation of the project if the project team is properly prepared to take advantage of it. (PMBOK, pp368, 2017)

2.1 Steps of executing project risk management

- Mapping risks, exploring the project environment

- Prioritizing risks
- Qualitative and quantitative risk analysis
- Developing a risk management strategy
- Risk monitoring

2.2 Mapping risks, exploring the project environment

The risk management activity begins with the exploration of the factors that may affect the project. It is very important for the project team to have an accurate understanding of the project's implementation environment and the characteristics of the people involved in the project. Environmental analyzes are usually based on SWOT and PESTEL analyzes, but in the case of more complex projects, more in-depth research may be warranted. Examples include the historical past of the construction site, soil information, and the exploration of other factors that do not appear in the PESTEL analysis. (Phillips, 2020)

It is crucial that the project team and stakeholders are involved in the risk identification phase. Based on the saying, more eyes see more, using past experience, even within the framework of an exchange of ideas, stakeholders are able to notice potential difficulties more widely. If the complexity of the project requires, the involvement of experts may be justified. However, bias can be a threat to honest risk management. Stakeholders can often dispense with certain risks, as they may fear that they may deter the customer. This is why it is very important to moderate these communication-based idea sharing sections, so that the risks are clearly explored and recorded in a transparent, unified form. It is the moderator's responsibility to not let the team go over the details. Of course, this also requires the right attitude and support from the customer. (Verzuh, pp109, 2005)

Project documents, contracts, and previous notes available to the project team can all be of great help in exploring project estimates and influencing factors. There is a strong emphasis on records that have been made in previous, similar projects, for example, and how well the team can use them in the current situation. (Wold, 2008)

2.3 Qualitative risk analysis, Risk ranking

Within the framework of the qualitative risk analysis, the priority of the already identified risks are taken into account. At this stage, it is important that the project team is working with real and reliable data. Prior to ranking, it is worth examining the completeness, objectivity, relevance, and timeliness of the information available. If these do not meet the expectations, the accuracy and reliability of the ranking may be greatly impaired. (Hicks, 2020)

The project team needs to develop a unified system in which it will evaluate all, high priority influencing factors. The design of the system is crucial, as it is only on the basis of this that the individual risks can be properly compared and prioritized. The simplest method used to analyze risks is to compare their impact and likelihood of occurrence. This means that the team examines the potential impact of a given risk and assesses the chance that this factor will actually appear during the execution of the project. The probability - impact matrix, derives a priority order from multiplying the weight of impact of each risk with their likelihood of occurrence. (Vector solutions, 2019)

However, in many cases, the project team can rank each factor based on other criteria as well, taking several other aspects into account. Examples of such aspects are proximity, urgency, latency, and perceptibility. If the team considers more than two aspects, it is often showcased on a bubble chart. It is necessary for the project team to set a minimum boundary from which the team decides that a risk is worthy of assessing, developing a strategy and possibly setting aside a reserve to overcome. In many cases, the probability of these factors occurring is negligible or their financial impact on the execution of the project is low. Prioritizing risks and calculating the safety reserve is a difficult task because excessively accumulated reserve could have been used in other sectors of the company as well. The project team always have to find the balance between risk and safety. (PMBOK, pp396, 2017)

2.4 Quantitative risk analysis

Quantitative risk analysis usually occurs in case of large and complex projects if the team or client evaluates that there is a need for further analysis of the impacts and management of risks already identified. Quantitative risk analysis continues to build on available documents, past experience and values, so their completeness and reliability are very important.

There are countless methods available for the team to further analyze the factors influencing the project. Some of these, widely used techniques will be briefly presented within the research. An example is the Monte-Carlo simulation analysis. Today, project teams are already able to simulate the expected outcomes of the future using computer software. The analysis of the project execution weighted with the possible occurrence of risks are run up to thousands of times and results in an integrated quantitative cost schedule. From the input data, an S-curve is created that perfectly illustrates the sustainability of the project cost and time schedule. The analysis showcases the most probable scenarios that the team has to take into account. (Ingall, 2007)

The occurrence of an influencing factor or the effect of a decision can lead to the emergence of other, already known or even unknown difficulties. It may be important for the team to explore the effects of individual risks and the relationship between the factors. This is the purpose of sensitivity analysis, which is designated to assess the correlation between risks. It is often depicted on a tornado chart and perfectly illustrates which events are the greatest risk of completing the project as planned. (Martins, 2020)

Project team decisions can be aided by decision-tree analysis. The essence of the analysis is to examine the outcome of each decision, weighted with its probability, that can lead to costs and benefits. The point is for the team to find the most optimal solutions based on the probabilities. (Hulett, 2006)

2.5 Risk management strategy

The identification of risks is followed by the development of a risk management strategy. It is the responsibility of the project team to address the factors that the chosen method of analysis considered critical during the project planning phase. The five simplest response strategies to manage risk are acceptance, avoidance, reduction, transfer, and escalation. (Baker-hopp, 2016)

In the case of acceptance, the priority of risk is usually low, and the project team does not take concrete steps to avoid it. In such a case, the team can insure itself by building up reserves, but in general, even if the risk does occur, it does not unduly delay execution. (Baker-hopp, 2016)

Reduction and avoidance are needed to address high priority risks. The project team will take concrete steps and seek a solution to reduce or possibly eliminate the impact of each influencing factor. These risks would greatly affect the success of the project's implementation, making it crucial for the team to prepare for their management. (Baker-hopp, 2016)

There are a number of risks that are unlikely to occur, but their impact is so large that the team cannot ignore them. These are usually factors that the team cannot prepare for in advance. In this case, the project team may transfer the responsibility of the risk to a third party. This can mean either performing a difficult activity or just insuring a project for a particular event. (Baker-hopp, 2016)

Finally, the escalation strategy. In this case, the project team does not have the appropriate authority to manage the identified risk. These influencing factors usually go beyond the project itself, they may even affect the entire company. In this case, it is worth raising the factor to the appropriate level. (Baker-hopp, 2016)

It is very important to stress once again that risks in the definition of PMI, can also be positive factors. The project team can create a risk management strategy to capitalize on these positive events. The members of the team can take steps to capitalize on the opportunity, or possibly outsource part of the project if the team does not have the knowledge to take advantage of the opportunity. (Hillson, 2009)

2.6 Continuous risk management

Even after project planning, risk management cannot end. The future is constantly changing, new, yet unknown risks may emerge or events that were previously considered critical may lose their priority during the construction phase of a project. Therefore, it is very important that both the project team and the risk managers in charge, monitor the information surrounding the project, keep an open eye and communicate changes in the influencing factors properly.

It is the responsibility of the team to update the identified risk list in the predefined system. Document the changes, the strategy, and the experience gained from handling the given risk. It is in the interest of the project team to not only think about the project currently being implemented. Just as all previous notes and recorded information in the planning phase facilitated the work of the team, for the future, all the documents created, and experiences gained can be useful for future projects as well. That is why proper risk management is a way of value creation for the future. (Verzuh, pp124, 2005)

3 Primary research

By processing the available literature, the secondary research provided a series of rather clear and at first glance easy-to-follow steps that, in theory, lead to a wide-ranging exploration and appropriate management of project risks. Nevertheless, it is often heard that certain projects are hampered by unexpected events, the expected delivery date must be postponed by months, and the project costs have multiplied compared to what was originally planned. Within the framework of a quantitative questionnaire research, the aim was to explore the opinion of project managers about the importance of risk management and the obstacles that do not necessarily appear in the theoretical guidelines. The questionnaire research was shared in Hungarian project companies and in online Facebook groups focusing specifically on project management. During the surveying period, 180 responses were received that met the pre-defined conditions. It was important that the

questionnaire was only filled by project managers with several years of experience who already have an accurate practical picture of project management and risk management. 70% of the answering managers already have at least 5 years of experience in the field of project management and mostly lead projects in the fields of construction, engineering and IT. 16% of respondents have completed high school, 49% have a degree and 35% have a master's degree. Interestingly, while most managers working in the construction industry did not have a tertiary education, the proportion of graduates with a degree in the IT field was 100%. About 53% of the respondents have other qualifications especially on the field of project management. Based on these responses, they were CAPM, PMP, and Prince2. 77% of respondents rated risk management as highly important in the phase of project implementation. Of these feedbacks, 93% responded that risk management is needed even during the project implementation phase. The aim of the survey was to explore the working environment of project managers in order to get a complete picture of how their projects work. The responses revealed that, overall, it is in the interest of the client to support the implementation of the project and its proper risk management. Nevertheless, it was spectacular that in about one-third of project executions, project managers perceived that corporate philosophy and compliance with standards not only influenced, but in many cases even hindered, project execution and honest risk management. Overall, respondents rated that they are completely satisfied with their project team members, colleagues. 75% of the employees can be entrusted with work without hesitation. They are taking responsibility for their actions. It can be stated that the asked project managers are having a good experience with their project teams and the team members in these cases are not a difficulty factor in risk management. In many cases, the survey showed that customers had different expectations of the project team's ideas. The project managers had to rate their expectations from the customer in given cases of risk management, after that they had to rate the level of support, they get in reality from their customers considering the topic of managing project risks. The experience of project managers shows that while in the planning phase of a project the client highly values the performance of risk management and the development of a risk plan, the expectations from the side of the manager related to continuous risk management, significantly alter from the expectations of the customer. While 79% of the respondents said that the support of the customer would be needed to carry out the continuous risk management successfully, and 68.4% of them would consider it worthwhile to explore the positive risks of the project, only about a third of the customers agreed with these statements.

Within the framework of a correlation calculation, it was analyzed whether, based on the responses received, whether there is a relationship between the attitude towards the implementation of risk management and the industry of the implemented projects. The Cramer coefficient of the association study gave a result of 0.34, indicating a moderately strong relationship between the two criteria. Although a single association study does not show a clear relationship between the two factors, it is important to see that while in the construction and engineering fields, risk management receives high priority in the project planning phase, in the IT sector, risk analysis remains important throughout the phase of project implementation as well.

83% of the project managers surveyed revealed that they had already worked on a project that had difficulties that could have been avoided with the proper application of risk management. 51% of them had already participated in a project in which the project failed due to an unforeseen, unexpected event. More than two-thirds of respondents would set aside at least 10% of the project's budget as a reserve to deal with unforeseen events, while 14% of respondents would prefer at least 20-35% of the budget.

The questionnaire also revealed that the respondents actually use the methods revealed during the secondary research, to manage risks. Managers are most often prepared to bridge

problems by building reserves, but in many cases the answers included finding another solution, escalating risks, or even postponing an entire part of a project due to a seemingly inevitable difficulty. Based on their own assessment, project managers are able to accurately estimate and prepare for the factors influencing project execution, mostly taking into account their previous experience and available documents.

4 Conclusion of the primary research

The results of the primary research are briefly summarized along the hypotheses set up at the beginning of the research. Hypotheses are rejected or supported based on the results of the questionnaire research.

H1: In the planning phase of the review projects, the analysis of risks receives the expected attention, however, the continuous monitoring of risks during the implementation of the projects loses its importance overtime.

The questionnaire research has repeatedly revealed that the customer and company attitudes towards certain phases of project implementation do not necessarily match the expectations of project managers and the project team. Respondents pointed out that in the planning phase of the project, high attention is still paid to carrying out risk management, as in this phase even the client is more interested in exploring the feasibility of the project. In contrast, it seemed that the support of continuous risk management and, as a result, its proper implementation is no longer realized in many cases. Thus, the first hypothesis was accepted with reference to the results of the primary research, with respect to the projects of the filling project managers.

H2: Continued risk management is lacking most in areas that use the waterfall model for project execution.

The answers from the project managers pointed out that among the respondents in the technical and construction fields, where more commonly well-planned waterfall model-based project execution is used in a more stable environment, risk management is mostly implemented only in the project planning phase. Waterfall-type project construction also has advantages, and the methodology is usually applied in more predictable, less flexible environments. However, this does not mean that the future cannot bring unexpected twists that are worth keeping an eye on. Based on the results of the respondents and the association study, the second hypothesis was also accepted.

H3: The project team would devote more energy to identifying and monitoring risks if conditions allow.

The survey pointed out that in many cases, customer and corporate circumstances influence and even hinder the execution of projects and the honest performance of risk management. Nevertheless, among the respondents, albeit at a low rate, in some cases it seemed that the project manager himself considered monitoring risks as a low priority task during the project implementation phase and blindly insisted on the execution of the previously prepared project plan. It was concluded that inflexible project management is not necessarily the fault of the company and the customer alone. The project team itself needs to have the right attitude and open mindset in order to be flexible in managing project implementation, to have an open eye, and to research the factors that may affect the success of the project execution. Based on these findings, the third hypothesis was ultimately rejected.

5 Conclusion

The research revealed that risks are positive or negative factors that can greatly influence the successful implementation of projects. The essence of risk management is to explore these events during both the planning and implementation phases of the project and to develop a strategy to deal with them. Although it is essentially in the interest of the team and the client to devote energy to this activity and there is a myriad of techniques available to the teams to help identify risks, it was clear that there are often obstacles to implementing successful risk management. Examples of such difficulties are the difficulty of estimating the project requirements, its complexity, the difference between the interests of the customer and the company, and the attitude of the project team itself. Ongoing risk management and conscientious documentation of experience is key because it can not only drive forward a given project activity but can also help to estimate similar projects in the future and identify potential difficulties. Continuous risk management creates value for both the project team and the company for the future. Unfortunately, even in the most stable project environment, the future can often hold surprises that can be predicted with proper attention. This is why it would be very important for the client and the corporate philosophy to support the implementation of projects with the necessary information and attitude, while the project teams have to strive for a flexible approach and an open mindset in order to discover signs of influencing factors in time.

References

Baker-Hopp & Associates: Five ways to manage business risk, https://detroitfulfillment.com/wp-content/uploads/2016/07/Five-Ways-to-Manage-Risk.pdf, Last download: 2020.07.30, 2016

David HILLSON & Ruth Murray-Webster: Understanding and managind risk attitude, https://drive.google.com/drive/folders/1C3BRhOf3-0rkdGEB WgQ8gSsZHSsl8rQZ?usp=sharing Last download: 2020.07.30., 2014

David HILLSON: Managing Risk in Projects, USA, Routledge, 2009, ISBN: 978-0-566-08867-4

Dr. VARGA János: A projektmenedzsment alapjai és módszerei, Budapest, Hungary, OE-KGK, 2015

Eric VERZUH, Projektmenedzsment, Budapest, Hungary, HVG kiadó, 2006, ISBN: 9789637525773

Henry A. DAVIS: DavisProject Finance: Practical Case Studies, Volume 1 (Second Edition), London, UK, Euromoney Books, 2003, ISBN: 1 85564 845 8

HULETT, D. T.: Decision tree analysis for the risk averse organization. Madrid, Spain. Project Management Institute, 2006

Melanie WOLD: Failure of risk management strategies proves Murphy's Law is alive and well. - https://www.fnlondon.com/articles/failure-of-risk-manage ment-strat egies-prove s-law-is-alive-a nd-well-1-20081215, Last download: 2020.07.30, 2008

PMI: PMBOK Guide sixth edition, USA, Project Management Institute, 2017, ISBN: 978-1628251845

Roland GAREIS: Projekt? Örömmel!, Budapest, Hungary, HVG Könyvek, 2007, ISBN: 9789639686151

Young Hoon Kwak & Lisa INGALL: Exploring Monte Carlo Simulation Applications for Project Management. - https://link.sp ringer.co m/article/10.1057/palgrave.rm.8250017, Last download: 2020.07.30, 2007