



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Everyone's Smart University

Project (Spring 2021)

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Section

Master

Date

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Course Code

(PMG510)

Project Risk Management

Instructions:

- آخر موعد للتسليم هو يوم الخميس ٢٠-٠٥-٢٠٢١ في تمام الساعة ٩ مساءً.
- الإجابة متاحة باللغة الإنجليزية أو اللغة العربية مع مراعاة أن تكون المصطلحات العلمية باللغة الانجليزية.
- يتم تسليم المشروع في صيغة ملف pdf مع الالتزام نموذج الجامعة ولن تقبل أي مستندات أخرى.
- يجب مراعاة أقسام البحث الرئيسية (مقدمة Introduction، دراسات علمية سابقة Literature Review، طريقة البحث Methodology، النتائج والمناقشة Results and Discussion، وأخيراً المراجع References. وان كان هناك ملحقات Appendices يتم إضافتها)
- يجب الالتزام بـ Theme موحد كما يلي:
- حجم الخط ١٢.
- نوع الخط Arial.
- لون الخط أسود.
- المسافة بين الأسطر line spacing 1.5
- عدد صفحات البحث (لا يقل عن ثلاث صفحات ولا يزيد عن ست صفحات).

Instructor's Name: Eng. Mosaab M. Hamed

Project:

Risk Identification and Analysis (Based on the project you chose in APM)

The objective of this report is to identify project risks, prepare a risk probability matrix, and carry out an analysis of selected risks. Referring to the project you select in **Advanced projects management APM course**, your task is to prepare a risk management plan that identifies potential risks in **each stage of the project** and identify risk management strategies.

From the course content and readings, you know that the overall purpose of risk planning is to anticipate possible risk events and be ready to take appropriate action when risk events occur—to eliminate or reduce negative impacts on the project.

You may wish to begin this exercise with a brainstorming about potential risks to get candidate risks “on the table” for consideration. And then identify and refine that wording for risks that have some realistic chance of occurring in this project. For example, potential weather problems present a real obstacle to completing field data collection by the planned completion date. It is also an issue that the project manager will ultimately have to plan for, as opposed to other issues such as a major disaster (e.g., your office burning down), is not a high-enough probability event that requires much time in planning. As described below, you will select several of the identified risks and carry out a risk analysis.

You will use the distilled list of risks to make a risk probability/impact matrix. The matrix will have at least three categories (high/medium/low) for probability and impact.

Remember that it is important to name risks effectively—use words that describe the risk event and point to the impact on the project (e.g., “injury of field technician disrupts data installation work”).

After completion of the risk matrix, document a risk analysis for the selected risks. This detailed documentation for that selected risk will include:

- a description of the risk and potential impacts (schedule, quality of work, cost, etc.) on the project.
- indicators or triggers that would be monitored to help identify the risk as early as possible.
- specific risk response strategies to take.

Using probability and impact matrix calculate the Expected Monetary Value (EMV) for all risks that have the impact in terms of cost \$\$.

Best of luck...

المشروع:

التعرف على المخاطر وتحليلها (بحث مبني على مشروعك الذي اخترته في مادة ادارة المشاريع المتقدمة)

الغرض من هذا التقرير هو التعرف على المخاطر المحيطة بكل مرحلة من مراحل المشروع, تحضير مصفوفة احتمالية المخاطر ومن ثم القيام بالتحليل لهذه المخاطر المختارة. مهمتك هي تحضير خطة متكاملة لإدارة المخاطر تشمل التعريف بالمخاطر المحتملة التي تحيط بكل مرحلة من مراحل مشروعك (نفس المشروع الذي اخترته في مادة إدارة المشاريع المتقدمة Advanced project management). ومن ثم القيام بتحديد استراتيجيات إدارة المخاطر المناسبة لكل خطر على حدة.

من محتويات المقرر والمصادر الأخرى المتاحة أصبحت تعلم الان أن الغرض العام لمرحلة التخطيط للمخاطر هي توقع أحداث المخاطر المحتملة والتجهز لاتخاذ ردة الفعل المناسبة عند وقوع الخطر – لمنع أو تقليل الآثار السلبية على المشروع.

قد تحبذ بداية هذا البحث بعصف ذهني عن ماهية المخاطر التي قد تحيط بكل مرحلة من مراحل مشروعك, وذلك للحصول على قائمة بتلك المخاطر. ومن ثم تحديد وتصفية هذه القائمة للوصول إلى قائمة مختصرة بالمخاطر التي لها فرصة واقعية أكبر في الحدوث. على سبيل المثال: المشاكل الجوية المتوقعة والتي تمثل عقبة حقيقية أمام اكتمال جمع البيانات من المواقع في أو قبل الوقت المحدد, هذه تعتبر مشكلة على مدير المشاريع أن يضعها في الحسبان. من ناحية أخرى, فإن المخاطر غير الواقعية مثل الكوارث الطبيعية والأعاصير (تلك التي تسبب حريقاً بمكتبك وفقدان الأوراق المهمة) ليست لها احتمالية وقوع عالية وبالتالي لاتستدعي تضيق الكثير من الوقت في التخطيط لها. كما سيتبين لك, ستقوم باختيار عدة مخاطر من تلك التي قمت بالتعرف عليها لتحليلها.

ستقوم باستخدام هذه القائمة المختصرة لعمل مصفوفة المخاطر (الاحتمالية/الأثر). المصفوفة ستحتوي على الأقل على ثلاث تصنيفات (عالي/متوسط/منخفض) للإحتمالية والأثر.

لاتنس استخدام أسماء تصف طبيعة المخاطر بصورة فعالة – قم باستخدام كلمات تصف الحادثة الخطرة وتشير الى أثرها على المشروع (مثل: إصابة أحد الفنيين في الموقع مما يؤثر على أعمال التركيب).

بعد انتهاءك من مصفوفة المخاطر, قم بتوثيق تحليلك للمخاطر المختارة. هذا التسجيل المفصل للمخاطر يجب أن يتضمن:

- وصف للخطر واثاره المحتملة (الجدولة, جودة العمل, التكلفة, الخ)
- المؤشرات والمحفزات التي يجب مراقبتها للمساعدة في التعرف على هذا الخطر قبل وقوعه
- تفصيل للاستجابة المقترحة للتصدي لهذا الخطر

باستخدام مصفوفة الاحتمالات والتأثير , احسب القيمة النقدية المتوقعة (EMV) لجميع المخاطر التي لها تأثير من حيث التكلفة \$\$.

مع تمنياتي بالتوفيق..

Abstract

Risk Analysis and Management is a key project management practice to ensure that the least number of surprises occur while your project is underway. While we can never predict the future with certainty, we can apply a simple and streamlined risk management process to predict the uncertainties in the projects and minimize the occurrence or impact of these uncertainties. This improves the chance of successful project completion and reduces the consequences of those risks.

This paper presents the structured Risk Management process followed at Nokia Siemens Networks that helps avoid crisis situations and incorporate learning from past mistakes. It highlights that effective and early risk identification and management secures the achievement of project objectives, leading to reduced rework costs.

Introduction

Project team members at various levels identify and handle risks in different flavours. However, this will be ineffective without a structured risk management framework, as this leads to:

-Incomplete impact evaluation, leading to loss of:

- Knowledge of the overall impact on the project objectives, like scope, time, cost, and quality
- Identification of secondary or new risks arising from the already identified risks

-Lack of transparency and a communication gap within and outside the team

Thus, it is very important for any project organization to set up an effective risk management framework. Instituting such a practice as a project team culture ensures:

- Conscious and focused risk identification and management
- Project progress as desired, with the least amount of deviations or surprise, and in line with project and organizational objectives
- Early and effective communication of project issues to organization and project stakeholders
- An effective team building tool, as team buy-in and acceptance is assured.

The risk management framework followed at Nokia Siemens Networks provides guidelines for:

- Continuous risk identification
- Risk evaluation
- Risk mitigation and contingency measure definition
- Risk monitoring and control
- Risk identification efficiency measurement

The risk management framework also provides templates and tools, such as:

- A risk register for each project to track the risks and issues identified
- A risk checklist, which is a guideline to identify risks based on the project life cycle phases
- A risk repository, which is all the risks identified across projects so far

Risk Management Framework

Risk Management Plan

The organization-mandated risk management framework is reviewed and tailored to define the project risk management plan when the project is initiated. The risk management plan includes these definitions and guidelines:

- List of possible risk sources and categories
- Impact and probability matrix
- Risk reduction and action plan
- Contingency plan
- Risk threshold and metrics

Risk Identification

Risks are to be identified and dealt with as early as possible in the project. Risk identification is done throughout the project life cycle, with special emphasis during the key milestones.

Risk identification is one of the key topics in the regular project status and reporting meetings. Some risks may be readily apparent to the project team—known risks; others will take more rigor to uncover, but are still predictable.

The medium for recording all identified risks throughout the project is the risk register, which is stored in the central project server.

The following tools and guidelines are used to identify risks in a structured and disciplined way, which ensures that no significant potential risk is overlooked.

1. Risk Sources

Risk Source	Description
Risk repository	The risk repository is the history data containing the list of risks identified for completed projects. The risk repository can be used to arrive at a list of potential risks for the project. This risk repository can also be filtered based on risk sources, categories, and projects.
Checklist analysis	The risk identification checklist is a questionnaire that helps identify gaps and potential risks. It is developed based on experience and project type.
Expert judgement	Risk identification is also done by brainstorming with or interviewing experienced project participants, stakeholders, and subject matter experts.
Project status	The project status includes project status meeting reports, status reports, progress reports, and quality reports. These reports provide the current project progress, issues faced, and threshold violations. These provide insight into the status of the project and potential new risks.

Exhibit 1 – Risk Sources

2. Risk Category

Risk category provides a list of areas that are prone to risk events. The organization recommends high-level, standard categories, which have to be extended based on the project type.

Risk Category	Extended categories
Technical	Requirements, Technology, Interfaces, Performance, Quality, etc.
External	Customer, Contract, Market, Supplier, etc.
Organizational	Project Dependencies, Logistics, Resources, Budget, etc.
Project Management	Planning, Schedule, Estimation, Controlling, Communication, etc.

Exhibit 2 – Organization-Provided Standard Risk Categories

Risk Analysis

Risk analysis involves examining how project outcomes and objectives might change due to the impact of the risk event.

Once the risks are identified, they are analysed to identify the qualitative and quantitative impact of the risk on the project so that appropriate steps can be taken to mitigate them. The following guidelines are used to analyse risks.

3. Probability of Risk Occurrence

High probability – $(80\% \leq x \leq 100\%)$

Medium-high probability – $(60\% \leq x < 80\%)$

Medium-Low probability – $(30\% \leq x < 60\%)$

Low probability $(0\% < x < 30\%)$

4. Risk Impact

High – Catastrophic (Rating A – 100)

Medium – Critical (Rating B – 50)

Low – Marginal (Rating C – 10)

As a guideline for Impact Classification the following matrix is used:

Project Objective	C Rating 10	B Rating 50	A Rating 100
Cost	Cost increase > 0 % or > 0 €	Cost increase 5 - 10% or > 50.000 €.	Cost increase > 10 % or > 100.000 €.
Schedule	overall project schedule delay > 0 days	overall project schedule delay > 1 week	overall project schedule delay > 2 weeks *
Scope	Scope decrease barely noticeable	Minor areas of scope are affected	Major areas of scope are affected; scope reduction unacceptable to the client
Quality	Quality reduction barely noticeable	Quality reduction does not affect vital functionality	Quality reduction requires client approval

Exhibit 3 – Impact classification guideline

The score represents bottom thresholds for the classification of risks assuming “normal” conditions. An upgrade of the score to the next or even next + 1 level is necessary, if the risk is impacted by critical factors such as:

- How important the specific customer is
- Whether the project is critical for the further development of the relationship with the customer
- The risk is already in the focus of the customer
- Specific penalties for deviations from project targets are agreed in the contract with the customer

5. Risk Exposure

Risk Exposure or Risk Score is the value determined by multiplying the Impact Rating with Risk Probability as shown in Exhibit 4.

		Probability			
		1 = high (80% ≤ x ≤ 100%)	2 = medium high (60% ≤ x < 80%)	3 = medium low (30% ≤ x < 60%)	4 = low (0% < x < 30%)
Impact	A=high (Rating 100)	(Exposure – Very High) (Score 100)	(Exposure – Very High) (Score 80)	(Exposure – High) (Score 60)	(Exposure – Moderate) (Score 30)
	B=medium (Rating 50)	(Exposure – High) (Score 50)	(Exposure – Moderate) (Score 40)	(Exposure – Moderate) (Score 30)	(Exposure – Low) (Score 15)
	C=low (Rating 10)	(Exposure – Low) (Score 10)	(Exposure – Low) (Score 8)	(Exposure – Low) (Score 6)	(Exposure – Low) (Score 3)

Exhibit 4 – Impact-Probability Matrix

The colours represent the urgency of risk response planning and determine reporting levels.

6. Risk Occurrence Timeframe

The timeframe in which this risk will have an impact is identified. This is classified into one of the following:

Timeframe	Description
Near	Now- until one month
Mid	next 2-6 months
Far	>6 months

Exhibit 5 – Risk occurrence timeframe

In addition to classifying risks according to the above guidelines, it is also necessary to describe the impact on cost, schedule, scope, and quality in as much detail as possible based on the nature of the risk.

7. Risk Classification Examples:

Risk event	Probability	Impact rating	Score
The hardware will be delivered 10 days late, leading to an overall project delay of 10 days in a project that is of minor importance to the customer	100%	B (50)	50
The hardware will be delivered 10 days late, leading to an overall project delay of 10 days. Delivery on time is important to the customer. High penalties for each day of delayed delivery are agreed.	100%	B (50)	50, but because of special circumstances is upgraded to 100
The acceptance test scope of work is not confirmed by the customer by integration test completion. From experience, it may be expected that the customer will require a certain number of additional test cases, leading to schedule delay and additional costs.	70%	B (50), because a risk of 6% cost increase and 10 days project schedule delay are expected	40
At C130 the customer has confirmed half the features described in the R-Spec, but informs Nokia Siemens Networks that the other half, as well as some additional requirements, are still under discussion. The final scope of the project is therefore very unclear. Major changes are to be expected.	80%	A (100), because a risk of more than 10% cost increase and more than 2 weeks project schedule delay, as well as major changes in scope, are expected	100

Exhibit 6 – Risk Classification Examples

Risk Response Planning

There may not be quick solutions to reduce or eliminate all the risks facing a project. Some risks may need to be managed and reduced strategically over longer periods. Therefore, action plans should be worked out to reduce these risks. These action plans should include:

- Risk description with risk assessment
- Description of the action to reduce the risk
- Owner of the risk action
- Committed completion date of the risk action

All risk action plans should be allotted to the person identified to carry out the action plan.

1. Risk Response Plans

For each risk, a risk response must be documented in the risk register in agreement with the stakeholders. This should be ensured by the project manager.

Risk response plans are aimed at the following targets:

- Eliminating the risk
- Lowering the probability of risk occurrence
- Lowering the impact of the risk on the project objectives

Risk response plans usually impact time and costs. It is therefore mandatory that the time and cost for the defined response plan are calculated as precisely as possible. This also assists in selecting a response plan from the alternatives, and in verifying whether the response plan is costlier or has more impact on one of the project objectives than the risk itself. After successfully implementing a set of response plans, the score of a risk could be lowered in consultation with the stakeholders.

Examples:

Risk event	Risk Response
Schedule delay to be expected if the hardware is delivered late.	Agree on penalties with the hardware supplier for delayed delivery. - Evaluate ways to shorten the timeline for onsite activities like installation, commissioning, etc. - Shorten the acceptance phase by reducing acceptance test cases or inviting the customer to a joint system test before customer release.
Time, cost, and scope deviation to be expected if requirements not final at project kick-off.	- Make sure that the requirements specification has been internally reviewed by all concerned parties and is internally agreed as complete and feasible. - Inform the customer about the latest possible date for input into the final version of the requirements specification and about the version that is to be used as basis for the development if no further input is available until then. - Open a claim against the customer. - Agree with the customer that all issues not clarified until project kick-off will be treated as change requests with possible impacts on time and cost.

Exhibit 7 – Risk response - Examples

Conclusion

Risk management is becoming the most challenging aspect of managing software projects. While we can never predict the future with certainty, we can apply a simple and streamlined risk management process to predict the uncertainties in the projects and minimize the occurrence or impact of these uncertainties.

Risk management not only helps in avoiding crisis situations but also aids in remembering and learning from past mistakes. This improves the chance of successful project completion and reduces the consequences of those risks.

This certainly is not the end of the journey for us on the effective risk management. It is a constant learning process to be able to constantly improve our practices to increase our process efficiency.

References

1. Siemens Quality Management System – Process documents. Available from the company intranet site.
2. <https://www.pmi.org/learning/library/risk-analysis-project-management-7070>
3. <https://www.projectengineer.net/project-risk-analysis-example/>