VILNIUS UNIVERSITY
BUSINESS SCHOOL

INTERNATIONAL PROJECT MANAGEMENT PROGRAMME

Lukas Šeduikis

MASTER'S THESIS

SĖKMINGO IT PROJEKTO RIZIKOS VALDYMO ORGANIZACIJOJE VEIKSNIAI IR JŲ ĮTAKA IT PROJEKTO SĖKMEI	*FACTORS OF SUCCESSFUL IT PROJECT RISK MANAGEMENT IN THE ORGANIZATION AND THEIR INFLUENCE ON IT PROJECT SUCCESS*

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SUMMARY

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STUDENT LUKAS ŠEDUIKIS

FACTORS OF SUCCESSFUL PROJECT RISK MANAGEMENT IN THE ORGANIZATION

AND THEIR INFLUENCE ON PROJECT SUCCESS

Supervisor – Vytautas Pugačevskis, Associate Professor of Partnerships

Master's thesis was prepared in Vilnius, in 2023

Scope of Master's thesis – 70 pages.

Number of tables used in the FMT – 5 pcs.

Number of figures used in the FMT – 8 pcs.

Number of bibliography and references – 21 pcs.

The FMT described in brief:

IT project management success is understood very differently among project managers. As technology evolves and the culture of project management evolves, new elements emerge that characterize the success of such projects. There is a debate about how project success can be measured and how project risk management affects it, as well as how project success and risk management are affected by factors such as organizational support. This paper analyzed the concept of project success, success criteria, risk management standards and risk management in IT projects mentioned in the literature and its influence on project success. Based on the literature review, a research model was developed that included an analysis of the interactions between project success, organizational support, and flexible risk management practices. Interviews of employees of Company X were conducted, data analyzed, conclusions and recommendations were presented.

Aim and objective of the FMT:

Based on the literature and research, determine the concept and criteria of Company's X project success, analyze risk management and determine what are the main risk factors that influence the success of the project, how organizational support affects the success of the project and how it affects risk management.

Research methods used in the FMT:

A qualitative research method was applied, a research questionnaire was prepared, and employees of Company X were interviewed.

Research and results obtained:

Summarized research results defined project success criteria applied in Company X, forms of organizational support for project management, risk management system and its success factors. The interaction and influence of all these elements on the success of the project has been determined.

Conclusions of the FMT:

The study showed that the success of the project is highly dependent on both risk management and organizational support. Also, these two elements interact with each other, reinforcing each other's performance and influencing the success of the project.

However, Company X does not have a unified understanding how it considers project success, how it could be measured, and there is no standardized risk management process, so recommendations for improvement were made.

SANTRAUKA

VILNIAUS UNIVERSITETO VERSLO MOKYKLA

TARPTAUTINĖS PROJEKTŲ VADYBOS PROGRAMA

STUDENTAS LUKAS ŠEDUIKIS

SĖKMINGO PROJEKTO RIZIKOS VALDYMO ORGANIZACIJOJE VEIKSNIAI IR

JŲ ĮTAKA PROJEKTO SĖKMEI

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Trumpas darbo apibūdinimas:

IT projektų valdymo sėkmė projektų valdovų tarpe suprantama labai skirtingai. Vystantis technologijoms ir tobulėjant projektų valdymo kultūrai, atsiranda vis nauji elementai, kurie apibūdina tokių projektų sėkmę. Kyla diskusijos, kaip galima būtų pamatuoti projekto sėkmę ir kokią įtaką jai turi projektų rizikų valdymas, taip pat – kaip projekto sėkmę ir rizikų valdymą veikia toks faktorius, kaip organizacijos palaikymas. Šiame darbe buvo analizuojama literatūroje minima projekto sėkmės samprata, sėkmės kriterijai, rizikų valdymo standartai ir rizikų valdymas IT projektuose bei jo įtaka projekto sėkmei. Vadovaujantis literatūros apžvalga buvo parengtas tyrimo modelis, kuris apėmė projekto sėkmės, organizacijos palaikymo ir lanksčių rizikos valdymo praktikų tarpusavio sąveikos analizę. Buvo atlikti Įmonės X darbuotojų interviu, pateikta duomenų analizė, išvados ir rekomendacijos.

Darbo tikslas ir uždaviniai:

Remiantis literatūra ir tyrimu nustatyti Įmonės X projekto sėkmės sampratą ir kriterijus, išanalizuoti rizikų valdymą ir nustatyti, kokie pagrindiniai rizikos veiksniai lemia projekto sėkmę, kaip organizacijos parama įtakoja projekto sėkmę ir kaip veikia rizikų valdymą.

Darbe taikyti tyrimo metodai:

Buvo taikomas kokybinis tyrimo būdas, paruoštas tyrimo klausimynas ir apklausti Įmonės X darbuotojai.

Atliktas tyrimas ir gauti rezultatai:

Apibendrinus tyrimo rezultatus, buvo apibrėžti Įmonėje X taikomi projekto sėkmės kriterijai, organizacijos paramos projektų valdymui formos, rizikų valdymo sistema ir jos sėkmės faktoriai. Nustatyta visų šių elementų sąveika ir įtaka projekto sėkmei.

Darbo išvados:

Tyrimas parodė, kad projekto sėkmė labai priklauso tiek nuo rizikų valdymo, tiek ir nuo organizacijos paramos. Taip pat šie du elementai sąveikauja tarpusavyje, pastiprindami vienas kito veikimą ir įtaką projekto sėkmei.

Tačiau Įmonė X neturi vieningo supratimo, ką laiko projekto sėkme, kaip galėtų ją matuoti, nėra standartizuoto rizikų valdymo proceso, todėl buvo pateiktos rekomendacijos tobulinimui.

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KEYWORD AND CONCEPTS DICTIONARY

- Ability to overcome risk - the ability of the project team or organization to control the risk that has occurred and minimize its impact on the project or organization.

- Agility - a characteristic that defines the team's ability to adapt to changing conditions in a project or organization and continue to work productively.

- Cyber security - a concept that describes and includes the security of computer networks, systems, infrastructures, etc., the ability to detect attempts to harm, prevent it or restore operations after an incident.

- Cloud computing - a term that describes virtual services that are available over the Internet.

- Experience of the project manager - a concept that describes the accumulated knowledge and experience of the project manager, which was acquired during the direct management of projects.

- Flexibility of risk management practices - a concept that describes the ability of the risk management processes established by the project team to adapt to a changed situation.

- Information technology (IT) - the totality of all computer technologies for data storage, processing, transmission and other actions, such as communication.

- Organizational support – support from the immediate environment of the organization, as an example - support of the top management in making decisions or allocating additional budget for risk management or help of colleagues from other departments in the implementation of certain tasks or experience sharing.

- PMI – Project Management Institute.

- Project management - the management and control of the entire set of activities to achieve a pre-measured and defined result, including the delegation of resources and tasks, resource management, budgeting, etc.

- Project success - a measurable value that is measured by factors depending on the views of the organization. Some organizations measure by the "Iron Triangle" principle, other organizations measure by other factors, such as customer satisfaction or intangible benefits brought by the project to the organization.

- Risk identification - a process during which potential risks, their probabilities and risk mitigation plans are determined, and all this is included in a risk register document.

- Risk management - a process of managing risks that may arise during the course of the project, including but not limited to financial risks, cyber security risks, human resources, etc. risks.

- Risk monitoring - a process of monitoring the progress of the project and comparing it with the risk document to determine the probability of risk occurrence.
- Risk prevention - a process during which specific actions are taken to prevent the occurrence of risk or to minimize its impact on the project or organization.
- Risk transparency - a process of sharing information about potential risks, their probabilities and management plans with stakeholders to gain stakeholder trust and support in the event of a risk event.

INTRODUCTION

Relevance of problem. In today's world, the role played by information technology is critically important, both in everyday life and in industry. This leads to the fact that IT projects become particularly important, creating value for both companies and society. It is therefore imperative that these projects succeed. In the past, it was common to consider success criteria the "Iron Triangle"– scope, budget and time. However, today's realities dictate that companies value other additional success criteria, such as client satisfaction, long-term sustainability, creation of added value and etc. These criteria can be influenced by various risks and the project team's ability to manage these risks has a significant impact on the success of the project.

In IT projects, the concept of risk should not treated as a static phenomenon, but as a dynamic variable that changes along with the latest technologies. The continuous progress and change of the IT sector creates uncertainties such as cyber security gaps, regulatory inconsistencies or technological obsolescence. These processes require risk management to be different than before. Therefore, a new approach is necessary to ensure effective and successful IT project risk management.

Problem description. Taking into account the information above, it was decided in this work to explore the definition of project success and the factors determining success used in one company operating in the IT field. Since risk is a variable element in IT projects, it is worthwhile to analyze how this company aims to achieve the best results of such risk management, what type of risk management success criteria it monitors and how it measures the success of risk management.

The object of the thesis is Company X, whose main areas of activity are data transmission networks, cloud computing and IT security.

The aim of the thesis is to define the success factors of IT projects applied in Company X, to determine the risk factors of such projects and their influence on the success of the IT project.

Objectives of the thesis:

1. To analyze the theoretical background of project success and risk management.

2. To analyze the theoretical background of the influence of risk management on the success of projects.

3. To conduct a qualitative research of Company's X project success factors and risk management factors, comparing the results with the results of the literature review.

4. To present conclusions and recommendations for monitoring the success of Company's X projects and risk management.

Research methods of the thesis. This thesis used literature review, analysis and qualitative research.

The literature review made it possible to create a general picture of how the success of IT projects is treated and measured in the world, what type of factors have the greatest influence on the success of such projects, what place risk management take among these factors, which risk factors have the greatest influence on the success of projects.

In order to carry out a qualitative research, a questionnaire was prepared and the employees of Company X were interviewed. The interviews were planned to be conducted live, but during the research a situation arose that not all interviews could be conducted live, so two respondents filled out written questionnaires in English. The responses of the other respondents were summarized and translated accordingly. During the research, there was low engagement from the respondents, so it was not possible to obtain a sufficiently detailed information about Company X's risk management.

Structure and scope of the thesis. The thesis consists of an introduction, literature review, research methodology, research results, conclusions and recommendations. The introduction briefly presents the novelty, problem, aim and objectives of the research, research methods and results. The literature review analyzes the theoretical aspects of project management success, risk management success and their interrelationship. In the methodological part of the thesis, the aspects of conducting the research are indicated, the diagram of the research model and the interview questionnaire are presented. Research findings include analysis of interview data. The conclusions and recommendations section provides a summary of the research results.

1. IT PROJECT SUCCESS AND RISK MANAGEMENT

1.1. Understanding project success in IT

Applying and understanding Critical Success Factors (CSFs) is one of the key factors in defining project success, and effective project management practices are equally important. After analyzing the literature, it can be seen that there is no unequivocal consensus and definition of what constitutes a successful project or effective management practice, but in all of the analyzed literature, the authors underscore the essential fact that these factors are directly related, but the authors emphasize it through different prisms.

For example, Berg et al. (2023) emphasize in their study that benefit management (BM) must be an innovation throughout the project, in order to ensure the created pre-measured and calculated value for society or the public sector. This emphasis is also supported by Miranda et al. (2023) study that analyzes the tools and methodologies used in Portuguese public sector projects to manage these projects. During this research, it was found that traditional methodologies, such as Gantt charts or Kick-off meetings are quite often applied, but the preliminary application of Agile methodologies in these projects does not show direct links with the traditional definition of project success.

Also, Miranda et al., in their study examines such nuances as the maturity of project management. This study claims that the maturity of project management techniques used in practice, such as "Project Progress Monitoring and Control" or "Task Definition", is deeper than it may appear at first glance. Also, an interesting finding of this study is that the importance of defined processes does not always directly influence or relate to the traditional project success measurement technique, the "Iron Triangle". This raises the question of whether the "Iron Triangle" is a suitable technique for measuring success in modern IT projects.

The following study by Aleksejevets (2019) discusses and analyzes the application of critical success factors in practice. In this study, we can see a very big difference between the theoretical part and the real practice. In this study, we see that project managers treat factors such as planning, communication or process management in a completely different way than they are usually described in the scientific literature.

Kumar et al. (2023) in their study analyze the perception of experienced project managers about what project success is and how it is measured. This study reveals that most of the critical success factors identified in scientific sources are not used in reality. Experienced project managers tend to focus on only a few, specifically applicable critical success factors. Also, this study argues

that the use of the "Iron Triangle" as a technique to measure project success is no longer relevant or does not reflect the whole truth about the project. Kumar et al. in this part of the study emphasizes that, in order to measure the success of the project, there is more and more focus on other factors, such as performance evaluation indicators, satisfaction and uncertainties of the interested parties or the real added value created by the final product.

An analysis of these studies revealed that success is no longer as simply measured as it used to be. Today's organizations are more and more inclined to non-traditional methods of measuring success, which include factors such as the added value of the product, the benefit of the project to the stakeholders or the ability of the project team to adapt to changing conditions in the project. Likewise, the ability to match the critical success factors described in theory with real-world conditions is an area that is constantly evolving and evolving in order to understand and define project success in a way that is acceptable to all stakeholders.

In general, evaluation of the articles of the scientific literature analyzed in this part, it is seen that it is necessary to re-evaluate and define the success factors of the project based not only on traditional techniques, but also on modern critical success factors, new project management techniques or added value measurement factors. The insights obtained during the analysis create a basis for further development and analysis of this topic in order to create a modern system for measuring project success, which should be adaptive and include the entire project as a whole, as well as the currently applied critical success factors.

1.2. Project success factors and success measurement

According to He et al. (2019) study, the Iron Triangle concept has historically been a key technique for measuring project success. In this concept or technique, the main focus is on three essential factors - deadlines, budget, scope. The main idea of this model is that if there is a change in any of the listed factors, all the remaining factors will also be affected by this change. For example, as the scope of the project changes, so will the project budget and the implementation deadline. However, this "Iron Triangle" methodology also has its shortcomings, as it does not reflect the complex multifaceted concept of modern IT projects.

In modern IT projects, the methods and essence of project management have evolved rapidly. These changes have also led to a deeper understanding of what constitutes project success and how it can be measured.

The main areas where modern success factors differ from the traditional model are:

- In today's projects, quality is very relevant, which is treated as one of the key success factors of the project. Quality includes both technical parameters and the performance of the final product under real conditions. In the iron triangle case, quality is not directly measured.

- As with quality, the "Iron Triangle" does not directly define in any way the management of interested parties or the indicator of satisfaction of these parties. This satisfaction indicator defines how the end user feels when using the product developed during the project, the adaptation of the product to environmental changes or the overall experience of the stakeholders throughout the project.

- Another extremely important success factor that is not defined by traditional concepts is team and organizational effectiveness. This indicator includes the team's ability to communicate, adapt to changing conditions and the overall impact of a successful project on the development and growth of the organization.

- Sustainability and Ethical Considerations: Modern project management integrates sustainability and ethical considerations into the success equation. Projects are increasingly being judged on their environmental impact, social responsibility, and adherence to ethical standards, reflecting a broader commitment to corporate social responsibility.

- Modern project management tries more and more to adapt the ideas of sustainability to the products being developed, without neglecting the ethical aspects of the project, in order to ensure the smooth development of the project and the fulfillment of the company's social obligations.

- Modern projects are often valued, not only as business objects, but as an opportunity to adapt and innovate, as well as an opportunity for team learning and experience. This allows the organization to improve in several directions at the same time, not only in terms of the implementation of innovations, but also in terms of collective competencies.

Overall, it should be said that modern success factors offer a more comprehensive methodology for measuring success and better reflect the multifaceted concept of IT projects in the ever-changing IT world. However, the concept of the "Iron Triangle" cannot be underestimated, which remains a relevant tool for quickly calculating change in a project or measuring project success without an extended, holistic analysis of project success.

N. Durmic, (2020), Venczel et al., (2021) in their research emphasize that in order to find the way to project success, it is necessary to harmonize and deeply understand various factors, manage them and align them with the goals of the stakeholders in the project. These studies mainly analyzed the industry sector and found that the project success model must be described in detail and must have concretely defined success factors and criteria that are guided by it. In the field of IT projects, success is based on different success factors, as a result, this model can also be applied to IT projects, provided that the project team is able to work harmoniously with each other and the leadership of the project manager will lead the team forward. To fulfill these conditions, concretely defined project details, specific requirements and objectives are also very necessary. Also, it is very important not to forget the constant supervision of the project progress and activities in order to prevent possible risks and project failures.

In addition, Sastoque-Pinilla, L. et al. (2022) conducted research provide an insightful approach to project success criteria using Q-methodology in the R&D sector. This reveals that achieving project objectives, ensuring the quality of customer satisfaction results and promoting knowledge generation are the most important criteria for both project managers and stakeholders. This finding highlights the importance of quality deliverables, stakeholder engagement and knowledge sharing in the project management process. These factors contribute to the success of a project by enhancing its value proposition and ensuring that it is aligned with the broader goals of the organization.

Sastoque-Pinilla, L. et al. analysis shows that the specific "Q-methodology" used in the research and development sector helps to format a comprehensive and insightful perspective that is used to define project success criteria. The study of this methodology reveals that the most important project success criteria for both interested parties and project teams in this area are:

- Achieving defined project goals;
- Customer satisfaction with the final product;
- Acquisition of new knowledge and experience of the project team;

These factors and insights emphasize once again that measuring project success is no longer limited to the "Iron Triangle" methodology and that project success is made up of more diverse factors that reflect the multifaceted nature of modern projects. Expanding the insights, we also see that these factors determine not only success, but also create internal added value within the project team or organization.

After reviewing and analyzing these insights, it can be concluded that project success is made up of many different factors that depend on the project context. The context of the industry in which the research is conducted is not important, since specific success factors depend on the

specifics of the project and the environment in which it is carried out. The main success factors of the project can be named as follows:

- The project team's experience, knowledge and willingness to work together. This factor is critical for the smooth progress of the project, because in the absence of quality cooperation in the team, miscommunications occur, tasks are not completed to the end, or there is a lack of quality in the execution of tasks.
- Specific project specifications and a clear leadership position for the project manager. This factor ensures that the team is clearly informed about the project goals, work processes and other important details that are necessary for the successful implementation of the project.
- Stakeholder management. This factor is extremely important for the success of the project because the interested parties, if they are not managed purposefully and qualitatively, can harm the project.
- Definition of goals and their implementation. This factor determines what goals were defined at the beginning of the project and how the project team managed to achieve them.
- Qualitative evaluation. This factor shows what quality criteria were set at the beginning of the project and whether the final product meets the expected quality requirements.
- Experience and acquired knowledge. This factor defines what intangible benefits the project team receives, that is, what new experience and knowledge the project team has accumulated during this project.

Furthermore, successful management of these factors, combined with a structured and adaptive approach to project management, is essential to achieving desired project outcomes. Depending on the project, all or part of the factors listed above may apply to the project. However, regardless of the quantity or nature of the applied success factors, their management is one of the essential criteria for the successful implementation of the project.

The analysis of the literature shows a tendency that the success of the project is usually measured in the following ways:

- Evaluation of the compliance of the project's final product to the requirements.
- Evaluation of customer satisfaction with the final product.
- Evaluation of the quantity and quality of new experiences and knowledge brought by the project.

- Have project deadlines and budget not been exceeded, but, in most cases, this is treated as a secondary measurement method

1.3. Risk management standards

Risk management in project management is an extremely important and integral process to ensure that the project runs smoothly and successfully. However, risk management can be a messy process by itself, so risk management standards were developed to systematize the risk management process. These standards act as an essential aspect in identifying or mitigating risks in ongoing projects.

With the help of these standards, risk management can be a structured and more manageable process due to the following factors:

- Common practice factors and processes - The Standards offer a set of specific good practices that can be used in project risk management, especially if it is a large-scale project involving several different countries or organizations from different countries.
- Decision-making process – Risk management standards dictate good practices on how decisions should be made and how these decisions should be justified to meet standardized and well-defined risk assessment steps. This is especially important in the IT field, when quick, concrete and measured decision-making can affect the success of the project or the final product.
- Stakeholder management – By managing stakeholder risks with these standards, it is possible to gain greater trust from stakeholders and thereby ensure their support for a particular project.
- Legal compliance – Most of these standards are approved by government organizations and meet all legal requirements, making it easier for the project team to ensure that the ongoing project complies with the legal acts. Also, in the field of IT, with the help of these standards, it is easier to ensure that the ongoing project meets the data protection, cyber security and other security standards provided for in the legislation.
- Standards encourage improvement – Since, in many cases, standards cover not only the processes mentioned above, but also other factors related to risk management, such as – continuous review or improvement tips – it allows the team to continuously improve and update their risk management processes. This is especially important when long-

term IT projects are carried out, as this sphere is constantly moving forward and new unknowns may appear at any given moment, which may cause undefined risks.

The risk management standards used in the IT field are not only theoretical advice, but also practically applicable and widely used processes that create a favorable environment for successful risk management during the project. The following sections will analyze standards accepted in the IT field, such as ISO 31000, PMI, etc.

1.3.1. Practice standard for project risk management by PMI

There are a lot of standardized processes for risk management in various types or practices of project management. For example, PMI has even published a guideline book about project risk management called "Practice standard for project risk management". In this book they are laying the ground rules for managing the risks of projects. PMI are firm believers that risk management has to be conducted on an ethical basis, in keeping with the project management code of conduct. In this practice standard they are dividing the risks into two main risks: individual risks and overall project risks.

Individual risk is described as a targeted risk that may affect one element, objective or task of the project. Most of the time it is not a threat to the success of the project, but to its timeline, budget or impact. These risks are managed and monitored by day-to-day project risk management.

Overall project risk is a huge risk that can negatively affect the outcome of the project, its objectives. This type of risk is made out of the entirety of individual risks and other various factors. It is a very important component of risk management that has to be monitored and the goals of the project have to be adjusted to the likelihood of this risk to avoid it or minimize the impact.

Since any project cannot be taken as a granted outcome, the risk management and project management correlate ideally together, to achieve the set goals or desired outcomes. In project management we have many techniques to control uncertain variables like work breakdown schedules, planning, cost control and so on. The similar ways also apply to project risk management. This gives the project manager an approach to risk control in a similar manner to project management and these ways integrates to project management in an easy manner, as such, playing a great deal in project success as a critical factor.

In the guideline book "Practice standard project risk management" process is clearly explained and states the steps of project risk management processes (Table 1). As in the description what is a risk, it can be derived that risk directly correlates with one or more objectives of a project, thus the process also has to be adjustable to the scale of a project. The process contains more than

one technique of identifying risks. Some of the techniques are qualitative identification, quantitative identification. Working with these techniques separately provides good results by working on a smaller scale projects, but on large scale or very complex projects they should be used in tandem to ensure the maximum quality of risk identification and what kind of impact it might have.

Table 1. *Risk management process steps*

● Planning of risk management	This defines the scope and objectives and ensures process integration to the project management
● Identification of risks	Identification of many knowable risks
● Qualitative risk analysis	Evaluates key characteristics of individual risks, enabling them to be prioritized
● Quantitative risk analysis	Evaluates the combined effect of risks on the overall project outcome
● Risk response plan	Determines the response strategies for each risk and overall risk, integrates into project management plan
● Monitoring and control of risks	Implementation of agreed upon tactics, reviews situation in project exposure, assesses the risk management process.

Source: Practice standard for project risk management, PMI 2009

These steps are the main action that has to be done to ensure an efficient and successful management of project risks.

The Figure 1 below depicts the flow and correlation between those steps and how they work continuously from the start to the end of a project.

Figure 1. *Flow diagram of project risk management.*
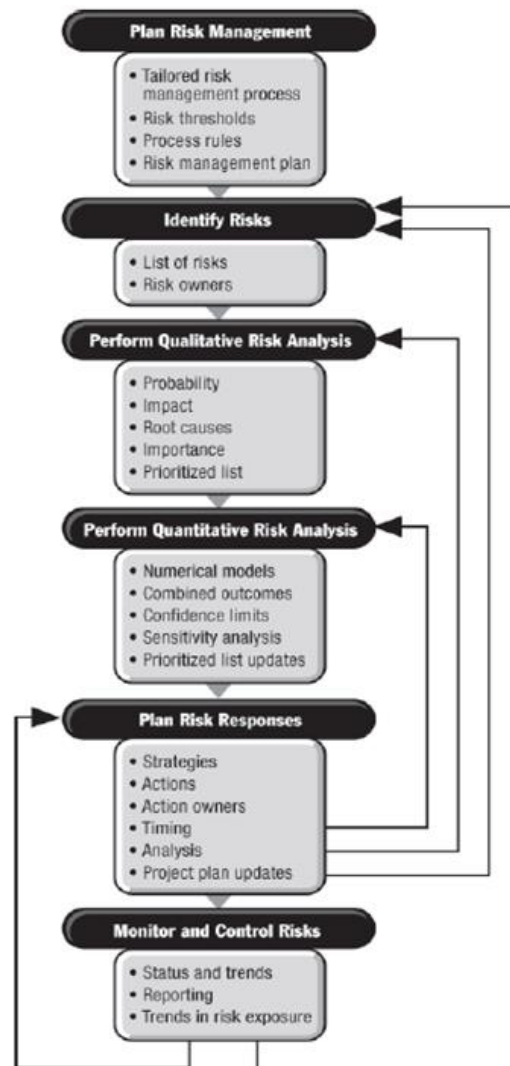
Source: Practice standard for project risk management, PMI 2009.

1.3.2. ISO 31000:2018 standard

Another project risk management standard is ISO 3100:2018. This standard was created by the International Organization for Standardization. The standard ISO 31000:2018 is applicable to any kind of field, where risk management is needed. This applies to project management as well. This standard is meant to develop the strategy for risk management in companies or project management processes. The revision of year 2018 was made to take into account ever growing and changes of various fields and how the risk management can be updated, to conform to the latest needs and trends in the market.

This standard is interesting in a way that it is similar to PMI standardization of risk in project management, but it is not certifiable and only provides guidelines, which can be tailored to specific

needs of a project or a company. The revised standard recommendations to create a strategy that commits to risk management by delegating tasks, supervisory function, authority, involving stake holders. This helps to ensure that proper force is delegated to stop a risk or determine factors for that risk and why it might occur. The model, by itself, is relatable to an open system that regularly exchanges feedback.

This standard is based on three main factors:

- Clarification of the objectives, tasks and key points of the organization or a project
- Assessment of the hierarchy structure
- Definition of resources meant for the risk management system

Figure 2 depicts how the three main factors correlate with each other and how one influences another.

Figure 2. *Correlation between three main factors in ISO 31000:2018 standard*
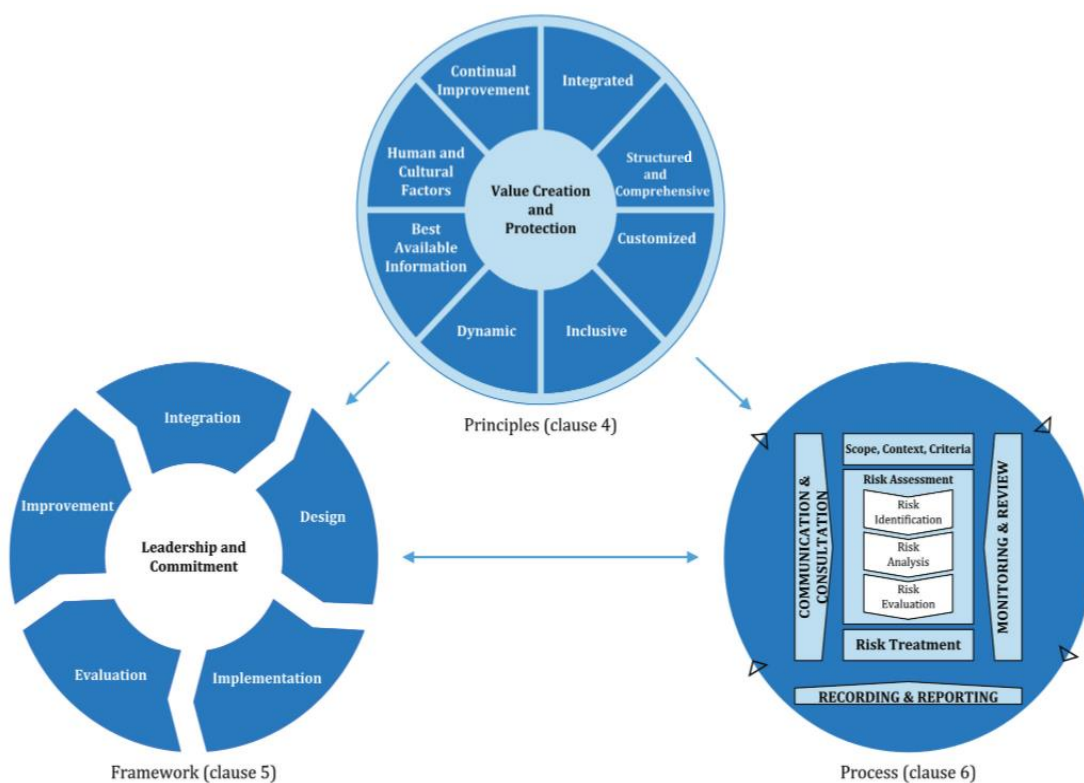
Source: ISO 31000:2018 Risk management — Guidelines.

1.3.3. International Institute of risk and safety management, ACP4 framework

Failures and risks are often unrecognized until it is too late, and most of the time, this happens due to employees or management's inability to control, recognize and communicate a risk. This is a huge pothole in the road to project success. Often situation is that several small events disturbs the flow of the project, management is not properly informed about it or it is taken to the board when the project is already affected to much by the entirety of small impacts and has fallen through or it is too late to do anything about it.

The framework idea is that everyone involved in project or risk management has to have a good understanding or skill set of risk control, risk communication and mitigation. Also, the company has to have a clear strategy for risk management, clearly defined responsibilities, empowered decision making and system for coordinating all of the events or processes that might occur.

This frame work was built by taking into consideration many different experiences from various fields, historical data analysis, consultations with various types of industries. This tool gives the ability for the company to be able to evaluate the skillset levels, competencies and other criteria of people who will be responsible for risk management, check what ability is strong in person, which one is weak. Depending on the framework, companies can determine what kind of skill needs to be strengthened in an individual. This frame can also be applied not only to individuals, but to companies as well. This is very helpful for companies' risk management development, because depending on the frame work, not only it can determine strong and weak points, but also analyze individual employees and train its staff to get rid of their shortcomings as a company.

IIRSM presents its framework in a generic way to ensure its compatibility to many various fields of industries, projects, individual evaluations for a benchmark and etc. The framework is divided into three main steps.

Table 2 briefly explains the three main steps of the frame work and how the levels are divided, by what criteria. Following the table, framework levels diagram shows and explains how these levels correlate with each other in the company, that uses this framework for risk management.

Table 2. *Main steps of IIRSM risk management framework*

● Operational	Knowledge and understanding with a bit of application
● Managerial	Clear application of knowledge
● Strategic	Reasoned advice and depth of complexity

Source: iirsm.org

1.4. Fundamentals of risk management in the IT sector

Risk management is more important than ever in today's IT projects. As already discussed in the previous chapter, risk management in the IT sector requires not only theoretical but also practical knowledge. During the literature analysis, it became clear that risk management is not necessarily based on standards, and other methods can be applied to manage risks, which are becoming more and more complex, thanks to the constantly evolving technologies and the development of the IT sector.

Micán Rincón et al. (2023) in his study "Project portfolio risk management" emphasizes that this sphere is based on formal knowledge, which includes various methodologies and combines them into one project portfolio management system. This analyzed study is based on bibliometric analysis and the authors of the study claim that more and more scientific research is applied specifically to the project portfolio and its selection. The relevance of this topic in Micán Rincón et al. tries to justify and emphasize the fact that this topic examines such factors as risk assessment and optimization strategies. In conducting this study, the authors tried to indicate the importance of risk assessment and management factor when taking a holistic view and understanding of project portfolio management.

On the other hand, Ika and Pinto (2023) advocate a multidimensional understanding of project success, including not only traditional indicators, but also the realization of benefits, stakeholder perceptions, sustainability and timing of results. Their four-dimensional model of project success provides a nuanced lens through which to view project management that includes the ecological effectiveness of projects and the collective approach of key stakeholders. This model prompts a re-evaluation of how success is defined and measured, suggesting that alignment with stakeholder values and the broader societal and environmental impact of projects are integral to the success of IT projects.

On the other hand, Ika and Pinto (2023) in their study defend the opinion that the success of the project is made up of several different levels and it is necessary to take into account each of them:

- The benefits brought by the project are measured;
- Stakeholders' approach to the project and its assessment;
- Sustainability of the product created by the project;
- Presentation of achieved results in a timely manner;

This model, compiled by Ika and Pinto, consists of four levels that are not included in traditional indicators of project success, such as deadlines, budget or scope, and provides a more detailed model for measuring project success that includes indicators such as the project's impact on nature or the collective attitude of interested parties to the project. In order to understand and apply this model, it is necessary to re-evaluate how project success is defined and evaluated in the IT context. This is especially relevant when one of the goals of the project is to meet the requirements of society or nature conservation during the implementation of IT project works.

Although the research conducted by both authors is different, the convergence of opinions in certain areas is clearly visible and points to the fact that today's approach to IT project risk management is more integrated and strategic. Although Ika and Pinto rely more in their study on a holistic definition of the success of the end products of the project, Micán Rincón et al. more closely examines the evolution of risk management and the perception and application of this process in the project portfolio, the results of both studies emphasize that, especially in IT projects, the risk management process is dynamic in nature and the essential contribution of this process in guaranteeing that the projects will not only be successful, but also look positive in the organizational or in the social context.

After analyzing these studies and the positions of the authors, it becomes clear that in today's IT projects, traditional risk management is no longer as effective when risks are identified and mitigated, and in order to ensure effective risk management, it is expanded beyond traditional understanding. Today, this process is of a strategic nature, which includes not only traditional risk management models, but also aspects such as long-term benefits of the project or public satisfaction with the project. Due to these reasons, it can be seen that the risk management process has become characterized by the ability to adapt to changing conditions, this process has more and more non-standard measurement or evaluation methods, and tries to be oriented towards the future, when the sustainability and social impact of IT projects is strongly emphasized

1.5. Successful IT risk management

In IT projects, as in any other project, the risk management process is of great importance. This process is designed and intended to ensure that the project will be managed and executed in such a way that risks are avoided or their impact on the project is minimized. This begs the question - what is successful risk management in IT projects? This issue will be further analyzed in the literature review to define how it is understood in the world of IT projects.

Here, for example, Schmidt (2023) states that in order to reduce the probability of risks in today's projects, it is necessary to take into account the lessons learned and study the historical data of risk management in projects of a similar type. The author of the study strongly advocates that with the analysis of historical data, which has been carried out in a systematic way, it is possible to identify in advance a large part of the risks that are repeated historically and prevent them immediately. Also, the study notes that the analysis of historical data can help create systems that facilitate risk assessment processes and create methods to mitigate these risks, thus positively influencing the success of the project by reducing the number of possible risks.

Another study was conducted by Ciric Lalic et al. (2022). In this study, the authors examine how various project management methods, be it the Waterfall method, be it the Agile method, or be it the hybrid model, influence the final success of the project and its factors. During the analysis, it became clear that this study emphasizes and evaluates the ability to quickly react and adapt to the changing situation. The authors of the study indicate that a dynamic team can be an essential success factor in an IT project. Also, it is noted that a properly selected project management methodology can have as much positive impact on project success as team dynamics.

Sadeh and others (2022) emphasize the influence of organizational support in IT projects risks management. During the study, it was found that in cases where top management supports project managers more, projects are more successful. Therefore, in order for IT projects to be successful, the organization must strengthen the involvement and support of top management

Combining the insights from these articles, successful IT project risk management is characterized by:

- The analysis of historical data and their application in existing or future projects aim to minimize the possible influence of negative risks on the outcome of the project.
- Appropriate selection of the methodology for a specific project is required, as well as the dynamics of the team and the ability to react to changes.
- Organizational support has a positive impact on risk management.
- In an effort to evaluate the effectiveness of the project risk management process, multiple evaluation methods are applied, which holistically cover the entire project and the footprint left by its final product in the organization or society.

Taking into account the already discussed aspects of the research analyzed in this section, we can conclude that in order to effectively manage risks in the IT sphere, the team must be dynamic, tend to adapt to changes, be able to analyze historical data, strategically look at the risk management process, and be able to properly select project management methodology, and organization must support project risk management.

1.6. Project success measurement and risk management success in IT

This topic is a constantly changing and developing research direction, depending on the development of the IT sphere. Many different opinions can be found in the literature regarding this topic, especially when it comes to measuring project success or the concept of risk management success.

Bosch-Rekveldt et al. (2023) highlight the wide range of research on project performance measurement, challenging traditional approaches to reconciling the tension between 'project success' and 'project management performance'. This special compilation highlights the importance of reliable and replicable methods for evaluating project performance, particularly in terms of accountability for public expenditure and financial sustainability of a commercial project. The paper highlights the complexity of performance evaluation systems, particularly in large and complex projects, and calls for more scholarship on the problematization of project success.

For example, Bosch–Rekveldt et al. (2023), in his research, analyzes how the concepts "Project success" and "Project management actions" interact with each other. The authors of this study reveal that it is extremely important to have solid project management methodologies that are based on experience and allow easy evaluation of project progress indicators. This is especially relevant when the projects are carried out in the public sector, and it is necessary to meet the budget requirements and to justify the expenses related to the project. Also, this study emphasizes that project progress assessment methodologies are naturally complex due to their specificity, especially when they are applied in large projects. For this reason, the authors of the study also recommend conducting more detailed research on this topic, so that it is possible to study this topic in more detail and create a complete picture.

Wenzel et al. (2021) note in their study that there is no clear dividing line between the concepts of "Project success" and "Successful project management", so in their study the authors examine the concept of success in a general sense. Also, this study proposes a rather interesting model, the general concept of success management, which states that success should be managed inseparable from the project, just like risk. Several nuances follow from this proposal - first of all, integrated success management should lead both the project and the executing organization towards a successful finish. The second aspect would be that, according to the authors, in order to ensure this process, appropriate project management methods must be chosen, and the goals and objectives of the project must be clearly defined, as improper definition of goals often leads to unsatisfactory final project products.

After conducting research analyses, it can be concluded that the success of risk management in IT projects can be characterized by:

- Based on the multi-layered nature of the project and the challenges of adapting measurement systems, one of the characteristics can be said to be "Performance Measurement Complexity"
- The relationship between risk management success and project success can be considered as another characteristic, since these concepts directly interact with each other.
- Next, one of the essential characteristics is the identification and understanding of critical success factors (CSFs).

To sum up the thoughts of this subsection, it can be said that in order to evaluate the success of the project and risk management, it is needed to have tools that are dynamic, able to assess all layers and nuances of the project, able to adapt to changing conditions, environmental impacts or project management methodology. Also, future research should further investigate and try to deepen the understanding of risk management and project success and try to improve the measurement tools for these factors.

1.7. The relationship between project success and risk management in IT

Determining the relationship between risk management success and project success requires exploring this area slowly and carefully, as it is a multi-layered concept. This relationship is also explored by Kallow et al. (2023) and Nordahl-Pedersen and Heggholmen (2023). In the study, these authors attempt to determine how successful risk management can directly influence the overall success of a project.

The study by Kallow and colleagues, although focused on the construction sector, provides insights that can be applied to the context of IT projects. Their work highlights the critical role of risk management strategies, including risk identification, monitoring and mitigation, in determining project success. The study reveals how the ability to manage and cope with risk acts as a connecting factor between these risk management strategies and overall project success. In addition, it is emphasized that the clarity and openness of risk processes increases the effectiveness of risk management in influencing the success of the project. The findings highlight the need for a holistic approach to risk management, with active risk identification and continuous monitoring as key components.

Although considering that the study focused on the construction sector, Kallow et al. (2023) many good aspects can be found in the work that can be applied in the IT sphere as well. This study examines how sustainable risk management strategies provide an opportunity to reduce the probability of risks, predict risks or control them in the context of project success. Also, it is emphasized that these risk management strategies act as a bridge between the project risk management process and the overall project success determination process. Additionally, Kallow and colleagues' research reveals that implementing sustainable risk management strategies increases risk transparency and openness, which directly impacts the effectiveness of the risk management process. In the findings of this study, we can see that the authors argue that a holistic risk management model is necessary for successful risk management in the context of proactive risk prediction and ongoing monitoring.

Nordahl-Pedersen and Heggholmen offer a different approach by examining the student-run project event Sidetrack. The study highlights the critical role of early planning, including well-structured ideation and concept development, in ensuring project success. The findings show that project organization, effective communication and a positive work atmosphere are key factors contributing to successful outcomes. This study highlights the importance of careful planning and organization in the early stages of a project to effectively manage risk.

Also, a study by Nordahl-Pedersen and Heggholmen presents this topic from a slightly different angle. The authors examined the student project "Sidetrack" and found that an essential component for the success of the project is a well-planned set of actions in advance, as well as a refined idea and concept of the final product. The conclusions of this study state that in order to achieve the success of the project, it is necessary to create a positive working atmosphere, an effective communication map and plan. This shows that in order to ensure successful risk management, not only the right strategy is needed, but also other essential project components such as planning, organization and human resources management.

Integrating the insights from these articles, several key themes emerge regarding project success and risk management in IT:

Summarizing the insights of this subsection, it can be said that there are several essential factors that directly influence risk management and project success:

- Strategic risk management - This is the chosen most appropriate risk management model for a specific project.
- Ability to overcome risks - This is a factor that determines how effectively the project team can deal with emerging risks to eliminate their impact on the project or minimize it.

- Early stage planning and organization – this factor shows that in order to effectively understand and manage the risks and success of the project, it is necessary to specifically define the requirements of the final product of the project, the concept, and the project management model in advance.

- Transparency of risk - this factor determines how well the risk is understood by the project team, how much it is communicated to interested parties, and what are the mitigation scenarios.

A common thread can be seen in the analyzed articles, which states that successful project risk management requires an organized, strategic and proactive approach to risk management. Effective risk management includes not only their identification or mitigation, but also points such as careful planning, effective communication and definition of project goals in the initial stages of the project.

1.8. IT project risk management case studies and industry-specific insights

This subsection analyzes and reviews specific examples of risk management from the branch of IT project management. This analysis aims to emphasize the multifaceted nature of IT projects and other nuances of risk management in this sphere.

Zaleski, & Michalski, R. (2021) focuses on the success factors of IT service projects, examining the interaction between traditional and Agile management methods. The study highlights four key factors influencing the success of IT service projects: agile techniques and change management, organization and people, stakeholders and risk analysis, and work environment. The study shows that both traditional and Agile management methods, which emphasize the role of stakeholders in achieving sustainable development goals, are significant for the successful management of IT service projects.

Vujović et al. (2020) research examines nuances that can turn into challenges in managing IT projects. In this study, the author insists on emphasizing the importance of careful planning and a correctly applied and effective, practical risk management model. Also discussed in this article is the fact that developing technologies are becoming increasingly complex, which in turn complicates projects and their risk management processes to ensure that the project will be implemented with quality and success.

Summarizing the insights from these articles, several key themes emerge:

- Comprehensive risk management: Successful IT projects require a holistic approach to risk management, integrating factors such as stakeholder support, technological innovation and sustainable development practices.
- Balancing traditional and agile approaches: effective IT project management involves combining traditional and agile methodologies, adapting them to specific project needs and context.
- Importance of stakeholder engagement: Stakeholder engagement and support is critical to project success, particularly in managing risk and aligning project goals with broader sustainability goals.
- Adaptation and continuous improvement: The rapidly evolving nature of IT requires continuous adaptation and improvement in project management and risk management practices.

From this analysis, there is a visible trend that IT projects require the ability to manage them dynamically, to apply various management methods at any stage of the project and to keep pace with evolving technologies. From these trends, it can be said that there is a need to constantly improve risk management processes, to examine technological development and possible risks arising from it, and to have an adaptive project management model.

1.9. Gaps in the literature

During the literature analysis, certain places where information was missing were highlighted. These areas indicate that future research could focus on the following topics in order to broaden the general horizons of IT project management:

Cloud computing and cyber security. The literature examined during the analysis mainly studied traditional risks and their management, advocated the development of the latest technologies and the resulting risks, but unique risks were not mentioned or mentioned briefly, in a few words. Currently, in the IT world, more and more organizations are choosing cloud infrastructure for convenience, but the resulting cyber security risks are still not widely researched and described.

Integration of Agile and traditional methodologies. Currently, hybrid IT project management models are being talked about more and more often, but there is not enough literature that analyzes the integration of traditional methods and Agile methodologies.

Stakeholder engagement and sustainability. A common study on risk management or project success mentions the factor "Stakeholder Engagement" and "Sustainability", but does not

extensively describe what these factors are, what they are based on, and how to use them to ensure that project risk management is successful.

The influence of organizational culture on risk management. This is a relatively new factor that became relevant when the IT world began to develop rapidly and technologies began to directly influence not only the success of the project, but also the success of risk management. Research into this factor could examine indicators such as the impact of organizational culture on successful risk management and its effectiveness in IT projects.

Quantitative analysis and empirical research. Although there are many different risk management models in the literature, currently there is not enough literature to support the effectiveness of these models.

Adapting to rapid technological change. There are many places in the literature that adaptability is necessary in managing IT projects, but there is not much detailed research on how to develop and apply an adaptive project management model that can be adapted without changing fundamental aspects in the course of rapid technological development.

Risk management in smaller IT projects. Also, during the literature analysis, it was observed that most of the literature deals only with medium and large IT projects. Mega projects are also mentioned in some places, but there is no mention of small-scale projects and their management.

In summary, these topics present an open opportunity to enrich the horizons of IT project management through in-depth research. This will not only help to deepen the understanding of the success of the IT project, but also of risk management and its success. By deepening the understanding of these places, it will be possible to prevent new, as of yet unrecognized risks.

2. METHODOLOGY OF THE RESEARCH

2.1. Research method

It was decided to use the principle of qualitative research to conduct the research. This model was chosen due to its ability to go deeper into the answers provided by the interviewee and extract more detailed information. This study will interview project managers and other personnel involved in project management at Company X.

2.2. General information about Company X

Company X has been successfully operating in Lithuania and Latvia for more than 25 years. The company's clients are large and medium-sized companies.

The main field of activity of company X is computer networks, cloud computing and IT security solutions, as well as IT audit, consulting and IT maintenance services. The services provided by the company include system design, selection, installation, maintenance and management of technical solutions that meet the requirements. Professional IT security consulting services are also provided to clients. Services cover the entire cycle from customer needs analysis, design, installation, maintenance, management to after-sales service and professional technical support.

2.3. Research model

This study will be based on three main hypotheses that will be examined during the survey:

Hypothesis 1 (H1). There is a direct positive relationship between organizational support and project success. This hypothesis states that in the presence of organizational support it is easier to manage risks and achieve project success. This support can come from both direct colleagues and top management.

Hypothesis 2 (H2). There is a direct positive relationship between the flexibility of risk management practices and project success. This hypothesis states that the project team's ability to adapt to changing conditions directly translates into the risk management process, which results in the team being able to quickly adapt and reassess risks, thus ensuring that the project's progress will be undisturbed or minimally affected and thus it is ensured that the final result of the project will be positive.

Hypothesis 3 (H3). Organizational support positively influences the flexibility of risk management practices. This hypothesis states that with sufficient organizational support, the project team can adapt more quickly and easily to sudden changes in project conditions, ensuring minimal deviations or even eliminating deviations from project goals.

A pattern similar to the "Iron Triangle" is visible in the research model. This means that all three hypotheses directly or indirectly affect each other. For example, the first hypothesis (H1) can have a direct influence on the success of the project, but at the same time it can be affected indirectly, through the second hypothesis (H3), it provides organizational support to ensure the effectiveness of the risk management process. These interrelationships are provided as a model and basis for the study.

Figure 3. *Research model scheme*
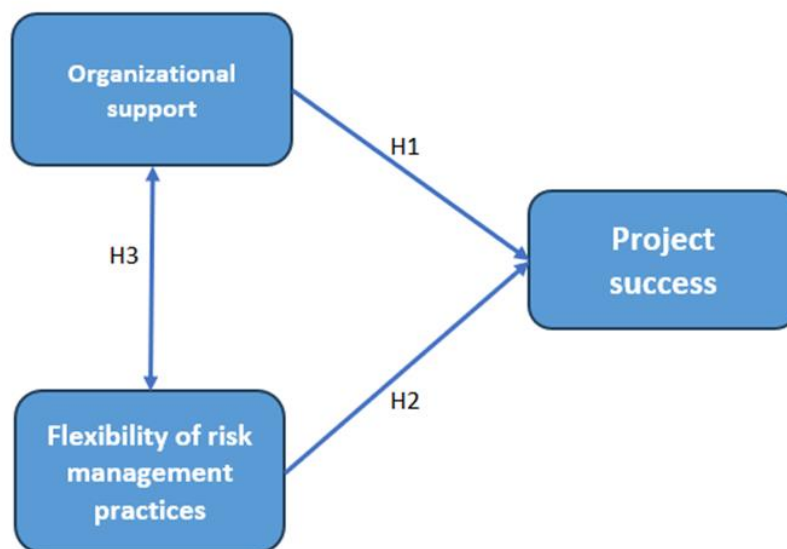
Source: Composed by the author

When testing the sustainability of the hypotheses, the following risk management factors will be analyzed:

- Comprehensive risk management. The aim is to investigate how risks are managed in company X in successful projects.
- Project management methodologies. The goal is to analyze what methodologies are used and how they are applied in the practice of company "X".

- Stakeholder engagement. The goal is to investigate how stakeholders are managed in company "X" and whether they are involved in risk management in real terms.
- Adaptation and development of risk management models. The goal is to analyze how company "X" applies various risk management models, and how it adapts them to real changing conditions.

2.4. Data collection, sample selection and data analysis

Data will be collected through semi-structured interviews with Company's X project managers, head project manager and chief technical officer. These roles are selected for their direct involvement and experience in risk management in IT projects, making them a rich source of practical insights and professional solutions. The interview will aim to explore their experiences, challenges, strategies and perceptions of risk management in IT projects.

The interview guide (Table 3) will include open-ended questions that will encourage detailed responses and allow participants to freely share their experiences and insights. Questions will focus on their approach to risk management, their experience with specific risks in IT projects, and their views on effective risk management practices.

Table 3. *Interview guide*

Theme	Detailed questions
1. Project management experience	• Briefly describe your experience in IT project management. • How long have you been involved in IT project management?
2. Understanding the success of the project	• Briefly describe how you understand project success • What are the critical project success factors you observe in your company's project management? • What other criteria do you consider when evaluating the success of a project? • How is risk management integrated into the overall monitoring of project success?
3. Risk management practices	• What risks do you usually face in IT projects? • How do you typically identify and assess risk in your projects? • How do you apply risk mitigation strategies in project management?
4. Organizational support	• Does the support (non-support) of the organization affect the risk management of IT projects?

Theme	Detailed questions
	• Can you share an example where organizational support (or lack thereof) had an impact on project outcomes? • What form of top management support do you think is most valuable to project risk management?
5. Challenges and solutions	• What are the biggest challenges you face in IT project risk management? • Do you use any innovative risk management strategies in your operations to overcome these challenges? • How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing? • Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?
6. Risk management success factors	• In your opinion, what are the key success factors for IT project risk management? • How do you monitor and measure the success of your project risk management efforts?
7. Lessons learned	• From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects? • Maybe there were events or situations in your experience that changed your approach to project risk management?
8. The future of IT project risk management	• In your opinion, how will IT project risk management develop in the future? • What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?

Source: Composed by author

The selection of participants was carried out using the method of target audience selection. 5 respondents who are directly related to project management in this company were selected (Table 4).

Audio recording equipment will be used during the interview, with the consent of the respondent. Later, the recording will be listened to and summarized. Next, the data will be analyzed and grouped into themes. After dividing the data into topics, this data will be analyzed again, the necessary aspects will be collected, and a research report will be prepared to present the collected data.

Table 4. Characteristics of participants

Participant	Role in Organization	Experience in project management
No 1	Head Project Manager	15 years
No 2	Project Manager	5 years
No 3	Project Manager	3 years
No 4	Project Manager	5 years
No 5	Chief technical officer	8 years

Source: Composed by author

2.5. Ethical considerations

For reasons of confidentiality, all participants will be informed and confirmed that the interview will be recorded, and full confidentiality will be ensured on the part of the researcher. Also, the objectives and topic of the research will be presented to the participants. Participants will also be informed that their participation in the study is voluntary and that they can withdraw from the study at any time, and upon request - all collected data will be destroyed and not used in the study.

2.6. Limitations

The main limitation of this study is the confidentiality agreements limiting the responses of the respondents. Due to the limitations imposed by these contracts, it is possible that respondents' answers may not be detailed enough to reveal more detailed information about the project itself or the details of its management

.

3. RESULTS OF THE RESEARCH

This section presents the results of the analysis of the respondents' answers. At the beginning, during the modeling of the study it were planned to conduct interviews with the respondents, but during the course of the study, a situation arose that it was not possible to conduct all of the interviews, so two respondents answered the questions by filling out the questionnaires immediately in English. The answers, given by other respondents, were summarized and translated to English. All completed questionnaires presented in the Annexes.

3.1. Project success understanding in the Company X

All respondents, answering the question of how they understand the success of the project, first emphasized that a successful project is one that fulfills the main three conditions - it is implemented within the set scope, within the allocated budget and within the set deadlines (Figure 4). Also, the project is considered successful if the client's expectations have been met and he is satisfied. Two respondents said that the quality of the project is important, one - the sustainability of the solutions, i.e. the ability to integrate with new technologies in the future, the profitability of the project and the growth of the team's competence. It was also mentioned that client satisfaction can be expressed in the fact that the client will return to the company again with a new project or bring in new clients.

**Figure 4.** *Project success description*
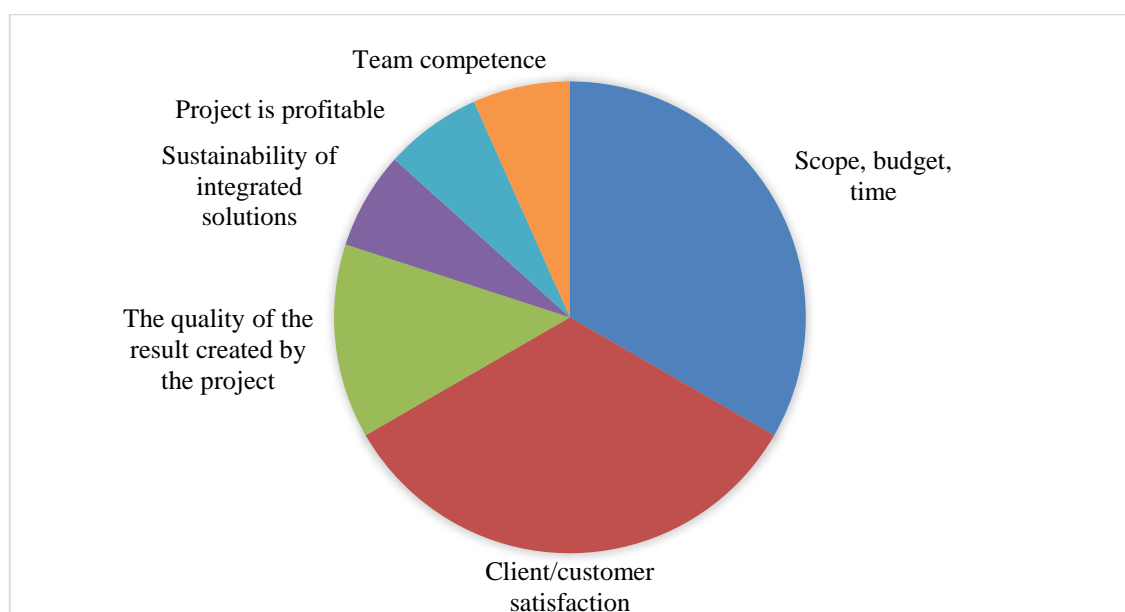
Source: Composed by author

This description of project success largely correlates with the description presented in the literature review. The literature review showed that the success of the project is usually defined by the team competence and collaboration, leadership and clear requirements, stakeholder engagement, goal achievement, quality assurance, knowledge generation. The company places a little less emphasis on management and leadership when it comes to project success.

Accordingly, in Company X, project deviations from schedule and/or budget and client satisfaction are considered critical project success criteria. In second place are project scope deviations and effective communication with stakeholders. Respondents also named a number of other factors that they consider critical, but there is no unanimous opinion on them, as these factors are mentioned only once (Figure 5). Other factors that have been identified as additional, not critical, to the success of the project:

- Quality of the created product.
- New relationships built or deepened existing ones.
- Probability of business continuation with the client.
- Probability of referrals and leads to new clients/projects.
- The ability to integrate with new technologies in the future.
- Internal costs/ROI.
- Client satisfaction.

Figure 5. *Critical project success factors in Company X*
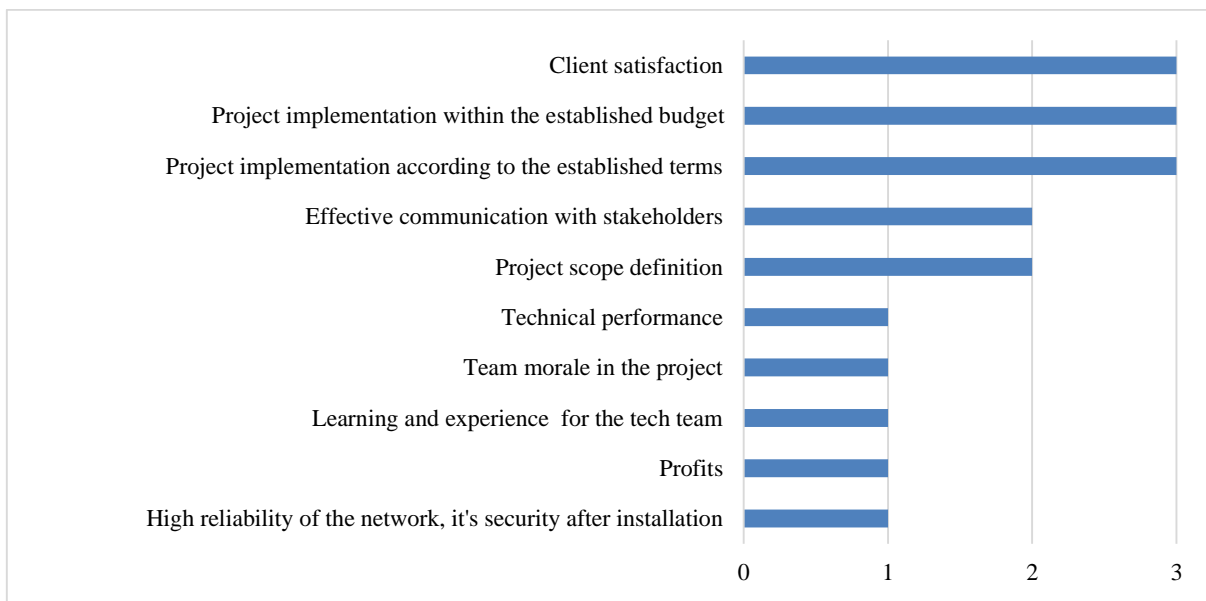
Source: Composed by author

When evaluating these factors, it is immediately noticeable that some of them overlap with critical project success factors, such as client satisfaction or product quality. This allows us to assume that Company X does not have a unified perception of project success and each project manager understands it based on his own experience. Therefore, it would be appropriate to have one systematic list of critical factors by which the success of the project would be measured. This list of factors should not be very extensive, as scientific articles show that a few of the most important factors are preferred.

These factors practically correspond to the factors most often mentioned in the literature, which measure the success of the project - compliance with goals and objectives, client satisfaction, strengthening of knowledge or competences in the organization, timeliness of the project and compliance with the budget. It is interesting to note that in Company X project timeliness and budget compliance are identified as the most important success factors, while in the literature they are considered less significant compared to quality or stakeholder involvement.

3.2. Organizational support impact

All respondents unequivocally agree that organizational support is very important for both project success and risk management in the project. During the interview, various examples were given, how the lack of organizational support led to deviations from the project budget or deadlines, and other problems.

During one project, the project was extended by three months and the budget increased by 3 times due to untimely decisions of the top management. During another project, "one of the stakeholders insisted on buying new product from different vendor instead of expanding already existing solution which has expanded project scope and project failed as there was no budget in the project for such procurement". Another example is where management decisions led to delays in implementing security solutions on the network, resulting in a data breach. There have also been cases in practice when several IT projects were implemented simultaneously in the organization and the same employees participated in all of them, so there was a risk that none of the projects would be completed on time.

Thus, practice shows that organizational support has a significant impact on the success of projects. One of the most important elements in risk management is resources, both human and financial. If the organization's management does not allocate sufficient resources to the project, there is a risk that the project will not be implemented, implemented poorly or incompletely. Another important aspect is the involvement of all levels of employees in risk management. Risk

owners should continuously manage assigned risks by responding to emerging threats in a timely manner and implement planned risk mitigation measures. Management's attention and employee involvement are also important. "If managers pay attention to the project risk management, are interested and involved, then appropriate decisions will be made, and employees will feel that the senior management care, then employees will also pay more attention to the risk management." Employees can share their experience and knowledge, contributing to risk management and project success. Employee involvement can be useful at various stages and areas of a project, such as managing project scope, selecting technical solutions, or providing legal advice on compliance. Cooperation with all interested parties is also critically important, primarily, of course, the client, but also equipment suppliers, service personnel, and external institutions.

Figure 6 presents the forms of organizational support, identified by the respondents that affect project success and risk management.

Figure 6. *Organizational support*
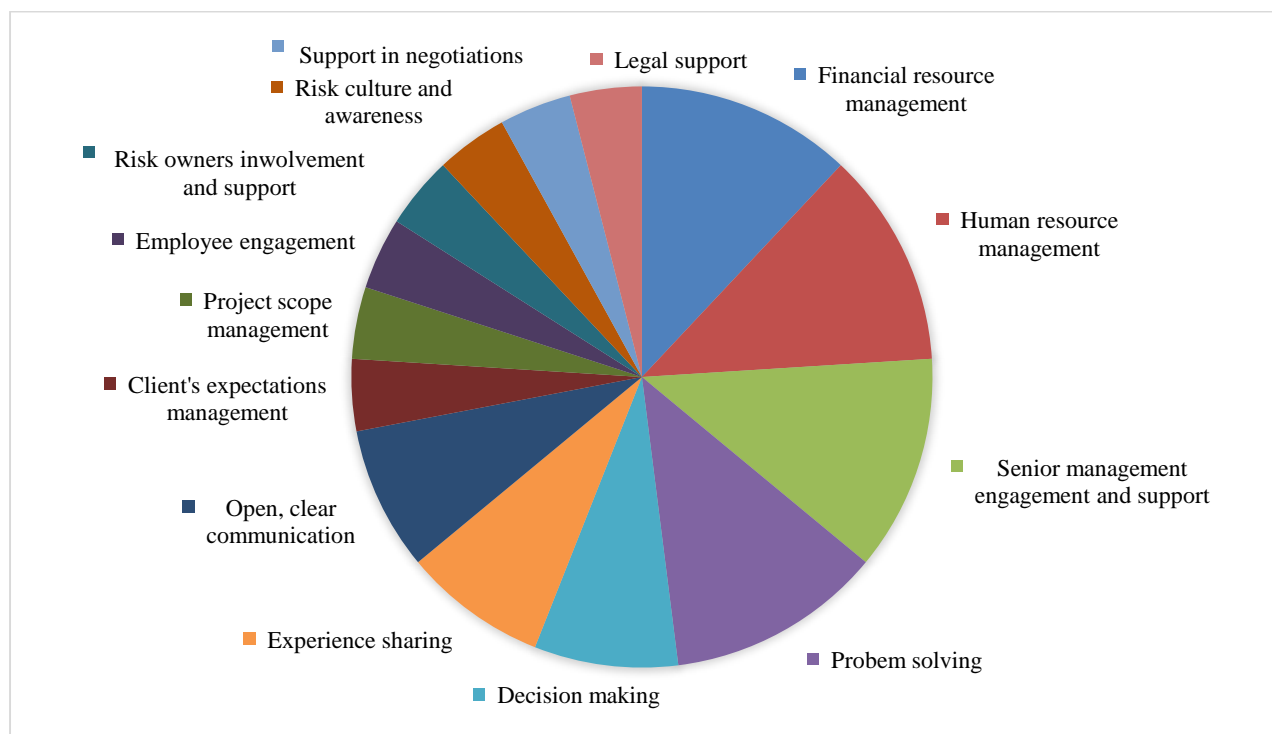
Source: Composed by author

Summarizing the information in this section it can be stated that the project will be successful if the organization has a holistic approach to the risk management, employees are competent, engaged, share their experience and knowledge, the top management plans and allocates

resources for risk management and makes timely decisions, there is continuous cooperation with interested parties.

3.3. Project risk management practices in the Company X

In the company, risk management is an integral part of project management. According to one of the respondents, "this is one of the most important techniques in project management, especially when we are working on production environment in some big infrastructures". "Risk monitoring is carried out as a measure of the implementation of the entire project, from planning to completion. Continuous review of risks and timely implementation of planned risk mitigation strategies are essential to achieving project objectives", says another respondent.

To identify risks a working session is organized at the beginning of the project. During the session, the risk lists of previous similar projects and the register of lessons learned are analyzed. A risk management document is prepared for a specific project, it specifies all identified risks, their assessment (probability and impact), planned risk mitigation measures, risk owners. Depending on the nature of the project, other stakeholders such as suppliers, equipment representatives, or lawyers may be consulted to determine risks. Once the risk management document is prepared, it is presented to the entire project team and the client. In order for the project to be successful, it is especially important to involve the client in risk management as early as possible.

The most frequently identified risks in IT projects are indicated in Table 5, the number of respondents who mentioned them in their answers is marked in parentheses. Risks can be divided into several typical groups - risks affecting project scope, budget and deadlines, technological risks, risks related to employee competence and stakeholder management, and legal risks. As can be seen from the data presented, most of the risks are related to the critical success factors of the project - project scope, budget and deadlines. There are fewer technological risks, but they are perhaps the most important, as even four respondents mentioned the risk of technological compatibility of the infrastructure, which shows that this risk occurs most often in projects. The second most frequently mentioned risk is cyber security. Several risks related to competence were also mentioned - this could be both the lack of technical experts of Company X and the lack of competence of the client's employees. Despite the fact that stakeholder management risks were mentioned only 1 to 2 times by the respondents, it was emphasized that the management of these risks is important for the success of the project. A couple of legal risks were also mentioned, which become particularly relevant when working, for example, with personal data.

Table 5. *Types and examples of IT project risks*

Risk of critical success factors	Technology risk	Competence risk	Stakeholders management risk	Legal risk
Delays in project deadlines (3)	Technological compatibility (4)	Shortage of tech experts (1)	Supplier management (2)	Compliance with the legal environment (1)
Budget overruns (3)	Cyber security risks (3)	Clients do not have strong IT administrator, that can go head-to-head with our tech personnel (1)	Procurement delays (1)	Data protection(1)
Unrealistic timelines and deadlines (2)	Sudden changes in solution design or functionality (1)		Stakeholder management (1)	
Not clearly enough defined scope can result in additional efforts (1)	Data security (1)		Communication (1)	
Fulfillment of client needs (1)	Clients does not have documentation of their own infrastructure (1)			
Impossible client's expectations (1)				
Clients do not know their network which can result in additional analysis and tasks not defined in the agreement which can result in additional costs and time delays (1)				

Source: Composed by author

One of the most common challenges in IT projects is related to rapidly developing technologies. As client's infrastructure does not change as fast as the latest technology, integration and compatibility issues between old and new systems often arise. It is necessary to evaluate this when choosing the most appropriate technological solution for the client. As technology evolves, cybersecurity becomes critically important.

Company X has a security operations center (SOC) in its structure. This SOC is responsible for cyber security requirements, their constant review, application of the latest technological security solutions and compliance with legal requirements. The SOC develops security protocols that all project managers must follow. Also, SOC advises project managers during risk identification, offers suggestions on risk mitigation strategies. Company X usually uses encryption, access control and secure coding to mitigate security risks.

Another common challenge is increasing the scope of the project. This risk arises from unclear and/or incomplete client's requirements and needs. In the course of the project, additional wishes of the client to include more functionalities appear. Also, may arise problems, the solution of which requires additional technical or programming solutions. All this leads to higher time needs, and the project budget grows accordingly. The management of this risk involves the cooperation of stakeholders, high-quality clarification of the client's needs at the very beginning of the project, and the use of expert experience in the preparation of technological solutions.

Once risks are identified, mitigation strategies are planned. The company does not have a written approved process for developing risk mitigation strategies, but there are unwritten agreements in place. The project team organizes working sessions during which the risk registers of previous projects and information on lessons learned are reviewed. Risk mitigation actions are selected based on the level of the risk. "The greater the risk, likelihood, or impact is, the greater the focus on risk mitigation", says one of the respondents. Depending on the nature of the risk, appropriate risk mitigation measures are selected, the balance of possible damages and costs is assessed. Expensive solutions will not be planned to manage small risks, the greatest attention is paid to critical risks.

A flexible approach is used to manage risks during the project. Periodically, once every 1-2 weeks, the project team meets and reviews all risks. If necessary, if unforeseen risks suddenly arise, the team can meet unplanned, it is important to react quickly to all situations. During periodic meetings, new risks that have appeared are discussed, mitigation actions are planned, the effectiveness of existing risk management is discussed, and new mitigation actions are planned if necessary. "For example, when a client was implementing a cloud-based CRM, the project had to reassess data privacy risks. This risk was already identified at the planning stage, but it was

necessary to choose more effective measures to reduce it, because the planned ones were not enough." Another project required a review of risk reduction strategies after the legal regulation of that area changed. If the risks are no longer relevant, they are removed from the risk management plan. When risk management strategies are changed, it is important to inform all interested parties in a timely manner so that the plans do not remain only on paper.

Other solutions are sometimes applied. One respondent said that for a complex multi-infrastructure migration project to the cloud, the team developed a large risk management document that covered all migrations. However, over time, the plan proved ineffective. The team then focused on the top five risks that were relevant to all migrations and worked on all other risks on a case-by-case basis.

Regarding risk management in the Company X, a number of factors were listed that affect risk management in IT projects (Figure x). According to the respondents, active identification of risks, planning of mitigation strategies, continuous review and updating of risks, and involvement of stakeholders in risk management have the greatest influence on the success of risk management. Project team and client involvement in risk management, organizational support in project risk management, and project team experience and expertise are ranked second in terms of importance. Less important factors include the use of technical solutions, agile project management and the integration of lessons learned into risk management.

Figure 7. *Risk management success factors*
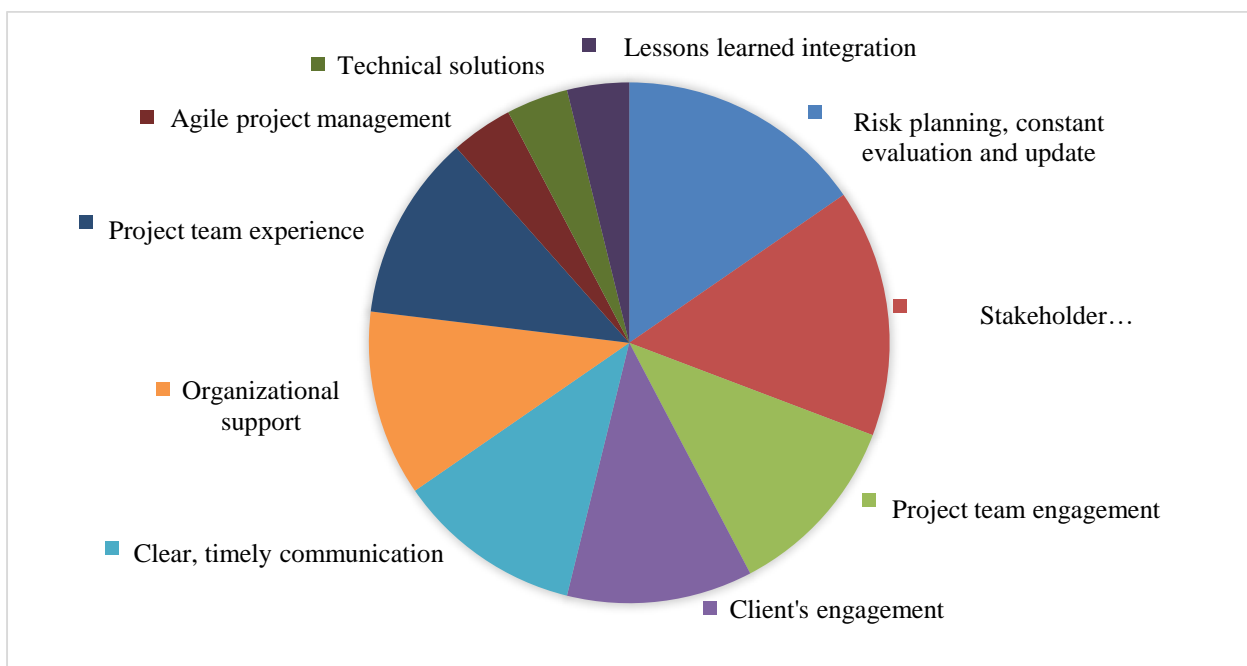
Source: Composed by author

However, to the question of how to measure the success of risk management, very different answers were received, which shows that the Company X does not have a unified approach on this issue. According to two respondents, risks are managed successfully, "if risks remain in risks documents without turning into issues". According to other respondents, the success of risk management could be measured by how many risks were successfully mitigated, by the minimum amount of unplanned downtime, whether project objectives were met without deviations, and what type of feedback was received from stakeholders.

The experience of the respondents shows that risk management is very important in achieving project objectives. Timely identification of risks and their proper management saves time and effort, eliminating potential problems in the future. If the culture of risk-based thinking is promoted in the organization and risk management becomes the responsibility of the entire team, not just the project manager, this raises risk management to a higher level. Simultaneously, emphasis is placed on involving all stakeholders in risk management as early as possible.

Project success is influenced by the speed and flexibility with which an organization can respond to changing circumstances to manage emerging risks. The specificity of IT risks is emphasized - "everything can go wrong at any given moment. IT projects are specific in such a way that they have many common risks, but each has a different angle to the same risk and you have to analyze each risk separately in each project, even if the risk and project are basically identical". As proof of this statement, the respondent gives an example when during the implementation of a typical project "during the patch, auto-update service somehow updated the software during migration and this update, due to migration processes, corrupted the whole database. We had to spend quite some time fixing the databases and researching why the auto-update had initialized by itself, since it was disabled beforehand." This incident resulted in a significant additional need for working time, although all risks were identified in advance and measures were taken to manage them. Later, additional specific tools were acquired to reduce this type of risk.

Summarizing the information above, it can be stated, that although the risk management process in the Company X is not described, it is taking place and partly meets the requirements of the PMI project risk management practice standard, except for the "Plan risk management" step (Figure 1). In order to achieve a higher quality of project risk management, it would be appropriate for the Company X to consider the full implementation of this standard in its activities and to think about the standardization of the risk management process. By agreeing on unified risk management success factors and their monitoring, it would be possible to compare the impact of project risk

management on project success. These comparisons would enable to use the best risk management practices for project management in the future.

Since all risk management is thinking about the future, we asked the respondents how in their opinion, risk management of IT projects will develop in the future and what competencies would be necessary for project managers in this area. According to the respondents, most of the factors that could affect the risk management of IT projects will be related to the latest technologies (Figure 8).

Accordingly, project managers will also need knowledge in these areas. Cyber security, knowledge of cloud technologies and possibilities of using AI are emphasized the most. Respondents also emphasize that the project manager must know the field in which he works, be interested in the latest trends and technologies in the field. Despite everything, soft skills – team leadership, communication, stakeholder management, problem solving, resilience, and etc., are still important for successful project and risk management. Thus, one of the elements of successful risk management, both now and in the future, will be the competence, knowledge and skills of project managers.

Figure 8. *Factors that will influence IT project risk management in future*
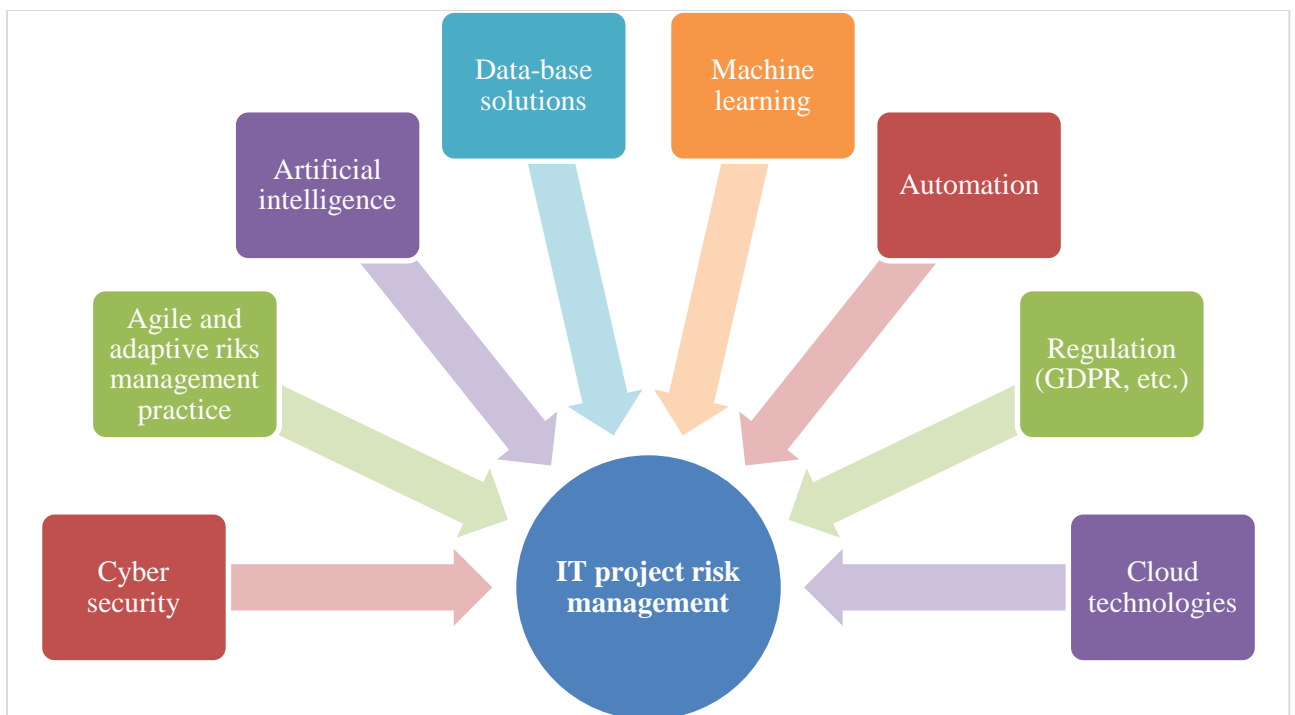
Source: Composed by author

Comparing Company's X risk management with the insights provided in the literature review, it can be seen that Company's X risk management is not yet strongly future-oriented, where project sustainability is taken into account. Although the beginning is already there, when assessing the risks, it is planned that the implemented solution will have the opportunity to integrate with the latest technologies in the future. Project management agility and learning from the past are also important for successful risk management. Company X successfully applies both of these elements in its activities.

4. CONCLUSIONS AND RECOMENDATIONS

In this study, the risk management system of IT projects implemented by Company X was analyzed and three hypotheses were tested:

Hypothesis 1 (H1). There is a direct positive relationship between organizational support and project success.

Hypothesis 2 (H2). There is a direct positive relationship between flexibility in risk management practices and project success.

Hypothesis 3 (H3). Organizational support positively affects the flexibility of risk management practices.

When testing the hypotheses, it was assessed how the success of the project is influenced by holistic risk management, the combination of traditional and agile methods, and the engagement of stakeholders.

The analysis of Company's X performance showed that the organization's support in risk management, both directly and indirectly, can lead to the success of the project. The project will be successful if organization has a holistic approach to risk management, employees are competent and engaged, shares their experience and knowledge with each other, top management plans and allocates resources for risk management, makes timely decisions. All these factors directly contribute to the success of the project and have a positive impact on risk management, enabling project teams to respond flexibly to emerging risks and manage them properly.

Risk management analysis showed that risk management directly determines the success of the project. In Company's X projects, the most risks are related to the critical success factors of the project – scope, budget and deadlines, while considering technological, cyber security risks as the most important ones. Stakeholder management risks are mentioned less frequently and are not rated as critical. Project success is directly influenced by the speed and flexibility of risk management process, with which the project team responds to changing circumstances to manage emerging risks. If necessary, the project team can discuss risks in an unplanned manner, the emphasis is on prompt and timely response to emerging risks. Also, making changes to risk management process in an ongoing project is considered as an adequate action if current risk management process is proven ineffective.

The research shows, that in company X, active identification of risks, planning and creation of mitigation strategies, continuous review and update of risks register, involvement of stakeholders in risk management process have the greatest influence on project success. Also important factors

are team and client involvement in risk management, organizational support in project risk management, and project team experience and expertise in the field of project.

Analyzing the project and risk management of Company X, several suggestions for improvement were formulated.

Company X does not have a unified understanding of project success, each project manager interprets it based on his own experience. Therefore, it is recommended to have a common list of critical success factors which should be used to measure the success of the project. Based on the literature review, it is suggested that this list should be kept short, but periodically reviewed and updated to reflect the latest trends in project management.

Another important aspect that should be addressed is stakeholder management and satisfaction. Although the respondents in their answers stated that it is important for both project success and risk management, it could be understood that this factor is not considered as critically important. Meanwhile, the latest trends in project management consider stakeholder satisfaction as one of the critical success factors. Therefore, it is recommended to include the satisfaction of stakeholders among the critical factors when compiling a list of project success criteria.

The risk management process at Company X is not described, but it is in place and largely meets the requirements of the PMI Project Risk Management Practice Standard. In order to achieve a higher quality of project risk management, it would be appropriate for the company to consider the full implementation of this standard in its activities and to think about the standardization of the risk management process. By agreeing on unified risk management success factors and their monitoring, it would be possible to compare the impact of project risk management on project success. These comparisons would enable the use of best practices for risk management in the future.

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ANNEXES

Annex No 1.
Interview No 1.

1. Project management experience
- *Briefly describe your experience in IT project management.*
- *How long have you been involved in IT project management?*

I have been working as a project manager for more than 5 years. Basically, I work with network infrastructure upgrades projects, implementation of wireless solutions, as well as solutions for the integration of security in the network.
I managed projects related to the implementation of new network architectures, including wired and wireless components, and ensured their compatibility with the existing IT infrastructure.
I started working as a network engineer, then moved to a project manager role. My responsibilities include project planning, resource management, vendor relationship management, and coordinating technical project deliverables with clients.

2. Understanding the success of the project
- *Briefly describe how you understand project success.*

A successful project is one that is implemented within a defined scope, with an assigned budget, within a defined time frame. The quality of the result created by the project and the satisfaction of the users are also important.

- *What are the critical project success factors you observe in your company's project management?*

The most important project success criteria could be:
- Project scope definition.
- Effective communication with stakeholders.
- Project implementation according to the established terms.
- Project implementation within the established budget.
- High reliability of the network and ensuring its security after installation.

- *What other criteria do you consider when evaluating the success of a project?*

When evaluating the success of the project, the quality of the created product is important to me - the long-term stability of the network and adaptation to future technological advances.

- *How is risk management integrated into the overall monitoring of project success?*

Risk management takes place throughout the project. Already at the planning stage, possible risks are identified, and their management actions are planned. During the implementation of the project, the list of risks is constantly reviewed, if necessary, new risk management actions are adjusted or included.

3. Risk management practice
- *What risks do you usually face in IT projects?*

The most common risks are delays in project deadlines, budget overruns, procurement delays, technological compatibility, cyber security risks.

- *How do you typically identify and assess risk in your projects?*

Risks are determined individually for each project. Risks are identified at the beginning of the project, registered in a dedicated document, risk mitigation actions are planned. Risk management plan is discussed with the team and the client. During the project, risks are reviewed and updated, irrelevant ones are removed, risk management actions are reviewed and, if necessary, updated.

- *How do you apply risk mitigation strategies in project management?*

Risk mitigation strategies are not developed individually. The project team reviews the project plan, risk register, lessons learned and accordingly identifies project risks and discusses their management actions.

4. Organization support
- *Does the support (non-support) of the organization affect the risk management of IT projects?*

Organizational support is very important. Top management ensures availability of resources and facilitates quick decision making. The head of project managers, other project managers and technical staff, by sharing their experience, can help both in identifying project risks and in planning actions to reduce them.

- *Can you share an example where organizational support (or lack thereof) had an impact on project outcomes?*

I had one network upgrade project where the head of the client's IT department changed during the implementation of the project. This had a strong impact on the project deadlines, as not enough time was allocated to the project from the client's side. Since there was no IT manager, it was difficult for me to communicate with the client's representatives in the project, there was no one who could make decisions, so we had big delays.

- *What form of top management support do you think is most valuable to project risk management?*

Timely and quick decision-making, appropriate allocation of resources

5. Challenges and solutions
- *What are the biggest challenges you face in IT project risk management?*

The biggest challenges are keeping up with rapidly developing network technology innovations, managing cyber security risks and integrating complex new solutions into existing infrastructures.

- *Do you use any innovative risk management strategies in your operations to overcome these challenges?*

Company uses agile risk management method to have fast and up to date reaction to rapidly changing situations. Also, there are some technical tools to be used, for example, network monitoring tool for potential issues identification.

- *How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing?*

The company has a security operations center. All project managers must follow safety guidelines. There is also a lot of attention for implementation of advanced security protocols.

- *Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?*

I didn't have such examples in my practice.

6. Risk management success factors
- *In your opinion, what are the key success factors for IT project risk management?*

Successful risk management of IT network projects depends on active planning, effective stakeholder involvement, good communication and agile project management.

- *How do you monitor and measure the success of your project risk management efforts?*

We measure the success of project risk management by the number of identified risks that have been successfully mitigated, as well as by the minimum amount of unplanned downtime and feedback from post-implementation reviews.

7. Lessons learned
- *From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects?*

I can say from experience that it is very important to anticipate changes and be ready to adapt quickly. It is also critical to foster a culture where risk management is a shared responsibility, not just the responsibility of the project manager. Communication at all levels of the project team is also important.

- *Maybe there were events or situations in your experience that changed your approach to project risk management?*

I did not have such examples in my practice.

8. The future of IT project risk management
- *In your opinion, how will IT project risk management develop in the future?*

I believe that in the future, a lot of attention will have to be paid to cyber security risks, as well as the need for more agile and adaptive risk management practices.

- *• What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?*

In the future, IT project managers will have to be well versed in new network technologies, cyber security and cloud solutions, and knowledge of AI will be required. They will also need to be familiar with agile methodologies and have strong analytical skills.

Annex No .
Interview No 2.

1. Project management experience
• *Briefly describe your experience in IT project management.*
• *How long have you been involved in IT project management?*

I have been working in IT projects for around 5 years already. In my years of work as a PM, I have managed various IT projects from small scale to large scale with multiple clients and parties involved. As for spectrum of the projects - I have managed IT projects that include hardware projects, cloud, migration, and software development projects.
I have around 5 years of direct experience in various projects from small to big.

2. Understanding the success of the project
• *Briefly describe how you understand project success.*

I understand project success as an entirety of a multitude of factors. Some of them would be:
- Client is satisfied with the project's outcome and would come back to us with another project or refer us to a new clientele.
- The project is finished on time and is profitable.
- The project is useful to the company and aligns with its course.
- The project gives the team some new experience, learning possibilities or deepens understanding of some already existing things, for example computer networks.

• *What are the critical project success factors you observe in your company's project management?*

- Client satisfaction
- Profits
- Learning and experience gathering for the tech team.
- Timeline
- Team morale in the project

• *What other criteria do you consider when evaluating the success of a project?*

As for other criteria, it varies from project to project, but usually it includes these:
- New relationships built or deepened existing ones.
- Probability of business continuation with the client.
- Probability of referrals and lead to new clients/projects.

• *How is risk management integrated into the overall monitoring of project success?*

Risk management and project success are two things that are inseparable in our company. Without risk management, many projects would not even come near to completion. This is one of the most important techniques in project management, especially when we are working on production environment in some big infrastructures.

3. Risk management practice
• *What risks do you usually face in IT projects?*

That is a hard question. Usually, it varies from project to project, but if i had pinpoint the risk that we face in most of the projects they would be:
- Clients does not have documentation of their own infrastructure.
- Clients do not have strong IT administrator, that can go head-to-head with our tech personnel, and this results in more work than planned.
- Impossible client's expectations
- Sudden changes in solution design or functionality.
- Unrealistic timelines and deadlines.
- Shortage of tech experts
- Hardware incompatibility with existing client's infrastructure.

- *How do you typically identify and assess risk in your projects?*

Usually, we are having a session at the start of the project to identify all the risks and create a risk management document for that specific project. In the document we write all the identified risks and actions to mitigate them. Afterwards, we present that document to the whole project team and stakeholders. Also, we are keeping the document up to date and do a session once a week or couple weeks, depending on project to update the whole document with new risks, their possibility rating and mitigation plans, while also removing the ones that are already outdated or not possible anymore, for example we delete hardware incompatibility after testing and making sure that its compatible, while we add the risk of lack of knowledge on clients side.

- *How do you apply risk mitigation strategies in project management?*

We do not have an established specific process or approach for developing risk mitigation strategies, but we have an unwritten process where we sit down for a session to write down all known risks and develop risk mitigation strategies based on experience and risk registry of previous projects. And throughout the project, we are having sessions to update risk management document of that project.

4. Organization support
- *Does the support (non-support) of the organization affect the risk management of IT projects?*

It has a huge impact, because organizational support can help in many ways, starting with the peer experience, where people from other teams or projects, can help your team to fix something or share a viable and working solution for some tasks, that involves risky changes in infrastructure or some other things like migrations to cloud. Going to middle management and top management, for example sales personnel can help PM to manage clients' expectations and/or scope of the project if it starts to get out of hand. While top management can help you in various situations, where you might need approval for a solution that requires more budget or additional team members and only top management can approve these changes to avoid some of the big risks.

- *Can you share an example where organizational support (or lack thereof) had an impact on project outcomes?*

Unfortunately, I do have a case where lack of organizational support led to insane creep of timeline. Originally, it was a simple project to upgrade one legacy system to a new system with a 90 days' timeline. After preparing everything, the upgrade started, one server was exchange for another, everything was connected the way it should have been connected, but there were zero successful

connection to end devices. When troubleshooting had started, after 2 weeks we hit a dead end and top management did not let our team to make a request for help to the old systems owners and their technical personnel, because of their beliefs. This led to another 3 months of troubleshooting to no avail. At this point, budget was 3 times over and losses were piling continuously. Only after another 4 sessions we managed to get top management on board to call previous installers for help. After they arrived, they investigated the connections and fixed the problem in 2 hours.

- *What form of top management support do you think is most valuable to project risk management?*

Where top management listens to your and the team's opinion and supports your decision on how to mitigate the risk.

5. Challenges and solutions
- *What are the biggest challenges you face in IT project risk management?*

Uncertainty and forever changing environment that you are working in. Basically, even if you have everything documented to the last cable and know the infrastructure inside out, there are unknown risk factors, for example that someone, working on another project won't change something without broadcasting the news about changes.

- *Do you use any innovative risk management strategies in your operations to overcome these challenges?*

I wouldn't call it innovative, but sometimes we do risk management in the agile way, and we are having short 10-20min stand ups for risk updates and reevaluation.

- *How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing?*

We have a security operations center in our company (SOC). They are responsible for all security related things, and we just follow their guidance. Also, we do consult them at the start of the project if it can have some sort of security risks.

- *Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?*

Me and my team had a project where we had to migrate multiple different infrastructures to cloud. Initially, we made one big risk document, that could be used for all migrations, but after some time we saw that it does not work, so we left 5 biggest risks that could be allotted to any migration and everything else we have dealt with on the fly.

6. Risk management success factors
- *In your opinion, what are the key success factors for IT project risk management?*

There are too many factors to name them one by one, but some of the most important would be:
- Project teams experience in similar projects and past records of risk mitigation in them.
- Organizational support (peers, mid and top management)
- Constant evaluation or risks and update of risk registry of the project. Especially if project takes more man than couple months to complete.
- Risk registry update in each main phase of the project.

- Client's involvement in risk management, to be able to react correctly to some sort of situation where his involvement is needed.
- Teams understanding what risk management is and why is it needed.

- *How do you monitor and measure the success of your project risk management efforts?*

We do not have a specified metering system, bus if risks stay on paper and they do not become reality - we consider risk management as successful.

7. Lessons learned
- *From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects?*

Everything can go wrong at any given moment. IT projects are specific in such a way that they have many common risks, but each has a different angle to the same risk and you have to analyze each risk separately in each project, even if the risk and project are basically identical.

- *Maybe there were events or situations in your experience that changed your approach to project risk management?*

Yes, I can not specify anything due to NDA's and it's hard to talk about it but I'll try to tell the story as best as I can without disclosing any details. Basically, that project was nothing out of ordinary and the job was done many times already successfully. We have created the risk management document, updated it biweekly. Reached the migration stage of the project and all the risks were in the green before migration. But during the patch, auto-update service somehow updated the software during migration and this update, due to migration processes, corrupted the whole database. We had to spend quite some time fixing the databases and researching why the auto-update had initialized by itself, since it was disabled beforehand. After this, we are checking everything twice under the microscope, to avoid similar cases and updating risk management documents way more frequently than before. As well as procured some specific tools to mitigate risks like this.

8. The future of IT project risk management
- *In your opinion, how will IT project risk management develop in the future?*

The way I see the whole IT sphere. It will have progress by leaps and bounds, hand to hand with the progressing technology, to be able to keep track of the changes and be able to evaluate risks effectively. Also, in my humble opinion, AI will start to play a huge role in risk management, even automate and predict it to some degree.

- *What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?*

Main points would be, that project manager must:
- Know well the field he's working in, perfect if PM is an ex-engineer of that field.
- Constantly learn about the new techniques and recommendations for managing that field.
- Incorporate AI to project management.
- Use advanced project management tools.

Annex No . 3
Interview No 3.

1. Project management experience
• *Briefly describe your experience in IT project management.*
• *How long have you been involved in IT project management?*

I managed IT projects for more than eight years. I mostly worked on projects such as data center development, implementation of cyber security solutions, cloud technology, network system upgrade, etc.
Currently, I hold the position of CTO, I am responsible for organizing technical maintenance, I participate in creating IT strategy, forming business goals, etc.

2. Understanding the success of the project
• *Briefly describe how you understand project success.*

In my opinion, project success includes not only the classic elements of the iron triangle - budget, time and scope, but also factors such as customer satisfaction or the sustainability of implemented solutions, i.e. the ability to integrate with new technologies in the future.

• *What are the critical project success factors you observe in your company's project management?*

Budget, scope ant time, client satisfaction.

• *What other criteria do you consider when evaluating the success of a project?*

The ability to integrate with new technologies in the future.

• *How is risk management integrated into the overall monitoring of project success?*

Risk monitoring is carried out as a measure of the implementation of the entire project, from planning to completion. Continuous review of risks and timely implementation of planned risk mitigation strategies are essential to achieving project objectives.

3. Risk management practice
• *What risks do you usually face in IT projects?*

In IT projects, we usually face technological risks, such as the integration of old and new systems and their incompatibility, cyber security risks, data protection. There are also risks inherent in all projects, such as supplier management, stakeholder management, compliance with the legal environment, etc.

• *How do you typically identify and assess risk in your projects?*

Usually, at the beginning of the project, a list of risks is drawn up, using risk lists of previous similar projects and lessons learned documents. We conduct consultations with clients, other interested parties, such as suppliers, equipment representatives, lawyers.

Risk assessment is carried out, risk probability and potential impact are determined. Risk reduction or elimination actions are selected according to the assessment results.

- *How do you apply risk mitigation strategies in project management?*

Risk reduction strategies, depending on the nature of the project, include both technical solutions and organizational or procedural actions. For example, it is important to ensure timely and quality communication between the project team and the client, supplier management, contractor management.

4. Organization support
- *Does the support (non-support) of the organization affect the risk management of IT projects?*

Organizational support has a significant impact on project risk management.
Top management manages the resources that are needed to implement the project. If the management does not allocate enough resources, both human and financial, the implementation of the project will be threatened.
Another important aspect is the involvement of employees in the implementation of the project. If employees are not engaged, spend little time on the project, or do not have the necessary knowledge and skills, project risk management may fail and the project may not achieve its goals.

- *Can you share an example where organizational support (or lack thereof) had an impact on project outcomes?*

I could not give a specific example. But in general, I can say that the success of the project is greatly influenced by the resources allocated by the organization. And here there are problems. If an organization plans too few resources, such as having multiple IT projects simultaneously involving the same employees, there is a risk that none of the projects will be completed on time. In this case, you have to either plan additional human resources or hire a contractor, but in this case, there is a risk of exceeding the project budget. Success will depend on how quickly and promptly top management makes the appropriate decisions.

- *What form of top management support do you think is most valuable to project risk management?*

The most valuable support from top management is focus. If managers pay attention to project risk management, are interested and involved, then appropriate decisions will be made, and employees will feel that the managers care, then they will accordingly pay more attention to risk management.

5. Challenges and solutions
- *What are the biggest challenges you face in IT project risk management?*

In my opinion, the main challenges are the rapid development of technologies in the field of IT, ensuring cyber security and data security.

- *Do you use any innovative risk management strategies in your operations to overcome these challenges?*

We use agile methodology in our work, and we also apply it to risk management. It is important to constantly review and update risks, and to respond quickly to potential incidents or problematic situations. Another thing we do, it's not something new but important, is employee training.

Employees must know the latest technologies and development trends in their field and apply this knowledge to risk management as well.

- *How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing?*

As I mentioned earlier, risks are constantly reviewed, updated, reassessed if necessary, and new risk management measures can be prepared if necessary.
For the management of cyber security and cloud computing risks, we apply security protocols prepared by the security operations center, technical solutions and employee training.

- *Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?*

I have not had any special case in my practice. Often, I am faced with situations where previously identified risks need to be reassessed as new circumstances arise that may change the likelihood or impact of the risk.
For example, when a client was implementing a cloud-based CRM, the project had to reassess data privacy risks. This risk was already identified at the planning stage, but it was necessary to choose more effective measures to reduce it, because the planned ones were not enough.

6. Risk management success factors
- *In your opinion, what are the key success factors for IT project risk management?*

The main factors for the success of IT project risk management are the application of the most suitable technical solutions, timely communication with the client, clarifying and harmonizing his expectations, frequent review of risks, updating, corrections of risk mitigation measures, active participation of the project team and client in risk reviews.

- *How do you monitor and measure the success of your project risk management efforts?*

We do not have any specific indicators to measure the success of risk management. We monitor how the risks were managed, whether the mitigating measures taken were successful, or whether the project objectives were achieved without deviations.

7. Lessons learned
- *From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects?*

The speed and flexibility with which an organization can respond to changing circumstances to manage emerging risks is essential. The speed of reaction in IT is critical. It is also important to develop a culture of risk-based thinking throughout the organization and to look at everything through the prism of risks. When employees start thinking "what if", risk management will rise to a whole other level.

- *Maybe there were events or situations in your experience that changed your approach to project risk management?*

In my practice, I did not have such events that changed my approach to risk management. The attitude was formed over a long time, simply considering the arising work situations, the realization of the importance of risk management in projects came naturally.

8. The future of IT project risk management
- *In your opinion, how will IT project risk management develop in the future?*

In the future, as in many fields, the influence of data-based solutions, machine learning, and AI will probably increase. Therefore, it will become important to be able to properly use these assumptions in the risk management of IT projects.

- *What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?*

In the future, project managers should be able to use AI, have knowledge in the field of cyber security, and be interested in the latest technologies. However, the same soft skills - team leadership, communication, stakeholder management, problem solving and decision making - will also be important.

Annex No . 4
Interview No 4.

1. Project management experience
- *Briefly describe your experience in IT project management.*
- *How long have you been involved in IT project management?*

During my career I was managing software development projects and IT infrastructure projects.
Lately (~15 years) I am mainly involved with IT infrastructure project management.
I was involved in managing various IT projects since 2004.

2. Understanding the success of the project
- *Briefly describe how you understand project success.*

Results delivered according to the agreement and customer satisfied with project results.

- *What are the critical project success factors you observe in your company's project management?*

High score of evaluation by the client.

- *What other criteria do you consider when evaluating the success of a project?*

Internal costs/ROI as there are mainly fixed price contracts.

- *How is risk management integrated into the overall monitoring of project success?*

In order to deliver project successfully risk considerations need to be embedded throughout the project lifecycle by identifying potential risks at the very beginning of the project together with stakeholders and project team members, assess and prioritize, define mitigation actions, assign responsibles and document. It is also very important to continuously monitor and regularly reassess and update risk document and communicate accordingly to all interested parties such as stakeholders and team members.

3. Risk management practice
- *What risks do you usually face in IT projects?*

Agreement-related risks such as:
Not clearly enough defined scope can result in additional efforts.
Unrealistic pre-defined timelines can result in project delays.
Clients do not know their network which can result in additional analysis and tasks not defined in the agreement which can result in additional costs and time delays.

- *How do you typically identify and assess risk in your projects?*

This is usually performed in the beginning of the project by reviewing experiences from the previous similar projects (registered in lessons learned document) and creating risks document relevant for the specific project.

Risks are constantly (usually during periodic risks meetings) reviewed and assessed accordingly – defined probability, impact, mitigation actions, risk-responsible etc.

- *How do you apply risk mitigation strategies in project management?*

Risk mitigation strategies are defined by project team in risk meetings, documented and periodically reviewed.

4. Organization support
- *Does the support (non-support) of the organization affect the risk management of IT projects?*

Organizational support is very important in managing projects risks. Timely involvement and support from the assigned risk owners in the organization is one of the main criteria for project success.

In general organization supports project risks management through allocating sufficient resources, risk culture and awareness in general, senior management engagement and support, open communication culture etc.

- *Can you share an example where organizational support (or lack thereof) had an impact on project outcomes?*

In a major In the project of expanding the Service Desk system in order to serve more countries one of the stakeholders insisted on buying new product from different vendor instead of expanding already existing solution which has expanded project scope and project failed as there was no budget in the project for such procurement.

- *What form of top management support do you think is most valuable to project risk management?*

Timely assignment of needed competent resources.
Support in scope refinement and other negotiations or legal help during project execution with client if not clearly enough defined in the agreement.

5. Challenges and solutions
- *What are the biggest challenges you face in IT project risk management?*

Unclear requirements and scope or scope changes during the project execution can introduce new risks or render existing mitigation strategies inadequate.
Resource constraints - insufficient or not enough competent resources especially from client side can hinder effective risk management efforts.
Time pressure/deadlines – can lead to rushed decisions and rework.

- *Do you use any innovative risk management strategies in your operations to overcome these challenges?*

Define and document risks at the beginning of the project and set-up regular risks assessment meetings with the team during all the project execution.

- *How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing?*

First of all, at the beginning of the project, we determine the security requirements, perform a security assessment and based on the results, select risk management measures. A plan for managing cyber security incidents or cloud service disruptions must be in place.

Encryption, access control and secure coding can be used to manage risk. Risks such as data loss or compliance risk are important to consider.

One of the risk management strategies is raising the competence of employees. Therefore, employees must constantly learn and participate in conferences.

- *Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?*

No specific example.

6. Risk management success factors
- *In your opinion, what are the key success factors for IT project risk management?*

Risks identification in the beginning of the project and regular reviews, updates and assessment by project stakeholders and team.

Integrate risk management activities into the project plan from the outset.

Effective communication between project team, client and other parties.

Project team competence in risk management.

Lessons learned from previous risks and projects should be integrated into future risk management practices.

- *How do you monitor and measure the success of your project risk management efforts?*

If risks remail in risks documents without turning into issues.

7. Lessons learned
- *From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects?*

Risk management plays an important role in successful project deliveries. Timely identification of project-specific risks and proper their mitigation allows saving time and additional efforts by solving problems before they appear.

It is very important to define, document, regularly review and update project risks and take adequate actions in addressing them – proper risk assessment saves time and efforts during project execution.

- *Maybe there were events or situations in your experience that changed your approach to project risk management?*

All bigger and more complex projects need risk management to be successful.

8. The future of IT project risk management
- *In your opinion, how will IT project risk management develop in the future?*

I think that the risk management of IT projects will be strongly related to artificial intelligence, automation, and cyber security in the future. There will also be a need to focus on regulation such as GDPR.

- *What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?*

Even now, project managers must have a lot of knowledge and skills to manage project risks properly and efficiently.

I believe that in the future, both technological competencies such as AI knowledge and soft skills such as problem solving, communication, flexibility, decision making, resilience, etc. will be important.

Annex No . 5
Interview No 5.

1. Project management experience
- *Briefly describe your experience in IT project management.*
- *How long have you been involved in IT project management?*

I work on various IT projects such as computer networks, cloud solutions, cyber security solutions. I've been in IT project management for three years, starting as a junior project coordinator and progressing to a project manager. My responsibilities have included project planning, risk management, stakeholder communication, and overseeing project execution.

2. Understanding the success of the project
- *Briefly describe how you understand project success.*

A project is successful when it is implemented within the defined scope, budget, and time. Also, when the customer's expectations are met.

- *What are the critical project success factors you observe in your company's project management?*

In our company, critical success factors include effective communication, timely delivery, budget adherence, technical performance.

- *What other criteria do you consider when evaluating the success of a project?*

Customer satisfaction.

- *How is risk management integrated into the overall monitoring of project success?*

Risk management begins with the preparation of the project plan. Possible risks and their mitigation measures are identified. Throughout the project, risks are monitored, discussed and mitigating measures are reviewed.

3. Risk management practice
- *What risks do you usually face in IT projects?*

Individual risks are determined for each project, but most of the risks are typical - technical compatibility of systems, security, management of suppliers and/or contractors, fulfillment of client needs, changes in project scope, budget, schedule, communication, etc.

- *How do you typically identify and assess risk in your projects?*

During the preparation of the project plan, a meeting is organized, during which we determine the possible risks of the project, all of them are written down in a special document. We also write risk mitigation measures in it. Then the risk management plan discussion with the team and the client. during the project, we periodically review the risks, if necessary, include new, revised planned mitigation actions.

- *How do you apply risk mitigation strategies in project management?*

Risk mitigation measures are selected according to the size of the risk. The greater the risk, likelihood, or impact, the greater the focus on risk reduction.

4. Organization support
- *Does the support (non-support) of the organization affect the risk management of IT projects?*

Organizational support is critical to project risk management. The organization allocates resources for project implementation, risk mitigation measures. It is also possible to use accumulated experience (risk lists, registers of lessons learned, experience of colleagues, etc.)

- *Can you share an example where organizational support (or lack thereof) had an impact on project outcomes?*

Once, the lack of timely decision-making from senior management delayed a network security upgrade, which led to increased vulnerabilities and eventually a minor data breach.

- *What form of top management support do you think is most valuable to project risk management?*

The most useful support from management is the provision of resources, clear communication, and participation in problem solving.

5. Challenges and solutions
- *What are the biggest challenges you face in IT project risk management?*

The biggest challenges are the growth of the scope of the project - during the course of the project, the client's expectations often grow beyond measure, the budget grows accordingly or the deadlines for the completion of the works become longer; competence of employees from the client's side - if the client does not have employees with appropriate competence, it is difficult to "speak the same language"; technical matters - for example, the compatibility of old and new systems with each other.

- *Do you use any innovative risk management strategies in your operations to overcome these challenges?*

We use agile methodologies for risk management.

- *How do you apply your risk management strategies to address emerging risks, such as those related to cyber security or cloud computing?*

We regularly update our risk management framework to include emerging risks like cybersecurity threats and cloud-related vulnerabilities.

- *Can you provide an example of a project where you had to change your risk management approach due to an emerging or unforeseen risk?*

When new data privacy regulations were introduced, our initial risk mitigation strategies for cloud migration project were reviewed and updated.

6. Risk management success factors
- *In your opinion, what are the key success factors for IT project risk management?*

Key success factors for IT project risk management are monitoring and update of risks, clear communication, and stakeholder management.

- *How do you monitor and measure the success of your project risk management efforts?*

We measure success by the number of risks mitigated, the impact on project outcomes, and feedback from stakeholders.

7. Lessons learned
- *From the perspective of your work experience, what lessons have you learned in terms of risk management experience for IT projects?*

The key lesson is that it is important to involve all stakeholders in risk management as early as possible and proactively manage all potential risks.

- *Maybe there were events or situations in your experience that changed your approach to project risk management?*

I had one project that required a major change in project scope. This resulted in a large budget overrun. Therefore, now we are trying to define and confirm the client's expectations and the scope of the project from the very beginning.

8. The future of IT project risk management
- *In your opinion, how will IT project risk management develop in the future?*

I think the biggest focus will be on cyber security, data privacy and cloud technologies.

- *What skills or knowledge will become critical for project managers to effectively manage risk in IT projects?*

Knowledge and skills in cyber security, data privacy and cloud technologies.