The Rational Unified Process

- A study on risk awareness

Authors: Sophie Eklund & Daniel Gunnarsson
Program: International Information Systems
Tutor: Jelte Jansons
Date: 2002-05-21
ABSTRACT

TITLE: The Rational Unified Process - A study on risk awareness

AUTHORS: Sophie Eklund and Daniel Gunnarsson

TUTOR: Jelte Jansons

INTRODUCTION TO PROBLEM: Many software development projects today have a tendency to fail on some level. Even though they may not fail entirely, they might be completed with schedule delays, budget overrun or with poor quality that do not meet the customer’s requirements. When a project fails in some way, it is because one or many project risks have occurred. Our own opinion in this matter is that if the project team members are more aware of the project’s risks, it might increase the probability of project success. Therefore, we wanted to explore the area of risk awareness. We contacted Volvo Information Technology AB and through discussions we decided to investigate risk awareness when using one of their software project methods. That method was the Rational Unified Process. This report has not been conducted because Volvo IT considers this to be a problem that they wanted to investigate. Instead, we wanted to investigate this since we find the area of risk awareness among project team members interesting and we were able to do this with help from Volvo IT. Even though we mention the term “project success” in this report, we will not investigate this in the report.

HYPOTHESIS: “By using the Rational Unified Process, a higher awareness of the risks can be achieved by all team members of the project”

AIM: The aim of this report is to investigate if risk awareness among project team members increases when software development projects make use of the Rational Unified Process (RUP).

METHOD: We have used a web-based questionnaire to gather information. Four projects at Volvo Information Technology AB were contacted and asked to participate in the questionnaire. Two of these were using RUP and two did not use RUP. Personal e-mails were later sent out to each of the project managers with a description of the aim of our research and the way it would be carried out. The participants had a total of seven workdays to fill out the questionnaire. After seven days the site of the questionnaire were closed down.

CONCLUSION: The differences in answers to certain questions have been rather significant between the two project methods. On the whole though, the answers have been positive for both project methods from a risk awareness point of view. Therefore, it seems to us that risk awareness is not dependent on the project method that is being used. We feel that we have not received enough convincing proof that members of RUP projects possess a higher awareness of project risks than non-RUP project members. Therefore we are of the opinion that we cannot verify our hypothesis.
TABLE OF CONTENTS

PREFACE ............................................................................................................. 4

1. INTRODUCTION .............................................................................................. 5

1.1 INTRODUCTION TO PROBLEM ........................................................................ 5
1.2 AIM OF REPORT ............................................................................................ 6
1.3 BOUNDARY .................................................................................................. 6
1.4 TARGET GROUP ............................................................................................ 6
1.5 HYPOTHESIS ................................................................................................ 6
1.6 DEFINITION ................................................................................................. 6

2. METHOD.......................................................................................................... 7

2.1 TECHNIQUES ............................................................................................... 7
2.1.1 Meeting ................................................................................................. 7
2.1.2 Books .................................................................................................... 7
2.1.3 Questionnaire ......................................................................................... 7
2.1.4 Questions .............................................................................................. 7
2.2 THE PARTICIPANTS ....................................................................................... 7
2.3 REALISATION ............................................................................................... 7
2.4 DROP OFFS .................................................................................................. 8

3. BACKGROUND ................................................................................................. 9

3.1 PROJECT MANAGEMENT ................................................................................. 9
3.1.1 History of project management ................................................................ 9
3.1.2 What is project management? .................................................................. 9
3.1.3 What is a project? ................................................................................... 9
3.1.4 Project success ......................................................................................11

3.2 RISK MANAGEMENT .....................................................................................11
3.2.1 Risk assessment .................................................................................... 12
3.2.1.1 Risk identification ............................................................................ 12
3.2.1.2 Risk analysis ................................................................................... 12
3.2.1.3 Risk prioritisation .......................................................................... 13
3.2.2 Risk control ........................................................................................... 13
3.2.2.1 Risk management planning ............................................................. 14
3.2.2.2 Risk resolution ................................................................................ 14
3.2.2.3 Risk monitoring ............................................................................. 15

3.3 SOFTWARE LIFE CYCLE MODELS ..............................................................16
3.3.1 The waterfall model ...............................................................................16
3.3.2 Incremental development .......................................................................17
3.3.3 The spiral model ....................................................................................18
The Rational Unified Process – A study on risk awareness
IA99 Blekinge Institute of Technology
Sophie Eklund
Daniel Gunnarsson

4. VOLVO INFORMATION TECHNOLOGY AB ......................................................... 20

5. THE RATIONAL UNIFIED PROCESS................................................................. 21

5.1 THE PROCESS .......................................................... 21
5.2 PROCESS FRAMEWORK .......................................................... 21
  5.2.1 Worker .......................................................... 22
  5.2.2 Activity .......................................................... 22
  5.2.3 Artifacts .......................................................... 22
  5.2.4 Workflows .................................................... 23
5.3 PROJECT LIFE CYCLE ......................................................... 24
5.4 THE PRODUCT .......................................................... 24

6. QUESTIONNAIRE .......................................................... 25

6.1 RUN-THROUGH OF QUESTIONNAIRE ...................................................... 25
6.2 RESULT OF QUESTIONNAIRE .......................................................... 26

7. RESULT .................................................................................. 33

8. CONCLUSION ........................................................................ 35

9. DISCUSSION ........................................................................... 36

10. BIBLIOGRAPHY ........................................................................ 37

  10.1 BOOKS .............................................................................. 37
  10.2 ARTICLES ........................................................................... 37
  10.3 PERSONAL REFERENCES .......................................................... 37

APPENDIX I

APPENDIX II

APPENDIX III
PREFACE

This thesis represents a ten week long study performed partly with help from Volvo Information Technology AB in Göteborg.

This study is the final assignment to receive our Bachelor’s Degree in Computer Science at Blekinge Institute of Technology.

We would like to thank the following persons for their involvement:

Our contacts at Volvo Information Technology, Lennart Persson and Jenny Nilsson, for their friendliness, helpfulness and sharing of knowledge and ideas during this thesis.

The members of the projects that took part in our questionnaire and the project managers who made it possible for them to participate.

Our tutor, Jelte Jansons for good ideas and support.

Sophie Eklund    Daniel Gunnarsson

2002-05-21
1. INTRODUCTION

1.1 INTRODUCTION TO PROBLEM

Since many organisations today use projects as their main method of performing work, it is easy to think of projects as a new phenomenon. However, this is not true. Projects as a way of performing work have been around for thousands of years. The Egyptian pyramids are a good example of ancient, very complex projects. Projects of today are of course also complex and like the ancient ones, they have to face different risks and constraints. One big difference between today’s projects and ancient projects though, is that today there exists a methodology called project management. Of course there had to be some sort of project management of the ancient projects as well, but it is reasonable fair to say that it differs a lot from today’s methodology. Project management is all about planning, organising, directing and controlling different activities as well as motivating the people working on the project. The aim of project management is to conduct a project as smoothly as possible and in the end, finish the project within schedule, budget and customer requirements. This might sound simple but in fact, it is quite the opposite, especially for larger projects. There are so many risks and constraints in the project environment that often the probability of finishing the project within schedule, budget and customer requirements will be greatly diminished. To stand a chance of the project being successful, it is of immense importance that attention is paid to the risks throughout the entire life cycle of the project. This is called risk management.

Risk management is the concept of identifying, analysing and removing or mitigating project risks. Risk management lies usually within the area of project management. Therefore, risk management, as part of project management, is ultimately the project manager’s responsibility. There are organisations however, where the responsibility of risk management lies even further up in the organisational hierarchy, for example senior management.

The way in which a project will be executed can differ. It depends on what kind of project it is and also in what organisation it exists. There are both formal and informal methods for project execution. Formal methods are structured and often accepted by a wider range of project driven organisations. Informal methods often exist within specific organisations or even within the project manager’s own mind. One example of a formal method is the Rational Unified Process.

The Rational Unified Process is a combined software engineering process and product. The goal of the Rational Unified Process is to ensure that the software produced by the organisation meets customer requirements within schedule and budget. The product itself is web-based and developed by the Rational Software Corporation.

We, the authors of this paper, recently took a course in project management. One section of the course was aimed at risk management and its effect on project success. During the course, project success was defined as a project that finishes within schedule, budget and customer requirements and we have worked from the same definition in this paper. We both thought that this area was interesting since many projects in the IT area often fails on at least one of these project success factors. And when a project fails in some way, it is because one or many project risks have occurred. Our own opinion in this matter is that if the project team members are more aware of the project’s risks, it might increase the probability of project success. Therefore, we wanted to explore the area of risk awareness. We contacted Volvo Information Technology AB and through discussions we decided to investigate risk awareness when using one of their software project methods. That method was the Rational Unified Process. This report has not been
conducted because Volvo IT considers this to be a problem that they wanted to investigate. Instead, we wanted to investigate this since we find the area of risk awareness among project team members interesting and we were able to do this with help from Volvo IT. Even though we mention the term “project success” in this report, we will not investigate this in the report. We will only focus on risk awareness among project team members. The reason to why we mention project success is to give the reader some background information to why we are interested in the area of risk awareness.

We think that this subject is relevant to investigate since we, as students on the International Information Systems Program, are likely to work in project driven organisations, either as project team members or project managers.

1.2 AIM OF REPORT

The aim of this report is to investigate if risk awareness among project team members increases when software development projects make use of the Rational Unified Process.

1.3 BOUNDARY

The boundary of the investigation is set to four software development projects at Volvo Information Technology AB.

1.4 TARGET GROUP

The target group of this report is people working in project driven organisations or projects that make use of RUP or are thinking about using this particular method and product. It is also aimed towards students that, based on their current studies, might work in project driven organisations.

1.5 HYPOTHESIS

Our hypothesis is:

“By using the Rational Unified Process, a higher awareness of the risks can be achieved by all team members of the project”

By “risks” we mean all kinds of risks that a software development project can be exposed to. Examples of those risks can be: financial, legal, technical and managerial to mention a few.

1.6 DEFINITION

To make it possible for the reader to understand and for us to be able to answer our hypothesis, we have put together a definition of what we mean by “awareness”. This definition has been formulated through various dictionaries combined with our perception of the word awareness. Our definition of awareness is as follows:

“A person who through insight, has gained knowledge and understanding of something”

The word something at the end of our definition refers to risks since we will investigate risk awareness.
2. METHOD

2.1 TECHNIQUES

2.1.1 MEETING

We have had a meeting with Lennart Persson and Jenny Nilsson at Volvo Information Technology AB in Torslanda, Göteborg, where they told us about their methods and policies for risk management. Through later discussions via telephone and e-mail we decided to investigate one project method that they recently implemented, namely the Rational Unified Process.

2.1.2 BOOKS

To be able to conduct this report we have taken part of books in subjects relevant to this report.

2.1.3 QUESTIONNAIRE

To gather information we used a web-based questionnaire. The reason for doing this was to make it easy for the project team members to fill out and spare them great pains over having to collect the questionnaire from the participating project members and having to send them to us through the mail. Another reason for choosing a web-based questionnaire was to make it as easy for us as possible to compile the results through database queries, not having to go through piles of papers by hand.

The reason for choosing a questionnaire was to involve as many people as possible in the investigation. Another reason was that we did not want to disturb the projects too much in their work by carrying out a large number of interviews.

2.1.4 QUESTIONS

We defined the questions based on our hypothesis and our definition of awareness (please refer to section 1.5). The reason for doing this was to make sure that, in the end, we can interpret the results correctly and by that, either verify or falsify our hypothesis.

2.2 THE PARTICIPANTS

The group of projects that took part in the investigation were four projects at Volvo Information Technology AB. Two projects use RUP and the other two do not use RUP. The investigation was aimed at the team-members of the project and not the project manager since he or she is usually already a lot more involved in the risk management part of the project than the rest of the team. We feel that the inclusion of the project manager would be misleading to the investigation, and therefore excluded him or her.

2.3 REALISATION

Four projects at Volvo Information Technology AB were contacted and asked to participate in the questionnaire. Personal e-mails were later sent out to each of the
project managers with a description of the aim of our investigation and the way it would be carried out. Based on this they decided if they wanted to participate or not.

The sent out instructions contained information such as correct web address to the questionnaire, login information and time to complete the questionnaire. The participants had a total of seven workdays to fill out the questionnaire. We stated that we did not want more than a maximum of 50 participants from each project.

After seven days the site of the questionnaire were closed down and e-mails were sent out to the project managers where we thanked them and their project team members for their involvement.

The instructions and questions on the questionnaire were written in Swedish. The reason for this was to facilitate for the respondents when answering questions and adding comments. The questionnaire can be found in appendix II. A translated version can be found in appendix III.

2.4 DROP OFFS

We chose a maximum limit of 50 participants from each project to avoid an unmanageable amount of answers that we would not have had time to analyse. We did not however expect 50 participants from each project. Therefore we feel that we cannot discuss any external drop offs from the questionnaire.
3. BACKGROUND

3.1 PROJECT MANAGEMENT

3.1.1 HISTORY OF PROJECT MANAGEMENT

The study of project management, its performance and methods, seems to have begun sometime just before World War II\(^1\). The development of establishing a methodology that would be recognisable today as project management, took place in the 1950s. Although, these activities were mostly aimed at projects in the process and construction industries at that time, the defence sector as well as the heavy engineering began developing certain numerical techniques that are still today important to project management.

Recent developments in the area of project management are\(^2\):

- The availability of technology – particularly project planning software and the computer processing power to support it
- The influence of world-class organisations on practices – particularly those from key sectors such as automotives and electronics
- The emergence of a strategic role for project management – as opposed to its previously reactive role
- The availability of a wider range of tools and techniques to the project manager – at a strategic, systems and operational level

3.1.2 WHAT IS PROJECT MANAGEMENT?

Project management is all about planning, organising, directing and controlling different activities as well as motivating the people working on the project \(^3\). Project management also include that the project manager understands the customer’s requirements as well as to hire quality team members\(^4\). The project manager must also be able to successfully complete the project within schedule, budget and customer requirements. These objectives are the most important ones for a project but also the most difficult to achieve.

3.1.3 WHAT IS A PROJECT?

A project can be seen as a “non-repetitive activity” since a particular project is carried out once and never again. It has the following characteristics\(^5\):

- Goal oriented
- Has a particular set of constraints
- The output is measurable
- Something has been changed through the project being carried out

---

\(^1\) Harvey Maylor Project Management, Prentice Hall. Great Britain 1999, 0-273-63829-7
\(^2\) Ibis
\(^3\) Ibis
\(^4\) Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5
\(^5\) Harvey Maylor Project Management, Prentice Hall. Great Britain 1999, 0-273-63829-7
A project can also be viewed as a conversion process\(^6\). A transformation of some sort of input to output. The input to a project is some form of want or need for change. The project will then be executed under a set of controls or constraints. These are often affecting the project in some way from the outside. Mechanisms are resources that make the transformation process possible.

**Constraints:**
- financial
- legal
- ethical
- environmental
- logic
- activation
- time
- quality
- indirect effects

**Input:**
Want/need

**Project**

**Output:**
Satisfied need

**Mechanisms:**
- people
- knowledge and expertise
- capital
- tools and techniques
- technology

*Figure 1. A project as a conversion process*

As shown in figure 1, there are many factors affecting the project in different ways. The environment in which the project resides is often complex and comprehensive. As one can imagine it is not that easy to be a successful project manager. To cope with all factors that affect the project, the project manager will need a good strategy. Usually the project manager will need to consider three key factors\(^7\):

- Time
- Cost
- Quality

The perfect project scenario would of course be: *time* – shortest possible, *cost* – cheapest possible and *quality* – highest possible. However, this perfect scenario is seldom achieved. Often, a trade-off has to be made between these three factors. Maylor refers to a trade-off as a prioritisation of the objectives of a project. For instance, if the objective of a project were to achieve a high level of quality, then time and cost would

\(^6\) Harvey Maylor Project Management, Prentice Hall. Great Britain 1999, 0-273-63829-7

\(^7\) Ibis
probably have to be compromised to meet that objective. These decisions all have to be a part of the project strategy.

**3.1.4 PROJECT SUCCESS**

The project strategy can be seen as a “road map” that will lead the project to success if properly done. But what defines project success? Well, there are some definitions to be found. According to Maylor, project success is when:

- Results are achieved which meets the stated needs
- Results are achieved within the given constraints
- Results are achieved at minimum cost
- Results are achieved with benefit to the project team
- Results are achieved with benefit to all stakeholders

It might even be easier to define project failure, which Maylor defines as:

- Project ran over budget
- Project ran over time
- Project output does not meet project needs

As we stated in the introduction, we define project success as a project that finishes within planned schedule, budget and customer requirements.

The concept of risk management is vital if the project should have a chance to be successful. As shown in figure 1, a project is affected by several factors which all can be seen as different risks. These risks need to be taken care of in some way.

**3.2 RISK MANAGEMENT**

Risk management is a practice of identifying and controlling risks. The idea behind risk management is to look into a project and see where the sensitive areas are- likely places for problems- and to do something about them. Risk management involves performing the tasks necessary to identify, analyse, plan, track, and resolve tasks using a defined risk management process.

Project risk is the possibility of unpredictable and unwanted loss that can occur anytime and anywhere during a project’s life cycle. Risk is associated with all aspects of the project, such as team members, management, requirements, architecture, design and implementation.

Using risk management does not mean that all risks will be removed, but it will make it possible for explicit decisions to be made which will mitigate the potential effect of some of the risks.

The practice of risk management involves two primary steps, each with three subsidiary steps. These are risk assessment (risk identification, risk analysis, and risk

---

8 Harvey Maylor Project Management, Prentice Hall. Great Britain 1999, 0-273-63829-7
10 Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5
11 John Raftery Risk Analysis in project managing, E & FN Spon. Suffolk 1996, 0-419-18420-1
prioritisation) and risk control (risk management planning, risk resolution, and risk monitoring). See figure 2.

### 3.2.1 RISK ASSESSMENT

Risk assessment is an analysis, which show the principal risks and the probability of occurrence, and gives suggestions for action. By performing risk assessment, one is better able to make decisions based on knowing the risk rather than not knowing it.

The three subsidiary steps that constitute risk assessment are risk identification, risk analysis and risk prioritisation.

#### 3.2.1.1 Risk identification

This is the step where the process of identifying known and unknown risks in a project are performed. After doing this step, a list of potential risk items have been brought about. Different techniques for identifying risks are for example checklists, where one search for risks found in past projects, and decision-driver analysis, where the sources of key decisions of the system is analysed such as choice of subcontractor and equipment.

#### 3.2.1.2 Risk analysis

Now when a list of potential risk items exists, it needs to be determined how serious these risks are and decide what to do about them. Techniques to determine this are for example network analysis and decision analysis. To describe these techniques in an easily understandable way, one can say that the techniques calculate a risks probability...
of occurring, described in percentage, of probably (50%), probably not (30%) and so on, and the size of loss that takes place if the risk comes about. Based on these two variables, one can easily calculate the risk value, which can be shown in a risk table. See table 1.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Probability</th>
<th>Size of loss (weeks)</th>
<th>Risk value (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal shortfalls</td>
<td>50%</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>New program language</td>
<td>50%</td>
<td>35</td>
<td>17.5</td>
</tr>
<tr>
<td>Lack of co-operation from users</td>
<td>30%</td>
<td>15</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*Table 1. An example of a risk table*

### 3.2.1.3 Risk prioritisation

After this step has been done, a prioritised list of risks that can be addressed further using risk control will have been created. Without this step, there is a chance of being buried in risks, not knowing which ones to concentrate on first. This step is done concurrent to risk identification and risk analysis, to make sure that risks with low priority will not be assigned too much identification-time or being overanalysed when this time can be used better on risks with higher priority.

With the starting point of the risk table, prioritisation is listed after “risk value” starting with the highest risk value at the top. See table 2.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Probability</th>
<th>Size of loss (weeks)</th>
<th>Risk value (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New program language</td>
<td>50%</td>
<td>35</td>
<td>17.5</td>
</tr>
<tr>
<td>Lack of co-operation from users</td>
<td>30%</td>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>Personal shortfalls</td>
<td>50%</td>
<td>7</td>
<td>3.5</td>
</tr>
</tbody>
</table>

*Table 2. An example of a prioritised risk table*

### 3.2.2 RISK CONTROL

Risk control follows the fashions of a risk management control loop\(^\text{13}\). The prioritised risk items that constituted the outcome of the risk assessment steps will, helped by risk control, stand a better chance of being resolved. See figure 3.

\(^{13}\) Barry Boehm Software risk management, IEEE Computer Society Press. California 1993, 0-8196-8906-4
### 3.2.2.1 Risk management planning

Risk management planning follows the steps in figure 4. The steps are executed in a concurrent fashion. Here, a co-ordinated plan for risk items to be resolved is produced.

- Choose best cost-benefit mix of risk management activities
- Develop individual risk management plans for each risk item
- Co-ordinate risk management plans with each other and with the project plan

### 3.2.2.2 Risk resolution

This is the phase where the risk management plan is executed. It is here that responsibilities are established and the milestone criteria in the plan are satisfied.

In this phase risk reduction techniques are carried out that are needed in the risk management plan. These are techniques such as prototypes and simulations.

---

Prototype - Users are sometimes not able to define what they want an information system to do, and they cannot visualise it from written specifications. Prototyping gives them a chance to see a system, "play" with it and modify it before it is implemented. This is a good technique for trying out possibilities that are too risky to try directly on the real product/procedure. It is also possible to extend the prototype so that, in the end, the prototype will constitute the end product/procedure.

Simulations - Another way of testing what will happen if certain risk-parameters change, without actually having to risk things in reality. One example is the Monte Carlo simulation, which is a mathematical technique for numerically solving equations.

3.2.2.3 Risk monitoring

The third and final step in the risk control process is that of monitoring the progress on resolving risks. This can be done in several ways, examples are “project top 10 risk item tracking” and “risk management plan milestone tracking”\(^\text{15}\).

Project top 10 risk item tracking - this method concentrates management attention on the most serious risks. This is how it is done:

- Rank the risks that are most significant to the project.
- Hold a review meeting every month. This is done to allow higher management to review the project’s progress.
- On every review meeting, begin with a summary of the progress of the risks on the risk-ranking list. Look at each risk's current ranking, the ranking it had previous month, and what has been done to resolve it during the past month. Obviously some risks will disappear from the list and some will be added from review meeting to review meeting. The ones that are going down the list or are disappearing from it do not need as much attention as the ones that are going up the list or are added to the list.

By using this method it is easy to keep track of the most important and urgent risks. It does not have to be exactly 10 risks on the list, if a few risks are added or subtracted from the ranking does not matter.

Risk management plan milestone tracking - milestones are important places along the risk management plan where extra attention needs to be paid. In this milestone tracking, a review meeting is held, to see if the risks are under control, or if corrective actions need to be determined and effected. The milestones in each individual risk item’s risk management plan are monitored in this procedure.

Obviously, it is not possible to foresee and plan for every risk. It is only possible to plan for those risks that one is aware of. At the same time it is important to aware that some unknown event might occur. Another important thing to remember is that risk management is a continuous process. It is not a process that can be done once and then be forgotten. Risk events can occur at any time.

The risk management process must be cost-effective. A cost-effective process balances risk resolution and risk acceptance. It is important to weigh the cost of risk control against the expected loss without risk control. Obviously, without attention to software risk, the exposure to risk increases.

\(^\text{15}\) Barry Boehm Software risk management, IEEE Computer Society Press. California 1993, 0-8196-8906-4
Something worth mentioning is that not all projects use these specific methods and techniques fully. It is up to every project to pick and mix any parts that are appealing to that specific project.

### 3.3 SOFTWARE LIFE CYCLE MODELS

Before the use of computers got more widespread, programming software was often done by one person for scientific purposes. He/she simply wrote the program and fixed the bugs (the code-and-fix model). But when programs had to be written for other people, people with little or no understanding of programming, there had to be some changes.

A software life cycle model describes the relation between the different development phases. These phases differ from model to model, but can generally be seen as\(^\text{16}\):

- Requirements phase
- Design phase
- Implementation
- Integration
- Testing
- Operations
- Maintenance

The lifecycle models outlines the phases from the point where the thought of a new project is initiated until the product is considered outdated and stop being used.

Using a life cycle model is one way of standardising project management practises and terminology. By doing this, one can accomplish the following\(^\text{17}\):

- Improve quality
- Reduce duplication of work
- Improve the quality of communication among employees, partners, and customers.

There are a lot of different life cycle models around, some of the most common ones are:

- The waterfall model
- Incremental development
- The spiral model

#### 3.3.1 THE WATERFALL MODEL

This was the first documented life cycle model, documented in 1970, and is sometimes known as the traditional model. The different stages in the waterfall model are processed in a linear fashion. The output of each phase is the input for the next phase\(^\text{18}\). This model is document-driven, which means that most of the outputs are documents. There are two types of the waterfall model:

---


\(^{17}\) Ibis

\(^{18}\) Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5
• **The sequential waterfall model** - presupposes that everything is right the first time, and once the step has been signed off it is not possible to go back and change anything from that step.

• **The iterative waterfall** - today’s most common approach. Works similar to the sequential waterfall model, but with one rather large difference, it is possible to return to a previous step and make changes.

---

3.3.2 INCREMENTAL DEVELOPMENT

The incremental development model consists of a number of builds that together constitutes the complete system. The builds determine the customer’s needs, define software requirements, and performs the rest of the development\(^\text{19}\). When the first build has been completed, the next build adds new functions to the first build. In contrast to the waterfall model, the incremental model executes the different phases (Requirements, design, implementation and so on) more than once, therefore the builds can be seen as “mini waterfalls”. The incremental development model is code-driven as opposed to the waterfall model that is document-driven. Each build ends with a system that is usable, which is a great advantage since the development of the system can be stopped after finishing any of the builds, without the entire project being abandoned.

\(^{19}\) Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5
3.3.3 THE SPIRAL MODEL

The spiral model was an attempt by Barry Boehm to overcome deficiencies found in the waterfall model\(^{21}\). In this model Boehm recognised and incorporated “project risk” into a life cycle model. His aim with this new model was to shift the management emphasis to risk evaluation and resolution. The spiral model consists of a number of loops. Each loop represents one phase, and one phase is divided into four sectors. These sectors are objective setting, risk assessment and reduction, development and validation, and planning for the next phases. In each loop/phase a review is performed at the crossing of the x-axis. This is done to check that everybody in the project, such as developers, users and customers, are committed to the developed product and the planning for the next loop/phase. See picture 1.

---

\(^{20}\) Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5

A distinguishing feature of the spiral model is that it is risk-driven, rather than document-driven (waterfall model) or code-driven (incremental development model) process\textsuperscript{23}. The spiral model iterates between the requirements, design and implementation phases. These iterations continue until the final system is complete. The model follows the phases similar to the waterfall model within each iteration\textsuperscript{24}.

\textsuperscript{22} Barry Boehm Software risk management, IEEE Computer Society Press. California 1993, 0-8196-8906-4

\textsuperscript{23} Ibis

\textsuperscript{24} E.M Bennetan Software project management: A practitioner’s approach, McGraw-Hill book company. London 1992, 0-07-707648-6
4. VOLVO INFORMATION TECHNOLOGY AB

Volvo Information Technology AB was established in 1966, when the Volvo-corporation gathered their IT resources in a corporation of its own. At this time the corporation was called Volvo Data. During the first years, operation and maintenance of powerful mainframe computers was the main business. Soon the Volvo-corporations started using the IT-corporation for systems development of all kinds.

During the trend of outsourcing in the 1990’s, discussions took place whether to outsource or not. The IT-business was considered too important in the ability to compete, to be placed somewhere else, and therefore in 1998 Volvo Information Technology AB was founded.

Volvo Information Technology is a fully owned affiliated company in the Volvo-group. Today, Volvo IT has a total of 4300 employees and is present in Europe, North America, South America and Asia. Their main customers are Volvo Global Trucks and Volvo Cars. Other customers are for example: Volvo Parts, Volvo Construction Equipment, and Volvo Power Trains.

The main areas of Volvo IT are data-operation, development of methods, and data- and telecommunication. 120 000 users are connected to systems that are driven by Volvo IT.

Volvo Information Technology AB uses different methods when conducting software development projects. Some of their projects make use of the Rational Unified Process. Other makes use of various methods that sometimes only exists within the project manager’s own mind. A common feature among these methods though is that they all include risk management.

---

25 Lennart Persson, Volvo Information Technology AB
5. THE RATIONAL UNIFIED PROCESS

Many software development projects today are either challenged or not completed, and the challenged projects usually completes with cost overrun and schedule delays 26. The number of unsuccessful or failed projects is greater than successfully completed projects. However, it is still possible to identify some factors to why they fail, for example 27:

- Inaccurate understanding of end-user needs.
- Inability to deal with changing requirements.
- Poor software quality.

How can these issues be resolved then? Well, according to Kruchten 28 there are deeper problems behind these that must be dealt with in order to be successful. These deeper problems are known as root causes. Some examples of root causes are:

- Overwhelming complexity
- Undetected inconsistencies in requirements, designs and implementation
- Insufficient testing
- Failure to attack risk

It seems as most software development projects fail because of a combination of these root causes. So, if organisations can find a way to treat these causes they are in a better position to be successful.

Many organisations today use a combination of so called “software best practices” to treat these root causes. These practices are 29:

1. Develop software iteratively.
2. Manage requirements.
3. Use component-based architectures.
4. Visually model software.
5. Verify software quality.
6. Control changes to software.

5.1 THE PROCESS

A process, which is based on these best practices, is the Rational Unified Process, hereafter referred to as RUP. RUP is a software engineering process that provides software development organisations with a disciplined approach of assigning tasks and responsibilities. The goal of RUP is to ensure that the software produced by the organisation meets customer requirements within schedule and budget 30.

5.2 PROCESS FRAMEWORK

As mentioned, RUP is a process that organisations can use for their software development projects. According to Kruchten, a process describes who is doing what, 

26 Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5
28 Ibis
29 Ibis
30 Ibis
how and when. RUP has a process framework that allows organisations to tailor it to their specific needs. The process framework in RUP consists of:

- Workers: the who
- Activities: the how
- Artifacts: the what
- Workflows: the when

5.2.1 WORKER

The worker in this sense, is a description of the behaviour and responsibilities of individuals or a group of individuals, rather than a description of the actual individuals. It refers to the role that defines how the individual should perform the work. It is the project manager that maps the relationship between individuals and workers when staffing the project. This allows for one individual to act as several different workers.

5.2.2 ACTIVITY

Activity refers to a unit of work that an individual performs. The activity itself should have a clear purpose. It can be for example to create or update a model or a plan. Every activity is handed out and performed by a specific worker.

RUP also contains so called activity steps. This means that the activities are broken down into three steps, thinking steps, performing steps and reviewing steps. The first step, thinking, allows for the worker to understand the nature of the task and in the end formulate the outcome. The second step, performing, allows for the worker to perform the actual work such as to create or update artifacts. The third step, reviewing, lets the worker evaluate his work against some criteria.

5.2.3 ARTIFACTS

Artifacts are the products that the project produces or uses in the process of reaching its final product. Workers to perform an activity use them as input and they are also the result of such activities.

Examples of artifacts are:

- Models, such as the use-case model or the design model
- Documents, such as a software architecture document
- Source code
- Executables

---

5.2.4 WORKFLOWS

Workflows are a way to describe the sequence of activities that produces valuable results as well as to show interactions between workers.

Figure 7. An example of a workflow diagram

These are the basic elements of the process framework. Additional elements are 32:

- Guidelines
- Templates
- Tool mentors
- Concepts

The purpose of these elements is to make the process easier to understand and use and also to provide more comprehensive guidance to the user.

With all these elements, RUP constitutes a process framework. We mentioned earlier that because RUP has a process framework, it is possible for organisations to tailor it to their specific needs.

---

The elements of the framework that can be added or replaced by an organisation are:\33:

- Workers
- Artifacts
- Activities
- Guidelines
- Concepts
- Mentors

5.3 PROJECT LIFE CYCLE

Every project follows some sort of life cycle structure. That is, the different phases a project can be in during its lifetime. One kind of life cycle process is the sequential or waterfall process. Many organisations use this technique for software development projects. However, according to Kruchten\34, the sequential process is more suitable for projects such as building a skyscraper or a bridge than for software development projects. This is because when building a skyscraper for example, the problem domain is well known. This however, is not the case in software development. Software engineers have only had a few decades to explore the field of software development.

So, instead of focussing on the sequential life cycle process, RUP uses the iterative approach. The iterative life cycle process is all about breaking down the project into smaller parts\35. When work on one part or iteration is finished, it starts on the next.

In an iterative life cycle, many decisions are driven by risks\36. It is of vital importance that the project manager is aware of the risks that his project might experience, if he wants to make effective decisions. There must also be clear strategies for mitigating or dealing with them.

5.4 THE PRODUCT

RUP is not just a process that organisations can follow for their projects. It is also a web-based product developed by the Rational Software Corporation. So in other words, RUP are a combined process and product. We tried an evaluation copy of the product and to us it seems quite easy to use. Of course our opinion must be taken with ease since we have not used the product in a real project environment.

What we found interesting though, was that in RUP, because of the layout of the product, it seems as every member of the project, quite easily can see and learn about the different risks that are on the risk list. This was one of the main reasons to why we decided to investigate risk awareness when using RUP. For a better understanding how this works, see appendix I.

The way in which risks are found and dealt with in RUP follows the usual steps explained earlier in the section about risk assessment.

---

34 Ibis
35 Ibis
36 Ibis
6. QUESTIONNAIRE

6.1 RUN-THROUGH OF QUESTIONNAIRE

Here follows a description of the aim behind the questions used in our questionnaire. These questions have been formulated based on our hypothesis and definition of awareness. The original questionnaire presented to the projects can be found in appendix II and an English version can be found in appendix III.

Question One

The purpose of this question is to make it possible for us to determine if the participant belongs to a RUP or non-RUP project. This information is essential for us since we will look at the possible differences between the two types of project methods.

Question Two and Twelve

These two questions are meant to examine the attitudes among project team members towards risk-management. We feel that these are important questions since the participants might have a negative attitude towards risk-management and this in turn could have an overall effect on the final results.

Question Three and Eight

These are core-questions that are tightly connected to our hypothesis and definition of awareness. We will use these in combination with other questions when analysing the answers in order to verify or falsify our hypothesis.

Question Four and Five

With these questions we wish to see if there is a difference in risk-management participation between the two project methods.

Question Six

With this question, we wish to look at the team member’s attitude towards increased participation in risk management tasks.

Question Seven

The purpose of this question is to explore the level of knowledge about risks and project methods that the participants possess.

Question Nine

This question was included in the questionnaire for us to be able to examine if the participants knowledge in risk management is used for practical purposes on a day-by-day basis.
Question Ten

The aim of this question is to get some background information about the team member's feelings in the case of how risk management are being used today and what it could look like tomorrow.

We feel that it could be interesting to look at the answers to this question in combination with question three and by doing so we could find possible connections between risk-awareness and confidence from the team members if taking on more risk-management tasks.

Question Eleven

With this question we want to explore if the team members feel that their insight in project risks will increase the probability of project success. In other words, how important the team member's insight in risk management could be to a project. Since insight in risk management leads to risk awareness, we believe that this is an important question to ask the participants. However, this question will focus on the team member’s attitudes towards the relevance of their own risk awareness and not as a measure of risk awareness.

6.2 RESULT OF QUESTIONNAIRE

We received a total of 32 answers from the questionnaire. These answers were equally distributed between RUP and non-RUP. As we stated in the method we feel that we cannot discuss the amount of drop offs since we, in the instructions to the project managers, limited the amount of participants in each project to a maximum of 50, but did not expect to receive that amount of answers.

QUESTION TWO

How important do the team members consider that risk management is to a project?

![Question Two Chart]

75% of the team members of RUP projects consider risk-management to be “very important” while 25% consider risk-management to be “important”. 38% of the non-RUP team members consider risk-management to be “very important”, while 62% consider risk-management to be “important”. None of the team members in RUP or non-RUP projects thinks that risk-management is “less important” or “not at all important”.

26
QUESTION THREE

Do the team members consider themselves aware of the risks that are being managed in their project?

75% of team members in RUP projects compared to 81% in non-RUP projects consider themselves aware of the risks that are being managed in their projects.

QUESTION FOUR

Do the team members consider themselves participating in the risk-management of the project?

62.5% of the team members in RUP projects participate through meeting/planning and 6.25% in other ways. 56% of non-RUP team members participate through meeting/planning, 12.5% by taking own initiative and 12.5% in other ways. 31.25% of the team members in RUP projects do not consider themselves participating against 19% of the team members in non-RUP projects.
QUESTION FIVE

Have the team members been offered to participate in the risk-management of the project?

![Bar chart showing participation rates]

62.5% of team members in RUP projects have been offered to participate compared to 37.5% of non-RUP team members.

QUESTION SIX

Do the team members want to participate more in the task of risk-management?

![Bar chart showing participation rates]

Team members in non-RUP projects are more willing to participate to a greater deal with 44% than RUP team members with 25%.
QUESTION SEVEN

Do the team members consider the risk management to be sufficient in their project?

50% of team members in RUP projects think that the risk-management is sufficient in their project, while only 25% of team members in non-RUP projects are of the same opinion. 6.25% of the non-RUP team members think that the project method has a lack of guidelines. 18.75% of the team members in RUP projects and 19% of the team members in non-RUP projects thinks that the method they are using is not utilized enough for efficient risk-management. 12.5% of team members in non-RUP project are of the opinion that the person responsible for risk-management consider risk-management to use too much of the projects resources, i.e. time, money.
QUESTION EIGHT

Do the team members feel that their knowledge about risks has increased through the project that he or she is currently working in?

![Question Eight Chart]

A large part of the participants in both RUP and non-RUP projects believe that their knowledge of risks has increased, 50% and 62.5% respectively. 37.5% in both groups have not noticed any difference.

QUESTION NINE

Do the knowledge the team member possess about risk-management facilitate his or her working task?

![Question Nine Chart]

56.25% of the team members of RUP projects believe that the knowledge he or she possess about risk-management facilitate his or her working task, while only 31% of team members in non-RUP projects are of the same opinion.
QUESTION TEN

Do the team members consider that the task of risk-management should lie more in the hands of the members of the project than with the project manager, based on how it works today?

![Bar chart showing the percentage of team members in RUP and non-RUP projects who believe the task of risk-management should lie more in the hands of project members.]

56.25% of the team members in RUP projects are of the opinion that the task of risk-management should lie more in the hand of members of the project, while only 25% of the team members in non-RUP projects think that it should.

QUESTION ELEVEN

Do the team members believe that the chance of project success (budget, time, customer requirements) increases if he or she has a greater insight in the task of risk management?

![Bar chart showing the percentage of team members in RUP and non-RUP projects who believe the chance of project success will increase.]

81.25% of the RUP projects and 68.75% of the non-RUP projects believe that the chance of project success will increase.
QUESTION TWELVE

Do the team members consider that the task of risk management costs more than what you gain by using it?

87.5% of the RUP projects and 93.75% of the non-RUP projects are of the opinion that risk management does not cost more than what you gain by using it. 12.5% of the RUP team members think that it does.
7. RESULT

Before we begin to make a deeper analysis of the results, we think that it is worth noticing that none of the participants thinks that risk management is unimportant for a project. On the contrary, all participants think that it is an important issue and very few thinks that risk management cost more than what you gain from using it. One opinion in this matter is that if the project is small with few project members, there is a chance that too much work is done administrating risks in relation to the size of the project. Another opinion is that you must have a plan of action when handling risks. If this is missing, risk management might cost more than what it gains. We believe that these comments are logical to this issue and shows that the participants are of this opinion only when certain scenarios occur.

As we mentioned earlier in the run-through of the questionnaire we considered two questions to be core-questions that are tightly connected to our hypothesis and definition of awareness. The results between the two project methods were quite alike although a few more participants in the non-RUP projects felt that they were aware of the project’s risks than the RUP projects. Overall, the results on this question showed that a very high percentage from both project methods consider themselves aware of the risks handled in their projects. We believe that this shows on good communication. Since both methods had a high result we cannot say that this communication is dependent on which project method is being used.

In the latter of these core-questions we received a similar result. There were a few more participants in the non-RUP projects that felt that their knowledge of risks had increased during their present project. One comment on this question showed that the size of the project might increase risk knowledge. It could be an effect of that larger projects often have more attention paid to risk management. This in turn could mean that formal meetings are more comprehensive and hence, also discusses risk management more thoroughly. Another comment we received showed that the only thing that differs between the two project methods when it comes to risk management is the templates and tools in the Rational Unified Process.

These two questions gave us an early indication that risk awareness might not be dependent on which project method is being used.

When we asked the participants of this questionnaire if they consider themselves participating in the risk management of the project, we were of the opinion that if they answered “meetings/planning” they could have a higher awareness of the project risks than if they had answered “own initiative” or “other”. With meetings we mean formal meetings held by the project manager or similar and not private meetings between team members. We believe that the team members that attend meetings or planning of risks could possess higher knowledge than those project team members that do not. Of course, the ones that have answered own initiative or other might very well indicate risk awareness, but could also indicate personal interest of project risks, and not necessarily knowledge of risks.

The number of members in RUP projects that answered meetings/planning where somewhat higher than in non-RUP projects. However, the amount of members in RUP projects that answered no to this question was higher than non-RUP projects. An interesting twist to this is that 80% of those members in RUP projects that answered no to this question had not been offered to participate in the risk management of the project in the following question.

It should be added that a larger number of members in RUP projects have been offered to participate in the risk management of their project and this could indicate that team
members in RUP projects could have higher knowledge of the project’s risks than members in non-RUP projects. However, it could also indicate that there is a difference between the two project methods when it comes to risk management participation.

Our question about whether the team members would like to participate more in the risk management tasks gave us a more positive reaction from the non-RUP projects than the RUP projects. This could indicate an interest in risk management and knowledge about risks. It could also be that fewer non-RUP project members have been asked to participate in the risk management of their projects and therefore might feel that they would like to be more involved than today. Perhaps, because they have an interest for the subject of risk management or they feel that their knowledge about risks might be useful to the project. Though, in both groups the greater part of the participants answered no to this question. This could be interpreted as lack of interest, but we believe that some of the team members feel that their burden of work do not allow them to participate to a greater extent than the present situation.

When we asked the participants if they believed that the risk management in their project were sufficient we wanted to explore if the participants had sufficient knowledge about their project’s risk management.

The most interesting about the answers received on this question is that twice as many from the RUP projects believe that the risk management in their project is sufficient as opposed to the non-RUP projects. We cannot say that this is because the members of the RUP projects have a higher level of risk and method awareness since the non-RUP projects have answered differently. What we wanted to look at by this question was to see if there was a significant difference in amount of answers in the last alternative, the “Do not know” alternative. If so, this could indicate that the members of any project method with a large amount of answers of this alternative might possess less risk and method awareness than the other. The answers showed that a fairly large population from both project methods chose the last alternative. However, the differences were small between the two project methods and therefore we cannot say that the members of either project method possess a higher level of risk and method awareness.

When investigating whether the members feel that the knowledge they possess about risk management facilitates their working tasks we are of the opinion that a positive answer to this question could indicate an understanding of the project’s risks, since obviously, if you are aware of the project’s risks around you it is easier for you to avoid making unnecessary mistakes. There are almost twice as many members of RUP projects that have answered yes to this question than non-RUP project members. We found this interesting since a lot of the members of non-RUP projects consider themselves aware of their project’s risks, but according to their answer to this question do not use this awareness in their daily work. Many of the comments we got on this question were that it makes it easier to prioritise your work if you have got knowledge of risk management.

When it comes to the issue whether project management should be delegated more to the project team members compared to how it works today, there is a majority of RUP team members that are positive to this scenario. Almost twice as many RUP members than non-RUP members are positive to this. We think that a yes to this question could indicate that the team member considers that he or she has got enough knowledge about risks to be able to take responsibility for some risks in his or her project. Although many are positive to the thought of more delegating of risk management to team members, many participants of this questionnaire have pointed out that there is still a need for a project manager who can survey, co-ordinate, and have the utmost responsibility of the risk activities.

This question in combination with the question if the team members consider themselves aware of the project risks are interesting since here, there is a possibility to see if the
project team members feel that they are aware of the risks and if they believe that they can handle more responsibility of risks in their projects themselves.

The percentages of team members that consider themselves aware of the risks that are handled in their projects are high in both RUP and non-RUP projects. However, a considerably larger percentage of RUP projects are of the opinion that more risk management tasks could be delegated to the team members. This could mean that members of RUP projects have got a higher confidence in themselves when it comes to risk management. It could be that they have a better support in the templates and tools they are using. The members of non-RUP projects consider themselves aware of the risk management in their projects but are not as positive as the members of RUP projects to have more risk management tasks delegated to them. Maybe they feel that they have enough work on their hands as it is or they simply do not believe that they can pull it off with the help they are getting from the method they are using today.

When we asked the project members what their opinions are of the connection between project success and greater insight in risk management, there are slightly more RUP members than non-RUP members that believe that project success would increase. From this we gather that it is important that all project team members have the possibility to follow what risks are being managed in the project. It might not be enough that the project manager or a person being assigned to handle the risks has got insight of the project’s risks.

8. CONCLUSION

The differences in answers to certain questions have been rather significant between the two project methods. On the whole though, the answers have been positive for both project methods from a risk awareness point of view. Therefore, it seems to us that risk awareness among project team members is not dependent on the project method that is being used. The reason for this could be that most project methods today uses the same type of risk management methodology when identifying, mitigating and eliminating risks. The differences lie in the templates and tools that the project methods make use of for this purpose. Because of this, we feel that we have not received enough convincing proof that members of RUP projects possess a higher awareness of project risks than non-RUP project members. Therefore we are of the opinion that we cannot verify our hypothesis.
9. DISCUSSION

When carrying out an investigation that involves external participants, it is very important to have good communication with the organisation or organisations that represent those participants. In this sense, we must say that it has worked out well for us. Our contacts at Volvo Information Technology AB have helped us a lot during the time of this thesis. We are very pleased with the effort they have made for us.

The web-based questionnaire that we used proved to be very efficient. We believe that if we had used a traditional questionnaire, printed on paper, it would have taken us a lot longer to send out, collect and compile the questionnaire. We did not experience any technical problems with the questionnaire, which we had some concerns about at first.

The rate at which we received answers was slower than we had expected. We would have liked to extend the period that the participants had to fill out the questionnaire. Unfortunately, we were not able to do this because of unexpected time constraints. We are however satisfied with the results we received from the questionnaire. Although, we did not know what kind of results to expect before we sent out the questionnaire since we had not found any previous reports on this particular subject.

The result that caught our attention the most was the high level of risk awareness that the participants in both project methods felt they possessed. This was a bit surprising for us, since from what we have learned, risk management is a task that is performed mainly by the project manager or a person assigned to be responsible for this task. Since we do not know exactly how risk management is performed in the different projects, we do not have a definite answer to this result. One possible reason can be that many team members participate in meetings were the risks of the project are on the agenda.

Another interesting result was that although many non-RUP project members considered themselves aware of their project’s risks, 69% of them felt that their knowledge about risks do not facilitate their working tasks. We find this surprising since we believe that if you are aware of the risks, you are in a better position to avoid making mistakes that you otherwise could have made.

Suggestions for further study could be to perform the same questionnaire to a larger population than we have had the possibility to investigate. This would make it easier to generalise the results than in our case. It could also be interesting to examine in what way an increased awareness of risks, from the team members point of view, could affect project success.
10. BIBLIOGRAPHY

10.1 BOOKS

Harvey Maylor Project Management, Prentice Hall. Great Britain 1999, 0-273-63829-7

Jag Sodhi, Prince Sodhi IT project management handbook, Management concepts. USA 2001, 1-56726-098-5


John Raftery Risk Analysis in project managing, E & FN Spon. Suffolk 1996, 0-419-18420-1


10.2 ARTICLES


10.3 PERSONAL REFERENCES

Lennart Persson, Volvo Information Technology AB
APPENDIX I

Example of the artifact “risk list” found in the trial version of the Rational Unified Process, found at the website of the Rational Software Corporation.
Risk List

1. Introduction

1.1 Purpose

1.2 Scope

1.3 Definitions, Acronyms, and Abbreviations

1.4 References

1.5 Overview

2. Risks

2.1 <Risk Identifier—a descriptive name or number>

2.1.1 Risk Magnitude or Ranking

2.1.2 Description

2.1.3 Impacts

2.1.4 Indicators

2.1.5 Mitigation Strategy

2.1.6 Contingency Plan
APPENDIX II

Screenshots of the original questionnaire in Swedish. The small pictures below the questionnaire are screenshots of the explanations that were used on question 2, 7, 10 and 11.
Fälte 5:
Har Du blivit erbjuden att delta i risk-hanteringsarbetet?

- Ja
- Nej

Kommentar:

Fälte 6:
Skulle Du vilja vara mer delaktig i risk-hanteringsarbetet?

- Ja
- Nej

Kommentar:

Fälte 7:
Tolk till risk-hanteringen i ditt projekt är tillräcklig?

- Ja

Om Nej, varför inte?
- Metoden saknar riktlinjer för effektiv risk-hantering
- Metoden utnyttjas inte till fullo för effektiv risk-hantering
- Den risk-användare anses att risk-hanteringen utnyttjas för mycket av projektnets resurser (tid, pengar)
- Den risk-användare anses att risk-hanteringen ej är nödvändigt

Kommentar:

Fälte 8:
Hur Din kändedom om risker ökat genom det projekt som Du för tillfället tillhör?

- Ja
- Nej

Kommentar:
Pågå 9
Underlättar de kunskaper Du har i riskhantering Dina arbetsuppgifter?

- Om Ja, på vilket sätt?
  - Nej

Kommentar

Pågå 10
Anser Du att mer av riskhanteringen bör laga hos projektledningen och mindre hos projektledaren, utifrån hur det fungerar dag:

- Ja
- Nej

Kommentar

Pågå 11
Tror Du att chansen att projektet lyckas (budget, tid, kundtro) är större om Du som medarbetare har större inbuds i riskhanterings arbetet?

- Ja
- Nej

Kommentar

Pågå 12
Anser Du att riskhanteringen kostar mer än vad man tämnar på att använda det?

- Ja
- Nej

Kommentar

Sådana nyckeldimensioner och frågor anses vara avgörande faktorer när du väljer en framtid för ett projekt.

Bör projektledningen skapa en uppsättning av frågor och detaljer som täcker saker som inte påminner när projektet avses av företag?
APPENDIX III

Questionnaire translated into English.

Questionnaire to four projects at Volvo Information Technology AB

1. What project do you belong to?
   [ ] Project Q
   [ ] Project X
   [ ] Project Y
   [ ] Project Z

2. How important do you consider that risk-management is to a project? *
   [ ] Very important
   [ ] Important
   [ ] Less important
   [ ] Not at all important
   Comment________________________________________________

3. Do you consider yourself aware of the risks that are being managed in your project?
   [ ] Yes
   [ ] No
   Comment________________________________________________

4. Do you consider yourself participating in the risk-management of the project?
   If yes, in what way?
   [ ] Meetings/Planning
   [ ] Own initiative
   [ ] Other
   [ ] No
   Comment________________________________________________

5. Have you been offered to participate in the risk-management of the project?
   [ ] Yes
   [ ] No
   Comment________________________________________________

6. Would you like to participate more in the task of risk-management?
   [ ] Yes
   [ ] No
   Comment________________________________________________

7. Do you consider the risk-management to be sufficient in your project?
   [ ] Yes
   If no, why not?
   [ ] The method lacks guidelines for effective risk-management **
   [ ] The method is not utilized enough for efficient risk-management
   [ ] The person responsible for risk-management consider risk-management to use too much of the projects resources, i.e. time, money.
[ ] The person responsible for risk-management do not consider risk-management necessary
[ ] Other
[ ] Do not know
Comment________________________________________________

8. Have your knowledge about risks increased through the project that you currently belong to?
[ ] Yes
[ ] No
Comment________________________________________________

9. Do the knowledge you possess about risk-management facilitate your working tasks?
[ ] If yes, in what way?
[ ] No
Comment________________________________________________

10. Do you consider that the task of risk-management should lie more in the hands of the members of the project than with the project manager, based on how it works today? ***
[ ] Yes
[ ] No
Comment________________________________________________

11. Do you believe that the chance of project success (budget, time, customer requirements) increases if you as a team member have a greater insight in the task of risk-management? ****
[ ] Yes
[ ] No
Comment________________________________________________

12. Do you consider that the task of risk-management costs more than what you gain by using it?
[ ] Yes
[ ] No
Comment________________________________________________

* The activities and methods a project makes use of to find, mitigate and eliminate those risks that a project can be exposed to.

** With method we mean what kind of method/process the project uses.

*** Should the team members of the projects obtain greater responsibility concerning management of risks that usually arise when working in teams?

**** We define a project that succeeds as:
- A project that do not exceeds budget,
- A project that finish within the allocated time period, and
- A project that meet the customer’s requirements.