

Risk Management in Software projects using Scrum framework

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Summary

This research project aimed to study how Risk Management is used in Scrum Framework at one department at Ericsson.

It starts with an overview of Agile / Scrum and a study of the literature, concentrating on what was available about Risk Management in the new methodology at the time of the study. Following the literature study, a summary of the standard ISO 31000 and Ericsson's Management System was done to be able to analyze the compliance with the standard, which is guiding this thesis work.

To finalize the gathering of data, interviews were done and internal documents analyzed.

For the achievement of the aims of the study, some methods were used to help the analysis; those approaches were chosen as they are useful tools to analyze possible root causes of problems.

The results showed that Ericsson's Management System for Risk Management complies with the standard but it is poorly used in reality by the projects.

Proposed changes to improve practice in Risk Management in Scrum framework are recommended to fill up the gaps found in the research.

Acknowledgments

Thanks to Roland Langhé for his continuous assistance, patience and feedback and for the inspiration in the lectures.

To my husband for never letting me give up.

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1 Introduction

Project Risk Management according to PMBok[1] is included in one of the Project Management Processes: 'Ensuring that project objectives are met by monitoring and measuring progress and taking corrective action when necessary'

The standard for Risk Management refers to it as part of good management practices and emphasize the importance of a well implemented approach to Risk Management. But experience shows that Risk Management is discussed but not fully developed in many companies, many understand the importance of it but still do not prioritize the work on this area.

When dealing with risk in a daily basis, involving the whole project team and stakeholders, the project is giving strength to Risk Management and it results in being incorporated in the culture and processes of the company no matter which methodology is used.

Some methodologies have more formal means of tackling risks, other suggest more informal ways. This thesis is going to do an analysis of Risk Management in Scrum framework in software projects.

Scrum is an Agile approach to develop software, it is one of the most used and known Agile methods. Considering Risk Management, experienced Agile and Scrum people working with these methodologies refer to it as being already incorporated in both.

'Scrum employs an iterative, incremental approach to optimize predictability and control risk' The statement is taken from the Scrum Guide, the official Scrum Body Of Knowledge, written by Ken Schwaber and Jeff Sutherland, co-creators of Scrum [2]

But how is Scrum related to the standards, knowledge and practices in the area? Are there any gaps that are not considered? This thesis will try to answer these questions.

This case study targets project managers, managers and all the people involved in projects.

2 Goal

Analyze what impact Risk Management would have when using Scrum framework in software development projects compared to waterfall method.

Unit of analysis: 1 main project and 3 software sub-projects at Ericsson

Research Site: Ericsson, Research and Development – PDU Evolved Infrastructure (EI)

Questions to be answered

- How does Scrum framework employ Risk Management compared to standards and practices used today?
- How would risk management process outcome in software projects be affected when using Scrum Way of Working?

3 Scope

This study has some limitations as described below.

This research is performed at the researcher's work place, EI Department at Ericsson. The Agile and Scrum methodologies started to be implemented in some of the teams for about 2 years ago, mainly in sites offshore. In Sweden, site Stockholm, the new Way of Working is being implemented, which means that the teams are still adapting to the new method.

The teams are located in different countries mainly in China, Australia, India and Stockholm but for this thesis, the meetings attended and informal interviews were done only with the teams in Stockholm with the exception of one interview with the participation of a person in India, one phone conversation with a person located in Gothenburg and email exchanges.

No analysis about the risks of changing methodology brings to the projects is considered.

The number of interviews will be restricted because of time constraints, the fact that the interviews are only possible to be performed during the researcher's working hours and that the key people to be interviewed are very busy.

The focus is in Risk Management, no deeper analysis of Agile or Scrum way of Working in the department is taken into consideration if not related to the area.

No comparison is done with Risk Management approach in other teams not using Agile / Scrum methods and the effects of lack or poor Risk Management has in the long run in Agile.

4 Expected Result

This investigation aims at people involved in projects, mainly project leaders and line managers but also all other staff direct or indirect participating in projects as designers, testers and other Scrum group members.

With my interpretive work, my goal is to explore the process of Risk Management in a Scrum framework used in Agile, to understand how it is used and the implications of it

I expect it to be used by the company as a guide to reflection in the area of Risk Management.

5 Methodology

To investigate the relevant aspects of the Risk Management approach and general knowledge used by the company in Agile/Scrum methods, the researcher uses interpretive investigation, in form of case study to understand the characteristics of it.

The philosophical basis will be of a hermeneutic nature, to guide the design, conduct and reporting of the interpretive research.

Literature study including books in the Risk Management area, Agile and Scrum methods and Agile course (including Scrum framework). Web search will be used as complementary to the previous sources of information.

The implementation of Agile and Scrum with a clear Risk Management approach can be interesting to project stakeholders as it can clarify the characteristics of it and can help making decisions.

The diagram below shows how the work was divided:

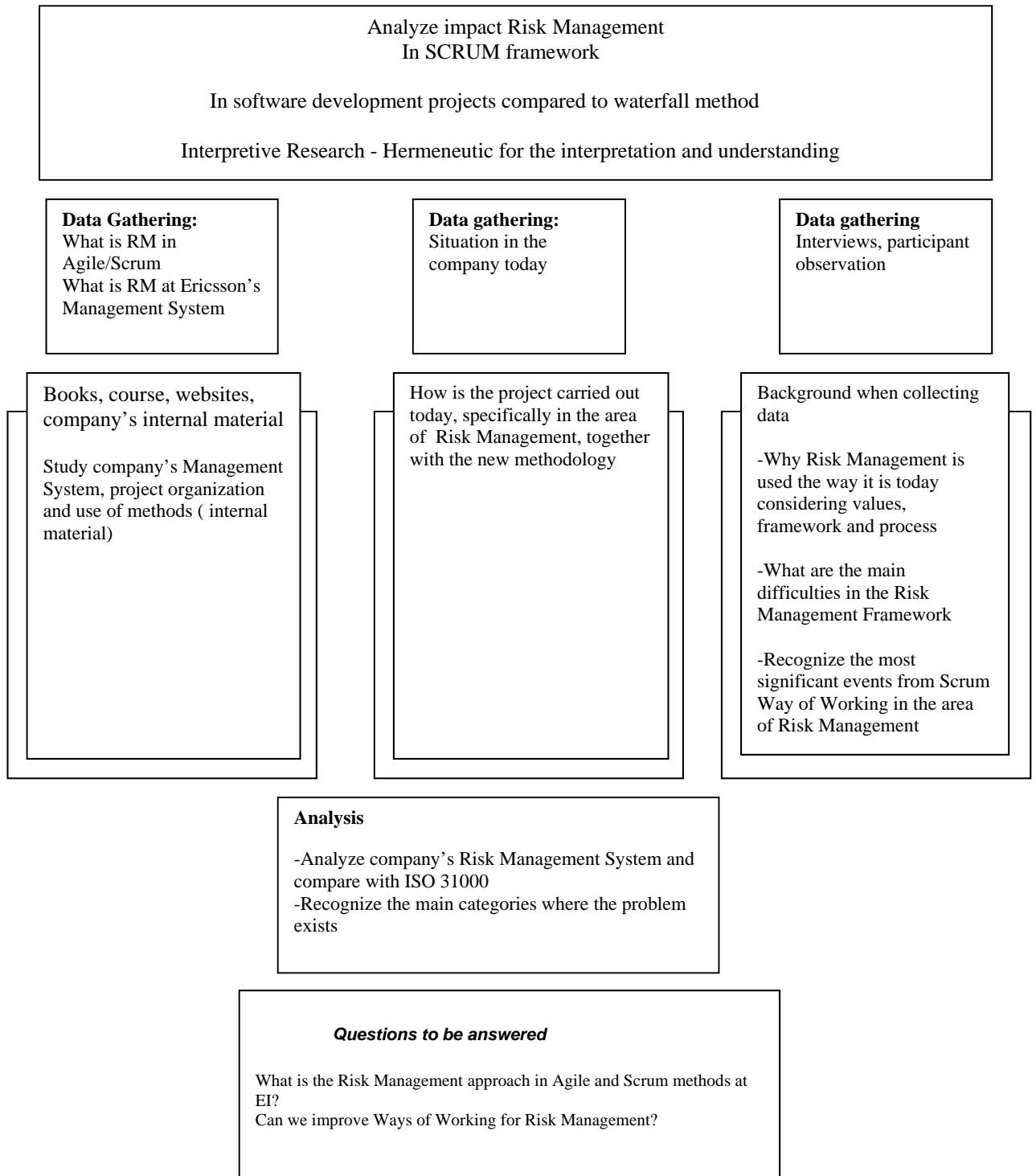


Figure 1– Division of the work

Data Gathering

Sampling

To gain a detailed picture of the use of the risk management some teams were identified. The purpose was to find teams that were working with the Agile/Scrum framework to get an understanding of the Risk Management approach. For this, one main project and three software sub-projects were chosen. The participants of the case study were designers, tester, product owners, project managers, program manager.

The teams were working for around one year with the new methodology. All the teams were new to this way of working and had taken a 3 days course in Agile framework. The course was called "*Agile development with Scrum and Kanban*" at an external company.

Collecting data: the carrying out of the work

- In the case study, the researcher used participant observation but she was not part of the teams as she worked in a different area. She attended to different meetings, had free access to internal documents as company policies and other related project documents and internal web-sites. The researcher has also collected evidence from e-mails and formal interviews.

Informal interviews and informal conversation was used as inspiration for the writing of the theory.

- The formal interviews were conducted at the researcher's work place and took, on average, one hour. At the end of the interviews the participants were encouraged to talk freely about the subject in case she/he wanted to add anything for the topic discussed.

The topic of the interview was 'Risk Management in Scrum' and a questionnaire was developed considering the role of the participant in the project, the purpose was to get input for the different questions of the research. The interviews' questions can be found in the Appendix 1

- The Management System of the company was studied to be able to understand how to manage the implementation of the Risk Management and when it comes in the process.

- Study of the Company's approach to Agile/Scrum, present situation: how the company is using the framework, how Risk management comes on it

Analysis

In all the steps of the research the hermeneutic approach was used, specifically in the analysis of the material gathered, the hermeneutics with the hermeneutic circle is applied when the parts are related to the whole and vice-versa. In the hermeneutic study, for interpretation and understanding, the meanings are analyzed considering the culture and taking into account the researches background and experiences. The interviews, observations and all the text collected are read, analyzed and interpreted.

The researcher experience and involvement in the area was also considered as the background of the analysis. The analysis work started already when collecting the data and proceeds through the time the study was conducted. In some cases, after collecting the data, the researcher contacted the participants to get a better understanding of the text produced and what was behind it.

Main Units of Analysis from the field data

Main units of analysis taken from the interviews, meetings, internal homepages comparison with literature and other departments' experiences are defined below, mainly based on the ISO 31000 [3]

Communication, Value, Team, Line, Process

After creating a narrative, with the interviews and participant observation, the researcher used other methods and tools aiming to help categorize the data to find out where the major areas are concentrated, those which appears in the text as patterns and themes.

Areas and methods used for helping the analysis are:

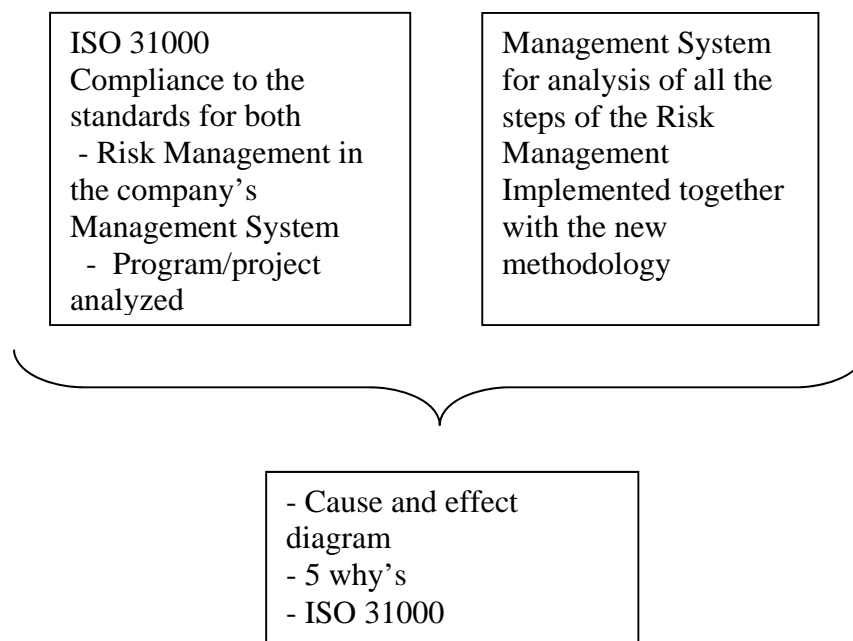


Figure 1 – Methods used in analysis

- Cause and Effect diagram helps to find out and sort out all the possible causes and understand their relationship.
- 5 Why's method: It helps to understand if the root causes are not mistaken; it is a very simple tool but helps finding quick solutions
- The analysis of the Principles and Framework in the ISO 31000 [3] compared to what is performed today by the department showing how Risk Management is represented in the key processes.

6 Theory and reflection of the case study

6.1 Agile and Scrum

6.1.1 Agile

The Agile movement started with the Agile manifesto, created by ‘agilists’ considered as lightweight methodologists. The ‘Agile manifesto’ [4] values are:

- Individuals and iterations over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Agile teams works having the Agile values as base, they work in short iterations, commit in delivering something at the end of each iteration and prioritize the work to be done. In each iterations, Agile teams should embody the learning from previous iterations and adapt to the current one to increase the value of plan, quality or in whatever area of significance.

The teams have different roles; the product owner who has the responsibility of the product, prioritizing the work to be done, developers, managers and customer who purchase or pays for the software developed.

Agile can be used with different frameworks as, for example, Scrum and Kanban, in which teams can work in projects, the frameworks can be adapted the way it fits better a team.

Scrum is summarized in the following topic and suggestions for more detailed information of both Agile and Scrum can be found in the references.

6.1.2 Scrum

Scrum is one of the most used Agile development processes.

Scrum uses self-organizing, cross functional teams and has the characteristics:

- Self-organizing meaning that the team as a whole is to come an agreement and cross-functional meaning that the features can be taken from idea to implementation by anyone that need to be involved.
- The team has the support of two specific team members: the Product Owner, who represents the customer and the Scrum Master that can be seen as a coach for the team.
- The project’s progress in Scrum happens with a series of sprints, iterations which takes around a month each. The deliveries are committed by the team members for a number of features contained in the product backlog, which is a list of the functionalities desired in the product. At the end of one sprint, these features are coded, tested and also integrated.

- When the sprint is ended there is a demonstration of the new functionality by the team to the product owner and other stakeholders, with a sprint review.
- In the sprint review, the team members present what they succeed in doing.

6.1.3 Risk Management in Agile / Scrum

Risk Management in software projects should be used the same way as in any other kind of project. It is included in PMbok [1] as one of the knowledge areas, crucial to the success of any program or project in the higher level, independent of the methodology used by the company.

Projects are constantly exposed to risks; time constraints, communication, tools and staff, all can be source of risk if not managed in the right way. Many projects fail in achieving the goals because of not giving special attention to the risks and not fully using Risk Management.

McManus, in his book ‘Risk Management in Software Development Projects’ [5] states that:

“projects usually fail because of management mistakes rather than technical mistakes and it could be argued that managerial issues are more important than technical issues in software engineering projects.” Figure 3 outlines some major causes of project failure.

Managerial issues – account for 65 per cent of failure
<ul style="list-style-type: none"> • Inappropriate project structure and channels of communication • Inappropriate resources (poor skill and knowledge mix) • Inappropriate estimates • Inappropriate planning methods (poor scheduling and tracking) • Inappropriate user buy-in • Inappropriate risk management
Technical issues – account for 35 per cent of failure
<ul style="list-style-type: none"> • Inappropriate software requirements • Inappropriate technical design • Inappropriate development and testing tools • Inappropriate technical documentation • Inappropriate technical support • Inappropriate technical reviews (and quality audits)

Figure 2 - Major causes of project failure (Source: Jonh McManus, 2004)

The figure 3 shows clearly where the major problems can be encountered in projects and the importance of Risk management.

This numbers are applied for software projects in general, it does not specify methodology and can be used as base for analysis in Agile projects. Considering the Agile approach of software development, the Risk Management has not been fully developed, many of the books about Agile / Scrum framework do not present the topic, and some of the latest books in the area ‘Agile project Management’[Highsmith 2010] highlights that even Agile being designed to handle hig-risk, it is extremely important to have separated risk analysis and mitigation in every project phase and process.

6.2 ISO 31000

Introduction to ISO 31000

The ISO 31000 standard recommends: ‘ that organizations develop, implement and continuously improve a framework whose purpose is to integrate the process for managing risk into the organization’s overall governance, strategy and planning, management, reporting process, policies, values and culture.’

[3]

The following picture shows the overview of the standard principles, framework and process for Risk Management.

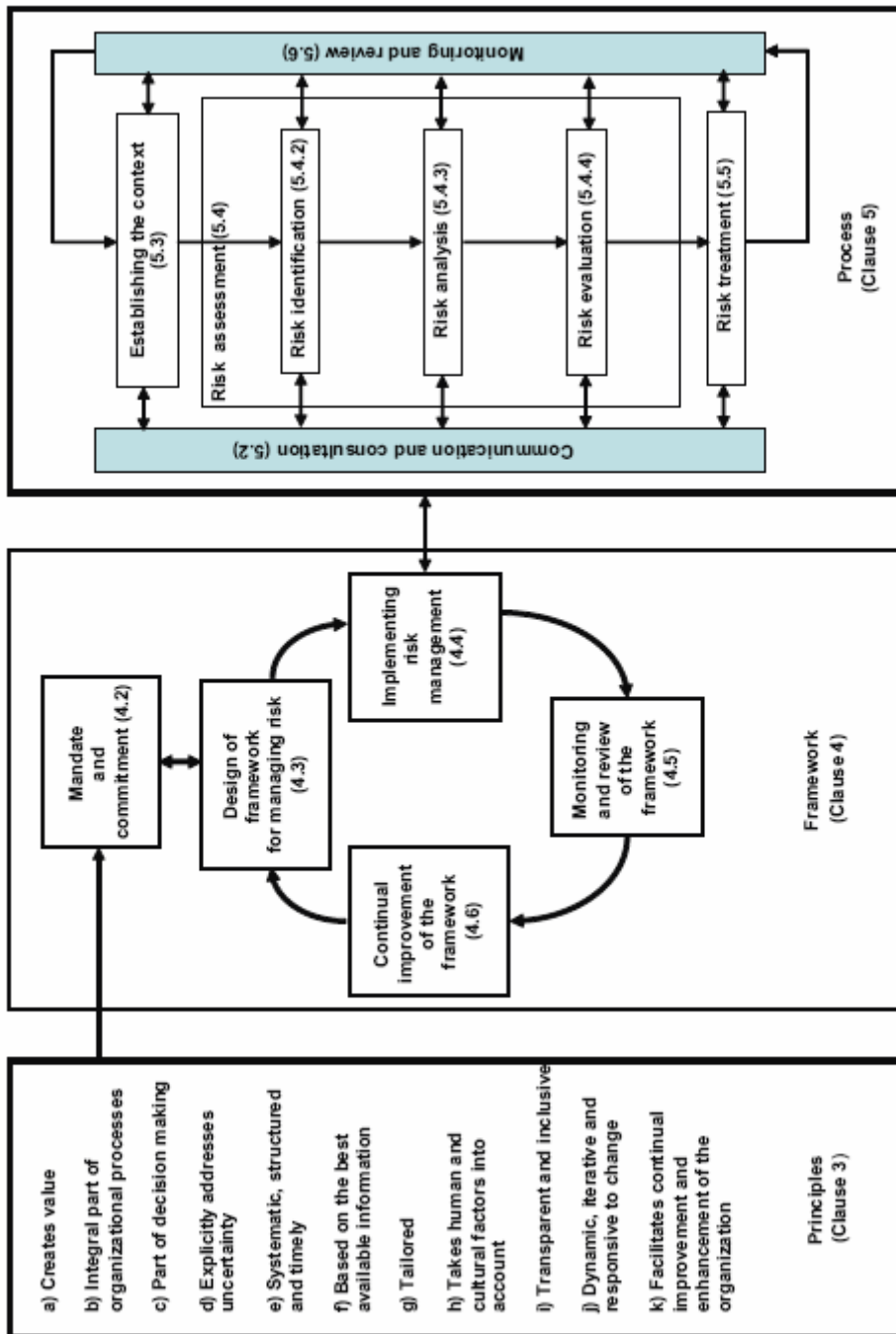


Figure 3- Relationships between the risk management principles, framework and process (ISO 3100)

For detailed description of the Standard see [3]

6.3 Ericsson's Management System

Ericsson's Management System was studied to analyze the compliance to the standard.

6.4 Risk Management case

In this chapter, a description of the situation of the Risk Management in the department is described and the identification of the problem is presented.

6.4.1 Present Situation at the company

At EI, Product Development is carried out in projects and the projects are managed according to PROPS. The New Ways of Working for development strategies as Agile are being updated, the process and decision making are covered according to Classic Way of Working and New Way of Working on Product Decision level.

The Tollgates and Go-decisions in the project decision model are default standards for the R&D projects.

Until 2010, the majority of the projects were run according to PROPS and waterfall approach but some projects started with the Agile methodology, this was mainly in the sites outside Sweden.

As a decision was taken to implement Agile - Scrum methodology at the site in Stockholm Sweden all the team at the development start using the new wow. It resulted in changes, as consequence of a new methodology, changes in processes and in the way the work is performed.

As other areas are affected, Risk Management has also had some impact, even considering that it should not be affected in the higher level, it has been a question mark, the analysis from the interviews shows that it has been left outside, almost forgotten with the introduction of Agile way of working.

An overview of the program/project is shown below together with the summary of the Risk Management approach in each of them

The Organization chart of the program/project studied is shown in fig. 5 and 6, Scrum methodologies are implemented in the sub-projects.

The program is divided in sub-projects with a total Program/Project manager and sub-project managers. The sub-projects are located partly in Sweden, Italy, China and Australia.

The total coordination of the program is done from Sweden where the main Program Manager is located, meetings, telephone conferences and Sametime meetings take place 4 days a week with the sub-projects. The project's documents are available from the Project's homepage and status of the some of the Scrum teams are updated in the RTC (Rational Team Concept) tool which was chosen as being most suitable for the Agile/Scrum methods. The status report is sent to the program once a week.

In the project's homepage, the different documents can be found, but no specific Risk Analysis or Risk Management topic could be found with these specific names.

Program Organization

Simplified view of the Program Organization

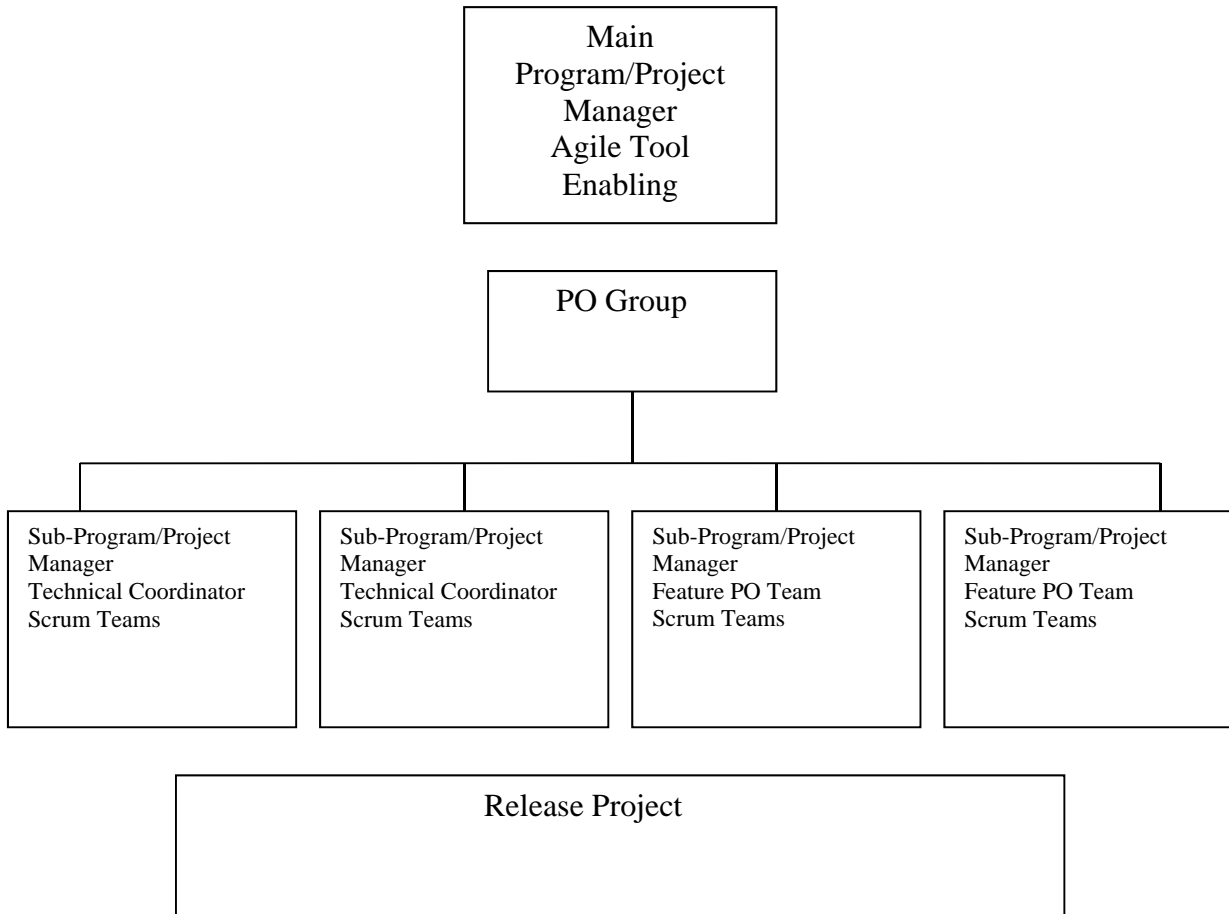


Figure 4 - Program Organization

Project Organization

Simplified view of the Project Organization:

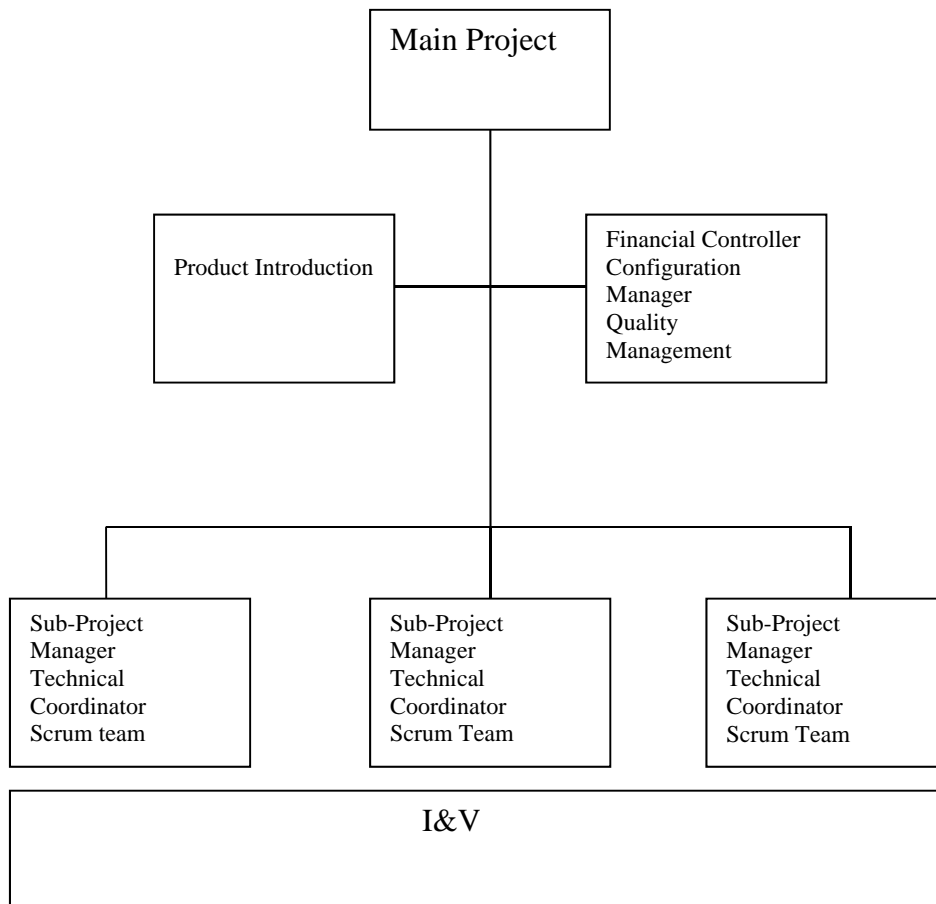


Figure 5 - Project Organization

Figure 6 shows the simplified view of the project organization. The project is divided in sub-projects with a total project manager and sub-project managers. The sub-projects are located partly in Sweden, Italy and India.

The total coordination of the project is done from Sweden where the main project leader is located. The project's documents are available from the Project's homepage and status of the Scrum team studied is sent to the project in the weekly reports.

In the project's homepage, the different documents can be found including the project steering documents where the Risk Matrix can be found under Risk Management.

For this project, the Risk Matrix was done in the early phases of the project, following the same procedure as previous projects, and the responsibility to follow up the risks in the Risk Matrix was passed, due of lack of time, from the Quality Manager to the project manager.

The overall Risk Management guidelines were found in the document named PDU AXE Project Quality Management Framework.

“Risk management shall be performed regularly on all project levels. “

The purpose of project risk management is to ensure that risks and unplanned events do not jeopardize the successful completion of the project. The projects ability to manage its risk efficiently, by means of preventive/corrective actions, directly affects the ability to reach the project goal.

The Quality framework is the base for all projects, focusing the quality approach for the department. It is based on Ericsson’s discipline manager.

Relationship Map

A relationship map was done to clarify how the different roles of the people working in the project/program are related to each other. See following diagram:

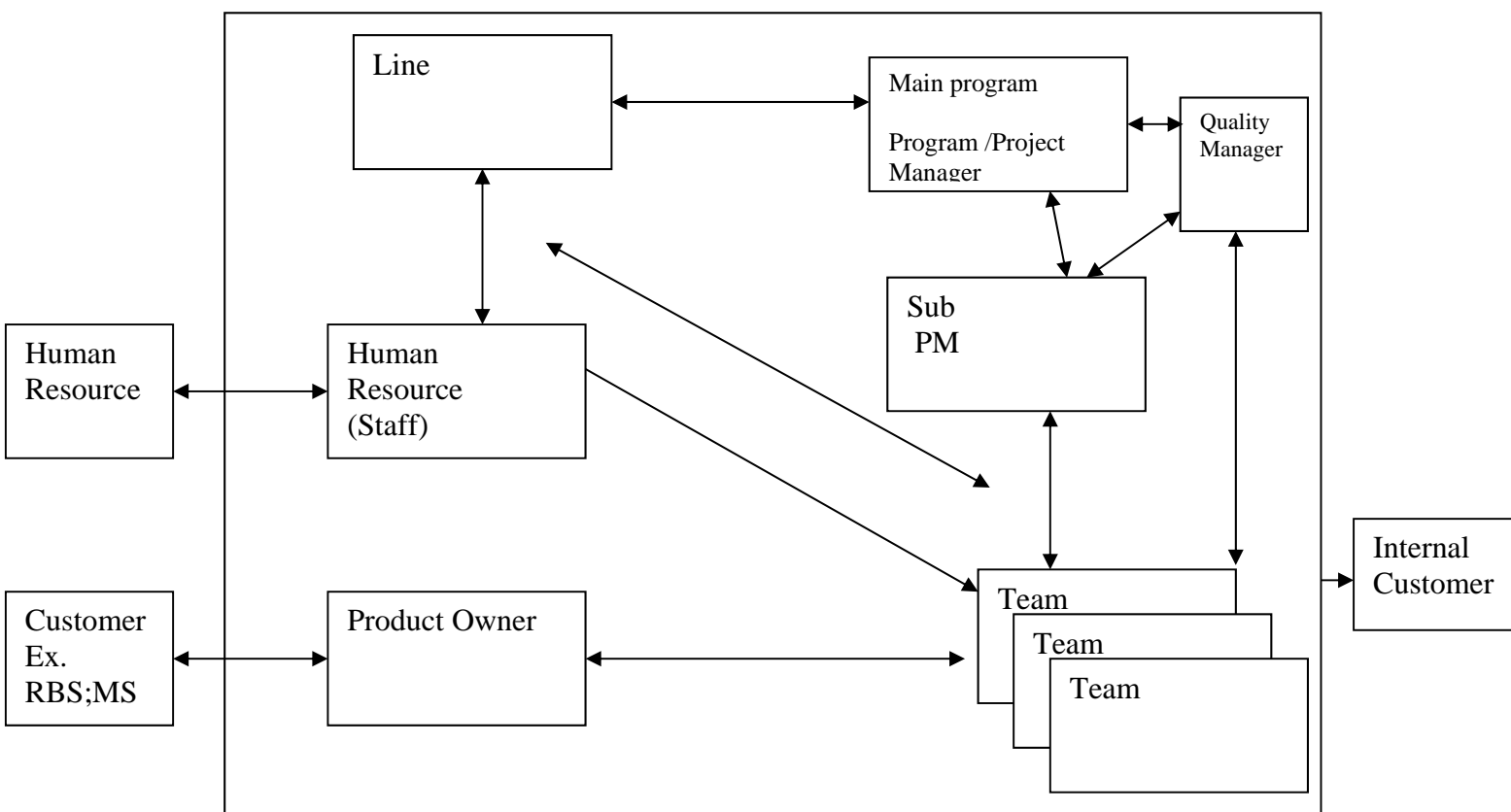


Figure 6- Relationship map for Main Roles in Product Development Agile/Scrum now at EI

Project phases

The project phases, according to Ericsson’s management system approach to Agile, resulted in updated decision making on the Product Level called as ‘Classic Wow’ and ‘New Wow’ but the project decision model is the standard for R&D projects with the Tollgates and GO-decisions.

The following figure 8 shows the classic WoW , the tollgates and relation to product decisions which are taken in the highest level of the project. It synchronizes with Business decisions in the Ericsson Business Process.

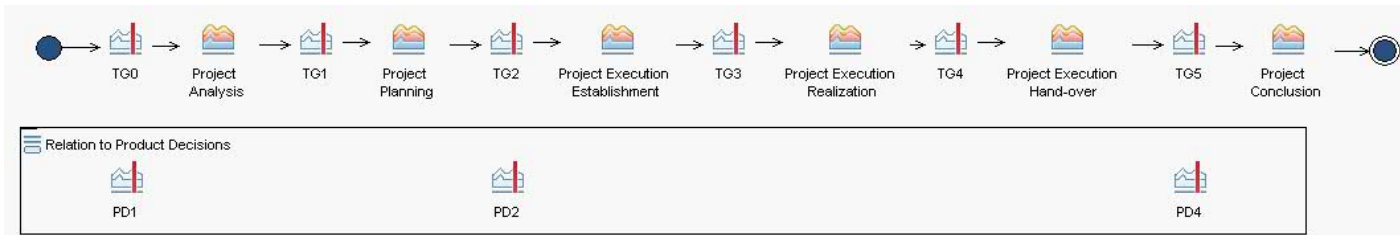
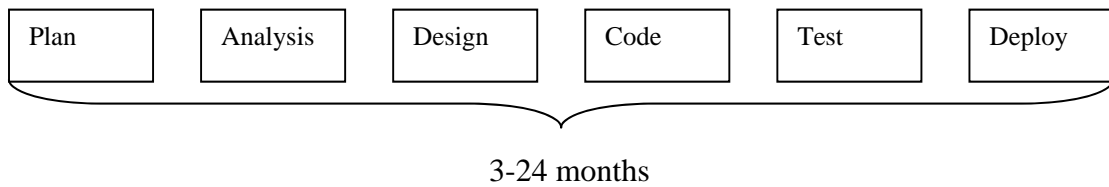


Figure 7 - Classic Way of Working

In the traditional Way of Working, the project phases take 3-24 months



In the Agile approach there are:

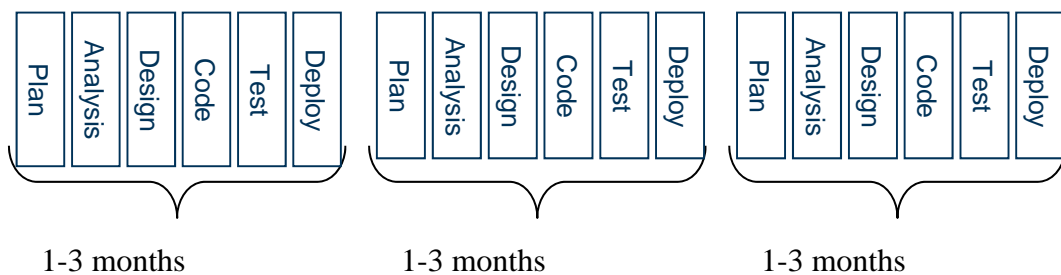


Figure 8 – Project phases in traditional way of working and Agile

According to Ericsson’s project management knowledge areas, each knowledge area, including Risk Management, should be applied to the different tollgates and project phases.

The project/program studied has a mixture of old and new Way of Working. In the low level Agile/Scrum is used and in the higher level for project decisions the old Way of Working is still used.

6.4.2 Problem Identification

Risk Management is a new area and not very explored, if included in the framework and culture give a lot of advantages. When searching for the use of Risk management in Agile methodology inside and outside the company, one can notice that there is little developed in the area. There are different opinions and different approaches and there is a lack of knowledge of the Risk Management processes.

When I did the research about the topic, I found out that books and internet sources give very little information, many times, assuming that it is not needed.

One of a few books that recently was published and which shortly develops the topic in a sub-chapter of Release planning is the 'Agile Project Management' [6] and the topic Risk is included in the chapter of the book 'Agile estimating and Planning' [9]. The first one emphasizes that even Agile being developed to handles risks, it is crucial that there is a risk analysis and that mitigation has also high importance in Agile different phases and process.

The initial proposal of this thesis was to identify how Risk Management is used in Agile/Scrum framework at the Department. Considering the initial proposal of this thesis, the questions for the interviews were identified by the researcher using her own experience in working in projects for many years and having in mind the guidelines of the standard ISO 31000.

After starting gathering data, the researcher finds out that Risk Management is not used in the way recommended by the standards, that people in the company is not familiar and do not have many clues how to use it and that there was not a clear understanding even before the change to the new framework.

In consequence, the scope was adapted a little from the initial proposal to understand what is missing in the process and where the problem could be located.

The people involved in the interviews were two Designers, one Tester, two Project Managers and one Program manager, two Product Owners and three Scrum Masters.

The questions for the Interviews can be found in the Appendix 1.

7 Analysis and Results

Initially this thesis purpose was to understand how Risk Management is used in the Agile/Scrum framework compared to standards and practices in the area. After initial analysis, having as base the ISO 31000 principles, framework and process [3], the focus turned to the poor use of Risk Management in the department.

Through the analysis methods used, two main problems can be seen from the data:

- **Risk Management partially complied to Standards**
- **Risk Management Process poorly used.**

7.1 Risk Management partially complied to Standards

7.1.1 - Ericsson's Risk Management Process

Below an analysis and comparison of Ericsson's Risk Management process description with the Risk Management Process defined in the ISO 31000 standard [3] – See overview of the standard in figure 4

ISO 31000	Ericsson	Comment
Risk Assessment: Risk Identification Risk Analysis Risk Evaluation	Comply	Risk Management Planning <u>-Tools suggested:</u> Lichtenberg, Mini Risk – to facilitate risk analysis. Risk Assessment <u>-Tools Suggested:</u> Risk assessment summary, Risk Checklists; <u>Risk Identification techniques:</u> Brainstorming, Information gathering techniques. <u>Risk Assessment Methods:</u> Mini Risk, Probability/Impact Matrix, Successive Principle
Risk Treatment	Comply	Risk Response <u>-Tools Suggested:</u> Risk Assessment summary, risk checklists, Scenario Simulation tools
Monitoring and Review	Comply	Risk Monitoring and Control <u>-Tools Suggested:</u> The ones suggested above
Recording the risk management process	Comply	The outcome of the previous steps should be documented and updated. Project Risk Status reported in Status Report

Table 1 - Risk Management Process at Ericsson and Risk Management process defined in ISO 31000

Analysis of the data in table 1:

Ericsson has not committed to follow the standard ISO 31000 but the analysis shows that Ericsson has in its process description the different phases of the process which are mostly complying with the standard.

7.1.2 - Program and project not complying with the standards

Below a comparison of the program/project Risk Management process with the one described in the standard ISO 31000 [3]

ISO 31000	Program	Project	Comment
Risk Assessment: Risk Identification Risk Analysis Risk Evaluation	No clear approach	No clear approach	First analysis there is no compliance with the standards
Risk Treatment	No clear approach	No clear approach	First analysis there is no compliance with the standards
Monitoring and Review	No clear approach	No clear approach	First analysis there is no compliance with the standards
Recording the risk management process	No clear approach	No clear approach	For the program/project studied the risk management activities were not traceable

Table 2 - Risk Management in Program/Project studied and Risk Management process defined in ISO 31000

Analysis of the data in the table 2:

There is an Ericsson compliance with the standards in the Management System description but that are not yet implemented the program/project studied.

Complementary data from the interviews:

- There is a concern about not applying a structured way of working:

“There should be a structured way of working, handling the procedures and instructions.” The interviewee points out the need of clear instructions about what to do.

Also another quote from the interviews highlighting the necessity of knowing and using the procedures:

“If there are no procedures or the staff do not know how to use it, there is the risk that the quality can not be assured.”

7.2 Risk Management Process poorly used

With further analysis of data, the researcher concludes that:

- **Very little Risk Management has been implemented**

An investigation tries to elucidate the common problems that can lead to poor Risk Management in the department.

- An analysis of the data collected identified some of the categories that are leading to poor Risk Management. A **Cause-Effect diagram** was done based on:
 - the interviews
 - observations

The aim was to identify the critical parts that could lead to the problem.

The main categories in the data were divided as **Human Resources, Communication, Team, Value, Methodology and Management** as can be seen in the following fig 10.

Cause and Effect Diagram

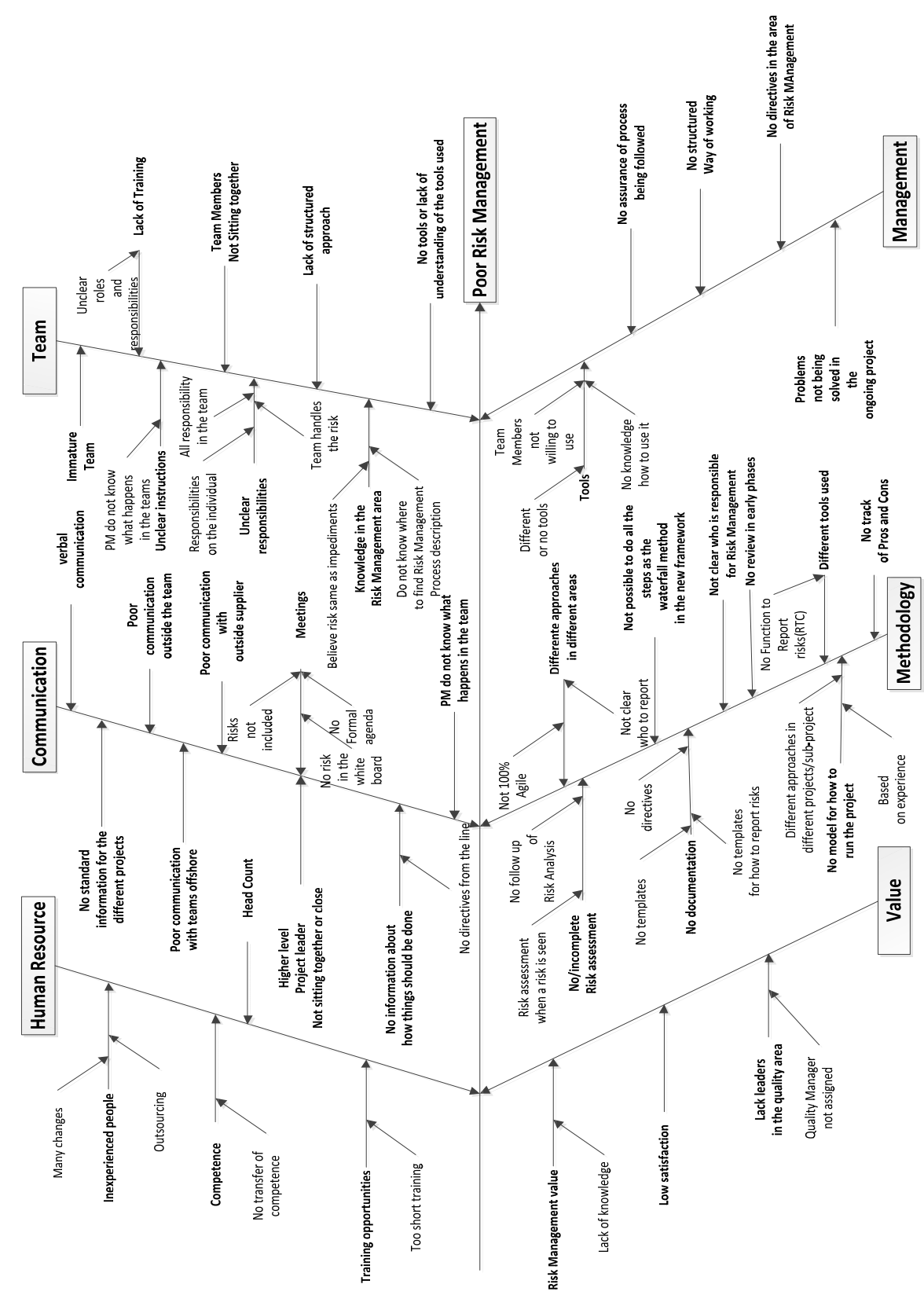


Figure 10 – Cause and Effect Diagram: Causes that contribute to poor Risk Management based on the data gathered

Further analysis of some of the causes encountered in the data and stated in the Cause and effect diagram are done using:

Five-whys' method: Lack of competence in the Risk Management Area

Relationship map: No directives in the area of Risk Management

7.2.1 Lack of competence in the Risk Management area

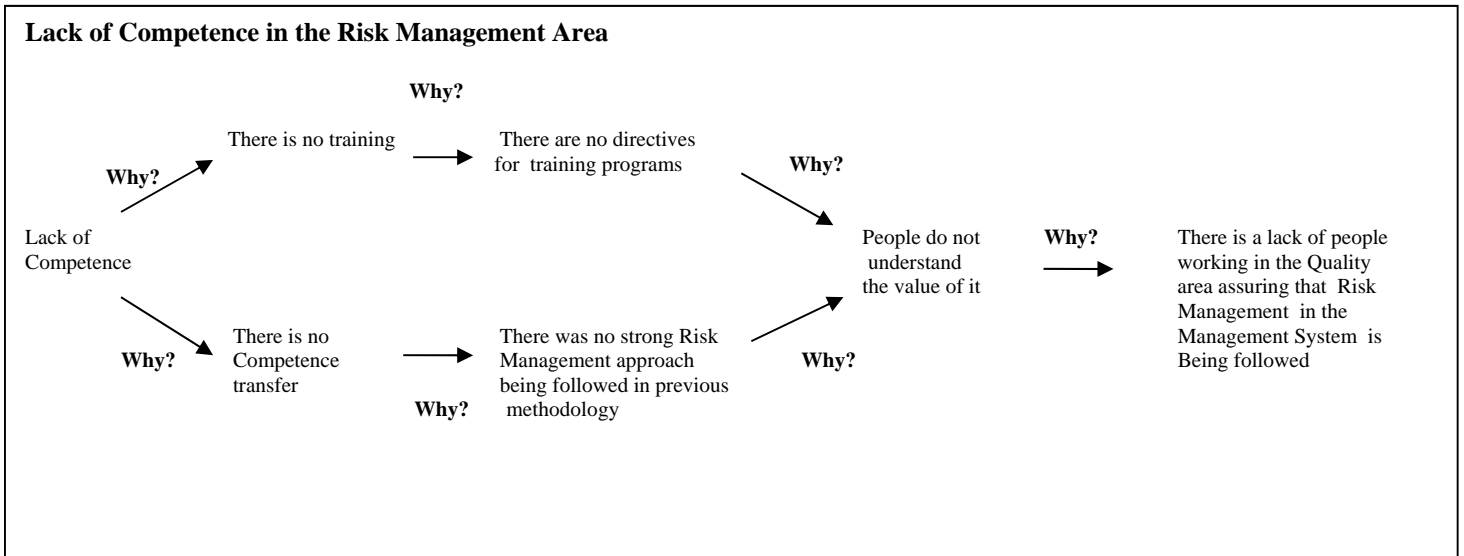


Figure 11 –“5 Why’s” method applied on the Lack of competence in the Risk Management Area

In this analysis, there is no need of going further levels as the solution can be found after 4 steps. If we take the root cause ‘Risk Management in the Management System is not being followed’, the problems that are consequence of Lack of competence’ could be improved by the implementation of the steps in the Management System connected with training in the area.

Some of the other causes found in the cause-effect diagram that could be connected with the Lack of competence:

- knowledge in the risk management area
- No/incomplete Risk assessment
- No documentation
- No model for how to run the project

7.2.2 No directives in the area of Risk Management

Another problem area seen in the cause-effect diagram is the lack of directives and guidance, a relationship map created previously is used to help identify where the weaknesses can be found in the different roles.

Relationship map for Main Roles in Product Development Agile/Scrum now and Risk Management

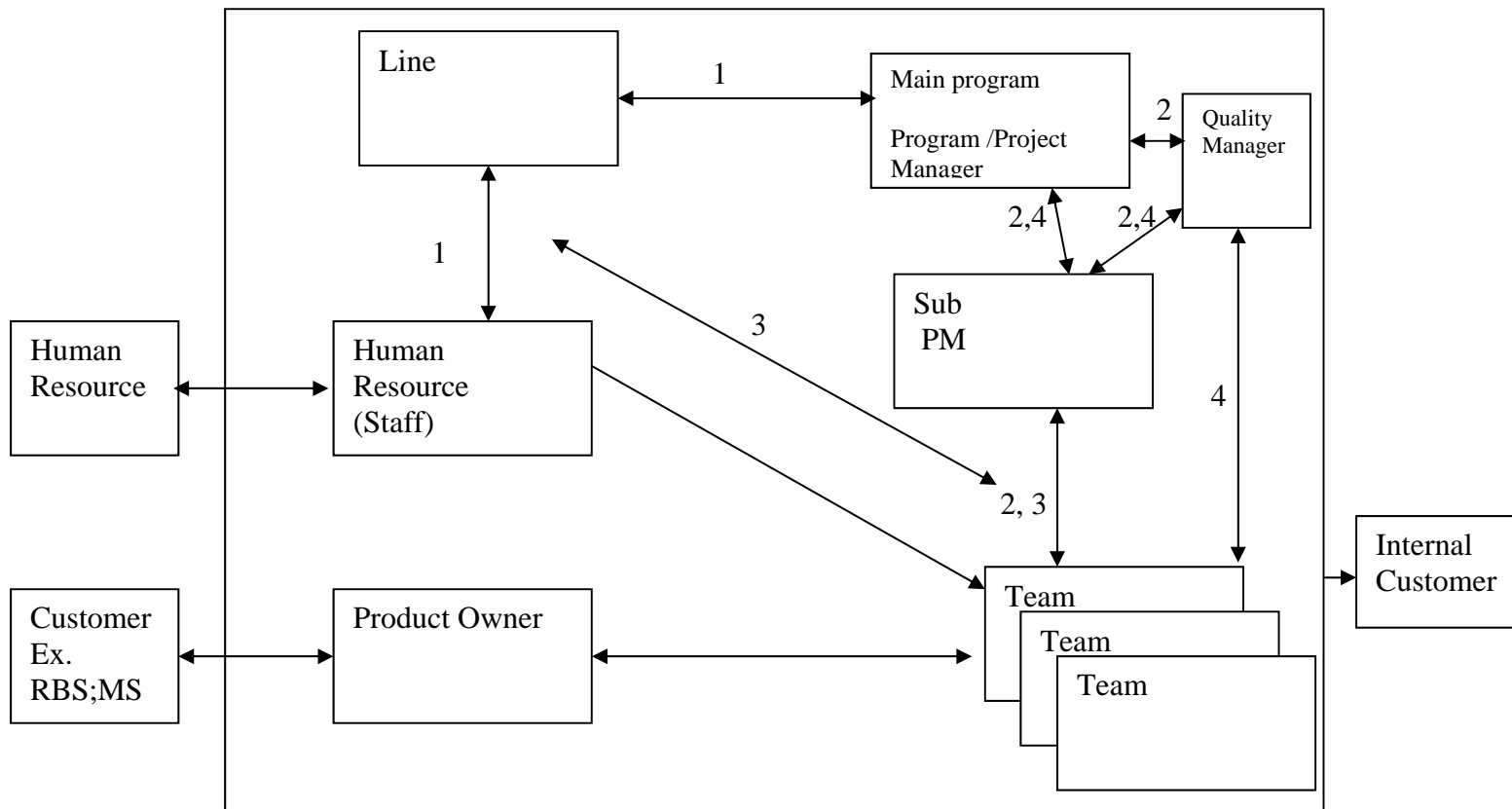


Figure 12- Relationship map for Main Roles in Product Development Agile/Scrum now at EI

- 1- Lack of directives
- 2- Lack of guidance
- 3- No awareness of what happens in the team
- 4- No clear directives, no training

Analyzing the data, the cause-effect diagram (see figure 10) the relationship map was build(see figure 12) and the analyses suggest that some points in the chain have weaknesses and can be summarized as:

- **deficiency of directives from the line in the area of Risk Management** resulting in project managers not knowing what to do and in consequence not being able to guide the teams and show the value of the Risk Management work.

A quote from the **interview** with a Project Manager:

“There is no general directive in projects; it is done based on experience”

When asked about the directives, the participant says that there is no directive for project Risk management from the management.

- **The roles involved do not have clear guidance in what to do** and it is in all levels, from the line to the team members, the flow that should exist is failing and then the Risk Management is lost and forgotten.

Another statement from the Project Manager:

“We do not have a formal approach, no model for how to run the project”

Another problem that contributes for the unsatisfactory use of processes:

The project managers not being involved in what happens in the teams.

The flow in the different levels is not working in an optimized way. There is a lack of communication and involvement from the project leading group which can be caused by the fact that Agile teams are supposed to have more responsibility and this can be misunderstood.

In the team, no clear directives to what should be done in the area of Risk Management can be found. The Scrum Master does not have the directives and acts according to experience. No work in the area can be done in the team level if people do not see the value of it.

Further investigation could answer the question: Can teams be left to work by themselves without guidance?

7.2.3 Human Resources, Communication and Value

In the Cause-Effect diagram, the other areas that are direct or indirectly connected to poor Risk management are analyzed and present deficiencies.

Human Resource

Project managers are signaling the head count is not enough, the need for competence has been a risk factor, there are new employees and little experience, rotation in the teams result in losing competence.

Inexperienced people decrease the quality as no good analysis of possible risks can be done without knowing the product.

Risk Management helps:

Risk Assessment can be used as input and map action/consequence of the risks above on the high level

Communication

Some of the flows in the communication needs adjustment, there would be an increase of value in having Project Managers, Program Managers and teams in closer contact; more risks are identified and avoided.

Risk management is not documented, there is a lot of valuable information about risks being spread through the organization, Minutes of Meetings, power point presentation, emails, this should be documented in a specific area chosen by the project and common to the whole project.

There is a need in increasing the communication in the new wow, higher management, line, sub-pm need to listen to the team members and vice-versa. The communication increase values.

Risk Management Helps:

The Risk management documentation helps avoiding repeating the same mistakes, enlighten the areas of major problems and the actions taken to give solution to certain kind of problems.

Team and Value

The teams do not know the value of a risk management framework, if it is not presented to them together with the advantages of it, they will not be willing to help.

If there are no clear directives to how to achieve the goals in time and with quality, decreasing the risks and acting on threatening, there are no guarantee on timely delivery with quality.

The teams are also showing different characteristics regarding the maturity of the team as a whole and instructions to follow. In some cases, the presence of the Product Owner close to the group gives more confidence to the team and helps in taking quick daily decisions.

In the value aspect, there are some questions that need to be answered in future work:

- What are the organization's values?
- What is the Risk Management value?
- Can people be 'inspired' and give value to it?

In the interviews the majority of the participants, pointed out or recognized the value.

There are a lot of contributions from the team and the rest of the project staff, there is a need to use that to increase quality and satisfaction among the staff.

Management and Line

The organization has to be managed as whole, different approaches in different sections/departments cause confusion and inefficiency.

Some of the problems seen are:

- lack of directives for Risk Management
- lack of involvement in Risk Management,
- poor communication between Program/Project and Line
- poor communication between Team members and Line.

In this area a Quality Manager can be of great value, it can be a point of reference where the staff can seek for help and inspiration.

7.2.4 Some of the Agile approaches on team level is not used

According to the literature, see chapter 6.1 Highsmith, 2010 [6], Agile is designed to handle high risk but some of the Agile approaches and principles are not done, as the data collected shows:

- **Retrospective not done in the project studied**

In Scrum, the teams are urged to do the retrospective in the end of each sprint, which takes the good and bad experiences and uses it as input for the planning of the next sprint. This can be seen as one of the Agile approaches to risks in the team level.

In the interview, some participants pointed out that the retrospective was not done in the team as they did not see the value of it. The lack of Risk Management on the higher level and risks being poorly considered can make that many uncertainties pass through the whole project unnoticed.

The retrospective can be also used by the line and project to identify the areas that need special attention.

- **Technical Review not done**

- High Quality is one of the principles of Agile; one important activity that secures quality is technical reviews and in the data from the interviews it was stated that technical reviews were not done in all teams, this can affect directly the Quality of the product.

8 Conclusions

In this chapter, I will describe the research outcomes in the area of Risk Management in Agile/Scrum at the department studied, the use of it and the difficulties encountered.

In the first part of this study a comparison of Risk Management in the department with the standards is done and it shows that the process complies with the standards in theory but in practice it is not applied by the project;

In the second part, the researcher analyzed the use of Risk Management in Agile/Scrum at EI department at Ericsson, as result the researcher finds out that very little of the process is used.

- Agile/Scrum do not present a clear Risk Management approach, one interpretation could be that this happens because the assumption that Agile/Scrum is risk based, no formal approach is necessary as can be seen in the literature review in chapter 6.1. Only some latest literature recognizes the value of a Risk Management approach in Agile.

Connected to the second part, there are some areas that showed weaknesses and that should be investigated closer, as communication, value, team work and Management.

These two parts are summarized in the table 3 below as finding 1.

The third part studies what are the main constraints that are leading to the problem and suggests how the implementation of Risk Management would help some problem areas. This part is summarized in the table 4 as finding 2.

The findings are divided in two parts:

- 1- Risk Management partially complied with the standards
- 2- Risk Management poorly used

Finding 1: Risk Management partially complied with the standards

Area Analyzed	Conclusion	Comment
Ericsson’s Risk Management Process	Ericsson’s Risk Management Process complies with ISO 31000 See analysis in Table 1 – chapter 7.1	No discrepancies were found in this area
Program and project analyzed using the Agile/Scrum methodology	The program and Project analyzed do not comply with the standards in the Risk Management area See Table 2 – chapter 7.1	The analysis of the Principles and Framework in the ISO 31000 [3] compared to what is performed today by the department shows - that there is no or very little representation of the Risk Management components in the key processes - there is a lack of reporting risks and Risk Management Performance, as is highlighted by the ISO Framework - there are no principles defined and no Risk Management framework in the project studied to help in critical decisions.

Table 3 - Finding 1: Risk Management partially complied with the standards

Finding 2: Risk Management poorly used

Area Analyzed	Conclusion	Comment
<p>Competence</p> <p>Can be seen in the areas of Human Resources, Team and Management in the Fishbone diagram figure 10 in chapter 7.2</p>	<p>Lack of competence in the Risk Management area</p> <p>See “5 Why’s” method used in the analysis in figure 11 in chapter 7.2.1</p>	<p>The analysis suggests that:</p> <ul style="list-style-type: none"> - The competence in Risk Management from previous projects was not passed to people working in the new methodology. - There is no sufficient training for Risk Management. <p>One interpretation is that there is lack of people working in the area of Quality making sure that the processes are understood and followed.</p> <p>As example: The Quality Manager can help as he/she should be trained to help and inspire people regarding Quality issues and helping the line management enlightening the importance of the framework.</p>
<p>Risk Management directives</p> <p>Can be seen in the areas of Communication and Methodology in the Fishbone diagram, figure 10 in chapter 7.2</p>	<p>No directives in the area of Risk Management</p> <p>See “Relationship map for Main Roles” figure 12 in chapter 7.2.2</p>	<p>The analysis shows:</p> <ul style="list-style-type: none"> - deficiency of directives from the line in the area of Risk Management - The roles involved do not have clear guidance in what to do

Area Analyzed	Conclusion	Comment
Human Resources, Communication and Value	Other areas contributing to poor Risk Management See chapter 7.2.3	This topic suggests that: - There is a need for competence development - The communication flow needs adjustment And highlights that: - Risk management is not documented - The teams do not know the value of a risk management framework - There are different approaches in methodology in different sections/departments causing confusion and inefficiency
Agile approach to risk	Some of the Agile approaches on team level is not used See chapter 7.2.4	The result could also identify that: - Retrospective is not done - Technical Review is not done

Table 4 - **Finding 2:** Risk Management poorly used

- One interpretation of the reason for the deficient use of the process and instruction is the changing of methodology followed by taking for granted that Agile do not need a formal Risk Management approach, which in result might lead to poor quality

Working in Agile methodology increases the responsibility of the individual and the team, which makes less strict the formalism of process and instructions.

It expects the team members to have fully responsibility to use the competence and capacity he/she has. This can be achieved if the team members and the teams are mature in their roles and know what to do. But if no instructions are being followed, no good documentation and clear work is implemented, the whole idea of working Agile will compromise the Quality of the product among other things.

As Soin (1999) [7] refers in the book Quality Essentials: 'people and managers come and go' if there is no competence transfer, no documentation, no clear way of running a project in all levels, there is no guarantee that it will work without problems in the future.

It is encouraged that teams find their own routines and way of working but there is a need of guidance and planning for what should be the outcome of it. The self structure is good if it can be followed for anyone new to the team otherwise team's way of working can be lost.

There is a need for acquiring knowledge about what should be done, what the routines and best practices are, showing the importance of a good management system which makes sure that the procedures are being followed.

9 Recommendations

“Processes are rolling along in organizations, whether we attend to them or not. We have two choices – we can ignore processes and hope that they do what we wish, or we can understand and manage them.”
Rummler (1995), Improving Performance [8]

In this chapter; I will lay out some suggestions that can be employed to potentially improve the Risk Management in the department after the issues found and outlined in the analysis and results.

1- Use the processes available and through it comply with standards

- There is a need for understanding the value of using the processes available. Agile methods, when used as recommended, can decrease some risks in projects. But a Risk Management System is important to decrease and manage risks in projects.
- Complying with the standards is the way needed to achieve quality. In Ericsson’s homepage, it is stated that Ericsson complies with the standards when doing business and that it is part of its operation and way of working. Even if Ericsson is not complying with the ISO 31000, perhaps because it is a relatively new standard, a reflection however is needed to guarantee that the company’s new way of working do not jeopardize the core values and the quality of its products.

2- Increase knowledge in the Risk Management area

The interviews showed that people do not use Risk Management because of lack of information, instruction, directives and education in the area. (See Chapter 7.2),

Some suggestions that could be used to increase the knowledge in the Risk Management area:

- Lack of competence could be solved with training in the Risk Management System
- Share information about Risk Management with new team members and new employees
- Internal mini courses
- Information in section/department/project meetings

3- Implement Risk Management System

There is no need to new implementations, what is already available from the management system and from previous projects, if used, are enough to improve the work in the area.

- Implementing Risk Management, with all its phases, makes easier to control not only risks but also areas that are weak and that can be highlighted and monitored, as examples, documentation and communication.

- Risk Management brought to team level, can improve knowledge about it and make people aware of the importance of it.

Some might argue that there are other areas to prioritize and there are many challenges in a project, to place all pieces in place takes time and effort from all parts involved but if small parts are implemented and followed one after the other, if they start being a 'must' in all projects, after some time, the projects will be run smoothly and the routines are followed and improved each new project.

4- Use the new methodology in an appropriate way and together with Risk Management

The new methodology should be used with the steps that helps risk awareness, as example, retrospective should be done and together with Risk Management implemented they can help the project to succeed.

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Appendix 1

Interview Questions:

General questions about Risk Management to developers, testers, TL

(aiming in getting an overall perception about the knowledge in the area, communication, responsibilities about RM in the team

How long have you been working with Scrum?

(background question, want to know the experience in the new method as it has been recently implemented)

Could you describe the Risk Management approach (Risk Identification/Analysis, Risk evaluation and Risk treatment used in the Scrum framework?

(want to know level of knowledge in the RM area for the new method)

Do you know where to find the risk management process description for Agile/Scrum [yes/no]? Could you tell where it is located?

(how easy is to find the information)

Could you tell what has changed from previous Risk Management approach compared to Scrum WoW?

(If the interviewee recognize any main difference)

What are the responsibilities in Risk Management in the Scrum team?

(Does the team member know what is he/she responsibility?)

How is the risk analysis done?

Any tool? If yes, Could you explain how it should be used?

How is the communication about risks done in the new methodology.

(Does he/she is participating / receiving the information necessary?)

How is the follow up and response to the risks during the sprints?

(Want to know how aware the interviewee is about the follow up and response of the risks)

What has been improved in the Risk Management area?

Questions to Project Managers

(aiming to get the PM perceptions of RM in the project when using Scrum, compliance with the standards, communication, directives from the line, tools used and involvement of the members of the teams)

How does the new WoW comply with the standards and practices in the area of Risk Management
(If it is still following the traditional practices in Risk Management)

What is the general directive for use of Risk Management process in Agile/Scrum framework?
(Has it been discussed/brought up with the managers)

How is Risk Management handled in Scrum teams compared to previous waterfall method? Any specific change you would like to highlight?

(Have they thought about what is the contribution from the team)

How is the Risk Management applied in the main/sub-project.
(how much are they working with the process..)

Who is leading the Risk process and how is the procedure?
(who has the responsibility?)

Which tool is/are used for Risk Analysis?
(is it the same as before, any plans to use something new, adapted to the new methodology)

How is the communication about the Risk Management process done among the members of the project and with the line?

(has he/she noticed any difference that could improve the process of communication?)

In what extent are the team members involved in the Risk Management process?

(Do we have more involvement now than before, what are the consequences)

Have you seen any Risk related issues been improved in the project?

(does he/she see any improvement or degradation of the process, any idea about new outcomes from the process?)

Which kind of risks are avoided/exposed/handled with the new Wow?

(Can he/she see any difference?)

Questions to product Owners

Are the expectations about Risk Management from the product/customer point of view been fulfilled with Agile/Scrum methodologies?

Could you point out some advantages that can be seen compared to traditional WoW?

Are the requirements/stories analyzed against the risks, in that case how is it done and who is involved?

How are the risks of the Total project delivery analyzed when working with Sprints?

Is the risk Management outcome used for preparations of Business plans, management of projects and product roadmap? How is it used?