

MASTER'S THESIS | LUND UNIVERSITY 2016

# Better communication in IT-projects with the MAPS Method

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ISSN 1650-2884  
LU-CS-EX 2016-39





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# Better communication in IT-projects with the MAPS Method

(A method for communication channel mapping developed  
with Design Science)

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September 1, 2016

Master's thesis work carried out at Scania CV AB.

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## Abstract

**Background:** As IT becomes a integrated part of more and more products and a greater part of product development process the need for good practices to manage IT projects and software development increases.

**Purpose:** The aim of this work is to improve the communication in IT-projects and thus the likelihood of a project being successful. Our focus has been to improve the identification of relevant stakeholders, the communication of project goals and the coordination within an IT-project.

**Theoretical framework:** The frame of reference for the new method includes; what makes a IT-project successful, what the main challenges in IT-projects are, stakeholder identification, communication, coordination in IT-projects, and communication distances.

**Method:** The new method have been developed with the design science framework. The problem area and what research that had previously been conducted was investigated in a literature study. The artifact, MAPS method, was then constructed based on the previous research trough a creative process. When the artifact was completed it was evaluated in a case study by applying the artifact to a recently closed project at Scania in Södertälje.

**Results:** The thesis have resulted in a new communication mapping method called, MAPS Method. The new method can be used to identify stakeholders and in the case study it identified stakeholders not present in the project documentation. The presence of communication distances that could lead to misunderstandings in the communication channels was identified by the MAPS method. The communication channels where each of the stakeholder in the case study got their information and progress updates about the project goal was also found. The information gained by applying the MAPS method could be used as input for the communication plan and the configuration plan. Most of the people interviewed in the case study agreed that the MAPS method would have provided a benefit if it had been applied to the project that was used in the case study.

**Keywords:** MAPS method, Communication, FLOW mapping, Communication channels, Project success



# Acknowledgements

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This thesis was conducted during the spring 2016 at Scania R&D in Södertälje, representing the final part of my master degree in Industrial Engineering and Management at Lunds Tekniska Högskola.

I want to thank my supervisor at Scania, Tomas Ersson, for his support with this thesis. He has been a great help and shown considerable dedication when helping me getting in touch with people of interest. Foremost I would like to thank him for his guidance and encouragement throughout the entire process.

Also sincere thanks to my supervisor at LTH, Elizabeth Bjarnason, who provided me with suggestions on relevant theory, advice on how to make the thesis comprehensible, and shown great understanding for a flexible work schedule.

A big thanks to the entire UTI department at Scania for their great hospitality and friendly encouragement during my work. A special mention of the UTIF group who has been host to my work and who has provided support whenever I needed it.

For her considerable patience in her help with the readability of the thesis I would like to thank Ida Rannestig.





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# Chapter 1

## Introduction

---

This thesis is focused on improving the communication in large-scale IT-projects. The subject was proposed by Scania R&D in Södertälje and the department for process improvement. This thesis have been written in collaboration with Scania CV AB and the majority of the work have been conducted at Scania's facilities in Södertälje, Sweden. In this chapter the context and background for the master's thesis will be presented. The chapter details the scope of the work and the three research questions that the thesis answers. The last section explains the disposition of the thesis to help the reader understand the structure of the thesis.

### 1.1 Context / Background

The need for good practices to manage IT projects and software development increases as IT becomes a more integrated part of products and a greater part of the product development process. IT projects thereby spreads to new fields where the knowledge about the challenges that are facing these kind of projects may be limited. A project rarely affects only one person so to keep everyone aiming for the same goal is a vital part of the road to project success. Even for experienced IT-organizations communication and coordination are major challenges. So for an less experienced organization it can be a tough challenging to coordinate and communicate.

This section further details the context of the thesis with IT-projects and communication within them.

#### 1.1.1 Research Area

Today the IT-sector has a global revenue of 1 357 billion euros[25] and continuous to grow each year. The possible impact of even small improvement to projects in the sector is high

in absolute terms. But how successful is the average IT project? To be able to have an impact there must be room for improvements.

The Standish Group's CHAOS Report [19] investigates the success rate for software projects. According to the report only 16.2 percent of the projects were successful. The definition of a successful project used in the CHAOS report is "The project is completed on-time and on-budget, with all features and functions as initially specified". So less than one in five project successfully delivered what they intended to deliver within the constraints given. Can this really be true or is it more to it?

There is some truth behind the numbers in the Standish group's report but their definition of success fails to account for one very important factor that affect most projects. The world around the project is not constant, change is always a factor needs to be taken into consideration. According to the CHAOS Report it was just 16.2 percent that achieved success with the CHOAS report's definition of success. Few software projects end up exactly as they where first intended; budget restrictions may be imposed, markets may change, or the customer may change his mind. If the project would adapt to any of these changes the project would be categorized as a not successful by the Standish group's definition even if all the stakeholders had agreed to the change.

Eveleens et al [17] instead introduces a definition where the ratio between features delivered and cost of the project is introduced. When the project change this ratio should remain the same. With this definition more projects are categorized as a success. This show the changing nature of modern IT-projects. The success rate is however not great in these projects either. So it is worth investigating if the success rate can be improved by addressing some of the biggest challenges facing IT-projects.

## 1.2 Research purpose

The purpose of this thesis is to develop a new method that addresses three major challenges for an IT-project; Identify the stakeholders, Define success, and facilitate awareness and coordination. These challenges is further detailed in Section 3.1.10 and 4.2.3. The new method that is developed in this thesis is called the MAPS method. MAPS is an acronym of **M**apping to **A**void **P**roject **S**urprises. This section details the purpose of this thesis. It describes some of the problems with awareness and goal progress in IT projects. The general problem description is then summarized in the three research questions that this thesis answers.

### 1.2.1 Problem description

Communication is one of the biggest challenges facing IT-projects today [13]. To succeed in the IT-projects coordination and communication is needed to have all the stakeholders aiming for the same goal. This coordination becomes a even bigger challenge with globalization and more complex project organizations. As the CHAOS report[19] showed,

projects does often not end up exactly where they intended. So IT-projects do need to accommodate for change and be able to communicate with its stakeholders to keep everyone aligned towards the same goal. When the scope or requirements changes the target for the project may not longer be aligned with what all of the project's stakeholders is expecting. If this misalignment is not managed there will be a discrepancy between what is expected and what is delivered. This will probably lead some stakeholders to view the project as failure when in reality it might solve the intended goal. To keep this alignment is an easy thing to say but much harder to put into practice.

The problem is then to keep everyone informed about what is going on and the progress of the project. To be able to do this you need to know who to inform and how to inform them. There have been a lot of research conducted both in the realms of stakeholder elicitation (who should be informed) and communication (how should they be informed and about what). The project's strategy to keep everyone informed is the content of the communication plan. The purpose of the communication plan is to facilitate effective and efficient communication. There is also a vast amount of research done on problems in IT-projects and the cause of them. So what is the true purpose of communication and how is effective communication facilitated?

As Scania faces these kind of challenges frequently. They need a organization that can adopt to change whilst they continue to delivery products of the highest quality. To achieve this they need a method to start working from and adapt to their development process. It needs to map the common pitfalls and provide a solid base for coordination in IT projects.

## 1.2.2 Research questions

The purpose of the MAPS method is to face three major challenges; Identify the stakeholders, Define success, and facilitate awareness and coordination. This problem can further refined to the following research questions (RQ). These research that are presented below aims to validate certain aspect of the developed method.

Research questions for this thesis:

**RQ1** - How can the MAPS method improve the identification of relevant stakeholders for a IT-project?

**RQ2** - How can the MAPS method improve the communication of the goal between stakeholders in an IT-project?

**RQ3** - How can the MAPS method improve awareness and coordination in an IT-project?

## 1.2.3 Contribution of this thesis

The academic contribution this study brings is an artifact that describes an approach to face three major challenges within IT-project. It also brings an example, and further understanding, of how communication works in an IT-project.

For Scania this thesis contributes with an understanding of how the communication works in their project and provides an approach to start working to improve communication. This by providing the a example of how to gather the information needed to form a communication plan.

## 1.2.4 Scope and delimitation

This section will set the scope of the thesis and will present the delimitation for it to clarify what will be addressed and what will not be.

The MAPS method proposed in this thesis is not a all encompassing project management method. It is meant to complement the current project management practices and put emphasis on important aspects within communication. The MAPS method will not provide the answer to the question what is the best means of communication to have the recipient understand the message. Nor will the thesis verify that the method of communication the stakeholders suggest is the most cost efficient way of communicating.

If a face-to-face interview is not possible the next best thing will not be investigate. Skype, Phone, interview trough intermediary, or email will not be investigated as replacements for the face-to-face interview. This is due to time limitations.

## 1.3 Disposition

This section will outline the disposition of the thesis. It is split into eight different chapters organized in an order that should enhance readability. In most cases there is first a chapter explaining the context and theory then follows a chapter on how the theory is applied in the thesis.

The first chapter, Introduction which you are currently reading, presents the background and context for the thesis. This include the scope, delimitation and problem formulation. Here is also the three research questions, that should function as guide throughout the entire thesis.

The second chapter, The case company, describes Scania CV AB who has hosted the work of thesis and provided a project to test the MAPS method on.

The third chapter, Related works, is about the previous research done in the problem domain. The chapter starts with a long frame of reference which is used when developing the artifact, the MAPS method. This is the result of a literature review with focus on success factors for IT projects. The second part explains the frameworks used in the thesis.

The fourth chapter, The MAPS method, presents the artifact developed in this thesis. This artifact is a method that potentially increase the success rate of IT projects and it is based on the research presented in the fourth chapter. The chapter starts with an outline on what the purpose of the method is and what the requirements on the method is. The six



main parts of the method is then described in more details and some other aspects is presented. The chapter finishes with a proposed work flow of how to use the MAPS method.

The fifth chapter, Research Method, describes the research choices made in this thesis. The design science framework that this thesis centered around is presented. The second part of the chapter presents the work flow of the thesis, what activities that have been conducted and in what order they were conducted.

The six chapter, Results and Discussion, presents as the heading suggest the result from the case study where the artifact was demonstrated. Each research question is presented with the result relevant for it. How the findings compares to related works and a discussion about the question is presented for each of the research questions.

The seventh chapter, MAPS method in a bigger perspective, present five topics that is more of a general discussion about the method and how it relates to observations made in the case study.

The eight chapter, conclusion, reconnects the findings with the research purpose and then presents some suggestions for future research.



# Chapter 2

## Case Company

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This chapter presents the case company Scania CV AB henceforth, Scania CV AB is referred to as Scania. Scania is one of the world's largest truck and buss manufactures. This thesis has been written in collaboration with Scania and their R&D department. Most of the work in this thesis have also been carried out at Scania's R&D facilities in Södertälje.

### 2.1 Scania

Scania are one of the world's leading manufactures of trucks and buses. The headquarter is located in Södertälje, Sweden with some 5 000 employees. The R&D operations is also located in Södertälje and it has 3 500 employees. Since 2014 it is a part of Volkswagen who also owns one of the main rivals, MAN. The revenue in 2014 was approximately 92,1 billion SEK (\$11,88 Bn). One of the most expanding parts of Scania is service and support-products, which helps it's customers to achieve cost-efficient transport solutions and high availability. With operations in 100 countries and more than 42 000 employees it has a global reach.

Scania is currently on the path from a traditional manufacturing company to a company that offers a complete logistics solution with many aftermarket services. Much of the expanded value proposition is in the form of IT services such as fleet management which summarize statistics about fleet use and the ability to remotely send new routes to the trucks' GPS. This in combination with a modernization of the internal IT structure and applications creates the need for efficient management in its IT projects.

## 2.2 Work process at Scania in Business development

In business development Scania works with three phases; White, Yellow, and Green. Before the start of the first phase a business case must be approved for work to begin. The first phase, the white phase, is close to a pre-study where much of the ground work is done but without the depth of a comprehensive pre-study. The second phase called concept development or yellow phase, starts when the portfolio managers give the project the go ahead. This continues the work from the white phase but goes into more depth. The last phase called green phase, or development phase, is where the project is implemented. The development phase starts with a meeting by the steering committee, whose role is to operationally steer the project. It is composed of representatives from the business units that are the most affected by the project. From the first steering committee meeting to when the actual development starts is usually not longer than six months. During this time; the requirements should be elicited, the project definition should be completed, and the project team should be formed.

Important activities for this thesis in the development phase is that there is a kick-off for the project members and steering committee shortly after the first steering committee meeting. This kick-off is where the work process within the project team is discussed and decided. The kick-off is the project members' foremost opportunity to influence the project's process. It should be stressed that the scope of the project is finalized at the first steering committee meeting and project members whom have not been a part of previous phases will not be able to influence it before the decision point where the scope is set.

## 2.3 The XYZ project

The XYZ project replaced the IT tool used in one of Scania's core processes. The XYZ project was called something else but in this thesis it will be referred to as the XYZ project. The project was initiated in 2011 and closed as a development project in early spring 2016. The project started with a broad scope to change, investigate and change work processes. After about three years the scope was limited to only replace the IT tool for the process. During this five year period parts of the project team changed.

The project team included 23 people in total and the system that was replaced was used by about 5000 people internally at Scania.

## 2.4 Scania's contribution

The main contribution from Scania has been time from their employees. This has been in the form of; interviews, meetings, brainstorming sessions, and workshops. Scania has also provided working space and office equipment needed for the thesis. Most of work

with the interviews and the writing of the thesis have been conducted at Scania's R&D facilities in Södertälje.



# Chapter 3

## Related Work

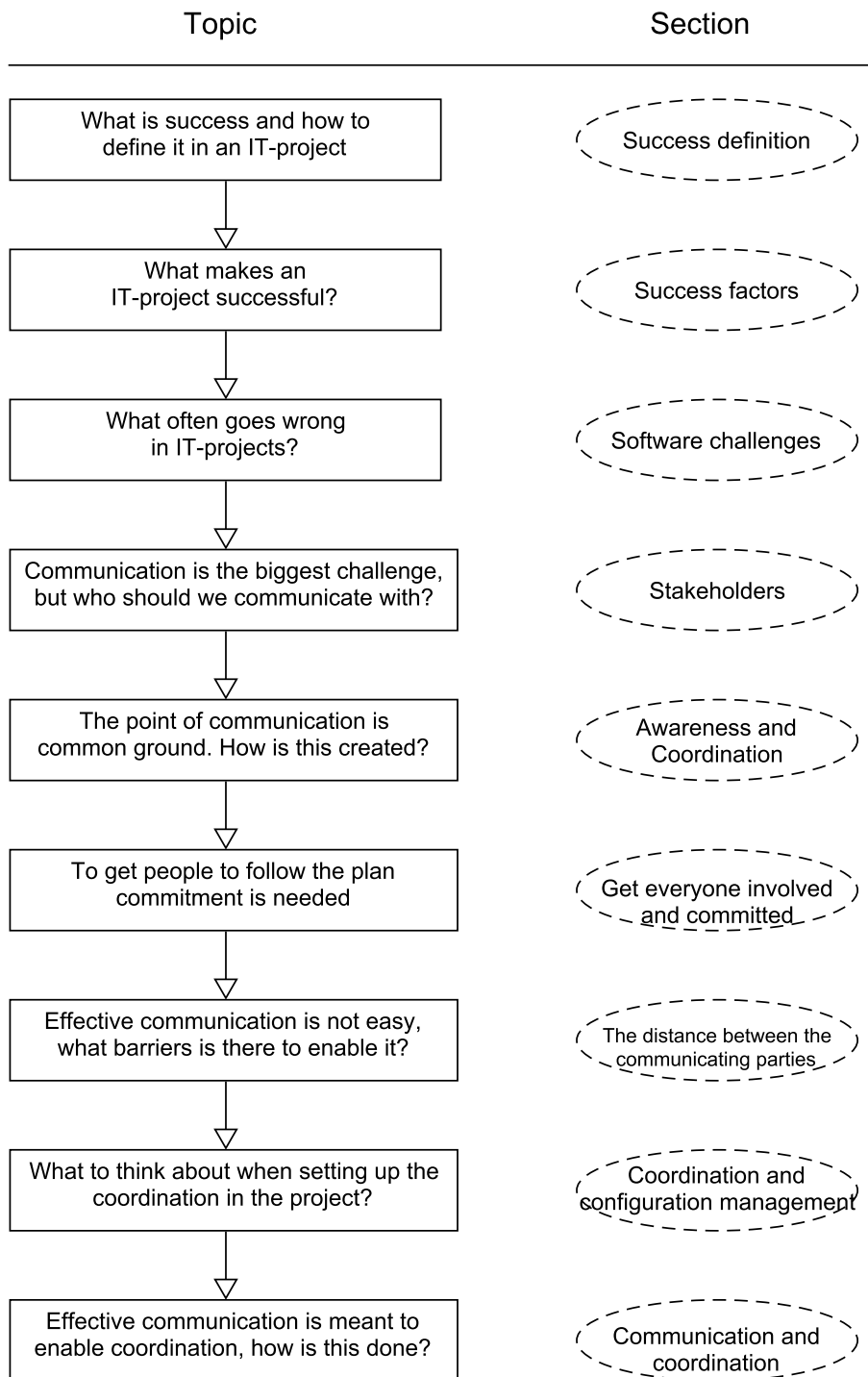
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This chapter is about the previous research done in the problem domain. The chapter starts with a long frame of reference which is used when developing the artifact, the MAPS method. This is the result of a literature review with focus on success factors for IT projects and communication. The second part explains the frameworks used in the thesis.

### 3.1 Frame of reference

This section presents the research that is the foundation for the developed artifact, the MAPS method. The frame of reference is structured as a narrative exploration of the subject. It starts with the assumption that to achieve success one must first define success. The factors that affect this success are thereafter investigated. With the success factors identified challenges to achieve the success are explored. Here communication is identified as a key factor that must be efficient to achieve success. Then the true purpose of success is investigated to be able to achieve the desired effects. Communication barriers or communication distances can hinder effective communication so the types of distances that can exist are explored. With the purpose for communication identified to be to coordinate the project towards the goal this coordination is investigated. In Figure 3.1 this chain of progression is depicted.

To grasp the vast areas of communication and IT-projects it is needed to shift between macro and micro perspective. Often will the general area first be discussed then certain aspects that are relevant be studied in greater detail. In this manor the topics of; IT-projects, Communication, Psychology, and Coordination are discussed.



**Figure 3.1:** Structure and flow of the topics discussed in the frame of reference. The section where each topic is discussed can be found to the right in the figure.



### 3.1.1 Success definition

To find success one must define success. To be able to increase the likelihood of achieving a successful IT project a definition of what constitutes a successful project must be found. The Standish Group's definition used in the CHAOS Report[19] presented in the background reads "The project is completed on-time and on-budget, with all features and functions as initially specified". This is a narrow definition with little flexibility to adapt to changes.

Thomas and Fernandez[45] offers an alternative definition in their paper "Success in IT projects: a matter of definitions?". They first conducted a literature review and found a vast spectrum of success definitions. An important insight was that the definition could not only deal in black and white, some parts could be successful and other parts could not be. Different authors categorized the success dimensions differently.

Three dimensions as suggested by Ballantine et al[4]:

- Technical development
- Deployment to the user
- Business benefits

or four dimensions as suggested by Saarinen[40]:

- Success of the development process
- Success of the use process
- Quality of the product
- Impact on the organization

or six dimensions as suggested by DeLone et al[49]:

- System quality
- Information quality
- Service quality
- Use
- User satisfaction
- Net benefit

Thomas and Fernandez[45] also points to the work of Noble Prize laureates Daniel Kahneman and Amos Tversky [28] and their prospect theory. The core of this work is that humans, in times of uncertainty, tends to overestimate their abilities and underestimate the challenges. This physiological behavior is true even for time, budget and quality. So a

partial failure, Thomas and Fernandez argues, can be viewed as a near optimal result.

Thomas and Fernandez[45] investigate further than the literature review and performed a case study on Australian IT companies to find a definition of success. This case study concluded that three practices could contribute to a successful project. The first one is that everyone should agree on the definition of success. Second, the track and measure your progress towards the success. Lastly, is to use the result of the tracking and measuring. "Simply, if you know what your are looking for, track your progress and are willing to alter your path, then your chances of finding success are better"[45].

To conclude there are some common denominators in most success definitions. There is not one measurement that will encompass the entire project and all aspects of it. The three dimensions categorizations above have business value, some quality aspect and adoptions by the users in common. These is a good place to focus combined with the result of Thomas and Fernandez case study with the most important factor being agreeing on a definition of success.

How to set and formulate a goal is outside the scope of this thesis but the relevant part for the thesis is that is should be easy to communicate and track. Johnson et al [27] suggest smart objectives to make the goal of the project; precise, measurable, realistic, and bound in time. With this kind of goal it can be tracked and communicated. This kind of objective should be introduced for each dimension of the success measure.

## 3.1.2 Success factors

With an idea about what success means in the context of an IT project and some aspects that should be included when defining the goal the actual success factors should now be investigated.

The CHAOS report[19], referred to in the introduction, have in their study found a number of critical success factors based on their rather limited definition of success. In descending order of importance they are:

- *Executive Support*: when an executive or group of executives agrees to provide both financial and emotional backing. The executive or executives will encourage and assist in the successful completion of the project.
- *Emotional maturity* is the collection of basic behaviors of how people work together. In any group, organization, or company it is both the sum of their skills and the weakest link that determine the level of emotional maturity.
- *User Involvement*: takes place when users are involved in the project decision-making and information-gathering process. This also includes user feedback, requirements review, basic research, prototyping, and other consensus-building tools.
- *Optimization* is a structured means of improving business effectiveness and optimizing a collection of many small projects or major requirements. Optimization starts

with managing scope based on relative business value.

- *Skilled staff* are people who understand both the business and the technology. A skilled staff is highly proficient in the execution of the project's requirements and deliver of the project or product.

Factor one (*executive support*) and three (*user involvement*) is about getting people, especially the right people, involved and committed to the project. Factor two (*emotional maturity*) focuses on how the group work together, both to capitalize on different skills but also the concept of the weakest link.

De Bakker et al [15] argues for that risk management and especially the coordination and sharing of information about this is critical for success. They write "Practitioners may become aware that risk management not only helps them to collect information and support their decision-making process, but also helps them to tune stakeholder perceptions and expectations, creating a commonly defined environment in which stakeholders actions are more effective. This may also contribute to the success of the project."

The definition of success they base their reasoning on is one by Habermas and it focuses on a personal evaluation of the project characteristics by each stakeholder. Instrumental action is a action an individual performs with the aim of reaching success, based in the assumption that the action will lead to the success[21]. De Bakker et al[15] then jumps to the logical conclusion that the project plan is a coordinated set of instrumental actions for the project. If the actor, in this case the different stakeholders, instead of just pursuing her own individual goal coordinates the action with the aim to find consensus this is called communicative action. This is where a common understanding of the situation is created and the actors seeks to collaborate with each other.

De Bakker et al[15] arguing supports Thomas and Fernandez[45] that to achieve success a common definition of success is needed. In this case it is a common goal that all the stakeholders base their instrumental action on.

In their paper De Bakker et al[15] also performs a case study that found that both the projects that were investigated identified stakeholder satisfaction as the most important success factor. De Bakker et al[15] concludes that with Habermas' broad definition of project success the stakeholders can clearly see the effects from risk management activities such as risk identification and risk allocation. This may in part be due to the fact that with the activities within good risk management practices there is synchronization of the stakeholders perceptions. They write "Adjusted stakeholder behavior and adjusted stakeholder perceptions, both originating from project risk management activities in which the same stakeholders participated, may be able to synchronize stakeholders' actions and perceptions, making the situation more predictable, in effect leading to less uncertainty."

### 3.1.3 Software challenges

With some more specific topics to focus on to achieve project success the coin can be flipped and instead focus on what to watch out for. The challenges that IT project faces is also important to consider to avoid project failure and reach success.

Da Silva et al [13] found in their literature review that the most research challenge in distributed software development is effective communication. 34 of the 54 papers included in the review mentioned this challenge. The second most research challenge was cultural differences and the third coordination. Others worth mentioning is Asymmetry in processes (6); Physical distance (7); different knowledge levels (9); and people management(12). The number after each challenge is the ranking on the list.

The literature review also included best practices that would improve project management and address the challenges. Many of the best practices focused on addressing communication and coordination. The list included; Provision of and training in collaboration and coordination tools(1), Multiple communication modes(2), Creation of communication protocols(5), and to promote informal interactions(7).

The importance of the communication can also be found in Conway's law. Melvin E. Conway wrote in his paper "How do committees invent?"[12] "Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.". This has later become known as Conway's law. This implies that any problems in the communication within the organization will lead to complications in the design. So already when one designs the communication channels some part of the software design is set.

### 3.1.4 Stakeholders

The executive support and user involvement mentioned in the success section both requires you to know how the user is and how to get involved and committed. The same goes for the communication and design of communication channels, it requires you to know which channels to design and manage. This is actually true for most of the challenges mentioned in Da Silva et al's literature review. So in order to face these challenges and achieve success the stakeholders need to be mapped.[13]

Sören Lauesen [30] describes a stakeholder as entities "who is needed to ensure the success of the project". To succeed in the project it is essential to identify the stakeholders and map their interests and attitudes.[30] The most important thing during the elicitation phase of software development is to correctly identify the stakeholders [10]. It is also during the elicitation phase relationships and ways of communicating between the development team and the customer are established [36].

In Garcia and Pacheco's literature review[36] they found two books, one by Sommerville [41] and one by Pressman [37], which stated that the identification of stakehold-

ers and their expectations is poorly achieved in software projects despite its importance. Garcia and Pacheco found that the process of stakeholder elicitation may be considered self-evident and is therefore neglected. The result would be an incomplete stakeholder map and potential conflicts in the future.

So how is stakeholder identification then performed according to best practice to avoid an incomplete map? Lauesen [30] has listed the following as the most important information to map about the stakeholders.

1. Who are the stakeholders?
2. What goals do they see for the system?
3. Why would they like to contribute/expected reward?
4. What risks and costs do they see?
5. What kind of solutions, suppliers, and resources do they see?

These questions are for a complete stakeholder analysis but to design a project organization it is all relevant information. However the first question is the most important for the ability to draw a map and know who to get involved.

This question is one of the research questions that Garcia and Pacheco [36] tried to answer in their literature review was "What methods or techniques are currently used to carry out the stakeholder identification in requirement elicitation?". The answer was that the methods and techniques used had a high degree of heterogeneity, no two organizations performed them in the same way. Each author had a technique from her view-point and no common framework was found. The elicitation techniques were divided into three main categories: Techniques only resulting in a list of stakeholders; Techniques that identified the stakeholders and also how they interacted; and the third was techniques that included an assessment of stakeholder when they had been identified. 23 studies fell into the second category, where interactions were included, and 15 of them proposed a context diagram to enable stakeholders to see what is happening in the system. The other eight suggested to begin from a principal stakeholder and focus the analysis from this point and outwards.

The second research question Garcia and Pacheco investigated was "What are the effective practices recommended for performing stakeholder identification?" [36]. This tries to answer what approach would be best to find a complete stakeholder and know who to get involved. Three main approaches to stakeholder identification were found. Five studies wrote that "Identify and consult all likely sources of requirements" would be the best practice. Another five had similar suggestion by identifying "Identify and consult with the stakeholders of the system" as the best practice. The last six of the studies that suggested a best practice wrote that "Identify user classes and their characteristics" would be the best approach.

The majority of the found papers then suggested to find a first set of stakeholders and then consult them. From these consultations new stakeholders are found and they are then

consulted. In this manor a more complete stakeholder map is found. There is however not a consensus about how to consult the stakeholders to find the next level of stakeholders.

With this more complete map the number of stakeholders identified can be quite high. To manage them efficiently some sort of stakeholder analysis, not only identification, may be necessary. With  $n$  number of stakeholders the potential number of communication channels can be calculated with equation 3.1.

$$\frac{n * (n - 1)}{2} \quad (3.1)$$

Table 3.1 presents some examples for how the potential number of communication channels grows with the number of stakeholders. The polynomial growth of communication channels suggests that some sort of prioritization and management of the stakeholders and their communication is necessary.

<b>n</b>	<b>Potential number of communication channels</b>
5	10
10	45
15	105
20	190
25	300

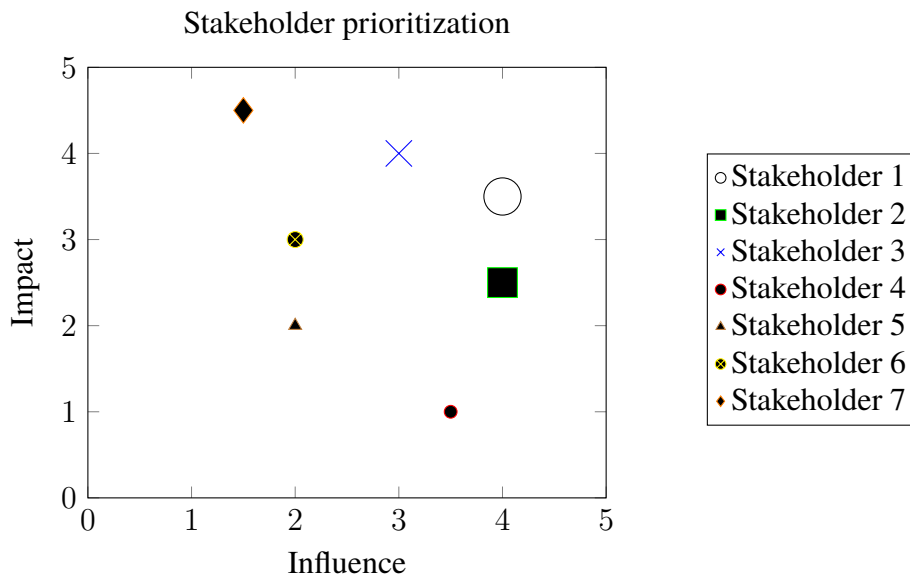
**Table 3.1:** Maximum number of communication channels between the stakeholder that can be present if every pair of stakeholders only can have one communication channel.

To prioritize stakeholders is a part of the stakeholder analysis. A common way to prioritize stakeholders is by their impact and their influence. Figure 3.2 depicts a plot of this prioritization technique. This would give good input on who to focus on and how to design the communication channels. For example it may be wise to have a direct communication channel with stakeholders in the upper right quadrant.

### 3.1.5 Awareness and coordination

When all, or at least enough of, the stakeholders have been identified the common ground must be created. The shared goal, view of success and the progress towards it must be defined and the maintained among the stakeholders, or at least the prioritized ones. The ones not included should be present on the stakeholder map but they may be left out of the communication due to the fact that they are not salient enough. The starting point for this must be to create awareness among the stakeholders so they know others progress and changes to the plan.

Awareness is in simple terms knowing what is going on. Gutwin and Greenberg [20] has found four main characteristics in their mapping of previous work. These characteristics are:

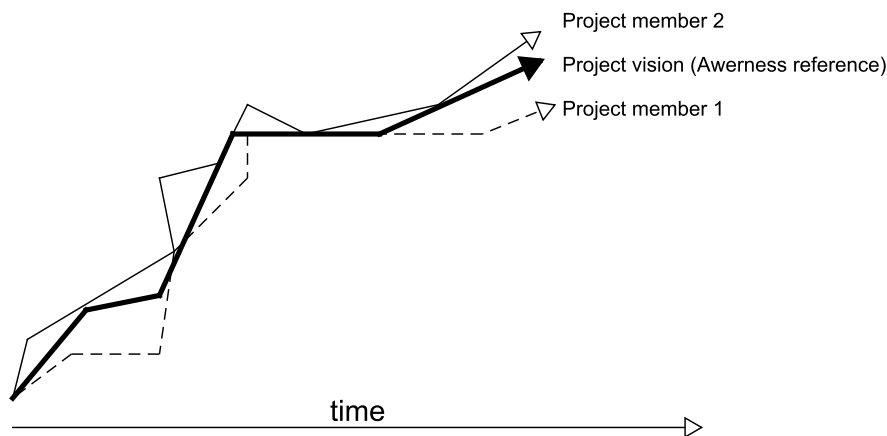


**Figure 3.2:** An example of a stakeholder prioritization matrix

1. Awareness is knowledge about the state of an environment bounded in time and space.
2. Environments change over time, so awareness is knowledge that must be maintained and kept up to date.
3. People interact with and explore the environment, and the maintenance of awareness is accomplished through this interaction.
4. Awareness is a secondary goal in the task - that is, the overall goal is not simply to maintain awareness but to complete another task in the environment.

Awareness is important to manage the transitions between individual and shared work. In collaborative work the group members frequently shift between these two. Coupling is the amount of work that can be complete before a person need to discuss; get information; or consult with other people. Awareness both makes these interactions easier and also allows people to be aware of the need for coupling. [20]

Joe Robinson [38] has written an article about the time spent on task between interruptions in the modern working environment. Some thought provoking facts are presented such as that the average time spent on single task before being interrupted is three minutes. The article's source content is from large American companies and primarily focuses on multitasking but the results is thought provoking and somewhat applicable in this thesis as well. The article refers to an Intel study that claims that a company of Intel's size loses about \$1 billion each year due to the productivity loss that stem from these interruptions. The key takeaway from the article is that multitasking makes us lose focus. 44 percent of interruptions are self-inflicted so not all stem from our own doing. No matter the cause it raises the concern that too much synchronization will not be efficient. So if the same level of awareness can be achieved with less coupling this would be beneficial.



**Figure 3.3:** Illustration of how the level of awareness among project members change can change over time.

It is an easy thing to preach to have everyone aware of what the others are doing but how should this be done in practice? One is managing the number of communication channels, as discussed above, and interfaces for these information exchanges.

To manage this there are methods and techniques that can be used. Mastrogiacomo et al has written an paper titled "Talk before it's too late: reconsidering the role of conversation in information systems project management" [33] which presents a model that is highly related to the purpose of this thesis. They focus on the phenomenon of *coordination surprises* which is an event that do not make sense in terms of one's own beliefs. The background in the paper is similar to the background in this thesis but from the viewpoint of information systems.

An excellent example is given where a project manager can not understand why a project member shows signs of grave misconception about the goal of the project. The project manager held a two hour start-up meeting where he in detailed explained the goal and afterwards everyone explicitly said that they understood. During the next couple of days the manager had "fly-by" meetings with different people how had attended the start-up meeting. Each of them asked questions and to action that indicated that they had not understood the goal of the project and the manager could not understand why.

For this kind of problems traditional coordination theory within the information systems field by Malone and Crowston[31] [32] offers little explanation Mastrogiacomo et al states. Instead the work of Herbert Clark [11] in psycholinguistics is used as a basis for a new theory. What Clark incorporates that the traditional coordination theory is missing is the linguistic act that accomplishes the effective coordination. Mastorgiacomo et al found sources that supports Clark theory that to achieve coordination of joint activities effective conversations needs to take place.

To facilitate this effective conversations the participants in the conversation need to



maintain a sufficient level of *common ground* which is constituted of; knowledge, beliefs and suppositions they share. It is also required that there is an assumption that knowledge and beliefs are shared. With Clark's common ground assumption the gap between the project manager and the project member used in the example can be explained, but no suggestions on how to correct it is given.

WinWin framework is used to assist stakeholders to elicit initial objectives and requirements.[8] It should also identify conflicts among the win conditions between stakeholders. So it can be used to help define common success and find conflicts among the stakeholders. An iterative process that tries to solve these conflicts is presented in the article. However In et al identified multiple weaknesses with the most important being; representing these differences, communication between the stakeholders, and reaching agreements in distributed or asynchronous environments. So in order to for this to work the stakeholders need to be identified and effective communication established. A way to represent these differences is also needed.

Mastrogiacomo et al describes a new method in the paper called Coopilot that aims reduce coordination surprises by adapting Clark's theory to positively affect the course of a project. Since project often is dynamic and subject to change it takes effort and maintenance to keep the common ground up to date. Mastrogiacomo et al implemented Clark's theory by giving the project managers a card with four variables to monitor at every meeting:

1. *Joint objectives*, the amount of common ground shared between the meeting participants about what they should achieve.
2. *Joint resources*, The amount of common ground with regard to the available resources to achieve the joint objectives.
3. *Joint risks*, What obstacles could stop the joint objectives to be achieved.
4. *Joint commitment*, The amount of common ground about what is expected from whom.

The results from trial run presented in the paper were positive with higher percentage of met deliverables and less coordination surprises. Some of the project managers reported however that it was hard to determine the common ground in a meeting and the estimates were highly subjective. Another result reported by a project manager from one of the three pilot tests was that the motivation of project participants had increased and even a shorter response time to emails had been noted.

### 3.1.6 Get everyone involved and committed

The motivation or commitment to the project, mentioned in the last section, is an important success factor. This is true both for projects and process improvement where you need people to work together. "Critical Success Factors in Software Process Improvement: A systematic Review" is a paper by Bayona et al [5] where they found that the five most referred critical success factors in software process improvement were, in order from most mentioned:

1. Commitment
2. Alignment with the business strategy
3. Training
4. Communication
5. Resources

The most frequent referenced factor, commitment, was mentioned in more than half of the papers Bayona et al investigated. To create or inspire commitment is not a trivial task, especially when it comes to get people to change how they work. To have people adhere to the process is the foundation for successful coordination. If some stick to the process and take action, Instrumental action as mention in the beginning of this section, as everyone followed the process they will be surprised when someone do not. This will lead to the kind of project surprises, or coordination surprises, described in the last section. So how do you get the people in the project to adhere to the set process and the project guidelines.

In the paper "Configuration management from a developer's perspective"[6] Bendix and Winter discuss the coordination problem between people in a software development project. Three universally applicable and understandable metaphors for the need to coordinate project work is introduced in the paper; the study, the construction site, and the library. The study is your private workspace where you do your work. The construction site is where all the small pieces produced in all different workspaces is assembled. Finally the library is where the projects shared knowledge is stored. Bendix and Winter performed a case study where the metaphors is used to facilitate a workshop where the developers, that will take part in a project, constructs a configuration plan.

Through the process of involving the developers in the process-design the projects is found to adhere to the plan much better than the reference projects. In the reference projects a theoretically better configuration plans where developed by one person and handed to the project. Bendix and Winter argue that the act of involving the developers in the process of developing the plan creates commitment to the plan and an understanding for it. This is much like involving end-users in software development. The higher adherence might be worth more than the benefit from a better original plan with lower adherence. If no ones follows the good plan it is worth nothing.

Related to this is the Hawthorne effect. This is widely known as the effect that attention from management will increase the productivity of the works and named after the plant where experiments took place. This phenomena have never definitely proved or disproved but many studies have helped to show that it is unlikely that the increased productivity was due to attention from management. It is however likely that the workers in the study increased their productivity because they didn't want to be excluded from it. The participants in the study had much more control over decision that affected them and therefor felt empowered. If they were excluded from the study they would loose this control. To be able to control factors that have direct effect on you had a positive effect on the workers. [48] So the act of letting people have their say and try to fit their needs may increase their

productivity.

### 3.1.7 The distance between the communicating parties

Another approach to the project surprises is to try to understand what might cause the misunderstandings that lead to the surprises. To evaluate the quality of the communication between two parties Elizabeth Bjarnason and Helen Sharp propose in their paper "The role of distances in requirements communication: a case study" [7] that the distance between the communicating parties shall be measured. They show that a long distance in the communication channel may lead to poor communication quality and by extension a lower product quality.

The distances are not only a geographical distance it can also be figuratively distances like different level of domain knowledge. The distances proposed by Bjarnason and Sharp that are applicable in this thesis are:

- Geographical distance, The physical distance between the communicating parties. A longer physical distance may lead to less frequent and less ease communication.
- Organizational distance, When people belong to different organizational units differences in goals and intent may occur.
- Psychological distance, if one of the parties have a perceived effort to communicate with the other for example due to interpersonal conflict.
- Cognitive distance, a difference in skill level och domain knowledge may lead to that information is interpreted differently.

In Bjarnason and Sharps research they found that a geographical distance may lead to that a person seeking information turned to a different information source than the intended in favor of one that was closer. A shorter geographical distance did also in some cases produce a less documented process.

One of the main problems with long organizational distance was to escalate problems. The nearest common decision maker is on such a high level that she will not have the specific domain knowledge to be able to resolve the problem. This will also lead to delay in the work flow. The groups with a long organizational distances had a higher perceived benefit from project meetings because this gave them a direct communication channel between the parties.

The main result within the psychological distance was that the distance rarely went both ways. The distance was often uni-directional so only one of the parties perceived that she had communication problems.

The cognitive distances varied greatly between the different teams. Short distances within domain knowledge allowed for more proactive work was reported by one tester.

Both the product owner and a requirement engineer reported that their high technical skill enabled them to efficiently communicate what they were thinking.

## 3.1.8 Coordination and Configuration management

The purpose of the efficient communication and to create awareness is to be able to coordinate the work and avoid surprises. According to ISO 12207 the purpose of configuration management is "The purpose of the Configuration Management Process is to establish and maintain the integrity of all identified outputs of a project or process and make them available to concerned parties." [18] By this definition the field of configuration management is intertwined with many of the aspects discussed in this chapter so far. To deliver the output to concerned parties requires these parties to be identified and categorized as affected by the output. To preserve integrity the communication channels and dependencies must be managed.

The information in a project is rarely static, it is subject to frequent change. The information in one document may need to be updated but there may be other documents that have dependencies towards it. This kinds of problems is what the field of configuration management handles. This even further solidifies the entanglement of configuration management and communication. One will effect the other and the other way around. So when working with communication strategies it is important to be aware of the biggest challenges within configuration management.

Wayne A. Babich defines three main challenges in configuration management in software projects in his book "Software configuration management: coordination for team productivity" [3]. This book have been the base for much research within the area of configuration management. The three main challenges described by Babich is; Double maintenance, Shared data, and simultaneous update. *Double maintenance* is the task of keeping multiple copies of something identical over time. Every time a copy is created it adds one more place to apply any change that is made to the item. To keep several copies identical over time requires a lot of work. The *shared data* problem is when updates or changes is propagated, in an uncontrolled way, to others. If someone is working on something that has dependencies on your work and has validated that her work is correct. If you then change something and the person who's work has dependencies on yours is not informed, or especially if she can not control when these changes is applied to her work, tries to validate her work again this my fail and she will not know why.

Babich [3] describes the intertwining of communication and configuration management very well in one of his opening paragraphs: "Why is so much time spent communicating? What is all the conversations about? Actually, conversation is not the big time sink. The term communication is a little misleading; we should use a more descriptive term: coordination. Programmers lose productivity because of the time they must spend coordinating their work with that of others. Even more important, they lose productivity because of mistakes that are made by failing to coordinate." This rather general description could be true for any member of a project. If a scope change is not coordinate and propa-

gated between project members different parts of the projects will work towards different goals.

These three basic problems is applicable in many situations. For example if two different groups would both say that they used a certain standard, lets call it standard X. This would be great from a coordination point of view if this standard for example outlined the work process. Unfortunately group 1 uses an old version of the standard that they have stored locally in the group folder and group 2 uses current version. This may lead to surprises due to differences in the versions. These surprises can be viewed as failure in the communication between the groups but when they in fact stems from a mistake in the document management. No matter if you view it as a document management mistake or communication mistake it exemplifies the entanglement of configuration management and communication. Effective configuration management will reduce the number of communication mistakes but it requires effective communication to achieve that coordination.

### **3.1.9 Communication and coordination**

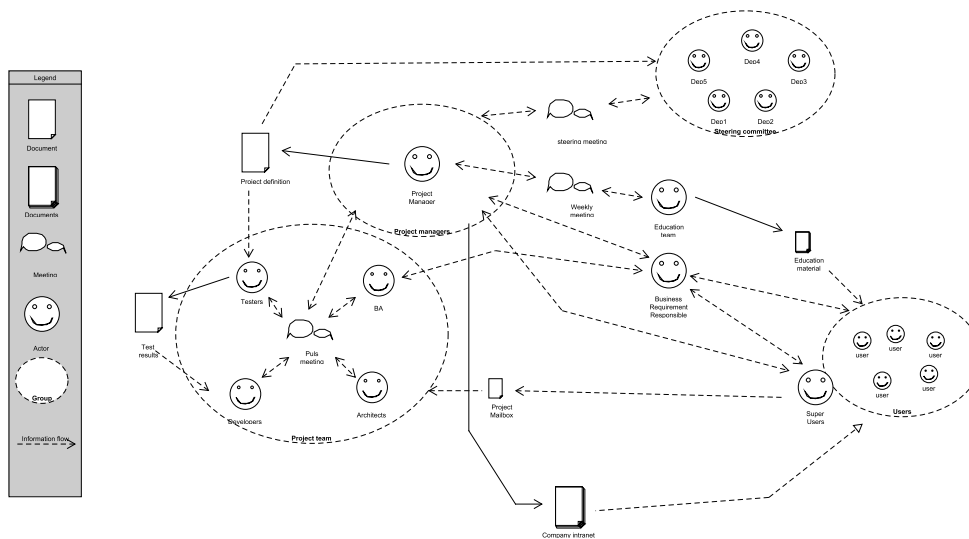
One method that tries to encompass both the communication and coordination part is the FLOW approach[43]. It tries to do this by focusing on the information. FLOW is an approach that is used to capture, model and managing flows of information. This approach is divided into three elements:

1. The FLOW model, is a model to visually present information flows with storage nodes, flows and experiences.
2. The FLOW method, is the framework to apply the FLOW model. This is to improve the software development process.
3. The FLOW Technique, is the actually activities to reach the improvement.

Kai Stapel, Eric Knauss and Kurt Schneider have in their paper "FLOW Mapping, Planning and Managing Communication in Distributed Teams"[42] proposed a method to plan and map the information flow within a development project. The main purpose of the method is to

1. Capture the information flows
2. Specify desirable information flows
3. Create a map important information flows
4. Apply the map of information flows
5. Monitor information flows

The method that is used to create a map, see figure 3.4 for example, that will help to achieve the first two items, to capture the information flows and specify desirable information flows. The third item results in documents that can help when implementing the plan in item four, apply the map of information flows, for example as resource in training. The



**Figure 3.4:** Example of an Flow map

map may also act as documentation in the project.

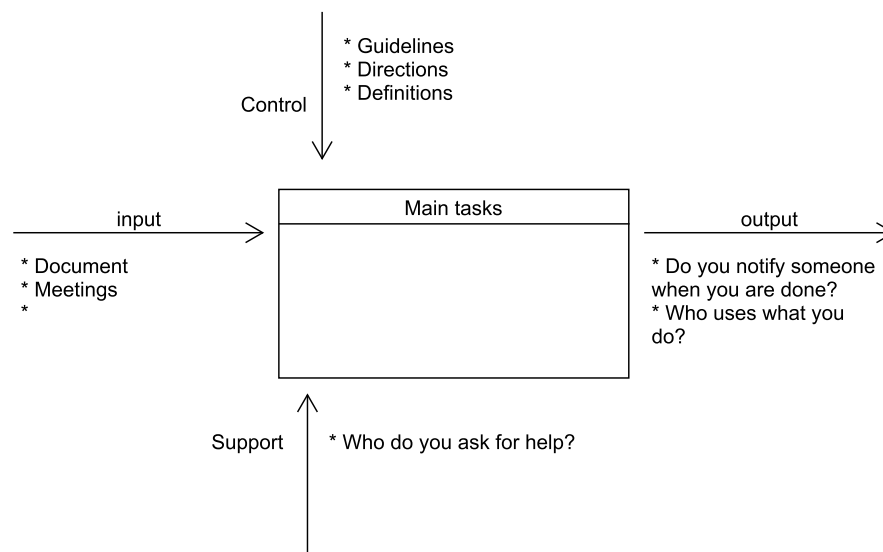
The FLOW Mapping approach builds on the work by Kai Stapel and Kurt Schneider in their FLOW method[43]. The FLOW Method is used to plan and direct communication in development projects. FLOW Mapping then introduces a simple visual notation to help visualize the information flows within a project. The information is divided into two categories, solid information and fluid information. If information is solid it implies that it is:

- Available for a long time
- Accessible multiple times without change
- Understandable for a third party

If the information do not satisfy one or more of the conditions above it is classified as fluid. Example of fluid information is something that is said at a meeting and then only stored in the meeting-participants heads. The notation includes the different communication channels and the information flowing through them. The authors have also introduced; information storage points and their location, the strength of the communication channel, choice of communication medium, and a kind of yellow pages with contact information.

The FLOW mapping approach collects the data through a interview with each project member, see figure 3.5 for framework for the interview. The project members are interviewed base on what they will do that week, the activities and tasks. For each of these tasks the input information they need is specified and the expected output. The guidelines they will adhere to and who they might ask for help is also investigated.

The FLOW method proposed in the paper suggest to plan the communication by first identify all the people that will participate in the project. A communication strategy shall



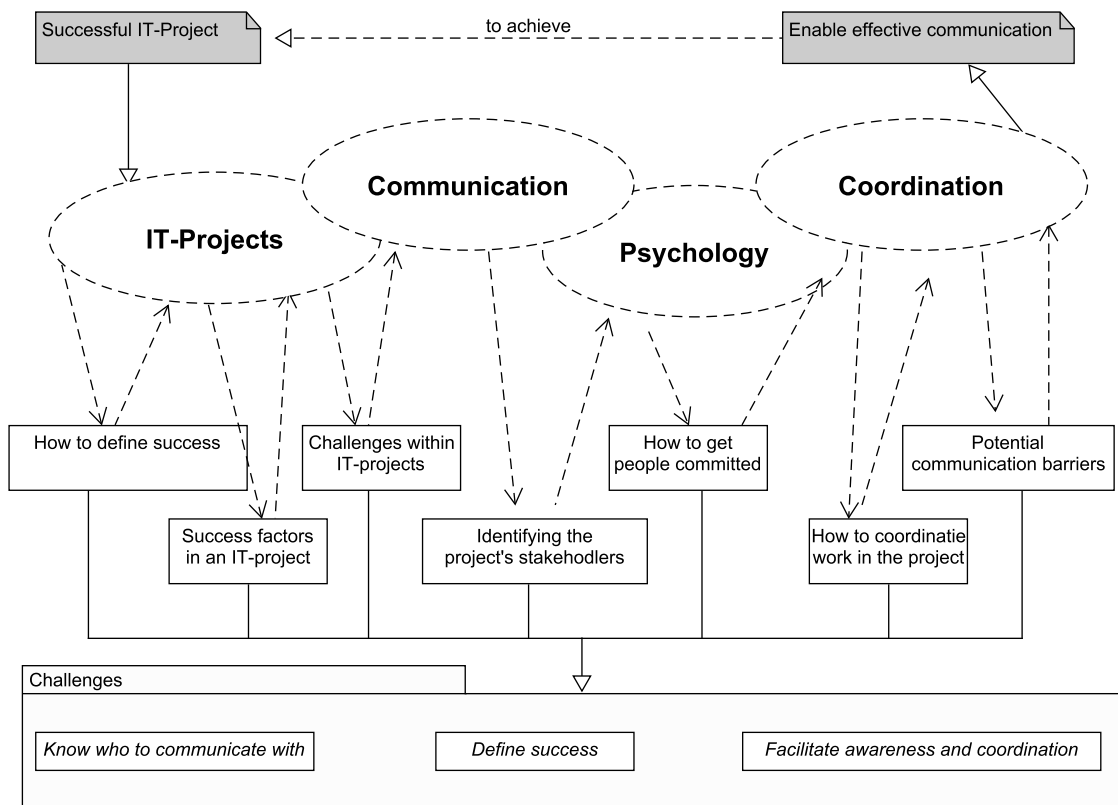
**Figure 3.5:** Flow style framework for interviews

then be developed based on scheduled and event-triggered information. In order to be able to develop the communication plan the different types of information that flows in the communication channels must be identified. The communication plan must support, the kind of information that the project participants want to exchange. How should the information in each of the communication channels be exchanged. To find a adequate answer to this question, how to communicate, is a research area in itself and is therefor not investigated. Stapel et al relies on "Media Richness Theory"[14]. For each identified group of project participants FLOW maps with their main activities is developed. This is to visualize the the information flows in a simple and easy to use way. The last step in the method is to merge all the partial maps to get a complete overview of all the information flows in the project.

The intention of FLOW is to be used within the project team as demonstrated both the case study by Stapel et al [42] and the case study by Bjarnason et al [7]. The principle of the mapping and the type of interview conducted by Bjarnason et al [7] is however applicable to organizations and projects in general. The interview is focused on building the map and to get the participants input on how the work and what information they need when performing their tasks. With this kind of map the communication channels can be; found, planned, and managed. This interview provided a base on how to consult stakeholders and how to conduct interviews with them. The missing piece from the section about stakeholder identification.

### 3.1.10 Conclusion

The frame of reference shows the span of research areas that is included when investigating the challenge of communication in IT-projects. It is needed to first investigate the topics on a high level then focus on what is important for the task of enabling efficient communication. In the frame of reference; IT-projects, Communication, Coordination, and Psychology have been discussed. In these high level topics more specific topics have been identified, these are; How to define success, success factors in an IT-project, challenges within IT-projects, identifying the project's stakeholders, how to get people committed to the project, how to coordinate the work, and potential communication barriers. Throughout the frame of reference the zoom bounces from high-level wide-angle to specific topic heavily zoomed in several times. The turns can sometimes be sharp but it is important to put the specific topics in to context to understand the big picture. A visual representation of the bounces can be found in figure 3.6.



**Figure 3.6:** Overview of the mapping between the topics discussed in the frame of reference and the challenges identified.

These specific topics can be boiled down to three major challenges; Identify Stakeholders, Define success, and Facilitate awareness and coordination. *Define success* is the challenge of having a common goal to work towards. *Facilitate awareness and coordination* is the challenge to use the communication to guide the project towards the common goal. *Identify stakeholders* is the challenge of knowing who to communicate and coordi-



nate with.

## 3.2 Models

This section presents the models that is used in the new method, the MAPS method, suggested in this thesis.

### 3.2.1 Stakeholder analysis

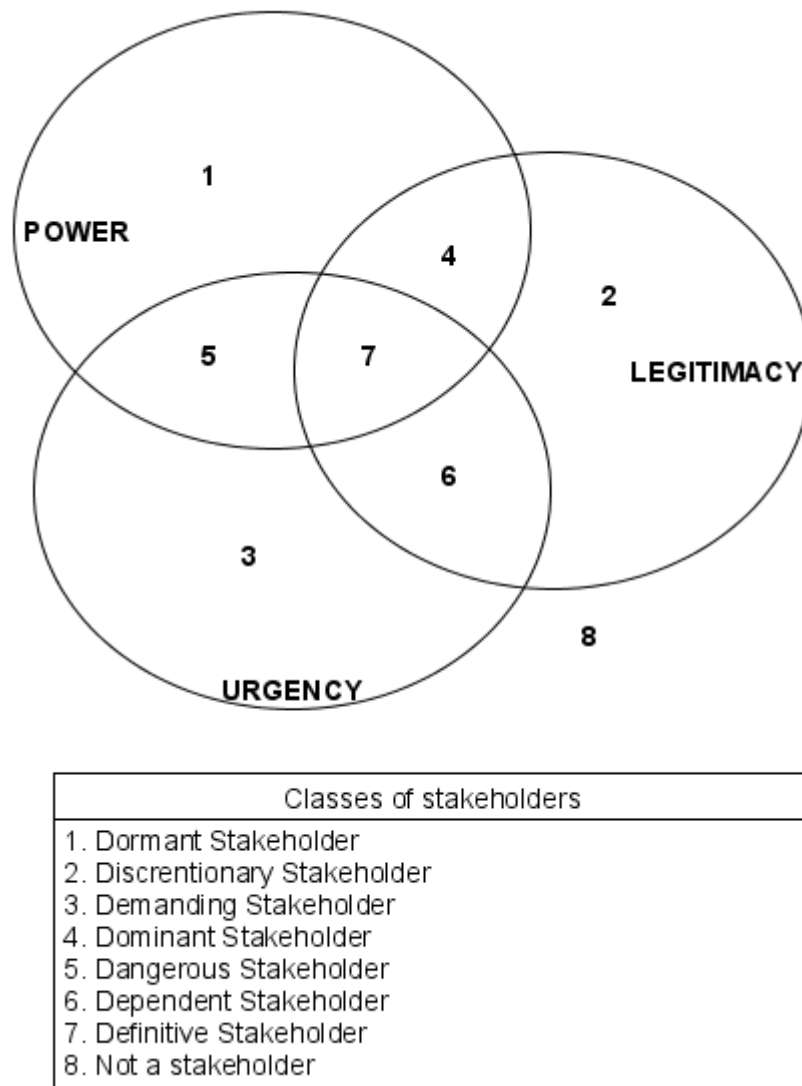
Stakeholder analysis may be important step on the road to success. This section will provide some frameworks to help the reader understand what the purpose of stakeholder analysis is and what is common methods to do it.

Wenell [47] has identified three major categories of stakeholders in a project.

1. **Core stakeholder** - Is someone who has a active part in the project and/or has the authoritative to make decisions affect the project. These stakeholders have a power to directly effect the project. Wenell places customers; the project group; steering group; users; and sponsors in this category. Wenell also argue for that the family of the project members should be placed here along with the mentors of the project managers.
2. **Primary stakeholders** - Is someone that will be affected by the project and therefor is presumed to want to effect it. Wenell describes them as people without the need to be an active part of the project but still want to effect it. In this group Coworkers not involved in the project; line-supervisors in charge of resource allocation; consultants; business partners; and suppliers is placed.
3. **Secondary stakeholders** - Is someone with limited interest in the project and no desire to effect it. This group contains NGOs; different kinds of government entities; and friends of project members.

This is one way to categorize the stakeholders. Another way is by; Power, Legitimacy, and Urgency as suggested by Mitchell et al[34]. A stakeholder can be attributed one, two or all three of these attributes. See figure 3.7 for venndiagram of the factors and their overlaps.

*Power* is the stakeholders ability to carry out her own will even when facing resistance. It can also refer to her ability to affect other stakeholders to act in her interest. Mitchell et al states that power may be hard to define but it is easy to identify. For the second attribute, *Legitimacy*, Mitchell et al refers to the work by Suchman [44] that focuses on; the evaluative, cognitive, and socially constructed nature of legitimacy. Suchman defines legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". A stakeholder gets the attribute, *Urgency*, when their relationship with the organization is critical and the circumstances makes the matter time sensitive. The stakeholder must be both from a critical organization and have a time sensitive matter



**Figure 3.7:** Stakeholder classification[34]

for the attribute of urgency to be set.

Mitchell et al also makes three important additions the attributes to emphasizes that the attributes are dynamic and not static. The additions are:

1. Stakeholder attributes are variable, not steady state.
2. Stakeholder attributes are socially constructed, not objective, reality.
3. Consciousness and willful exercise may or may not be present.

Based on their definitions Mitchell et al then states their first proposition that defines how to categorize the salience of the stakeholders. *Proposition 1: Stakeholder salience will be positively related to the cumulative number of stakeholder attributes — power, legiti-*

*macy, and urgency — perceived by managers to be present” [34].*

There are many other ways to also categorize and organize the stakeholders. Simpler variations that can be found just by logically thinking about is to categorize by; role in the project, need for progress updates, or organizational power. The approach that should be used depends on the size and scope of the project.

## 3.2.2 Communication

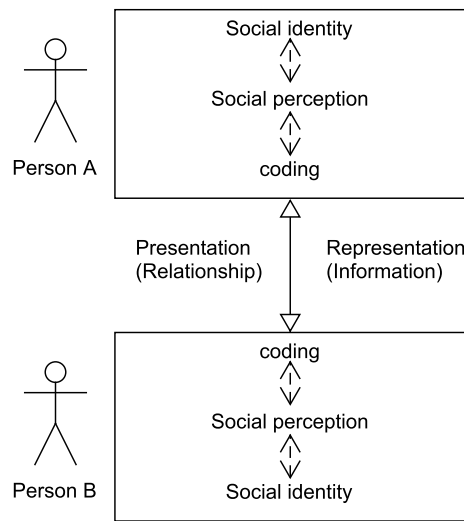
In much of the frame of reference, section 3.1, effective communication is discussed. In order to design a method to support effective communication a definition of communication should be discussed. This section will discuss the definition of communication and then some basic models for how communication works.

The Oxford Dictionary defines communication as ”The imparting or exchanging of information by speaking, writing, or using some other medium”. Thereby can communication be classified as a process.

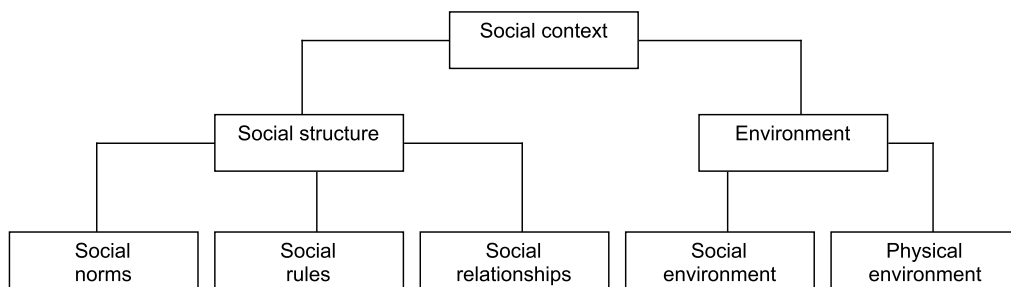
Hartley [22] has developed a basic model of communication , seen in figure 3.8. The model should be viewed as support for understanding basic concepts of interpersonal communication and not a complete framework. The parts in the model is to be viewed as the smallest common denominator that is present in all interpersonal communications. The different components is linked together:

- features of the social situation influence our social identities
- how we see ourselves influences how we see others – social perception
- these mental or cognitive processes influence how we act – how we encode and decode our communication

This is further complicated due to the fact that each of the parts can be further divided into subparts at closer inspection. The social identity for example is not a static entity, it changes over time and due to outside influence. [22]



**Figure 3.8:** Hartley's model of interpersonal communication [22]



**Figure 3.9:** Social context for communication [22]

### 3.2.3 Communication plan

The goal of the communication plan is facilitate effective and efficient communication between the stakeholders in the project. It should detail how the communication inside and outside the project should be conducted. A key factor in the success of the project is good two-way communication among all stakeholders. "Good communication forestalls surprises, prevents duplication of effort, and can help to reveal omissions and misallocation of resources early enough to permit corrections". [35].

**Table 3.2:** Steps to create and content of a communication plan.

Source: [35]

<b>Step</b>	<b>Focus on the following</b>	<b>Questions to ask</b>
1	Communication objectives	<i>What are you hoping to achieve with your project communications? Look at the objectives established for the project.</i>
2	Target audiences (internal and external) and the makeup of each audience	<i>Who do you want to communicate with? Refer to the roles established for the project. Consider a broad range of stakeholders.</i>
3	Purpose of the communication for each audience	<i>Why are you communicating with them? Think about what your audience would like to know from their perspective - "What is in it for me?"</i>
4	Key communication messages and the content of the message	<i>What do you want to say? The content should address the reason the audience will be interested in the project.</i>
5	Information sources	<i>Where will you find the information you need to collect for your communications? Some information may be from official sources, and other information will be created as part of the project and stored in the project repository.</i>
6	Frequency of the communication	<i>How often do you want the communication to be delivered? Weekly, bi-weekly, monthly, at the end of a stage, etc.</i>
7	Format and delivery mechanism for the communication	<i>How does the target audience prefer to receive this information? Report, phone, website, meeting, formal presentation, etc.</i>
8	The messenger	<i>Who is the responsible communicator? Who prepares and distributes or presents the communication? Usually the project manager and project sponsor are the main communicators, but the size of the project may require the assignment of a role of project communicator.</i>
9	Communication milestones and measurements of success	<i>How will you know if your plan is working? Establish some simple performance indicators and evaluation measures to determine if the communication plan is effective. Example – use of a Meeting Evaluation form after a meeting.</i>



# Chapter 4

## MAPS method

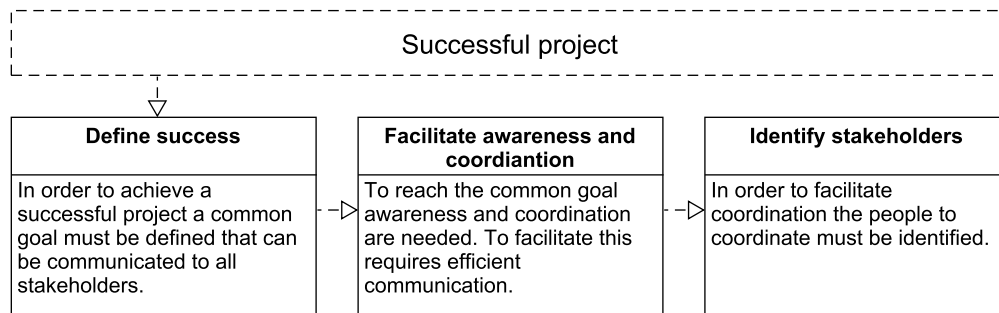
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The MAPS method should increase the likelihood of achieving a successful IT-project by enabling more efficient communication. MAPS is an acronym of **M**apping to **A**void **P**roject **S**urprises. The more efficient communication helps to maintain awareness and coordinate the project towards a common goal. This is done by addressing the three major challenges identified in the conclusion of the frame of reference, see Section 3.1.10. It is important to understand the origin of these challenges to be able to gain the intended benefit from the MAPS method. The three challenges are; Identify the stakeholders, Define success, and Facilitate awareness and coordination. The challenges is presented in more detail in Section 4.2.3 to 4.2.2.

In order to address the challenges the method is split in to six parts each with its own focus. The parts are; The stakeholder's experiences and attributes, The project workflow, Identify all stakeholders, Establish and maintain a common goal, Identify risks, and Information volume and relevance. The MAPS method is constituted of the MAPS interview and the MAPS map. The MAPS interview focuses on collecting the information and is focused on the six parts named above. The MAPS map is a visualization of the stakeholders and their interactions. The map is used to validate that all the stakeholders have the same perspective of the project's context when it starts. This chapter first introduces the MAPS method and the challenges are explicated. An outline of the method is then presented where the MAPS method is put into its context. The six parts that form the foundation of the information collection in MAPS is detailed. The last section is dedicated to how to use the MAPS method.

## 4.1 Introduction to MAPS method

The MAPS method should increase the likelihood of achieving a successful IT-project by enabling more efficient communication within large-scale IT projects. In more tangible terms this is done by collecting information to form a communication plan that address the communication challenges identified in the frame of reference, see Section 3.1.10. The main challenges that have been identified are depicted in Figure 4.1.

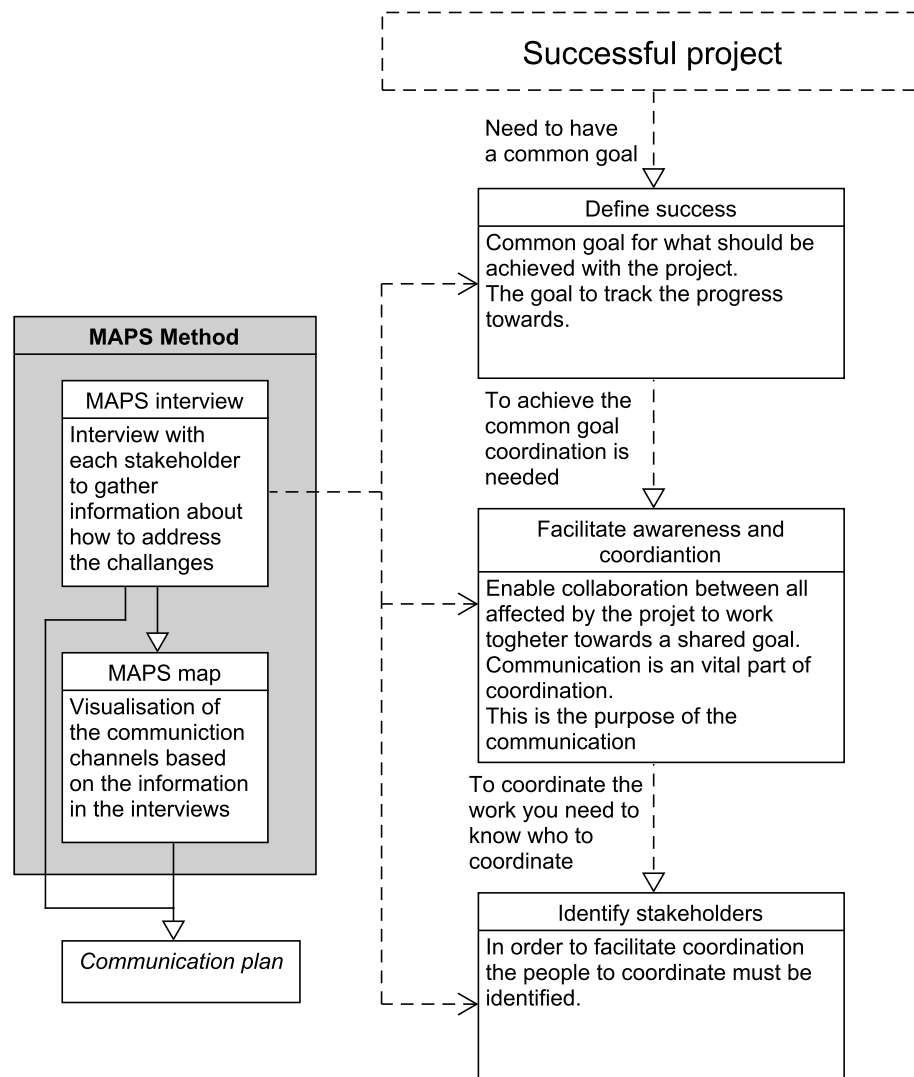


**Figure 4.1:** The main challenges with regard to communication that are facing IT-projects. These were identified in Section 3.1 and the MAPS method tries to address them by providing information to be used in the communication plan.

It is important to understand the origin of these challenges in order to see the logic how they relate to the communication in a project. These challenges form the purpose of the communication. Communication is a vital part in order to collaborate in a project. A project is rarely performed by one person, not within a large company at least. It is even rarer that the project only affects one person. When more people are involved the need for communication and coordination increases. The strategy for the communication is in a large project defined in the communication plan. The MAPS method will gather information so the communication plan can be formed in a way that these challenges can be addressed. In figure 4.2 an overview of the MAPS method and the challenges is depicted. The MAPS interview collects information to address the three challenges. The information gathered is then visualized in the MAPS map which should be shared to validate the information. The information from the interview is then used as input for the communication plan.

The MAPS method has been designed so it is feasible to use for large IT-projects in a corporation. Feasible in corporate context refers to that the information gather should have some business value since it takes time to collect. The context of the case company, Scania, has been used as a frame of reference for this feasibility.





**Figure 4.2:** Introduction to how MAPS faces the challenges. The MAPS interview collects information to address the three challenges. The information gather is then visualized in MAPS map which should be shared to validate the information. The information from the interview is then used as input for the communication plan.

### 4.1.1 Output and Value

To be used in a corporate context the MAPS method must present some value for the time invested. This section will present what the value comes in the form of.

**The MAPS method should enable more efficient communication within the project.** In more tangible terms this means that. The MAPS method...

- ...provides the input needed to take informed decision when creating the communication plan for the project.

- ...identifies the stakeholders for the project.
- ...provides input for a stakeholder analysis.
- ...identifies risks the stakeholders see to the project.

In addition to this some more intangible benefits is gained. The MAPS method...

- ...establishes a communication channel with the prioritized stakeholders.
- ...increases the commitment from the stakeholders.

### 4.1.2 Possible use-cases

This section gives a few examples for what the information can be used for to help the understanding for the intended use of the MAPS method.

All project should have some sort of communication plan to have a strategy to reach everyone that is affected by the project. The MAPS method is target to provide input to this plan and let the project management make informed decision about the communication channels.

Along with the input for the actual communication plan the information collected can be used to educate people about the importance of sticking to the plan and stress the importance of open communication. For example if the FLOW map is created it can be used as a visual aid to show why a certain communication channel exists.

If new people is introduced to the project the information gained from the MAPS method can be used to get these new people up to speed faster.

## 4.2 The challenges

The three major challenges; Identify Stakeholders, Define success, and Facilitate awareness and coordination face most IT-projects. *Define success* is the challenge of having a common goal to work towards. *Facilitate awareness and coordination* is the challenge to use the communication to guide the project towards the common goal. *Identify stakeholders* is the challenge of knowing who to communicate and coordinate with.

The following sections details each of the challenges one by one.

### 4.2.1 Challenge: Define success

In order to work towards achieving success it must be defined what constitute success. Define success is thereby the challenge of having a common goal to work towards. Thomas and Fernandez wrote a guiding quote, "If you know what your are looking for, track your progress and are willing to alter your path, then your chances of finding success

are better”[45]. The definition of success should be measurable and bound in time, this to be able to communicate the goal and the progress towards that goal. Thomas and Fernandez[45] found that the definition should be broken down in to smaller parts, see Section 3.1.1.

Another important aspect is to get the definition shared among all the stakeholders. De Bakker et al[45] found that the most important success factor was stakeholder satisfaction. Satisfaction comes from the difference between what the stakeholder expects and what the stakeholder perceive she got delivered. So for the stakeholders to shared perception that the project was a success, they need a shared definition of what constitute success. This definition sets the frame for what the stakeholders should expect from the project. So to achieve a successful project the stakeholder must understand the goal so she has the right expectation.

In order to achieve a successful project the stakeholders’ expectations must be maintained and kept in alignment. This is done through the project’s communication and is one of the main purposes of the communication plan. The shared perception and expectations are what the stakeholders will base their instrumental action on. Since these expectations frames the stakeholders’ context for the project it is important that this is correct for communication in the project to work. If a stakeholder has the wrong perception of the context this will be a likely source of future misunderstandings.

## **4.2.2 Challenge: Facilitate awareness and coordination**

When a success definition is set the challenge is to work towards this goal. A project is rarely done by a single person, it is even rarer that it only affects one person. So to achieve the success people need to work together and collaborate. To be able to work together and avoid coordination surprises the affected people need to communicate. Another way to phrase this is that a common ground need to be established for the affected people to base their decision on the same information. This requires awareness about what the other people are doing and their perspective.

Awareness is in simple terms knowing what is going on according to Gutwin et al [20]. The awareness is bounded in time and space. It may change over time or depending on context. So the awareness must be maintained and this is done by communication. Awareness is need to complete other tasks but it is not a goal in it self. Perfect awareness (when everyone knows everything) is however in most cases outside of a projects reach. The communication to maintain awareness takes times and therefor cost money for the project. The amount of awareness that is needed depends on the coupling between the stakeholders in the project. [20]

The coupling is the amount of work that can be done before a person needs to collaborate with other people or get new information [20]. Communication is therefor needed to complete a persons tasks that she is responsible for in the project. Communication is

also needed to avoid people being surprised by what the person delivers, i.e. avoid project surprises where the expectations and what is delivered do not match each other.

The communication also needs to be efficient. The message should not be misinterpreted by the receiver. These misinterpretations can be caused by many things, the causes can be viewed as communication barriers. Obstacles for the efficient communication. The communication distances identified by Bjarnason and Sharp [7] are examples of these barriers. To enable efficient communication these barriers need to be handled so misinterpretations or misunderstandings are avoided.

### 4.2.3 Challenge: Identify stakeholders

Most challenges presented in Section 3.1 that an IT-project is facing requires that the stakeholders have been identified. The communication is one example of this where a key element of the communication plan is the target audience for the communication. The audience for the communication must be identified and some information about them collected so they can be reached by the project's communication. Garcia and Pacheco's literature review [36] also pointed to research that suggested that the task of identifying stakeholders is often considered trivial. The common theme with the best practices found by Garcia and Pacheco [36] was that the stakeholders themselves should be consulted. The MAPS method should therefore conform to this best practice and at some point consult the stakeholders to utilize their knowledge.

To emphasize why it is important to find all stakeholders Conway's Law [12] states that "Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.". If some stakeholders are not found the communication channel associated with them will not be found either. If these communication channels and stakeholders are missing that part of the organization will be missing. By Conway's law the corresponding part of the output from the project will be missing as well.

In the case where new stakeholders are found late in the project the effect in most cases will be negative. If a new stakeholder is found that is salient enough for her to affect the project it will probably lead to additional cost for adjustments. In a utopia the new stakeholder would have expectations and a goal that is perfectly aligned with what the project is working towards. This utopia is however very unlikely. It is far more likely that the new stakeholder will trigger a redesign that will take time and cost money. The expectations from the other stakeholders must then also be adjusted which may create tensions.

If the new stakeholder found is not salient enough to trigger changes to the project the stakeholder would probably feel left out. It may be the utopia case again where the expectations and goal are perfectly aligned with the project's goals but this is very unlikely. It is more likely that the goals are not aligned and the new stakeholder may have some discontent.

Regardless if the new stakeholder is salient enough to take a more active role in the project finding them late may have a negative impact. If they are found late it is likely they will feel a bit left out. If they feel left out their commitment to the project may be lower and their good-will towards the project might be lowered as well. With lower good-will and commitment the adaption of the output of the project may be lower. Lower adoption among the stakeholders, especially the users, will lead to the overall success will be lower.

## 4.3 MAPS Method Outline

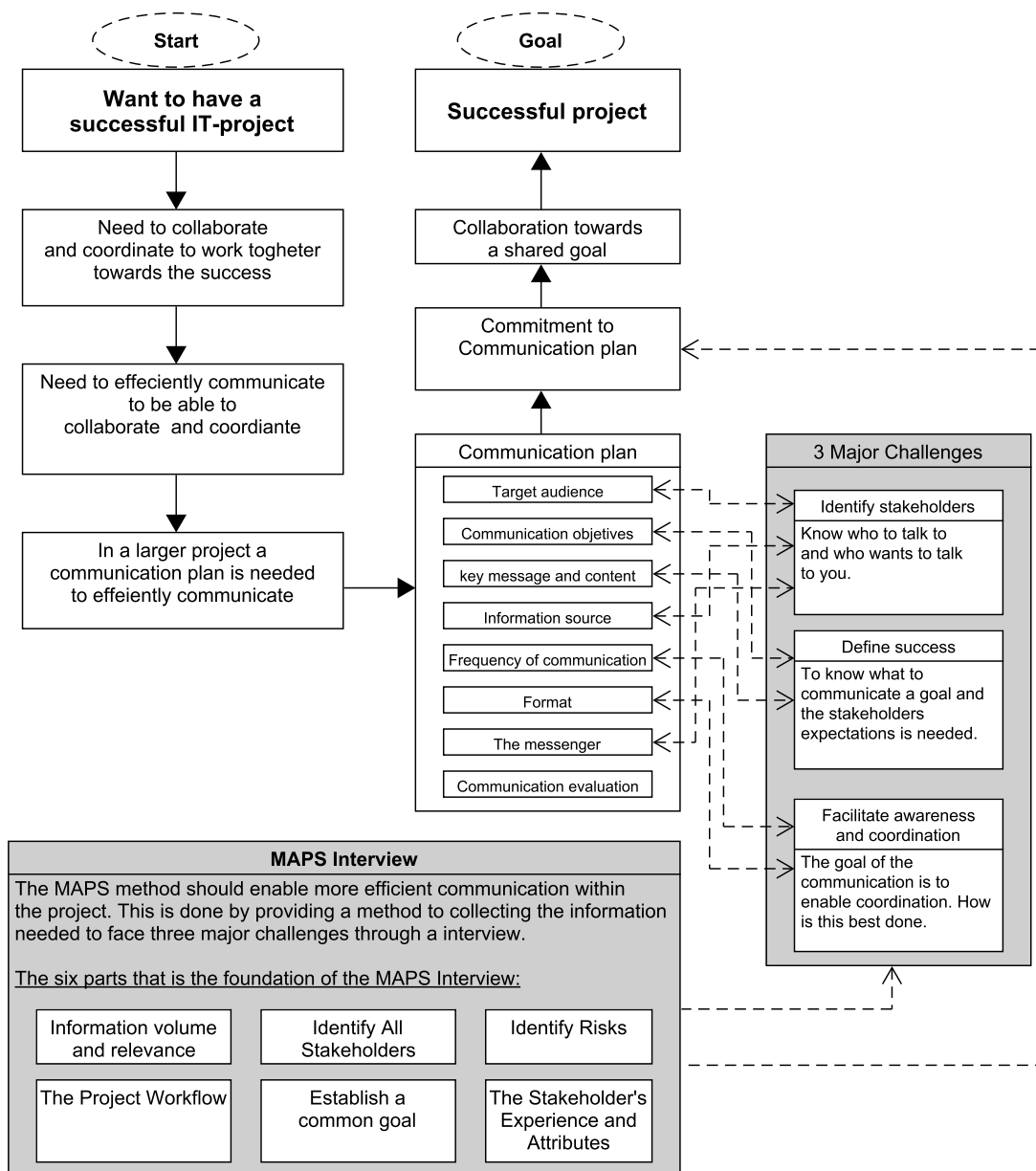
The MAPS method improves project communication by addressing the three challenges presented above, namely identify stakeholders, define success, and facilitate awareness and coordination. This is done by combining relevant previous research, presented in Chapter 3. The context and outline of the MAPS method is detailed in Figure 4.3.

One of the purposes of the MAPS method is to provide input to the communication plan. In the related works the aspect of creating commitment to a plan by involving those affect in the planning phase was discussed, see Section 3.1.6. The MAPS method should adhere to this and consult those affected when gathering the information. If the consultations is done through face-to-face interviews it could give benefits.

These benefits comes from the soft aspects of people management. If the project manager took the time to conduct this interview in the beginning of the project and used it to identify stakeholders it would help build a relationship between the interviewee and PM. It show the interviewee that the project manager takes the time to listen and values her input. The project manager will also be able to use this get a feeling for the stakeholders in the project and put a face on them. By conducting an interview the coding of the questions becomes easier for the project manager. She can adapt the coding during the interview and gets instant feedback about things the interviewee do not understand. Both directly from the interviewee if she asks questions or by her behavior during the discussion.

The fact that the stakeholder gets involved in the planning phase and feel like her input is valued will increase her commitment to the project. This is however contingent on the interviewer making a good impression during the interview and actually listens to the interviewee. This is true for much of the benefit of the method, it is contingent on that the interviewer conducts the interview in a good manner and understands the interviewee. The amount of useful information gained during an interview is contingent on the interviewer's interview skills and her ability to form interpersonal relationships. These are however skills that resides in the realms of what a project manager should posses.

The first challenge, identifying the stakeholders, explicate the problem of knowing who the stakeholders are and the other two challenges requires this to be solved in order to be solved themselves. The best practice for this is to consult the known stakeholders to find more stakeholders and then consult them. This shall start with the obvious stakeholders, like the project team, that can be found just by think by yourself. This consultations conforms well with the previously discussed topic on how to create commitment. The FLOW



**Figure 4.3:** Overview of how the MAPS method relates to the communication plan and the communication challenges

mapping interview provides a good foundation to base these consultations of the stakeholders on. With intelligently designed questions to complement the FLOW interview it could be used to find more stakeholders. A tweak to the FLOW interview would be to focus on the information needed to perform the stakeholders tasks in the project.

The second challenge, define success, can be partially handled by the interview and communication channel mapping. The FLOW interview helps to identify the communication channels used by stakeholders to gain knowledge about the project's goal. If the communication channels where the stakeholder get the information about the goal is iden-

tified these can be managed and adapted to the audience. The same goes for updates about the progress towards that goal. In order to communicate the goal without misunderstandings it should be clear, measurable and bound in time. What the stakeholder expect from the project can also be incorporated in the interview. If the stakeholders' expectations are identified the communication can be adapted to these expectations and make the communication more efficient.

The third challenge, facilitate awareness and coordination, is a difficult one. The FLOW interview do however provide a good foundation for this too. The interview focus on what information the interviewee needs to perform her main activities in the project. Couplings and dependencies can be identified from this information. Questions about; experience, domain knowledge, and difficult communication channels could identify distances in the communication channels that could potentially lead to misunderstandings.

With this outline six areas of information that is needed have been identified, found in the bullets below. Each of these categorizes will be further explained in Section 4.4, The Parts.

- **The stakeholder's Experience and Attributes**, e.g. domain-knowledge, where she works and motivation.
- **The Project Workflow**, e.g. Main tasks and what is its input and output.
- **Identify All Stakeholders**, e.g. who they are, what they want and why.
- **Establish and Maintain a Common Goal**, e.g. How the interviewee usually gets updates about this and if she understands them.
- **Information Volume and Relevance**, e.g. is the current information flow overwhelming and is it relevant.
- **Identify Risks**, e.g. what do usually go wrong and what information is hard to understand.

The method must be feasible to use in a company where resources is limited and therefor all costs must be compensated with some benefits. Therefor a maximum time for the interview is 60 minutes but with a target time of 30 minutes. At a company time is money. To have the method remain feasible to apply to each stakeholder group this time should be kept.

## 4.4 The Parts

The MAPS interview have six parts. Each with its own intention and motivation. It is important to stress once again that the purpose of why this information is collected is important. The intention of each part must be understood. Once this is understood the questions and discussion in each part can be adapted by the project manager to fit the situation. Below each of the six categorize of questions are explained further and the intention behind them. Each category starts with the intention and then details specific questions that can be used for the category.

### 4.4.1 The Stakeholder's Experience and Attributes

The experience the stakeholder has and her personal attributes will affect the type of communication she prefers and uses. These attributes may build communication barriers that is important to map.

To achieve an effective sharing of information is not an easy task even if all the participants are identified. As seen in Hartley's communication model[22], in Section 3.2.2, and in the social context the person and the coding she does is an important part of communication. This coding combined with the knowledge and education, both affecting the social perception, that a person got can cause misunderstandings in the communication when they differ at the sender and receiver for example as Bjarnason et al[7] demonstrated, in Section 3.1.7, with communication distances. Both the Distance theory[7] and the Coopilot[2] method refers to the need for common ground. This includes both the actual knowledge and the social perception/context.

So in order to manage this information about the persons that represent the stakeholders is needed. How much experience do they have in their job and how geographically accessible are they. It would also be beneficial to know about the persons motivations and involvement in the project and the company because this represents her social identity.

So the focus of this part is to get an understanding for the person that is being interviewed. The information is meant to identify attributes associated communication distances and other potential sources for misunderstandings.

The questions used in trial run of MAPS:

- How much experience do you have of the product domain? (*Scale*) *Parameter in the cognitive distance. If the two parties in a communication channel has significantly different levels of domain knowledge this can cause misunderstandings.*
- Where is the desk at which you conduct most of your work? (*Open*) *Parameter in the geographical distance.*
- How much experience do you have in your current role? (*Scale*) *Parameter in the cognitive distance.*
- How long have you worked in your current company? (*Scale*) *Parameter in the cognitive distance.*
- Do you have a strong desire to affect the processes the project will work with? (*Scale*) *Can function as indicator about the desire and motivation for the work she is doing*

Questions added after the case study:

- How much of your work load will be this project? (*Scale*) *The bigger the part the project have of the total work load the more priority and commitment it might get.*

Questions removed after the case study:

- Do you have a strong desire to affect the processes the project will work with? (*Scale*)

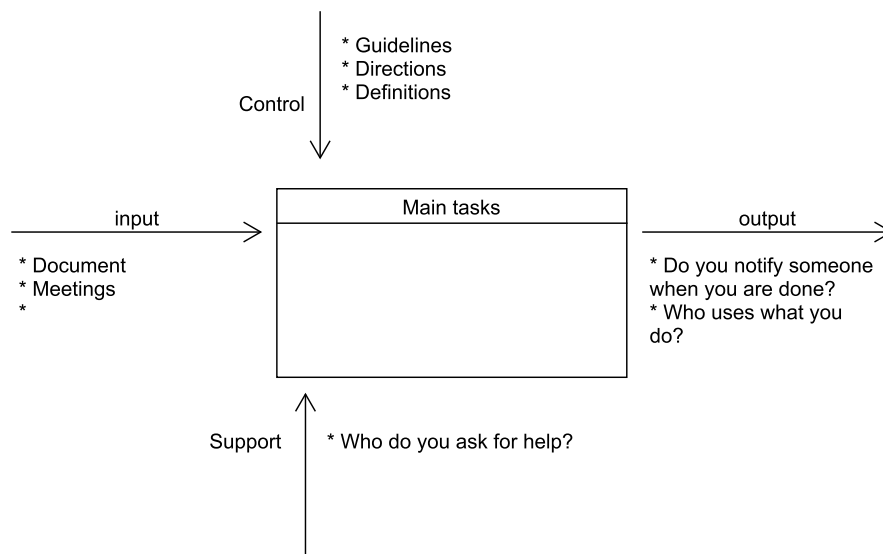


## 4.4.2 The Project Workflow

In order to manage communication channels the channels must first be identified. The FLOW Mapping[42], see Section 3.1.9 and figure 4.4, provides a framework that can be used to identify communication channels. By focusing on the tasks that should be completed the information the interviewee need for her work can be identified. This explicates the most important communications channels that is need in the project, the channels that carries the information to get the job done.

The coupling discussed by Gutwin and Greenberg [20], in Section 3.1.5, can also be identified by the FLOW mapping. To identify these couplings is important to enable awareness and make sure the output reaches everyone who needs it. By knowing who the sources of the information is the communication channels can be designed so the distances is kept short which should reduce the misunderstanding.

This will be very close to the flow interview to be able to map what information is used and who the interviewee collaborate with when she has problems.



**Figure 4.4:** Flow style framework for mapping the work that the interviewee is conducting

So the focus of this part is to define what information that needs to flow to the stakeholder to enable her to complete the tasks she is responsible for in the project. The persons she collaborates with and who she sees needing the output of her work.

The questions used in trial run of MAPS:

- What are the main tasks in your role in the project? (*Open*) *Part of the FLOW interview framework*

- What information do you need to complete these tasks? (*Open*) *Part of the FLOW interview framework*
- What is the output of your work? (*Open*) *Part of the FLOW interview framework*
- Who uses the output of your work? (*Open*) *Part of the FLOW interview framework*
- Do you follow any frameworks or guidelines in your work? (*Open*) *Part of the FLOW interview framework*
- Who do you ask for help if you need it in your work? (*Open*) *Part of the FLOW interview framework*

Questions added after the case study:

- What are you responsible for in the project? (*Open*) *Define the role and responsibilities (if any) for the stakeholder in the project*
- Who do you collaborate with when working? (*Open*) *Different angle of the support question*

Questions removed after the case study:

- Do you have a strong desire to affect the processes the project will work with? (*Scale*)

### 4.4.3 Identify All Stakeholders

Many of the practices found in the theory chapter; risk sharing[15], success definition[45], and coordination[2] requires all the stakeholders to be identified. This is however rather obvious, to manage something you must know who to manage. The same goes for communication, to communicate with someone you must know who this person is or at least how to reach her.

The best practice for stakeholder elicitation is to identify and consult all likely sources for requirements to get a complete stakeholder map. The FLOW style framework in the previous section, Section 4.4.2, is a start for consulting the stakeholders in order to get access to their knowledge. Another best practice would to identify user classes and their characteristics. This categorization of stakeholders, see Section 3.2.1 for methods to categorize and prioritize, is important for the MAPS method in order to know which groups to consult and prioritize to keep the method feasible in a company environment.

If a complete stakeholder map is produced early in the project this may help to avoid surprises during the project when the project team is aware of everyone who has a stake in the project. In order to get this mapping as complete as possible it is important to focus not only on the project team but also on distant stakeholders. As stakeholder identification may be neglected due the fact it is considered trivial [41] [37] it is important to have a structured approach that encompasses the distant stakeholders as well.

The intent of the MAPS method is to facilitate efficient communication therefore the interactions between the stakeholders is another area to focus on. This is also one of the categories of stakeholder identification that Garcia and Pacheco [36] found, techniques that identified the stakeholders and how they interacted from Section 3.1.4.

The questions used in trial run of MAPS:

- Who are the stakeholders of your work? (*Open*) *Try to find as many stakeholders as possible.*
- Who do you see as a stakeholder for this project? (*Open*) *Try to find as many stakeholders as possible.*
- Who tries to effect your work? (*Open*) *This is meant to complement the question where the interviewee is asked about all the stakeholder she sees for the project. With a different angle maybe more stakeholders is found.*
- Who are you trying to effect? (*Open*) *This is meant to complement the question where the interviewee is asked about all the stakeholder she sees for the project. With a different angle maybe more stakeholders is found.*
- Why do you want to contribute/effect the this project? (*Open*) *May be trivial for active members but may not be trivial for all interviewees.*
- How do you interact with the other stakeholders? (*Open*) *Meant to find the communication channels between the stakeholders. This complements the FLOW questions in the previous section*

Questions removed after the case study:

- Why do you want to contribute/effect the this project? (*Open*)

#### 4.4.4 Establish and maintain a common goal

The most important piece of information to communicate is the goal of the project and have everyone agree on what to be done. The goal is also the foundation for communication about the progress and the status of the project. Section 3.1.1 and 3.1.2 do cover these topics and their background in detail.

To ask if the stakeholder have heard about the project before and if they have heard about it how they heard about it. This is to find how the information currently flows through the organization. To ask how she usually would look for updates for the project will find where she normally would look if she has not heard anything else. To ask how she would prefer the updates and communication about the goal and the progress towards the goal includes her in the planning. To involve the people that is affected by the plan, in this case the communication plan, in the development of the plan the likelihood of they following it increases according to Bendix and Winter [6].

It is also relevant if the stakeholder experience that there are misunderstandings due to confusion about the goal. Especially what she feels like these misunderstandings cause for problems or consequences.

So this part focuses on establishing a common goal and making sure that there is communication channels that will help to keep it harmonized among the stakeholders. Or in the words of the challenges. This part focus on making sure that the stakeholder has the correct expectation and that there is a channel to manage the expectation if the project changes.

The questions used in trial run of MAPS:

- How did you get information about the initial goal of the project? (*Open*) *If information questions about how the stakeholder received the initial information about the goal this can help to identify channels that must be kept up to date for new or distant stakeholders.*
- Do you feel that you understand the goal of the project? (*Scale*) *To check how this type of stakeholder understand the communication channel where she learned about the goal.*
- How do you get information about adjustments/changes to the goal? (*Open*) *Find the communication channel that is used for updates to the goal*
- How do you get information about the project's progress towards that goal? (*Open*) *Find the communication channel that is used for progress updates*
- Do you feel that there are many misunderstandings that stems from a lack of common understanding of the goal in your recent projects? (*scale*) *To check if this actually is a problem. If everyone thinks it works fine, status quo should be kept.*
- Do you have any suggestions to reduce these misunderstandings due to different understandings of the goal? (*Open*) *To get input on how to communicate to this stakeholder more efficiently*
- Do you have any suggestions about how to efficiently communicate the progress of your work to the project's stakeholders? (*Open*) *To get input on how this stakeholder prefers to communicate*

Questions added after the case study:

- Can you in three sentences tell me the goal of the project. (*Open*) *Inspired by the Coopilot-method. Have a check-up question to confirm that the stakeholder have understood the goal.*
- How do you want the updates about the progress of the project? (*Open*) *To complement the question about reducing misunderstanding and put more focus on what the stakeholder want. It may be beneficial to have some targets here and let the stakeholder chose from. If the question is wide open it is a risk that the spread of answers that the stakeholders prefer is to wide.*

- What do you expect of the project? (*Open*) *Capture the stakeholders expectation. Could also be phrased as, in what way do you expect to benefit from the project?*

### 4.4.5 Identify Risks

Risks are an inherent part of any project. The intention of the MAPS method is to avoid project surprises, see Section 3.1.5. Risks that occur unexpectedly will mostly likely be categorized as project surprises. De Bakker et al [15] wrote "Practitioners may become aware that risk management not only helps them to collect information and support their decision-making process, but also helps them to tune stakeholder perceptions and expectations". The intention of the efficient communication is exactly that to tune the stakeholders perceptions and expectations. If the perceptions and expectations can be tuned project surprises may be avoided which will lead to a more successful project.

Risk is one of those things that everyone has a different view on based on their experience. It is also something that is present in all projects. There will always be uncertainty associated with the project. So to achieve the common ground that is needed to communicate efficiently the risks must be shared among the stakeholders. To ask the stakeholders what risk they see to the project and what usually goes wrong helps to identify the risks. It also allows the project manager to mitigate these risks and engages the stakeholder in the planning. This should create higher adherence to the project plan[6]. By focusing some question on communication specific risks it creates awareness about these risks which may hinder efficient communication.

So the focus of this part is identify the risks that the stakeholders associate with project to be able to mitigate them. If the risks can not be completely mitigated at least the risk that the stakeholders associate with the project should be harmonized among the stakeholders. This to avoid unnecessary surprises that may be viewed as failure to communicate. Some extra emphasis should be put on communication specific risk.

The questions used in trial run of MAPS:

- What are the major risks to this project in your opinion? (*Open*) *Direct question about the risk the stakeholder see to the project.*
- What information is usually hard to find? (*Open*) *Communication specific risk. Information that is needed but not accessible is a risk.*
- In what information channel do you feel that there is the most misunderstandings? (*Open*) *Focus question about which communication channel may need extra attention to not cause misunderstanding.*
- What consequences do these misunderstandings lead to? (*Open*) *By asking about the consequences possible indicators for misunderstandings and communication errors are gained.*
- Do you have any suggestions on how to avoid these misunderstandings? (*Open*) *To get input on how to communicate more efficiently*

Questions added after the case study:

- Do you have an example of a communication problem that caused problems for you?  
*(Open) A question to get the interviewee to freely discuss something that usually bothers her.*

### 4.4.6 Information volume and relevance

With the amount of interruptions Joe Robinson found in his research[38] the amount of information should be considered. With too many interruptions the communication could not be considered efficient. The information that is communicated must be worth the time of the interruption and not be irrelevant and/or incomprehensible for the receiver.

So the focus of this part is make sure that the stakeholder is not overloaded with information. The information that the stakeholder receives should also be considered relevant and of sufficient quality.

The questions used in trial run of MAPS:

- Do the amount of information sent to you make you miss important details? *(Scale) Input for the amount of information that can be pushed out. If the stakeholder is currently having a information overload this must be taken into consideration when planning the communication.*
- In recent projects how have the information been regarding the level of details?  
*(Scale) Aspect of the quality of the communication channel*
- In recent projects how have the information been regarding the Technical level?  
*(Scale) Aspect of the quality of the communication channel*
- In recent projects how have the information been regarding the relevance? *(Scale) Aspect of the quality of the communication channel*

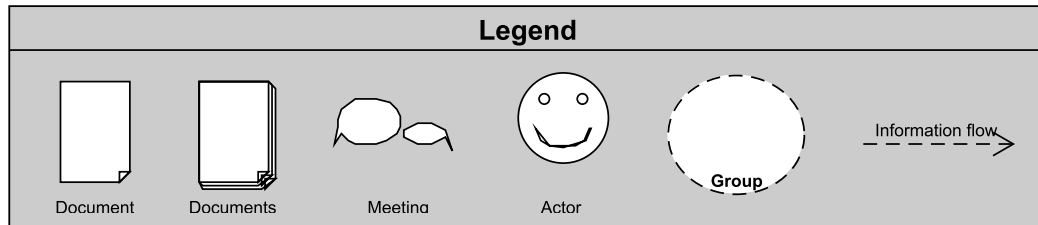
## 4.5 The MAPS Map

The focus of the MAPS map is to validate that all stakeholders have the same perception of the project's context when it starts. The MAPS map is drawn based on the information gained in the MAPS interviews. The map is based on the FLOW notation [42] with some modifications. A legend for the notation can be found in Figure 4.5.

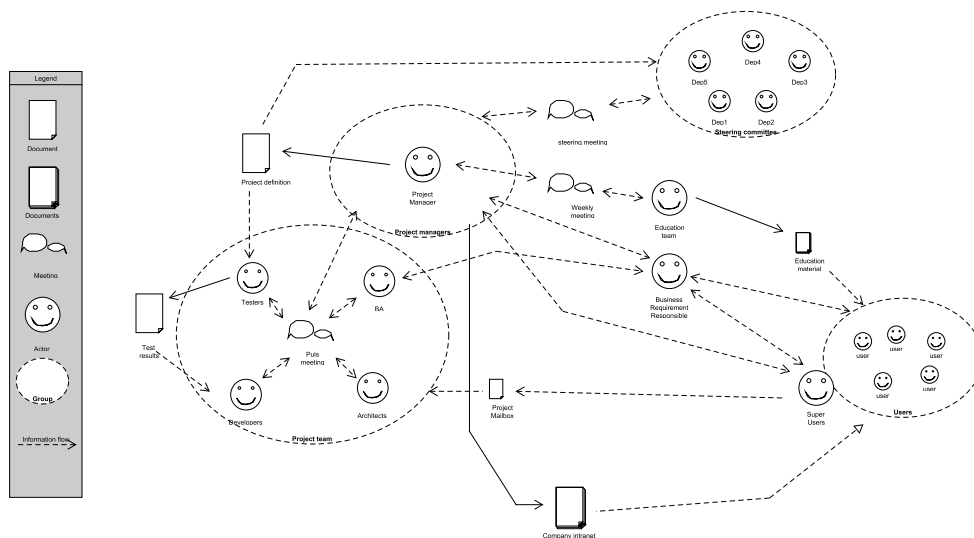
The map is a visualization of some of the information gained in the interviews. Since the goal and progress towards that goal have been identified as one of the key information to have to achieve success this should be validate. The validation focuses on that all the stakeholders should share a common view of the context of the project. This is also a foundation for the common ground that should be established.

Each stakeholder group is encompassed by the group symbol. Actors is added to each group. The stakeholders interaction are then be added. The meeting symbol should be

used for interaction where the primary communication is direct conversations. The document symbol should be used for solid information.



**Figure 4.5:** Legend for the MAPS map



**Figure 4.6:** Example of a simple MAPS map

## 4.6 How to use the MAPS method

Up until now the intention and parts of the interview have been discussed. But how should the method be applied? In short the project manager must identify a first set of stakeholders. These stakeholders are interviewed according to the interview in the previous section. The new stakeholders found in the first set of interviews should then interviewed to find even more stakeholders. In this manor the list of stakeholders grow. The iteration stops when no new stakeholders is found. Between each iteration the MAPS map is updated. After the last iteration the lose ends are tied up and the map is baselined. The map is distributed to all of the stakeholders to be validated and establish a common ground for the project's context. Below in this section the seven steps that should be conducted are detailed. Each step have a short description and the expected output and the activities to conduct. In figure 4.8 an overview of the steps that is included in the MAPS method is

depicted.

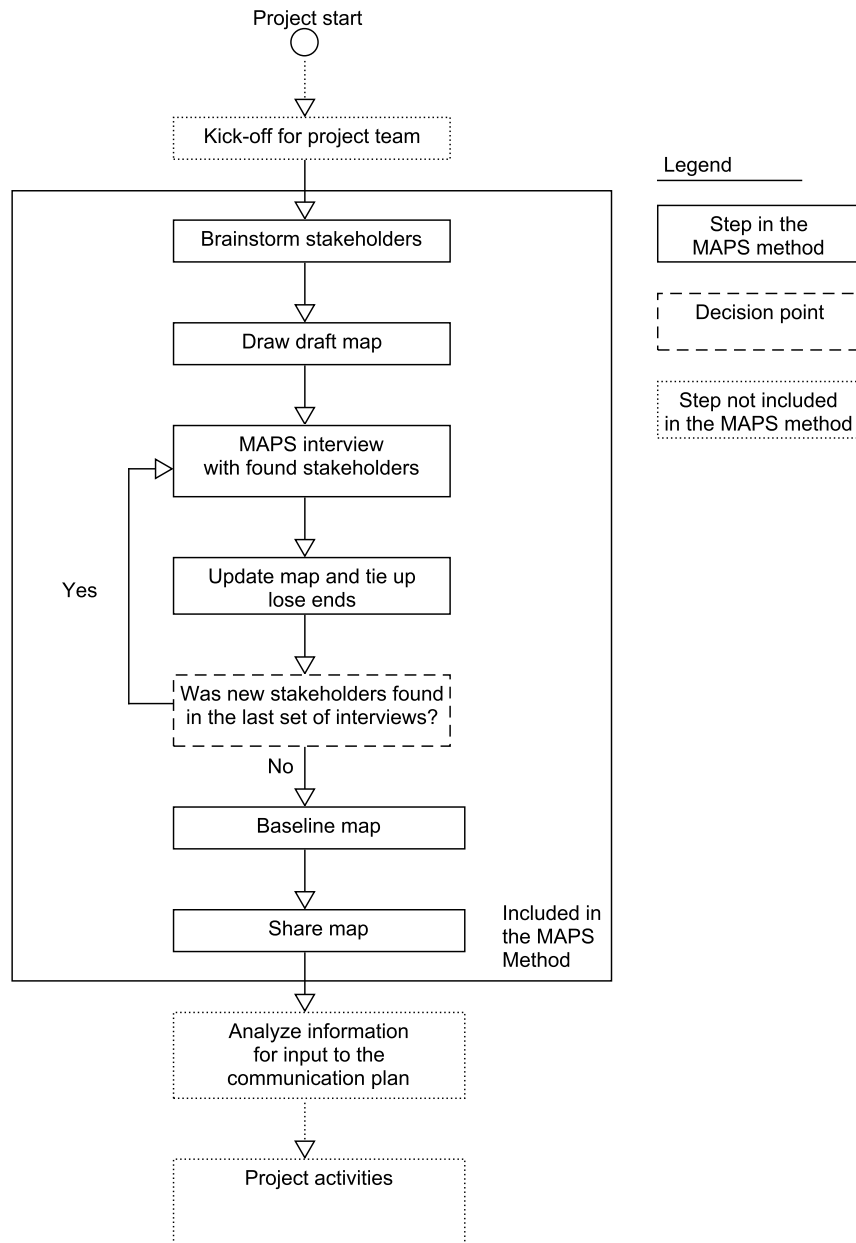


Figure 4.7: Workflow of MAPS method

### 4.6.1 Steps before the MAPS method

The project will start and the project team will be formed. The goal and intentions of the project should be set.



**Output:** Project teams and project goal.  
**Activities:** Team building and workshops

## 4.6.2 Step 1 - Brainstorm stakeholders

The project managers brainstorms to find initial stakeholders. It is suggested to start from the project team and work outwards when identifying stakeholders here. The found stakeholders should be categorized.

**Output:** Crude list of the stakeholders for the project  
**Activities:** Brainstorm to find initial stakeholders

## 4.6.3 Step 2 - first map draft

A first outline of the MAPS map is created based on the list of stakeholders from step 2.

**Output:** Crude map of stakeholders for the project  
**Activities:** Draw flow map

## 4.6.4 Step 3 - MAPS interviews

Interview stakeholder from each of the identified categories of stakeholders. Start with the most involved in the project and work out towards the periphery. The interview should focus on the areas detailed in the previous section. It is important to put emphasis on that the interviews is to gain that stakeholder's perspective.

An example questionnaire can be found in appendix B.

**Output:** Updated list of stakeholders and information about the stakeholders  
**Activities:** Conduct MAPS interviews with stakeholders

## 4.6.5 Step 4 - Update map

The map is updated according to the interviews conducted in the previous step. If new stakeholders have been identified these should be categorized and prioritized, see Section 3.2.1. Lose ends should be tied up, for example if users get information from the intranet but you do not have any information about who updates the intranet this should be investigated and added. All new stakeholders is added to the map and if any of them has a sufficient priority you return to step 3 again and conduct interviews with them as well.

**Output:** Updated MAPS map  
**Activities:** Update map

### 4.6.6 Step 5 - Baseline the map

When no new stakeholders, with sufficient priority to get interviewed, is found during the interviews and the map have been updated the iterations stops. The map should then be baselined.

**Output:** Baselined MAPS map

**Activities:** Baseline map

### 4.6.7 Step 6 - Share map

The map should be shared with the stakeholders who is present on the map so the stakeholders can validate the information. All changes after this point should also be communicated to the stakeholders. If feedback from the stakeholders is given that something is incorrect this should be corrected and a revised map is then shared with the stakeholders.

**Output:** validated MAPS map

**Activities:** Baseline map

### 4.6.8 Steps after the MAPS method

The information gathered during the interviews should be compiled and analyzed. How this information is analyzed is not part of the MAPS method. This is left to the profession of the project manager. The information is then used to form the communication plan.

**Output:** Communication plan

**Activities:** Analyze information and form communication plan

### 4.6.9 Triggers to update

If something changes in the project it may be necessary to update the map to keep it current. These changes can be

- Someone leaves or enters the project. *The domain knowledge and communication channels may change as a result of this.*
- Change of direction within the project. *This may affect who has an interest in the project.*

It is important to also communicate these changes to the stakeholders so everyone gets this information.

## 4.7 Summary

The MAPS method collects information that is needed in the communication plan through the MAPS interview. The information is collected to allow the communication plan to be formed so three major challenges are addressed; Define success, Facilitate awareness and

coordination, and identify stakeholders. The MAPS method is constituted of six steps, where step three and four are iterated as long as salient stakeholders are found. The MAPS interview conducted in step four has six different focus areas; The stakeholder's experience and attributes, Identify risks, Identify all stakeholders, The project workflow, information volume and relevance, and establish a common goal. Information about the stakeholders and their interaction through different communication channels are validated with the MAPS map that is shared among the stakeholders when the interviews have been conducted. An overview of the MAPS method and its steps can be found in Figure 4.8.

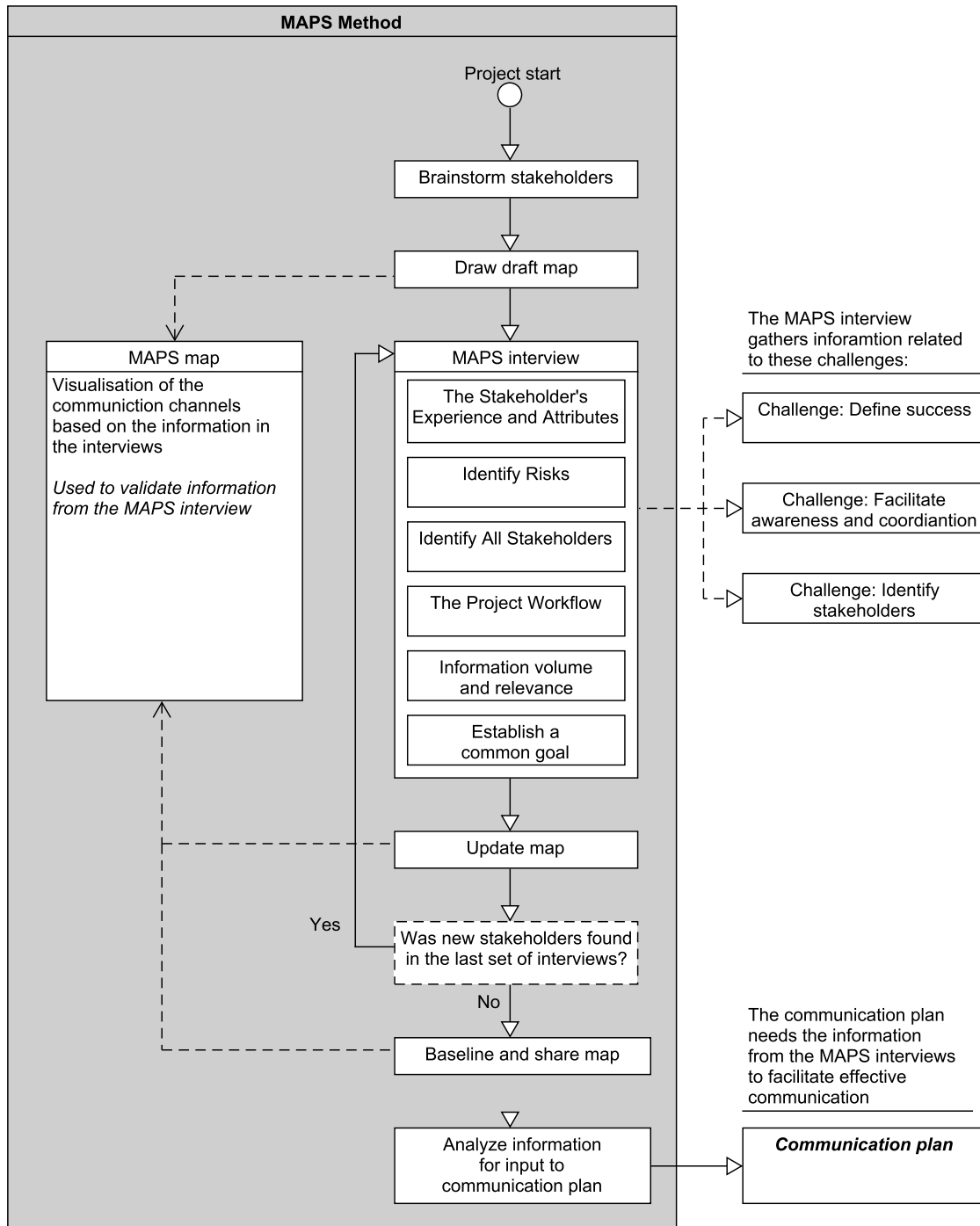


Figure 4.8: Workflow of MAPS method

# Chapter 5

## Research Method

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The purpose of this chapter is to present how the research have been conducted and what choices have been made about the research method. The work method is based on the design science framework where the problem is first explicated then a artifact is developed, in this case the MAPS method, to solve the problem. The final step is to evaluate the artifact and analyze the result of the evaluation. The chapter will give the outline of the work flow where after a detailed description of each step follows.

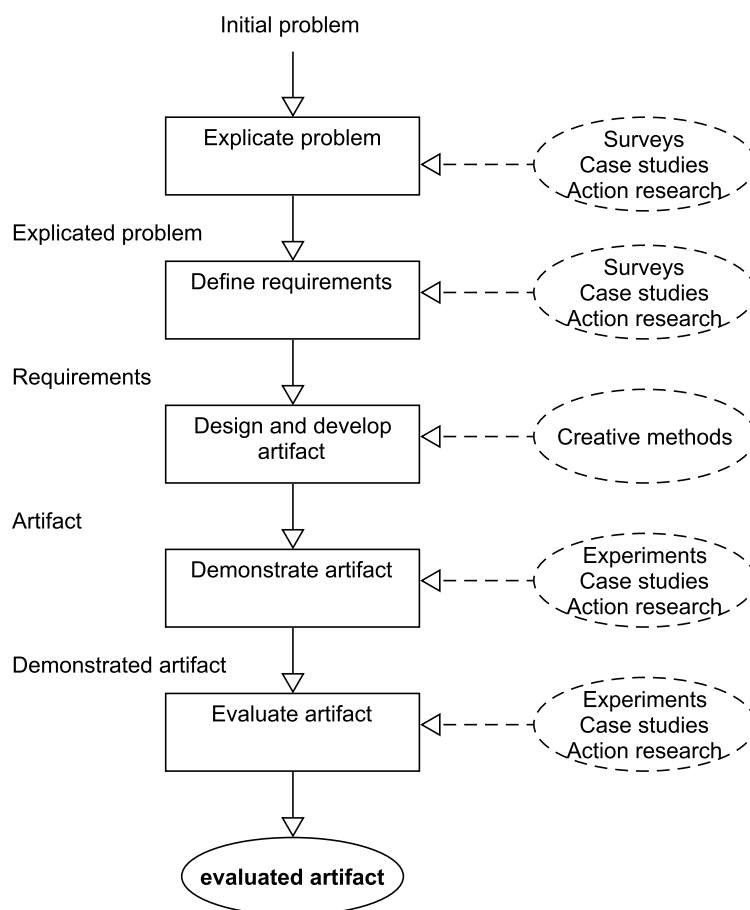
### 5.1 Design science

This thesis is based on the Design science framework. "Design science in these areas aims to create novel artifacts in the form of models, methods, and systems that support people in developing, using, and maintaining IT solutions" [26]. Johannesson et al [26] presents a framework for design science research that is based on the same foundation as described in the The methodological approach section A.1. This framework encompasses a number of guidelines and activities to improve the scientific rigor. The activities that should be conducted are:

- *Explicate problem*, Investigate, analyze, and formulate the problem. It is important that the problem is of general interest and not only applicable to one particular instance.
- *Define requirements*, these requirements shall outline a solution in form of an artifact. It should include structure, environment and functionality.
- *Design and Develop Artifact*, this activity should result in an artifact that solves the problem and meets the requirements defined in the steps before.

- *Demonstrate Artifact*, can be viewed as a proof of concept that shows the feasibility of the artifact. The artifact shall be tested in an illustrative or real-life case.
- *Evaluate Artifact*, compared to the requirements and how well it alleviate the problem it intends to solve.

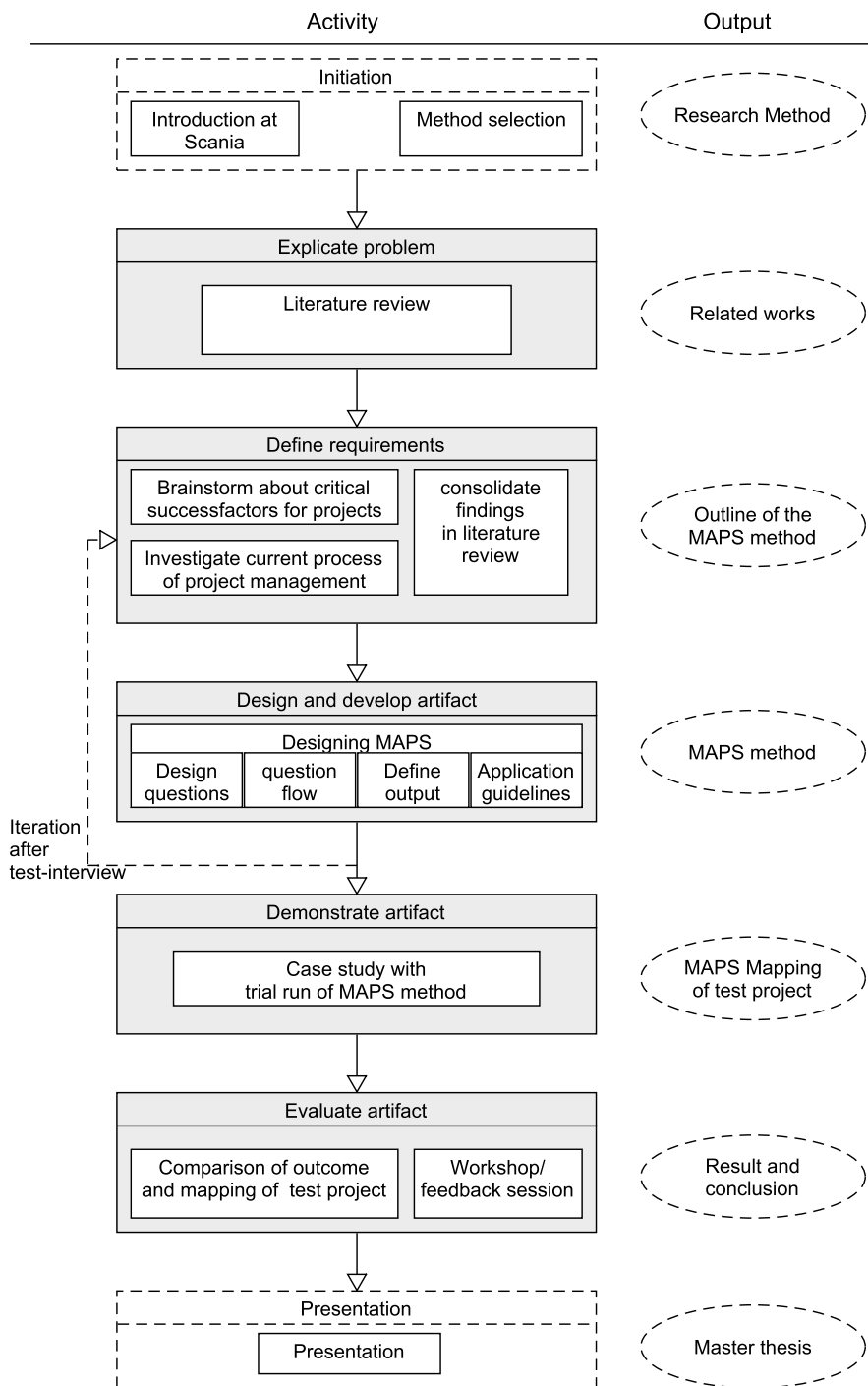
Even though these activities seem highly sequential it is allowed to move back and forth between them to achieve an iterative process. In figure 5.1 suggested research strategies are depicted on the right for each activity. Johannesson et al [26] is however clear that no strategy can be excluded depending of the situation any strategy can be appropriate. It is encouraged in design science to include models and theories from several different fields in the knowledge base. The theory for the specific topics that have been considered can be found in Appendix A.



**Figure 5.1:** Flow in design science research based on Johannesson et al [26]

## 5.2 Outline of the Work flow

This section describes the outline of work flow for this thesis. The design science framework, see section 5.1, forms the foundation with additional guidelines from the selection portal, see section A.2. The scope for the thesis was first set in collaboration with Scania. After scope was set the problem and what research that had previously been conducted was investigated in a literature study. The artifact, MAPS method, was then constructed based on the previous research through a creative process. When the artifact was completed it was evaluated in a case study by applying the artifact to a recently closed project at Scania in Södertälje.



**Figure 5.2:** An overview of the applied design science approach. *Dotted rectangles* represents steps that is not explicitly listed in the design science process. *Solid rectangles with gray background* represents steps in the design science process. *Solid rectangles with white background* represent activities. *Dotted ellipses* represents expected output from the activities in the corresponding step.



## 5.3 Initiation

The thesis was proposed by Scania CV AB originally with the title "Communication and information within business development and IT" and would focus on how the information a specific department within Scania is received by its customers. From this origin a quick, highly exploratory, search for previous and related research was done. Brainstorming session, with the research material as context and Scania's current challenges as focus, was conducted to narrow down the scope. After a few sessions the academic supervisor gave constructive and suggestions on more relevant papers to draw inspiration from. After a few iterations these sessions and the academic supervisor's input resulted in the chosen scope and research questions.

**Table 5.1:** People that participated in the initiation phase

Participant		
Name	Position, Company	Type and focus
Tomas Ersson	Scania CV AB, Business IT Analyst	Brainstorm
Annika Maehans	Scania CV AB,	Brainstorm
Rim Yaacoub	Scania CV AB, Project manager	Brainstorm
Ola Svensson	Scania CV AB, Project manager	Brainstorm
Elizabeth Bjarnason	LTH	Input on the scope

## 5.4 Selecting research method

With the scope and research area set reference literature for how to conduct scientific research guided the work to set up the research method, see Appendix A for this research. Decisions included; what information needed to be researched, how to construct the new method, and how to evaluate the new method.

The purpose of this thesis will be both exploratory, with trying to identify what makes a IT project successful, and problem solving, with trying to find a method to increase the likelihood of a project being successful. Höst et al [24] states that multiple purposes is allowed as long as it facilitates the objective of creating a clear and stated purpose to enable a concrete plan of how to conduct the research. In this case it will support the goal to have a wide approach to the subject and enable research from different fields to be combined.

Design science provided a framework for how to structure the work and how to detail the activities that needed to be conducted when designing an artifact. The artifact in this case is the new method, the MAPS method, that should increase the likelihood of a successful IT project. The idea behind the framework fitted well with the philosophy chosen for this thesis. From this framework the exploratory research was conducted within the

frame of explicating the problem and for this a literature review was used. Literature review is an important tool for data collection in a thesis project. According to Bryman [9] it serves many purposes including insight into what is known in the area, significant controversies, and relevant concepts and theories. Brainstorming with professionals within the field of IT projects was also part of this step.

The exploratory research is aimed at a better understanding of how a project success within the IT-sector is achieved. It will focus on what factors that is important to achieve a successful IT-project. Why this part is classified as exploratory research is to try to focus not only on standard solutions but also on more out of the box approaches and soft sciences as well. The problem solving part is to investigate a new method that would try to address the biggest challenges for IT project, which also should be the main factors that cause unsuccessful projects. This problem solving should build on what have been found in the exploratory part.

Since access to the reference projects within Scania is limited and mass gathering of information will be difficult therefor a qualitative approach is selected. If instead the definition by Martyn Denscome [16] is used the choice is supported, quantitative research uses numbers as the unit of analysis and qualitative research uses words or visual images as the unit of analysis.

For the philosophical assumption the interpretivism approach is used. This is recommended for developing artifacts since it captures the context for the phenomenon by focusing on perspective, opinions and experiences. The thesis will also touch the critical approach where the social context and cultural history is important factors.

Applied research, Analytical research and Empirical research have all been used in this thesis. To analyse initial hypothesis and steer the related works research *Applied research method* have been used. To analyze the data collected an *Analytical Research method* have been used. Input to the thesis shall be taken from project participants and build on their expertise knowledge, experiences and observations which makes it suitable to use *Empirical research method*.

The research approach is mostly inductive with the exploratory research laying the ground work for the theories. Patterns where discovered in the literature review that form the theory and artifact. The evaluation part of this thesis can however be categorized as deductive since the MAPS can be viewed as the theory that formed hypothesis that observations tried to confirm. This part inductive and deductive approach can be viewed as abductive approach.

Interviews was used both when defining the requirements for the artifact and as part of the artifact. In the requirement definition the interviews where used to gain insights in how projects is conducted in a large company and to information about Scania's general processes.

A *case study* was used when the artifact was demonstrated and evaluated. In this thesis

the case study is used to capture communication and coordination phenomenon in a large scale software project at Scania CV AB. This is used as a context for the trial of the artifact, the MAPS method.

## 5.5 Explicate problem

In order to gain a better understanding of communications, project success and mapping a narrative review of previous research was conducted. Since the focus in the original idea for the thesis was communication the topic *communication in large scale IT projects* was the first one to be investigated. From this new topics were found with *critical success factors for IT-projects* being the most important. This topic lead to *Communication and Commitment in IT-projects*. In this cascading fashion a frame of reference for the thesis was built. The other part of the thesis is models to build the new method, that is to be one of the contributions of this thesis, on. For this the academic supervisor suggested *FLOW Mapping* which was investigated in a similar fashion as the other topics.

When reviewing papers first the title then the abstract was checked for relevance. If the paper was relevant the related works part and conclusion was read in its entirety. All relevant related works was included in the search for new topics so this papers was also first checked for relevance in the abstract and then the related works and conclusion was read in it's entirety. And so on. If the paper should be named and included for topic reference the rest of the paper was read as well. The stopping criteria for the cascading in related works was when most relevant concept felt familiar in the related works part of the papers.

When searching for keywords and topics academic papers and books have been prioritized by fist searching through the university library at Lund's University<sup>1</sup>. In these searches all results, if it were fewer than 100, was checked at least for relevance in the title. If the results exceeded 100 hits further constraints was introduced to the search. Most search terms was also entered in a internet search engine, preferably google.com in a browser with private surfing mode on to not skew the results with previous searches. The results on the first three pages were first evaluated on title and if they seemed relevant headers in the source was checked and if it stilled seemed relevant the entire page was read. Abstracts were used where possible but few web-pages had it.

Used keywords at searches:

- Large scale software development communication
- Large scale software development project management communication
- Success factors in IT projects
- critical success factors in IT Projects

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<sup>1</sup>LUBSearch (lubsearch.lub.lu.se)

- communication in large scale software
- Communication framework
- workspace awareness
- stakeholder elicitation
- hawthorne effect
- FLOW mapping
- FLOW IT projects
- ISO 12207
- Communication plan IT projects
- communication model

**Table 5.2:** People that participated in the explicate problem phase

Participant		
Name	Position, Company	Type and focus
Tomas Ersson	Scania CV AB, Business IT Analyst	Brainstorm
Elizabeth Bjarnason	LTH	Suggestion on material

## 5.6 Define requirements

In the most general sense a new method to increase the likelihood of achieving success in a IT-project was constructed. The method builds on the research found in the literature review. The research was analyzed for patterns and links to base the method on. Interviews with the project managers for IT projects within Scania on how they conduct this type of work today have been used as input as well. An outline of the methods and models that makes up the foundation of the MAPS method was created. This included brainstorming about what makes a project successful.

**Table 5.3:** People that participated in defining the requirements for the MAPS method

Participants		
Name	Position, Company	Interview type and focus
Tomas Ersson	Scania CV AB, Business IT Analyst	Brainstorm
Rim Yaacoub	Scania CV AB, Project manager	Brainstorm

## 5.7 Design and develop artifact

After the outline was completed the details were put into place like defining the questions to ask and how to visualize the information flows. The outlining and refining details steps were iterated a few times after test interviews had been held to try the MAPS method. The stopping criteria for this iteration was when the author, the academic supervisor and the company supervisor all were reasonable content with the result and structure. Meetings were held where the questionnaires were presented and discussed. Each meeting and the corresponding changes is viewed as one iteration.

**Table 5.4:** People that participated in the design phase

Participants		
Name	Position, Company	Interview type and focus
Tomas Ersson	Scania CV AB, Business IT Analyst	Working meeting
Annika Maehans	Scania CV AB,	Working meeting
Elizabeth Bjarnason	Supervisor, LTH	Working meeting

## 5.8 Demonstrate artifact

The designed MAPS method was tested by applying it to a recently closed project at Scania. The project was selected with certain criteria; it should be recently finished so the project members have it in fresh memory, it should be within the IT area and preferably with some software development. The test was conducted in a case-study format where context was important.

To get enough domain knowledge about the project and to be able understand the answers by the interviewees in a better way two meetings about the project was held. The first was a introduction to the project with purpose and output. The second was a more in depth view from the project managers that have been responsible for the project for last couple of years.

The trial of MAPS started with that a list of stakeholders and groups within the project was compiled from the organizational chart for the project. From this list interviews with one person from each of the different groups were scheduled. The interviews was conducted in the manor described in section 4.6. During the interview notes were taken on the questionnaire and after the interview each question was summarized in an excel sheet.

No modifications to the method were done during the course of the interviews. This even though some questions were not working out as intended. The reason for not changing the questions during the interviews were to so if some questions work on some groups of stakeholders and not on others.

The map over the project was drawn in a similar fashion to a flow map and updated as prescribed in the MAPS method.

**Table 5.5:** People that participated in the demonstrate phase

Participants		
Name	Position, Company	Interview type and focus
Annika Maehans	Scania CV AB,	Introduction to XYZ project
Tomas Ersson	Scania CV AB, Business IT Analyst	Information meeting about the XYZ project
Rim Yaacoub	Scania CV AB, Project manager	Information meeting about the XYZ project
Ola Svensson	Scania CV AB, Project manager	Information meeting about the XYZ project

### 5.8.1 Case study setup

The initial list, the one that should be compiled by the PM, with stakeholders that should be the first round of interviews was compiled with the help of the PMs and a person that had been a member of the project a while back. An email was sent to a representative from each group identified on the list asking them if they would be willing to help with a master thesis and could spare an hour of their time. If they replied that they were willing to participate an interview was schedule with them. This interview had the following format. It began with a five minutes presentation of the idea behind this thesis and what is meant to achieve. The MAPS interview followed where the interviewee was asked to answer the question like it was two years ago when the current PMs took over the project. After the MAPS interview was concluded the evaluation questions followed. It was made clear for the interviewee that these questions was not part of the MAPS method, instead the questions focused on evaluation the XYZ project and the MAPS method. The interview was then finished and the interviewee was again thanked for taking the time to participate.

Name	Role in project
Person 1	Technical project manager
Person 2	Business Requirement Responsible
Person 3	Test leader
Person 4	Super user
Person 5	Business Analyst
Person 6	Steering committee
Person 7	Education team
Person 8	Steering committee
Person 9	Solution architect
Person 10	User

**Table 5.6:** People interviewed during the case study

## 5.9 Scientific evaluation and Analysis

The answers in the open questions was categorized and the number of interviewees that mentioned each particular thing was counted. For example can a category be that misunderstandings caused delays. For each of the question with a scale answer the highest response, the lowest response, and the average response were calculated.

From the categorized responses five interesting topics was selected to discuss at a workshop. The format was that a topic was presented to the group with some context and sub-questions to get the conversation started. The topic was then discussed for 10-15 minutes as an open table debate with us as the moderator. During the debate notes were taken by one a whiteboard so every one could see them. In this manor each of the five topics was discussed. Directly after the workshop the notes was extended to a summary of the debate for each topic.

In order to have a comparison for the findings in the case study we were given access to the project directory where the project documentation was stored. This allowed us to see what information was present and how it was presented.

The MAPS method was evaluated by comparing the results obtained in the case study with the results from lessons learned and the interviews conducted with the project stakeholders. The test run results was also be compared and evaluated against the results of the workshop.

The map was drawn and updated between each interview and the open-source tool Umlet<sup>2</sup> has been used to create it. An example sketch can be found at: [GITHUB-link]

**Table 5.7:** People that participated in the analysis phase

Participant		
Name	Position, Company	Type and focus
Tomas Ersson	Scania CV AB, Business IT Analyst	Workshop
Annika Maehans	Scania CV AB,	Workshop
Rim Yaacoub	Scania CV AB, Project manager	Workshop
Ola Svensson	Scania CV AB, Project manager	Workshop
Irene Nilsson	Scania CV AB,	Workshop

## 5.10 Presentation

The presentation of the work is the thesis you are reading.

<sup>2</sup>Link to Umlet's website <http://www.umlet.com/>





# Chapter 6

## Results and Discussion

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This chapter presents results of the case study evaluation of MAPS and discussions around the results. The results are split into three parts. The first part is the MAPS map that has been drawn based on the interviews in the case study. The second part is the results from the quantitative questions in the interviews. The last part is a discussion around each of the research questions.

To be able to be more clear and precise in the discussion some definitions are introduced.

- **The case study** refers to the case study conducted to evaluate the developed artifact, see Section 5.8.1 for details.
- **Interviewee** refers to a person interviewed in the case study, see Section 5.8.1 for details.
- **The workshop** refers to the workshop that was held to discuss topics related to the results, see Section 5.9 for details.
- **Project manager**, the coordinator of the project and in the discussion it will be assumed that she is responsible for the communication plan.

### 6.1 MAPS map

This section presents findings related to the MAPS map that was created based on the interviews in the case study. In Figure 6.1 the communication channels found in the case study are depicted. The figure shows the complexity that exist in larger projects. The map shows the importance of the daily meeting within the project team. This meeting is where the people conducting the work gets their updates and keeps them focus towards the same goal.

The amount of channels in towards the users are highlighting some of the complexity with multiple layers and paths. There is one channel that goes through the BRR to the super user and then to the users. One channel that goes through the super user and one that goes directly to the users. It is however not that surprising that there is so many channels. There are roughly 5000 users that should be informed so some different channels is needed to reach them. The time constraint did not allow me to start segmenting and interviewing multiple user categories.

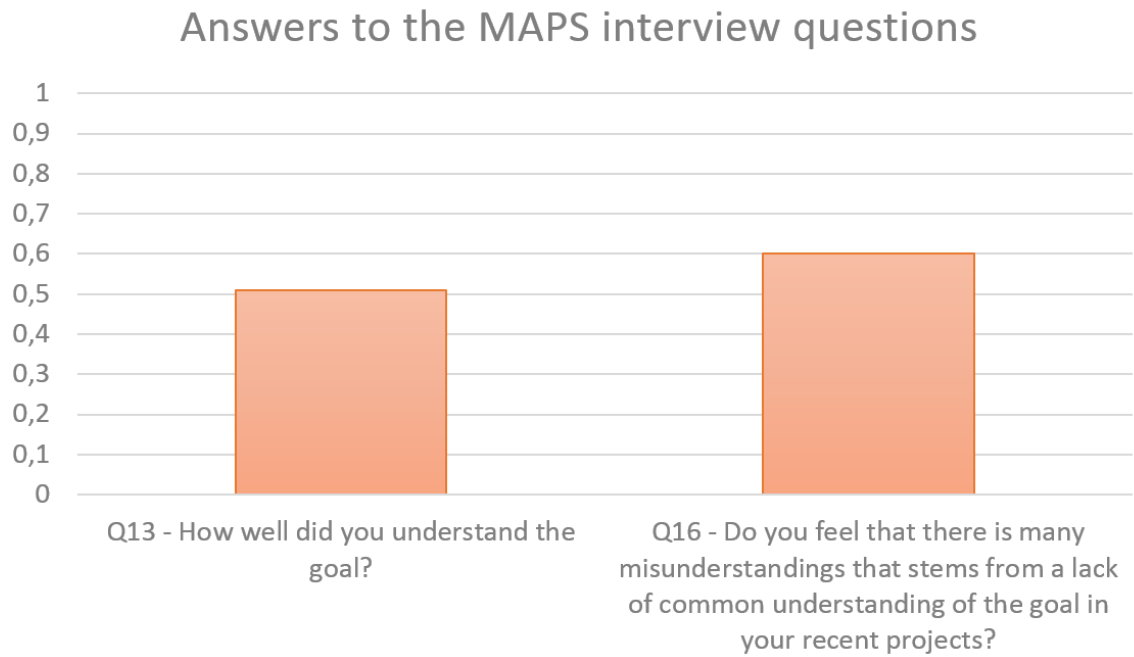
The intended use of the MAPS map is to validate that everyone has the same perception of the project and its surroundings. Most of the interviewees stated that the MAPS map was easy to comprehend which is its main intention. It will take some time for the project manager to draw but it makes it easier than a list to validate the information. One aspect that was hard when drawing the map was to find the balance between many details and easy to comprehend. If the project is complex enough it might be a good idea to create partial maps for parts of the project to keep details whilst maintaining comprehensibility.

In Table 5.6 the roles that have been interviewed can be found. This is not a complete set of all stakeholder categorize found in the map. The time constraint did not allow for more interviews to be conducted. In a real world application more interviews should be conducted to complete the map. When drawing the map it is important to keep the intention of the map in mind. The main purpose identified for the map is to be used to validate the project's context with the stakeholders. If the project manager intent to further use the map the trade off between details and comprehensibility should be different

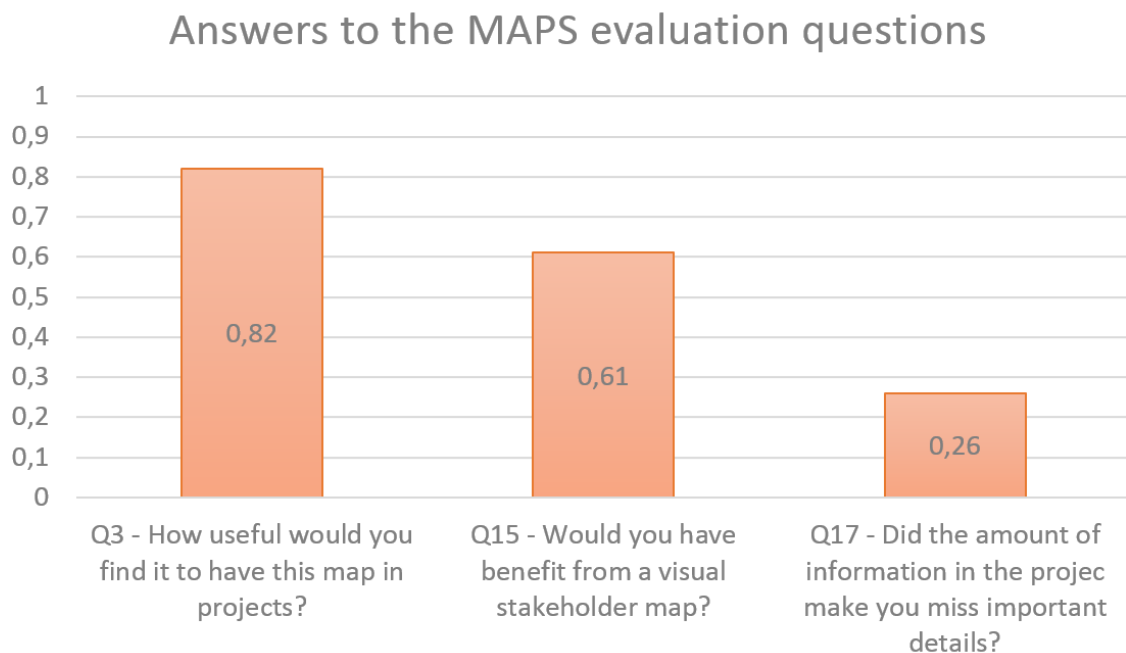


**Table 6.1:** Summarized responses from the scale questions in the MAPS Questionnaire in the case study. The presented value is normalized on a scale 0 to 1. The value between the parentheses is the numerical value from the case study.

Question	Mean	Lowest	Highest
Q1 How much experience do you have of the product domain? <i>Coded so "No knowledge" was represented by 1 and "Expert" was represented by 7.</i>	0,54 (3,8)	0 (1)	1 (7)
Q3 How much experience do you have in your current role? <i>Coded so "0-6 months" was represented by 1 and "5+ years" was represented by 4.</i>	0,8 (3,2)	0 (1)	1 (4)
Q4 How long have worked for your current company? <i>Coded so "0-1 years" was represented by 1 and "10+ years" was represented by 5.</i>	0,74 (3,7)	0 (1)	1 (5)
Q5 Do you have a strong desire to effect the processes the project will work with? <i>Coded so "No desire" was represented by 1 and "Very strong desire" was represented by 7.</i>	0,81 (5,7)	0,57 (4)	1 (7)
Q13 Do you feel that understand the goal of this project? <i>Coded so "Have no idea what it is about" was represented by 1 and "Have a very clear picture" was represented by 7.</i>	0,51 (3,6)	0 (1)	1 (7)
Q16 Do you feel that there is many misunderstandings that stems from a lack of common understanding of the goal in your recent projects? <i>Coded so "No misunderstandings" was represented by 1 and "Daily misunderstandings" was represented by 7.</i>	0,60 (4,22)	0,29 (2)	1 (7)
Q24 Do the amount of information in your projects make you miss important details? <i>Coded so "No information overload" was represented by 1 and "I only have time to check headings" was represented by 7.</i>	0,33 (2,3)	0 (1)	0,71 (5)
Q25a In recent projects how have the information been regarding the following aspect level details? <i>Coded so "Too few details" was represented by 1 and "Too much details" was represented by 7.</i>	0,54 (3,77)	0,29 (2)	0,86 (6)
Q25b In recent projects how have the information been regarding the following aspect technical level? <i>Coded so "Too low level" was represented by 1 and "Too high level" was represented by 7.</i>	0,59 (4,11)	0,29 (2)	0,86 (6)
Q25c In recent projects how have the information been regarding the following aspect relevance? <i>Coded so "Mostly irrelevant" was represented by 1 and "Only relevant information" was represented by 7.</i>	0,7 (4,9)	0,29 (2)	1 (7)



**Figure 6.2:** Selected results from the MAPS interview questions



**Figure 6.3:** Selected results from the MAPS evaluation questions

**Table 6.2:** Summarized responses from the scale questions in the MAPS Evaluation in the case study. The presented value is normalized on a scale 0 to 1. The value between the parentheses is the numerical value from the case study.

Questions		mean	Lowest	Highest
Q2	How well do you understand the MAPS Map? <i>Coded so "Can't read it" was represented by 1 and "Completely understand it" was represented by 7.</i>	0,82 (5,75)	0,71 (5)	1 (7)
Q3	How useful would you find it to have this map in projects? <i>Coded so "Completely useless" was represented by 1 and "Would use it every day" was represented by 7.</i>	0,62 (4,37)	0,29 (2)	0,86 (6)
Q5	Did you understand the goal of the project? <i>Coded so "No knowledge about it at all" was represented by 1 and "Completely understood it" was represented by 7.</i>	0,54 (3,75)	0,29 (2)	0,86 (6)
Q6	During the project, how well did you know about the current progress? <i>Coded so "Can't read it" was represented by 1 and "Completely understand it" was represented by 7.</i>	0,70 (4,87)	0,29 (2)	0,86 (6)
Q15	Would you benefit from a visual stakeholder map? <i>Coded so "I have no use for it" was represented by 1 and "I would use it every day" was represented by 7.</i>	0,61 (4,28)	0,29 (2)	0,86 (6)
Q17	Did the amount of information in the project make you miss important details? <i>Coded so "No information overload" was represented by 1 and "I only have time to check headings" was represented by 7.</i>	0,26 (1,85)	0 (1)	0,57 (4)
Q18	How much of the information you received in the project was directly relevant for your work? <i>Coded so "Mostly irrelevant" was represented by 1 and "Only relevant information" was represented by 7.</i>	0,71 (5)	0,29 (2)	0,86 (6)
Q18	How much of the information you received in the project was relevant as good to know for your work? <i>Coded so "Mostly irrelevant" was represented by 1 and "Only relevant information" was represented by 7.</i>	0,77 (5,42)	0,43 (3)	0,86 (6)
Q19	How was the technical level of the information? <i>Coded so "Too few details" was represented by 1 and "Too many details" was represented by 7.</i>	0,57 (4)	0,29 (2)	0,86 (6)

## 6.3 RQ1 - How can the MAPS method improve the identification of relevant stakeholders in an IT-project?

This section presents the findings and discussions for the first research question, "*How can the MAPS method improve the identification of relevant stakeholders in an IT-project?*". Two topics that stem from the findings are discussed; Approach to finding the stakeholders, and Collaborate and share the result. Each of the topics is paired with the findings from the case study and discussed in relation to related works and discussion at the workshop. Based on the discussions potential updates are suggested in the last section in the chapter.

### 6.3.1 Approach to finding the stakeholders

To be able to evaluate if the MAPS method can improve the identification of the stakeholders the approach to finding the stakeholders should be analyzed. This can be examined in some different dimensions for example the question construction or the use of multiple data sources.

When conducting the interviews the questions about the the project's workflow was better at find the stakeholders that worked close to the interviewee than general stakeholders. The direct question about who is a stakeholder to the project better captured the general stakeholders. The question "Who tries to affect your work" found some stakeholders but none of them was core stakeholders. Who are you trying to affect identified one stakeholder. The question about how you interact with other stakeholders found some interesting connections between the stakeholders. For example that one interviewee is a close friend to half of the steering committee and would always just call them to get the information she needed. This was information you only gain through a conversation, where interviewees pointed out informal connections to other stakeholders.

Some new stakeholders were found. The MAPS method did in the case study find stakeholders that were not present in the project's documentation. The new stakeholders were not core stakeholders but they had communication channels to other stakeholders. Example of this was the group that was responsible for the education for the system that the XYZ project was meant to replace. The education group was identified by users as the source where they were introduced to the XYZ project for the first time. Two interviewees said that groups and facilities outside of Södertälje had a tendency to be forgotten. Three interviewees claimed to have known that groups at other locations than Södertälje would use the output of the XYZ project when the project started. Despite this the fact that other locations also were stakeholders came as a surprise to the project half way into the project.

Different questions were able to find different kinds of stakeholders. So by asking questions from different angles the likelihood of finding a more complete stakeholder-set should increase. Triangulation can be used to increase the validity of information[24]. A

common way to do the triangulation is to combine different sources of data[16]. These sources is when verifying findings in a thesis but the principle of triangulation is used in MAPS. The approach of asking questions from different angles can be viewed as one kind of triangulation.

Another form of triangulation is to verify the communication channel from both ends. By asking the persons in each end questions to find who she is communicating with. For example asks both who you are trying to affect and who tries to affect you. This should identify the communication channel from both ends when interviewing the two communicating parties. In the case study many of the communication channels were identified from both ends. In some case the interviewee forgot to mention a communication channel that another stakeholder had claimed the interviewee was a part of. The interviewee confirmed the communication channel in most cases after a direct question if the communication channel did exist. This indicates the effectiveness of trying to verify the communication channel from both ends, it happens that people forget or have different opinions about what are important.

Asking more people from each stakeholder category will increase the likelihood of finding a more complete stakeholder map. To ask more people would always lead to a equal or better stakeholder map when it comes to the completeness, more is always better. It would however increase the cost for a decreasing marginal gain for each extra interview. The case study did not try to answer where the saturation point is located for when the marginal gain do not outweigh the additional cost of interviews.

During the MAPS interviews three people mentioned that they knew about off-site location was a stakeholder to the project. So if these stakeholders would have been consulted, as they were in the case study, these locations could have been found earlier. The project surprise of finding them mid-way through the project could then have been avoided. Sommerville[41] and Pressman [37] found that the process of stakeholder elicitation may be considered self-evident and is therefor often neglected. The result would be an incomplete stakeholder map and potential conflicts in the future. The case study findings and in our own experience gives some merit to the fact that stakeholder identification may be neglected due the fact that it may be considered trivial. In a complex organization like Scania it is not a trivial task to identify the stakeholders. Adding to the complexity is the fact that Scania's corporate parent is Volkswagen, the second largest car manufacturer in the world[1]. No one person could have a detailed picture of the entire organization and to consult other people will in a more complex project be the only way to get a complete stakeholder map.

The MAPS method provides an implementation of the best practice to consult the stakeholders to identify further stakeholders [36]. Garcia et al[36] states that in order to identify overlaps or discrepancies among the stakeholders all stakeholders must have appropriate knowledge and no stakeholder can be omitted. We would argue that all stakeholders should be identified but stakeholders that are not salient enough do not need to be consulted, see Section 3.2.1 for Salient model. The result of the case study do however support that the practice of consulting stakeholders is an efficient way to finding more



stakeholders for the project.

### 6.3.2 Collaborate and share the result

In the case study none of the interviewees answered that a stakeholder map was readily available in the project. Half of the interviewees had searched for information and found an organizational chart but it was not a complete stakeholder map. Three people mentioned that they had, or knew of someone who had, tried to map stakeholders for themselves. They did this independent of each other and without coordination between each other or towards the project manager's stakeholder list. Thus, currently (without MAPS) there was no agreed or common stakeholder map within the project.

The MAPS method includes sharing a stakeholder map among the stakeholders and would function to avoid the work being done twice. The MAPS method would also harmonize the map among the stakeholders so everyone had the same perception of whom is a stakeholder. Not only does the MAPS method harmonize it also collects the wisdom of the group. By consulting each of them and combining the results the map should be more complete. But since the evaluation was performed in retrospect the harmonization cannot be confirmed, only that the MAPS methods suggest to share the map when it is completed.

Another part of sharing the map is to validate the findings. One of the purposes of the map is that it is easy to comprehend. This was supported by the case study where the interviewees graded the MAPS map as 5.75 out of 7 when asked how comprehensible it was. So the map seems like a good way to share knowledge. The map should be sent to the stakeholders when all interviews are finished. The stakeholders can then be asked to give feedback if they feel like someone is missing. This will establish common ground with regard to the world in and around the project and how it is linked together. Three of the interviewees claimed that they were indifferent to getting a list of project's stakeholders or getting a visual map with the stakeholders. The list requires less effort to produce but may not allow the beholder to get the overview of all the stakeholders and communication channels as easily as with the map. Since finding all stakeholders is important it may be worth investing into creating the map so the stakeholders have an easier time comprehending the information.

### 6.3.3 Suggested updates to the MAPS method

Based on the discussion the following question should be added to the MAPS method.

*Who do you collaborate with when working? (Open)* **Motivation:** It complements the support question well by trying to gain related information from a different angle. In order to triangulate better.

*Do you know of someone that would benefit from the output of this project? (Open)* **Motivation:** Find more stakeholders.

*Do you know of departments that works similar to yours? (Open)* **Motivation:** Find more stakeholders.

## 6.4 RQ2 - How can the MAPS method improve the communication of the goal between stakeholders in an IT-project?

This section presents the findings and discussions for the second research question, *"How can the MAPS method improve the communication of the goal between stakeholders in an IT-project?"*. Four topics that stem from the findings are discussed; Identification of Communication channels, Harmonize the picture, Communication distances and barriers, and Project topics. Each of the topics is paired with the findings and then discussed in relation to related works and discussion at the workshop. Based on the discussion potential updates is suggested in the last section in the chapter.

### 6.4.1 Identification of Communication channels

One of the focus areas of the MAPS method is to identify the communication channels that are used to communicate the goal and progress towards that goal. These should be used to reach the stakeholders with the information. In the case study all stakeholders could identify the channels where they experience that they got the initial information about the goal of the project. They could also identify how they experience that they had received updates about the goal. Two of the channels identified were not present in the project documentation. This was compared to for example the communication matrix drafted for the project. The effect of having identified the communication channels where the goal is shared can however not be measured due to the retrospective evaluation.

So the identified stakeholders could identify where they got their updates from. The MAPS method have potential positive effects on the identification of stakeholders, see Section 6.3. So by identifying more stakeholders more communication channels can be identified as well. The stakeholders are the target audience in the communication plan and the communication channel is a way to get messages to this audience. The MAPS method does however just provide input to the communication plan and it is up to the communication plan to utilize the information for the desired effects to come true.

The case study did not provide any answers to how granular the identification of the communication channels should be. As discussed in the Section 6.3.1 the identification can be improved by asking more people within the stakeholder category. This would increase the likelihood of finding all communication channels. It would however not be feasible to try to cover every conversation that takes place in a project in its communication plan and that is not the purpose of the communication plan. That kind of granularity

will probably be a waste of money. No plan can cover all possibilities. So the project manager must decide what is an appropriate granularity for the identification. For the purpose of the collected information is to be used when forming the communication plan.

Where to stop searching is dependent on the project and its purpose. So it is up to the person that should form the communication plan to identify where the trade off for the added benefit of more information no longer justifies the cost of conducting more interviews. A way to do this is by performing consequence-analysis. What would be the consequence of these groups not getting correct information? Data analysis takes time and the project manager must decide how much information she actually will use in the analysis. The use of consequence analysis was also suggested in the workshop for many of the stopping criteria. It is however hard to adequately conduct a consequence analysis for what information that might be gained the MAPS interview.

## 6.4.2 Harmonize the picture

One part of communicating the goal is making sure everyone has the same goal. Or at least knows what the intended goal of the project is. In the case study interviewees tried to answer the question about how well they did understand the goal truthfully. However the answer the interviewee gave on a scale 1 to 7 was not that useful, it was just a self-reported metric about the knowledge which depends on so much more. The conversation that took place during the questions about the goal gave a much better feeling of how well the interviewee actually had grasped the goal. With a face-to-face conversation the common ground can be evaluated and the understanding for the goal can be determined by the interviewer. This would also normalize the scale of how well the goal was understood if the same person conducted all the interviews. So a conversation about the goal was much better at evaluating the knowledge about the goal than a self-reported metric.

One of the interviewees said that the MAPS method, if applied at the start of a project, should have helped to harmonize the knowledge about the stakeholders and goal. The interviewee stated that the harmonization would have been valuable. One interviewee stated that a more well-defined frame for the project would have reduced the misunderstandings due to different views of the goal. The frame referred to the different roles and what the project was expected to deliver. Another interviewee said that the progress updates were hard to interpret due to the fact that the goal was not clearly defined.

In the case study expectations from stakeholders was the most frequently mentioned item of information when the interviewees were asked for information that was hard to find and would benefit the project. So to gain information about the expectation each stakeholder has and share this would be valuable to the project according to the interviewees. Expectations and the goal can sometimes be hard to separate. But by having the conversations in the MAPS interviews gave insight about what the stakeholder expected from the project. This can however be improved and be asked more explicitly in the MAPS method. The expectations is also information that is covered by the communication plan, the purpose of the communication to each audience is to be able to meet their expectations.

De Bakker et al[15] makes the argument that by including the stakeholders in the risk identification the stakeholders' behavior were adjusted along with their perceptions. The adjustment may be because of the synchronization of the stakeholders that occur when they discuss and is included in the activities. By having the same perception the situation becomes more predictable because the stakeholders base their action in a harmonized frame of reference argues De Bakker et al[15]. The same argument can be made analogously for the goal definition. By having a conversation the common ground can be established.

For the interviewer practice makes perfect when explaining the goal. When discussing the goal the conversation is a two way communication. The interviewee should understand the goal that is the main purpose. Is the interviewer however not able to explain the goal to the stakeholder in a way she understands, it will suggest to the interviewer that the goal should be adjusted. During one of these conversation the interviewer will be called out if she is not able to put the goal in the context of the stakeholder. The interviewer must therefor be able to put the goal in context. This practice of explaining the goal in the interviewees context will be valuable when the communication plan is formed. The experience will help the project manager to decide who to reach the stakeholder and how to format the message.

Garcia et al[36] makes the argument for the importance of the context of the goal. "... the essential purpose of any product or service (completeness, correctness, and suitability), and the quality of the software used is satisfaction: the capability of the software product to satisfy users in a specified context of use." [36]. The delivered output of the project is evaluated in the user's context and therefor the goal of the project should also be put into that context as well. The expectations from each stakeholder will be related to her specific context.

Thomas et al[45] first practice to succeed in an IT-project suggested that everyone should agree on the definition of success. The second practice Thomas et al[45] found was to the track and measure your progress towards the success. How to define the goal is not objective of the MAPS method but these conversations may give an indication of the current definition is clear enough so it can be communicated as well as if all stakeholders have the same perception of the definition. During the case study it was possible to correct the perception of the goal that was not clear to some stakeholders. This can be considered a bit remarkable since the project in the case study was finished.

At the workshop the concept of control question was discussed. In theory the control question should provide a tool to evaluate the stakeholder's understanding of the goal in her context. At the workshop it was considered a good idea and that control questions would have the potential to work within Scania. An important aspect that was discussed at the workshop was to prepare people in advanced that control questions will be asked later. If the control question was asked in the wrong way or without the proper introduction it may be considerate as a "interrogation". So the success of these control questions is much down to the interviewer and her interpersonal skill. The concept of control question had been tested in a few cases with some success within Scania.

### 6.4.3 Communication distances and barriers

Communication distances and communication barriers are a threat to communication of the goal, or any communication for that matter. If there are distances or barriers in the communication channel this may cause misunderstandings that distorts the message. Therefore if barriers can be removed or at least identified communication could be improved.

Half of the interviewees noticed that a difference in the domain knowledge caused a problem. In the communication channels where these problems occurred the interviewees had different domain knowledge according to the answers given in the MAPS interview. It can be noted that it was often the person with the higher domain knowledge that reported the misunderstandings. The MAPS method could thereby find the cognitive distance of a difference in domain knowledge. Since the evaluation was performed in retrospect no evidence of how the identification of the distance would have affected the project have been collected.

Geographical distances were noticed in the case study. Two people said that the co-localization of the project team, and thereby a short geographical distance, lead to neglect of updating and/or creating documentation which can have caused misunderstandings for others. Several of the interviewees noted that groups and facilities outside of Södertälje had a tendency to be forgotten, as discussed in RQ1. The geographical distance was identified by MAPS but as with the cognitive distance the retrospect evaluation limits the possibility to measure the effect of being aware of the distance.

One interviewee said that it would have been valuable to have the information about the stakeholders and distances that was collected during the MAPS interview to understand each other better. Potential benefits of the identification of the distance information were as input when designing the project's communication and better understanding for each other.

Bjarnason and Sharp[7] found that in one case a short geographical distances tended to produce a less documented process. This phenomenon was explicitly mentioned by one of the interviewees in the case study in this thesis as well. Psychological distance was often reported just from one end of the communication in the case study by Bjarnason and Sharp[7]. The cognitive distance of domain knowledge was both in the case study and in Bjarnason and Sharp's[7] often just reported from one end of the communication channel. However was it the opposite end of the communication channel. In Bjarnason and Sharp[7] the person with the lower domain knowledge reported the problem whilst in the case study it was the person with the higher domain knowledge. The fact that only one end of the channel reported it as a problem may indicate the the problem was not discussed during the project. At least not discussed to the point it was completely resolved.

The MAPS method can, as demonstrated with geographical distance and domain knowledge difference, identify attributes about the communication channels. If these distances

are identified people should be able to be more aware of them and ensure that a common ground is established in the channel. A better established common ground would reduce the misunderstandings which would improve the communication, which include the communication of the goals. In the MAPS method the mapping of; Where the desk is, domain knowledge, experience from the role, and experience from the company enables to measure some distances within the communication channels. The effect of knowing about the distances have however not been evaluated in the case study.

One interviewee in the case study mentioned that a unified vocabulary would have reduced the misunderstandings in the communication. This can be viewed as a cognitive or organizational distance. Different parts of the organization may associated different meanings to words. They may also have different work processes and values. All these differences is a source for potential misunderstandings. Just two of the interviewees identified the case company's dictionary as a source of information. The dictionary have the potential to unify the vocabulary within the project but if the communication channel is not open to all the stakeholders this may actually cause misunderstandings. If one party operates under the assumption that the dictionary is the guideline and the other party do not even know of it existence it will cause a gap in the common ground a open up for potential misunderstandings.

When asked directly most of the stakeholders had heard about the dictionary but it was not that frequently used. So the development of a common vocabulary will be quickest within the teams that work close together. Between groups with longer organizational distance it will take time to develop a common vocabulary. In our experience, both from the case study and previous, it takes time to develop this common vocabulary and have a coherent use of words within the group. Related to this is the coding in Hartly's model, see Section 3.8, which is focused on how people code the message they try to communicate. This coding is a expression of the social context, see figure 3.9, and in a global company different organizational units that work together in a project may have vastly different social context which can cause misunderstandings.

### 6.4.4 Project topics

One of the intentions with the MAPS interview was to set efficient communication as a topic for the project. The intention was to have the stakeholders keep this in mind for the duration of the project. At the workshop the idea of having topics for a project was discussed. The result of the workshop discussion was that it would be possible to set topics. It would be important that continuous reminders were given if the topic should stick. If the adherence to the topic was controlled it gave a positive effect. It was also suggested that one topic do not cover an entire project's lifespan. The topics should evolve during the course of the project to support it in it's current phase. So more specific sub-topics could be set to support the intention of the MAPS method and enhance the communication.

In the responses from the interviews some good topics was identified, see list below. The identified topics are more specific than the high-level topic of communication. Each

of the topics listed below will however support the topic of efficient communication.

- *Common definition of success*, A good first topic for the project to set the frame for the project. With a well defined frame all future communication will be easier.
- *Roles and responsibilities*, Many pointed to this as being a source of misunderstandings. And can be viewed as an evolution of the setting the frame. When the information is clear and well defined it is much easier to communicate and understand.
- *Common vocabulary*, This came up in one interview and something we experienced ourselves. It is easy to assume that everyone uses the same vocabulary as you but this is not always the case within a project. Culture, organizational identity and experience all affect how we code our communication. This means we can have different interpretations of the same word which can lead to misunderstandings in the communication.

### 6.4.5 Suggested updates to the MAPS method

Based on the discussion the following question should be added to the MAPS method.

*Can you in three sentences tell me the goal of the project. (Open)* Control question to be able to harmonize the goal better among the stakeholders.

*How do you want the updates about the progress of the project? (Open)* When doing the analysis this felt like a hole in the information gained., to directly ask what the interviewee wants. This is both to gain the information and to emphasize that her input is valued.

*What do you expect of the project? (Open)* In the analysis it came clear that the expectation was a important factor and a direct question about it would help to map the stakeholders.

*Do you have an example of a communication problem that caused problems for you? (Open)* In order to better map what the actual consequences of the misunderstandings are will help prioritize which threats and risk that need to be the most closely monitored.

## 6.5 RQ3 - How can the MAPS method improve awareness and coordination in an IT-project?

This section presents the findings and discussions for the second research question, "*How can the MAPS method improve awareness and coordination in an IT-project?*". Three topics that stem from the findings are discussed; The Communication plan, Shared goal leads to better coordination, and Roles and responsibilities. Each of the topics is paired with the findings and then discussed in relation to related works and discussion at the workshop.

Based on the discussion potential updates is suggested in the last section in the chapter.

### **6.5.1 The Communication plan**

The information the interviewees claim to need to complete their tasks in the project and the communication channel for this information was identified by the interviews. Who they asked for help and what guidelines they followed were also found.

The intention of the communication plan is to enable efficient and effective communication. As discussed through out this thesis the purpose of the communication is to facilitate coordination. The MAPS method provides input to the communication plan and could therefor implicitly improve the coordination. However due to the retrospective evaluation the effects of awareness or coordination improvements can not be verified through the case study. For further discussion about the link between MAPS and the communication plan see Section 7.1.

### **6.5.2 Shared goal leads to better coordination**

The harmonizing of the picture, discussed in Section 6.4.2, should by extension lead to better coordination. The harmonization of the goal and the expectations should make the stakeholders have better alignment in their instrumental actions, see Section 3.1.2. If more people have base their decision on the same information this should lead to better coordination. No information was gained in the about this in the case study apart from the harmonization mentioned in Section 6.4.2.

The same argument that is made in Section 6.4.3 can be applied for RQ3 as well. To gain knowledge about communication barriers and identify them early may help to achieve more effective communication with less misunderstandings. A more effective communication should lead to better coordination.

### **6.5.3 Coordinate the information**

The consequences of misunderstandings due to; coordination errors, lack of awareness, or discrepancies in the common goal was that things took longer time to complete. Most misunderstandings was cleared up according to the interviewees but the task was completed with a delay and in some cases a missed deadline.

An awareness and coordination improvement could be that everyone has the same information to base their decisions on. Something that came to mind when three of the interviewees said that they, or someone they knew, had made a list of the stakeholders independent of one another was to have escalation channel for information need. It would work as when you found yourself without a vital piece of general information, like a stakeholder list, you would have a designated interface where a request can be made. This is to



avoid the scenario where subgroups in the project creates the same information in different variants. From a communication point of view this makes sense.

The problem of the same work being done twice is however again the entanglement of; communication, configuration management, and in this case information management. The misunderstanding about the current version can be viewed as a failure of communication. It is to some degree true that it is a failure in the communication, but in our opinion communication is not the solution to the root cause only to the symptom. The root cause is an error in configuration management and particularly in the part about keeping information available. Remember the definition of configuration management in chapter 3.1.8, "The purpose of the Configuration Management Process is to establish and maintain the integrity of all identified outputs of a project or process and make them available to concerned parties." [18]. The part about making it available to concerned parties is key. To solve it with just communication would mean that everyone communicated exactly what they did all the time. To solve it with just communication is therefor not feasible and would create a lot of noise which would not be efficient. A potential problem is also that if there were one place where information could be requested easily to laziness of man would take over and people would not look as hard for the information themselves. They would just request it directly without looking and create overhead for the project. The idea of the request interface is viable but it must be preceded by a configuration management that holds already collected information readily available.

## 6.5.4 Roles and responsibilities

Information that one interviewee reported as hard to find was what was the current version of things like the timetable. Another piece of information that several interviewees said was hard to find and/or could be better defined was the roles and responsibilities for the people involved in the project.

The part of the interview called work conduct, see Section 4.4.2, focuses on the tasks the interviewee will perform in the project. This can be linked to the roles and responsibilities each stakeholder has in the project. Information about these responsibilities was something that was something that some interviewees identified as something that would reduce the misunderstandings in the project. The questions about the main tasks and the output of the interviewee's work can also function as control questions for the interviewee's responsibilities in the project. Discussion about what is expected of the interviewee is natural to have together with these questions.

## 6.5.5 Suggested updates

Based on the discussion the following question should be added to the MAPS method.

*How much of your workload will be this project? (Scale)* This was added to after some interviewees said that the total amount of time they spent on the project was less than 5

percent. The low percentage gave them a low commitment to the project.

*What are you responsible for in the project? (Open)* Triangulate the information in the work conducted with a direct question. Meant to open the conversation about defining the role and responsibility for the stakeholder in the project. This may seem trivial for project members but the case study pointed to that clear responsibilities would lessen the misunderstandings in the communication.

## 6.6 Threats to Validity

This section will discuss potential threats to the validity of the thesis and its conclusions. To reiterate from the how to conduct research chapter. The design science framework does not prescribe a specific quality assurance method. For qualitative research Håkansson [23] states that the following aspects should be taken into consideration; validity, dependability, confirmability, transferability, and ethics. Höst et al[24] have three categories of QA; reliability, validity, and generalizability.

### 6.6.1 Reliability

*Reliability means that the data collection and analysis should be performed with in a correct and careful way. Or linked to the dependability that is the process of judging the correctness in conclusions. Confirmability is that the research has been performed in good faith without personal assessments.*

One of the ways the reliability can be improved is to present the work flow to the reader [24]. Chapter 5 provides a detailed description of the work flow and who helped in each step.

A threat to the reliability is that we did not record the interviews in the case study. We took notes during the interview and after the interview summarized the discussion around each question. Höst et al states that the reliability can be improved by having the interviewee approve the summary of the interview. This aspect was incorporated in the interview by asking control questions before taking notes from longer discussion. For example "Is it correct that you the main benefit of MAPS would have been [...]?" Any direct quotes the interviewee was offered to review before it would go to print.

Due to time constraints we were limited to conducting the interviews in Södertälje and was not able to visit the off-site locations. This means that the sample has a bias towards the center of the project in the case study.

### 6.6.2 Validity

*Validity is to measure what you intend to measure or is in qualitative research that the researcher is truthful and adheres to existing rules.*

The biggest validity threat to this thesis is the retrospective evaluation. Due to time constraints the MAPS method could not be implemented as intended and then evaluated. The ideal study would apply the MAPS method in the start of several projects and then measure the outcome. The result in these projects would be compared to projects within the same company that had not applied the MAPS method. A retrospective evaluation was conducted which meant that some aspects of the MAPS method could not be evaluated.

Connected to the last paragraph about retrospective evaluation is the separation of time-bound knowledge by the interviewee. Many of the interviewees had a hard time separating what they knew then and what they know now. This affected, or in some cases strongly affected, the answers they gave during the MAPS interview. Evaluation of the actual method is hard due to the fact that the MAPS method is applied to a project in retrospective.

The validity can be improved by triangulation according to Höst et al[24]. A common way to triangulate within a research is to combine different research methods, different sources of data or different researchers [16]. This was done to the greatest possible extent in the thesis by focusing on literature reviews to find patterns and trying to verify the findings. We have however no doubt that with more time more sources to either strengthen or disprove the claims of this thesis can be found since communication is such a diverse field of study.

All the questions were not asked exactly like they were written, the formulation of the question was in some cases tailored to what the interviewee had answered before and what type of language she was using. This was to get a better flow in the interview but it meant that the some question may have been interpreted in a different way. This meant that the questions may have had slightly different meaning to the different interviewees. This may affect the results.

### **6.6.3 Generalization**

*Generalization is mainly concerned with the sample size, with a larger sample size more generalized conclusion can be drawn according to Höst et al[24].*

Case study evaluations have often problem with the generalizability due to the narrow perspective of the study [39]. The generalizability is however improved if the case study's context is well aligned with the intended use [39]. The case study in this thesis had the right context, a large IT focused project within a large company. Only one project was investigate as well which limits the generalizability, this was due to limited time and resources.

Generalization on a different level may be a validity threat as well. In the case study, due to some of the stakeholders being busy or located outside of Södertälje, not every one that was intended was interviewed. Limited resources also meant that only one person from each stakeholder category was interviewed. This made the population in the case study limited.

## 6.6.4 Ethics

*Ethics is how well the integrity of the results is kept, that coercion and other interference is avoided and privacy/confidentiality is kept.*

As discussed in the previous section the population in the case study was limited. This meant that to keep confidentiality of the participants in the interview great care had to be put into how the results were phrased. To write that the person in role X had problems with the person in role Y can be directly traced to who said what. So it has been a balancing act between confidentiality/privacy and correctness of the results.

In the same manner it has been a balancing act between what is considered confidential internal information from Scania and what could be published in order to give a fair analysis.

# Chapter 7

## MAPS method in a bigger perspective

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This chapter presents five topics to put the MAPS method in a bigger perspective. *MAPS and the communication plan* focus on how each of the questions in the communication plan relates to the information gathered with the MAPS method. *Business value* discuss the value that the MAPS method could provide to an company and some of the costs associated with using the method. *Soft aspects of personal communication* highlights the more intangible side of the MAPS method with the benefits of face-to-face conversations. *The world around the project is not perfect* explore the world around the project and investigate how it affects the project. *Office politics and motivation* discuss different scenarios that affect how the communication in a project is perceived. These topics tries to emphasize that there is much more that affects the communication than the can be encompassed in one method.

### 7.1 MAPS and the communication plan

Several time in this thesis it is stated that the MAPS method should provide input to the communication plan and enable effective communication. This section presents that link between MAPS and the communication plan. Effective communication is what the communication plan intends to facilitate. Thereby the goal of the communication plan is aligned with the intention of the MAPS method. The link between the two is that the MAPS method is an approach on how to collect the information needed to create the communication plan.

In Section 3.2.3 a structure for a communication plan is presented. Each of the steps that the communication plan should cover[35] is linked to the appropriate part of the information gathered by the MAPS method.

## 7.1.1 Communication objectives

*What are you hoping to achieve with your project communications? Look at the objectives established for the project.*

The overall goal for the communication should be aligned with the goal of the MAPS method, to achieve a successful project.

A little bit more specific the MAPS method suggest that part of the goal with the communication is to enable coordination and facilitate awareness. Another part of the goal of the communication is to harmonize the stakeholders' expectations. Both of these goals can be traced to the challenges presented in section 4.2.1 and 4.2.2.

## 7.1.2 Target audiences

*Who do you want to communicate with? Refer to the roles established for the project. Consider a broad range of stakeholders.*

Directly related to the challenge of identifying the stakeholders, see section 4.2.3, in the MAPS method. For discussion about the stakeholder identification in the MAPS method see Section 6.3. The stakeholders will give the target audience for the communication plan.

## 7.1.3 Purpose of the communication for each audience

*Why are you communicating with them? Think about what your audience would like to know from their perspective - "What is in it for me?"*

The objective of the communication plan is to enable efficient and effective communication in the project. The purpose of this communication is to keep the common ground and spread awareness. By keeping the common ground for expectations and goal the instrumental action will be taken in the same direction by all stakeholders. It is important to keep this in mind as the true purpose of the communication.

For each stakeholder communication will also be needed to obtain information needed to perform her tasks and spread the output of these tasks.

## 7.1.4 Key communication messages and the content of the message

*What do you want to say? The content should address the reason the audience will be interested in the project.*

The MAPS method ask specific questions about the expectations the stakeholder have so the communication can address these expectations. The communication should also focus on making sure that the stakeholder have the latest updates about the project's progress towards that goal.

The other part of the content must be the information the stakeholder need to complete her tasks related to the project.

### **7.1.5 Information sources**

*Where will you find the information you need to collect for your communications? Some information may be from official sources, and other information will be created as part of the project and stored in the project repository.*

When focusing on the tasks the input and output from each stakeholder is mapped. It is thereby possible to locate where the information originated by looking for the stakeholder that outputs that information.

### **7.1.6 Frequency of the communication**

*How often do you want the communication to be delivered? Weekly, bi-weekly, monthly, at the end of a stage, etc.*

This is not explicitly asked in the MAPS method. It can be partially deduced from the information volume question. These questions is design to adjust the information volume so the stakeholders feels satisfied with it.

### **7.1.7 Format and delivery mechanism for the communication**

*How does the target audience prefer to receive this information? Report, phone, website, meeting, formal presentation, etc.*

The MAPS method maps how the stakeholder is currently used to receive updates. Questions about how it is working and possible improvements is also included. With this information a delivery mechanism should be possible to design.

### **7.1.8 The messenger**

*Who is the responsible communicator? Who prepares and distributes or presents the communication? Usually the project manager and project sponsor are the main communicators, but the size of the project may require the assignment of a role of project communicator.*

The MAPS method focuses on the current communication channels to identify the current communication network. When these communication channels is identified the

current messengers can be identified. With the mapping complete it may be identified that the BA is the only one in contact with some users groups and she should therefore be responsible for keeping these users up to date. Otherwise a new communication channel where to progress updates are communicated should be established.

### **7.1.9 Communication milestones and measurements of success**

*How will you know if your plan is working? Establish some simple performance indicators and evaluation measures to determine if the communication plan is effective. Example – use of a Meeting Evaluation form after a meeting.*

This is not handled by the MAPS method. It should be implemented but it is not guided by the method.

## **7.2 Business value**

Any cost must be out-weighed by a business value in a for-profit company. The cost of the MAPS method is the time it takes to conduct the interviews, draw the map and analyze the information. In a company time equals money, so the time to conduct the activities in the MAPS method must be compensated by a benefit. How would MAPS provide this value so the cost of conducting each of these interviews is compensated?

The consequence of errors and misunderstandings in the communication is that they also takes time to sort out. Decision may be taken based on misinterpreted information. Many of the interviewees in the case study reported that misunderstandings had caused tasks to take extra time and in some cases deadlines had been missed. So if some misunderstandings can be avoided the MAPS method can provide business value.

Most interviewees were positive to the use of the MAPS method and thought it would have helped, one did however not answer and one was indifferent. Two interviewees pointed out that the impact are bigger in a complex projects. On a scale from 1 (completely useless) to 7 (Would use it every day) the potential helpfulness of the MAPS method was 4.37 but with a wide spread. Stakeholders closer to the project team found it less helpful and stakeholders further out found it more helpful.

If the MAPS method works as intended it should provide benefits to the project. By forming a better communication plan misunderstandings can be avoided. By keeping the stakeholders aiming for the same goal and thereby get them to take their instrumental actions in the same direction as discussed in the previous chapter, see Section 6. Other benefits would be to find stakeholders early to avoid late and thereby costly changes. To value could also come from higher adoption rate. The higher adoption rate can be a benefit if the expectations are managed in a good way so the users have positive attitude towards the output of the project. So the business value can come in both the form of reduced cost for the project due to time savings or higher business value of the project output due to



higher adoption rate. Real business value comes from the output of projects being used.

Related may also be the Hawthorne effect[48], see Section ???. By asking for the stakeholders for their input and trying to adapt to it may give them a sensation of control of their environment. In the Hawthorne studies the effect of this control was higher productivity to not be excluded from the trials. In the context of this thesis the control can translate to higher commitment. Other factors that can be argued for is that the project members feel happier. If you feel like you input is valued you may want to contribute more and you feel appreciated. Happier workforce is not a tangible business value but still an important factor to consider. If the MAPS method achieves the goal of better coordination this may also contribute to happier stakeholders. The frustration of misunderstanding may decrease the team spirit and by eliminating some of the misunderstandings the stakeholders may feel happier.

These business value is contingent on a number of other factors. For the MAPS method to be cost effective the project manager and the Business analyst must coordinate in the stakeholder identification. Since the MAPS method is based on interviews and face-to-face conversations the outcome is dependent on the person conducting the interviews and her interpersonal skill, see Section 7.3 for further discussion about this. The outcome of the MAPS method is also contingent on how the information gather in the interviews is analyzed and implemented in the communication plan.

Few of these factors could be measured in the evaluation of the method. To capture this value a quantitative study where the actual time savings, and there by cost benefits, the MAPS method provides in form of fewer coordination and communication errors is measured.

## **7.3 Soft aspects of personal communication**

To invest the time and talk to someone can have more benefits than just the information you gain from the conversation. Our experience from the case study is that the simple task of actually talking to the stakeholders can give a benefit in it self, especially for stakeholders in the periphery. When a face-to-face conversation takes place both parties gets a good sense of the type of coding the counterpart in the conversation is using in her communication, see Hartly's model in section 3.8. If the project manager understands the coding the other party is using, this information can be used when designing the communication plan. This information may help to avoid unnecessary misunderstandings due to different coding of the conversation.

Another intangible aspect is the opening of the communication channel. By talking to someone you open a communication channel to them and that makes it easier to start a conversation in the future. What we experienced in the case study was that even if you had been introduced to a person it was first after having had the first real conversation with someone that it became natural to just ask a quick question. The kind of questions that

make coordination more efficient and a more natural part of the daily work.

If the other person in the conversation can be convinced that you care you can convey another important message. The MAPS method and the interview are there to improve the project for everyone. The interview is a chance for that person to express her opinion to on how she want the communication to work. The interview is there for her benefit not only for the project manager's benefit. If this message gets across to the other person she will probably commit more to the project because she feel that her opinion is valued.

Another part of the face-to-face conversations is that you can keep it informal and off the record. By expressing that none of the information gained will be directly spread to other people people gets more outspoken. Conflicts that may not have surfaced in a group conversation or in written responses can be identified. For example if one person feels she has a hard time communicating with another person due to some past indiscretion may only come up at an off the record conversation. The project manager should gain this information and be able to handle the situation without revealing that it has been said to the third party.

Soft aspects works both ways. High demands on the person that conducts the interview. Commitment requires commitment. You have to show that you care. Show that you value her opinion. If the information is not used and the same thing that she saw as a risk occurs and it totally surprises you this will be a bad thing.

## 7.4 The complexity of the world

The environment that the projects resides in is complex and far from perfect. Projects function in the context of complex companies where there is a lot of legacy and external factors that the project must adjust to. The world around the project is far more complex than the academia can account for in some cases.

To think that one master's thesis can solve the problem of communication in large scale IT-projects would be naive. The realms of; IT-projects, Communication, Psychology, and Coordination are all big research areas on their own. The MAPS method is a method to approach the problem and particularity know what to look for. That is why the thesis puts a strong emphasis on the intent behind the method. If the reasoning behind the method is understood this can guide the project manager when these "it depends"-situations arises.

One example of this is the corporate communication and information strategy for the company that hosts the project. It may be that for legacy reasons there is; one, or two, or even five different channels for the same kind of information. With many communication channels for the same information there is an increased likelihood of incoherent information in the different channels which can cause misunderstandings. The project will in all likelihood not have jurisdiction to change the corporate strategy, or in many cases it is not a strategy it is just the way things are. This legacy of different communication channels that may exist is an example of the imperfect world the project must adjust to.

The multiple communication channels may come from trying to reach as many as possible in a way the recipient wants. If ten people is asked how they would like to get the progress updates it is likely that ten different answers is given. Even if one channel is reach in consensus for this project the next project may create a different one. Legacy is then created if a common strategy is not in place. So to reach efficient communication in the project it is of high importance that it is supported by a communication strategy. That must be in place before the MAPS method can have the best chance of success. But there will always be a trade-off between the effort of handling multiple channels to satisfy each stakeholder and the consequence some stakeholders not receiving information the way they want.

The MAPS method will help to identify the communication channels so the project can be aware of them but the source of the project's bad communication may lay outside the project's control. By identifying the channels, which the MAPS method helps to do, it gives a chance to handle them at least. The use of the information collected in the MAPS method is equally important as the overall communication strategy. The communication plan created by using the information from the MAPS method must also take the communication strategy inconsideration. This is to avoid creating unnecessary legacy.

The result of the complexity is that the MAPS method needed to be flexible and scalable to be able to adapt to the complex environment. The fundamentals of the communication in IT-projects will be the same in most organization and is in this thesis described in the three challenges, see Section 4.2.3 to 4.2.2. The flexibility is achieved by the modularity in the parts of the interview and the approach. If the person applying the MAPS method understands the purpose in the three challenges and the intention of the six parts she can adapt the interview to fit the complex context she has to adjust to.

## **7.5 Office politics and motivation**

Even the best laid plans are worth nothing if nobody follows them. In a large organization there will often be hidden agendas and sub-optimization for personal gain. Many times this are not due to malicious intent, it is the result of a trade-off. For example a project manager can be tempted to hype up the expectations for the project among the stakeholders to gain some initial commitment from them. If she promise a bigger benefit the stakeholder will maybe be willing to commit more to the project. The hype may however cause the result that is delivered to not meet the stakeholders' expectations. This will lead to the project being considered less successful.

The office politics may also be present in the communication of progress updates. What if a project has demo with important stakeholders in one week. A problem arises that will cause the project to miss the scheduled demo with 50 percents chance. If the problem is not resolved quickly it will set the project back two weeks and the demo will be missed. Should this be communicated to the stakeholders? The core project team probably needs to know but who else? The customers that with a fifty/fifty chance gets no demo in a week? The steering committee which will have to give the project more money to com-

pensate for the delay, if it occurs. This is not an easy decision to take. If the problem is not communicated and the delay occurs it will be interpreted as bad communication when the customer gets very short notice about the canceled demo. If the problem is communicated but the delay do not occur it will contribute to noise in the communication channels. The project manager may also be lucky and do not communicate the problem and the delay do not occur. Nobody knows the outcome and no matter what the project manager chooses there will always be a risk with negative consequences. This kind decision illustrated above will probably not be regulated with any communication plan. The decision will be down to the profession of the project manager, it will be a judgment call made by the project manager.

When it comes to motivation and commitment office politics will also play a part. The MAPS method creates commitment by involving the stakeholders or at least asks for their opinion but there are many others factors that affect the motivation. Consultants may have a focus on short term return and may not fully commit to the project. Some stakeholders may feel like the project steals time from their main responsibilities. No matter the reason, low commitment and motivation will be as hazardous as anything for the perception about the communication and especially the attempt to create awareness. For example some stakeholders would not read information unless they were practically forced to. So what is the project's responsibility and what is the stakeholder's responsibility. The project can not force the stakeholder to understand but should the project only make sure they have provided the information or should they make sure it was received? The decision may depend on how prioritized the stakeholder is and what consequences a knowledge gap may cause.

These examples above tries to illustrate situation where other factors than communication plans and communication gaps will play a much larger role for how the communication is perceived. In these cases the benefit of the MAPS method will be limited. With a strong and shared goal some of the situation described above may be handled better. The topic of the complexity of decision making in large organization is however to complex to discuss here, if this interest sounds interesting we suggest researching the fields of normative control and especially incentive alignment.

# Chapter 8

## Conclusions

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This chapter summarize the thesis by reconnecting to the research purpose. In the end of the chapter suggestions for future research for the MAPS method is presented.

### 8.1 Did MAPS achieve its goal

The purpose of this thesis was to create a new method that addressed three major challenges for an IT-project. Namely; Identify stakeholders, define success, and facilitate awareness and coordination. The approach chosen was to improve the communication by gathering first hand information from the stakeholders to improve the communication plan. A new method, called the MAPS method, that is based on previous research was developed. MAPS is an acronym of Mapping to Avoid Project Surprises. The MAPS method is constituted of two parts; the MAPS interview and the MAPS map. The interview gathers information as input to the communication plan and the map is used to communicate some of this information to all the stakeholders. For a detailed explanation of the MAPS method see Section 4.

The new method was evaluated in a case study at Scania CV AB in Södertälje who stood host for this thesis. In the case study it was found that by using a combination of the best practice ”to consult the stakeholders to find new stakeholder” and triangulation in the questions the MAPS method was able improve the identification of stakeholders. The MAPS map was found easy to comprehended and could be used to validate the information gathered. To improve the communication of the goal in the project the MAPS method was able to identify the communication channels used to communicate the goal to each stakeholder category. The conversations that took place during the MAPS interview were able to correct some misperceptions about the goal and could be used to establish common ground for the goal. In order to reduce the misunderstandings the MAPS method can identify some communication barriers and distances. The improvements to awareness

and coordination could not be evaluated in the case study but the information from the MAPS method can be mapped to the information needed in the communication plan.

Overall the interviewees in the case study thought that the MAPS method would have helped the project if it would have been used. So the MAPS method is at least a partial success. All the intended benefits could not be confirmed in the case study but the method is a good start for large companies to improve their communication and increase the likelihood of achieving a successful project.

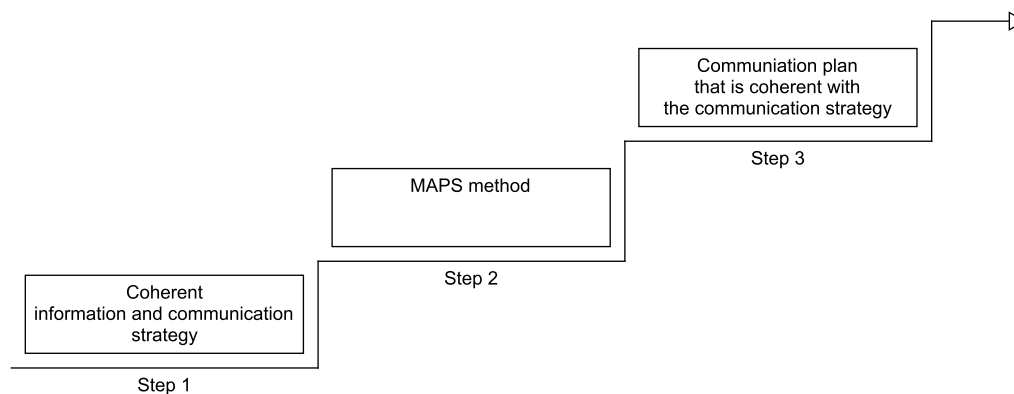
## 8.2 Future research

This section will present some future research for the MAPS method. It presents to areas where research could be conducted to strengthen the developed method.

### 8.2.1 Extended MAPS method to a framework

The most important future research for MAPS method is how the information should be used to create the communication plan in practice. It is a subject that we had hoped to be able to cover in this thesis but there was insufficient time. It is within the realms of the project manager profession to be able to create a communication plan from the information gather with the MAPS method but to find some best practices would probably increase the business value of the MAPS method.

As discussed in Section 7.4 and ?? the MAPS method would benefit from having a clear and coherent information and communication strategy in place for the organization that conducts the project. All legacy within the company will dictate which course of action is possible and what is not possible for the project. How the communication plan is implement based on the information from the MAPS method is also defining factor for how much effect the MAPS method has. This steps that enable each other can be viewed as a ladder that must be climbed one step at the time, see Figure 8.1.



**Figure 8.1:** MAPS Ladder of implementation

Further research is suggested in first what strategies best support the MAPS method when it comes to information management, configuration management, and company wide communication strategy. The other part is how to translate the information collected in the MAPS method to concrete actions and strategies for the project.

### **8.2.2 Evaluation of Communication and Business value**

The MAPS method is part of process to created the communication plan. It can therefor be viewed as a process improvement. To achieve the most of the process improvements some sort of feedback loop should be in place to measure the effects. For this loop to be closed definitions on what is good communication is needed and how to measure it. The same goes for coordination, how do you measure improvements in coordination and learn from that. If these measurements are in place it will be easier to evaluate the business value of the improvements as well.

## **8.3 Contributions**

This thesis has contributed with an analysis of success factors for communication in large scale IT-projects. A method to reach the identified success factors have been developed. The method have been tested in an industrial setting.





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# Appendices



# Appendix A

## How to conduct research

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The purpose of this chapter is to present the methods and procedures that can be used to conduct research projects. Some different views are presented and

### A.1 The methodological approach

The methodological approach is the systematic process of carrying out the research work and solving a problem including research methods. Learning the logic behind the research methods, explaining why a certain method is used and not another to support evaluation of research results. [23]

#### A.1.1 Philosophical assumption

Philosophical assumptions is the guiding philosophy for the research and there is three options for qualitative research; Realism, Interpretivism, and Criticalism. Realism observe phenomenon to provide credible data and facts. It is suitable in interdisciplinary research in information and communication. Interpretivism is used in projects with opinions, perspectives, and experiences characters to get context for phenomena. Suitable for developing artifacts. Criticalism assumes that the reality is socially, historically, and culturally constituted, produced and reproduced by people. Suitable for learning about users' culture how it might affect the usages of computer systems. [23]

#### A.1.2 The research purpose

When conducting a research study the general purpose can be either; descriptive, exploratory, explanatory, or problem solving. *Descriptive research* is conducted to inspect

and describe how a phenomenon works or is performed. The purpose of *Exploratory research* is to investigate a phenomenon deeper with regards to how it works. With *Explanatory research* the purpose is to find causes and explanations for a phenomenon. Finally, Problem solving is when the goal is to identify problems and try to solve them. [24]

### A.1.3 The research methods

The research methods is how the research should be conducted on a high level. Many of the approaches can be both a research method and a research strategy just depending on how detailed the description is. The methods identified and presented by Håkansson [23] is

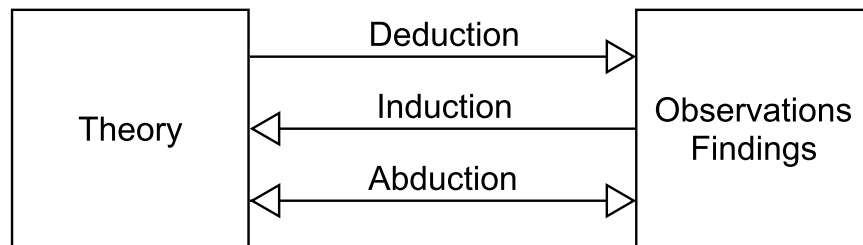
- *Experimental research*, is to draw conclusions about the causalities between variables.
- *Non-experimental research*, draws conclusions the situation by examining existing scenarios.
- *Descriptive research*, focuses on what happened but not why. It is also called statistical research.
- *Analytical research*, is to validate a hypotheses using facts and information already collected.
- *Fundamental research*, focuses on observing a phenomenon to get new insights into the essence of nature. Allows old theories to be challenged and new to be born.
- *Applied research*, is used to build on previous work to solve a particular problem och develop a practical application.
- *Conceptual research*, is used to develop new or interrupt old concepts.
- *Empirical research*, tests predictions by focusing on real people and situations. It also drives knowledge from actual experiences.

### A.1.4 Research approach

The research approach is where you start. There is two main ways of thinking about this and one hybrid strategy. The first one is a inductive approach, and this is mostly associated with qualitative methods. Reasoning formulates theories with alternative explanations from observations and patterns. Enough data should be collected to gain understanding of the phenomenon investigated and establish different views of it. In simple terms, a phenomenon is investigated starting with a blank page to form hypothesis. The other approach is the deductive one. This is used when the hypothesis can be expressed in operational and measurable terms. The hypothesis is almost exclusively tested with quantitative methods when a deductive approach is used. In simple terms, the researcher has a hypothesis that she wants to investigate. The hybrid strategy is called Abductive approach and is used for incomplete set of data. Both a deductive and inductive approach is used and to selected

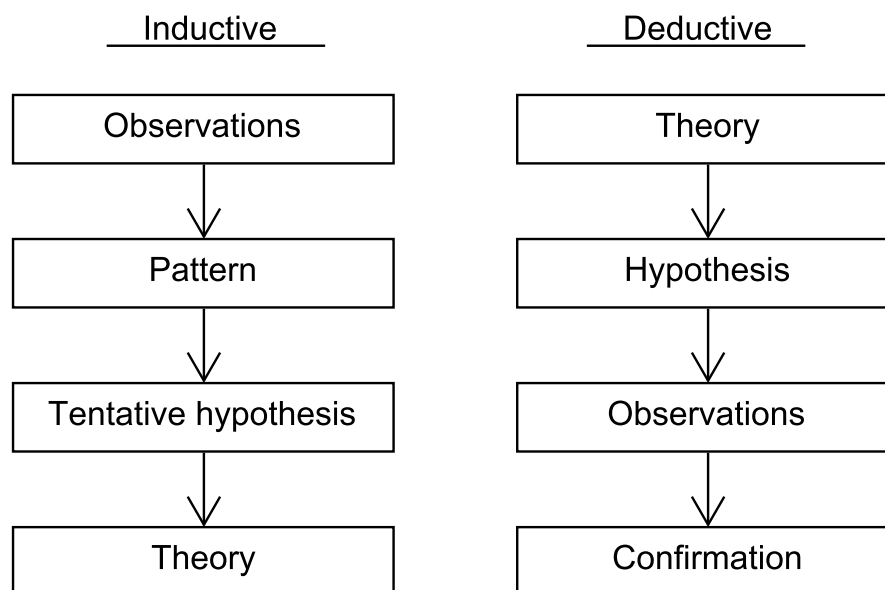


the hypothesis that best explains the evidence found.



**Figure A.1:** Direction of conclusion for different research approaches

Höst et al [39] presents the flow even more clearly, see figure A.2



**Figure A.2:** Flow in inductive and deductive research. Based on figure in Höst et al[39]

### A.1.5 The research strategy

This is how the research will be conducted, a set of guidelines for how to carry out the research. It includes organizing, planning, designing and conducting the research [23]. When settling on a research strategy Yin [50] suggests that three main conditions should

be considered; Type of research, the investigator's control over behavioral events, and to focus on contemporary phenomenon.

In her literature study Håkansson [23] found these main approaches to research strategies

- *Experimental research*, This method is used for experiments with large data sets. It is used to control all variables of an experiment to be able to prove a cause-and-effect relationship.[23]
- *Ex post facto research*, is related to experimental research but is carried out on data already collected.[23]
- *Surveys*, this descriptive research method examines the frequency and relationship between variables. The method can be used both for quantitative and qualitative research depending on the characteristics of the questionnaire.[23] Höst et al has a more broad definition with the goal being to describe and compile the present settings of the researched phenomenon [24].
- *Case study*, is to investigate a phenomenon in a real life context using multiple sources of evidence. The boundaries between phenomenon and context are not clearly evident. Can be used for both qualitative and quantitative research.[23] Höst et al states the purpose of the case study to be a gain of a deeper understanding of one or many cases without intervening with the studied object [24].
- *Action research*, is suitable for qualitative methods because they are based in settings with restricted data sets. This should improve how people address issues and is to contribute in a problematic situation.[23] Höst et al defines this strategy as with carefully supervised and documented study of a phenomenon solve a problem. [24]
- *Exploratory research*, using a qualitative data set as many relationships as possible between variables is examined.[23]
- *Grounded theory*, trying to develop a theory that is grounded in data.[23]
- *Ethnography*, uses descriptive studies of culture and people that under investigation have something in common.[23]

## A.1.6 Data collection

Three main categories of data collection is defined by Lethbridge et al [46]; direct, indirect, and independent. Direct sources, also called first degree sources, is where the researcher is in direct contact with the data source e.g. Interviews, focus group and Delphi surveys. Indirect sources, also called second degree sources, is where the researcher takes raw data from a source but is not in direct contact with the person generating the data, e.g. telemetry data or a video recording. Independent sources, also called third degree sources, is where the researcher examines already produced artifacts, e.g. document analysis.

Håkansson [23] have identified many different ways how to collect data.

- *Experiments*, To collect a large set of data.

- *Questionnaires*, To collect either quantitative data through closed questions or qualitative data through open questions.
- *Case study*, To collect in-depth data of a single or small number of participants.
- *Observations*, To collect data by observing participants while in a certain situation.
- *Interviews*, To collect the point of view from one participant and gain in-depth data.
- *Language and text*, To collect data about the meaning of texts and interpreting conversations.

## Literature review

The literature review can be done either Systematic or narrative. The narrative review is used to generate understanding rather than knowledge, it tends to be open and have a relative wide scope. The systematic review is to identify and consolidate results from previous studies, this is best suited for retrieve quantitative data. The narrative review is better suited for qualitative data.[9]

[DESCRIBE NARRATIVE APPROACH]

## Case study

Yin [50] describes a case study as "an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Kyburz-Graber [29] has comprised a set of guidelines for what constitutes a good case study:

- A theoretical basis including research questions is described.
- Triangulation is ensured by using multiple sources of evidence (data collection and interpretation).
- A chain of evidence is designed with traceable reasons and arguments.
- The case study research is fully documented.
- The case study report is compiled through an iterative review and rewriting process.

For exploratory research the case study is well suited according to Höst et al [39].

## Interview

An interview can be carried out in many different ways and for different reasons. The first distinction that is important to make is between a open and a closed question. The open question allows for a multitude of different answers. Where the closed question requires the answer to come from a predefined set of options. It is easier to analyze the results from a closed question but the open question has no restriction in the scope of the answer so more details may be obtained. Another differentiation point is the type of interview that is conducted. The *unstructured interview* is mostly used for exploratory purposes and

is characterized by open questions. This leads the conversations to subjects of interest by the interviewee and researcher. The *fully structured interview* is similar to a questionnaire-based survey where all the questions is planned in advanced and asked in a particular order. Usually the questions in the fully structured interview is closed. In the middle there is the *semi-structured interview*. This is common in software engineering case studies and here is the questions planned in advanced but not necessarily asked in that order. This interview format also allows for improvisation with follow-up question that is not planned in advance. [39]

The interview session can be split into different phases. Most interviews will have an introduction phase to get both the interviewer and the interviewee comfortable in the situation. It starts with the interview presenting; the purpose of the interview, the agenda, and formalities such as asking for permission to record the interview. During the introduction phase general question about the interviewee's background, the project, and the organization is asked that should be relatively easy to answer. When the actual questions starts in the next phase the structure can be either; a funnel, a pyramid, or a timeglass. *The funnel* starts with open questions and then zooms in specific parts. *The pyramid* is the opposite to the funnel, it starts with closed focused question and then opens up during the session. The last one is *the timeglass* which alternates between zooming in and widening the focus. After the interview Höst et al strongly recommends to transcribe the interview, and that this task is done by the researcher and not by a third party. [39]

## Focus group

The focus group closely resembles an interview but the data collection is conducted with several people at once. Group dynamics do that people often react to extreme view the do not agree with so there is some instant feedback. It is relatively cost efficient to be able to interview many people at once. In a properly formed group the different background also allows for new insights to be gained because of the nature of the group setting. [39]

## Archival data

This is third degree data that can contain both quantitative and qualitative data. Example of sources is:

- Meeting minutes
- Technical documentation
- Management documents
- Organizational charts
- financial records
- Reports

Höst et al stresses that it is important to thorough with the quality assurance process for third degree sources. Most of the documents list above will not have been written with intent of holding up to be source material in academic research. Many parts may just be included because the corporate template has it listed as mandatory to include. [39]

## A.1.7 Quality assurance

Håkansson [23] describes seven key factors to determine quality:

- *Validity*, In quantitative research it is that the variables actually measures what they are supposed to measure. In qualitative research it is that the researcher is truthful and adheres to existing rules.
- *Reliability*, refers to the stability of the measurements.
- *Replicability*, can another researcher replicate the results of the study.
- *Ethics*, How well the integrity of the results is kept, that coercion and other interference is avoided and privacy/confidentiality is kept.
- *Dependability*, the process of judging the correctness in conclusions.
- *Confirmability*, the research has been performed in good faith without personal assessments.
- *Transferability*, usability for other researchers.

For a qualitative research; validity, dependability, confirmability, transferability and ethics should be discussed. In quantitative research; validity, reliability, replicability and ethics.

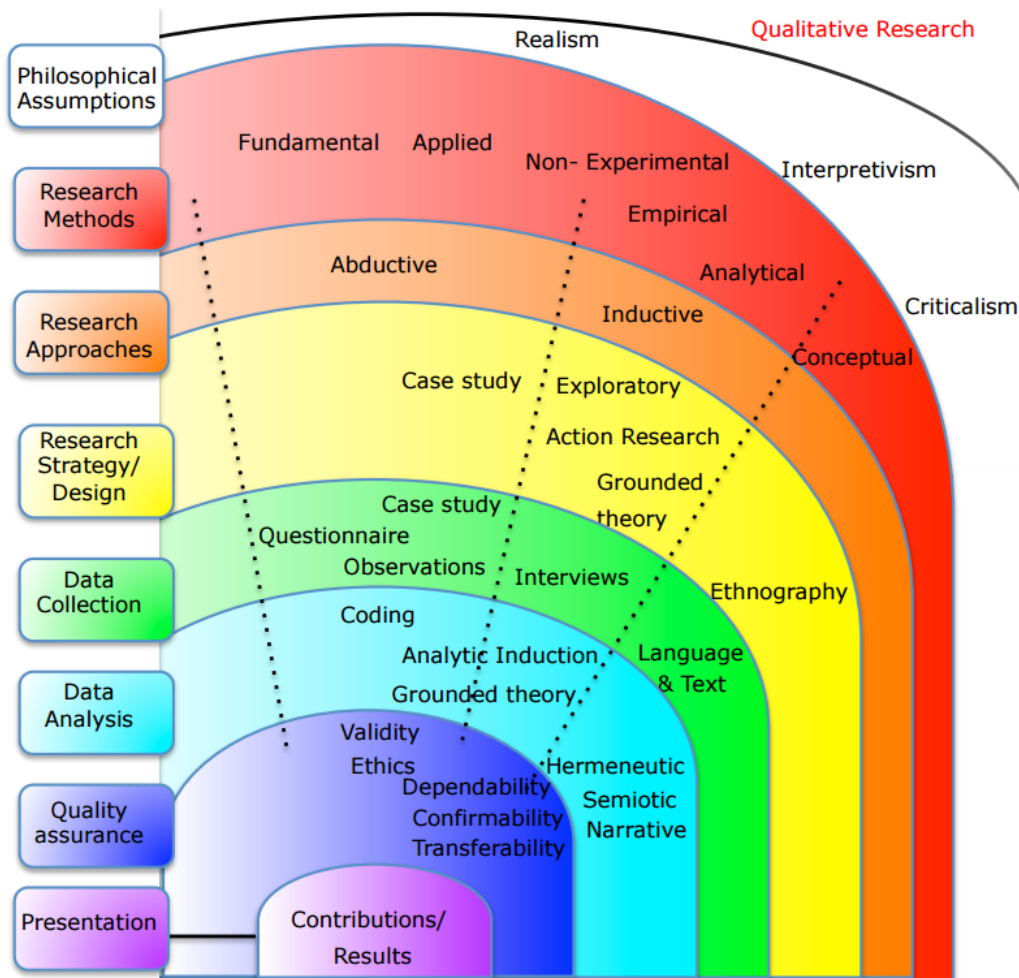
Höst et al[24] have three categories of QA; reliability, validity, and generalizability. Reliability means that the data collection and analysis should be performed with in a correct and careful way. Validity is to measure what you intend to measure. Generalization is mainly concerned with the sample size, with a larger sample size more generalized conclusion can be drawn. A small sample size on the other hand makes it more difficult to generalize the findings. [24].

## A.1.8 Presentation

This should according to Håkansson [23] be a rigorous description of the theory of the research methods and methodologies. These methods should be present early in the process and then followed. The output of this method shall then be presented and the quality aspects be discussed.

## A.2 Selection portal

Anne Håkansson has constructed a portal for choosing the appropriate methodological approach and presents it in her paper "Portal of Research Methods and Methodologies for Research Projects and Degree Projects" [23]. The first decision point is to identify if the research should try to prove a phenomenon (quantitative research) or explore a phenomenon to create theories (qualitative research). This decision places the research in either the right- or left-hand side of the portal. It is not advised to mix and match between the two, once a decision is made this path should be strictly taken[23]. Other authors instead claims that to analyze a problem from multiple angle would strengthen the research.



**Figure A.3:** The right hand side of the Method portal. Images reference:[23]

# **Appendix B**

## **MAPS Questionnaire**

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# MAPS mapping template

Mapping to Avoid Project Surprises interview questionnaire

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## What is this document?

This document contains a questionnaire for the interview that is part of the MAPS method. It should function as a base for the MAPS interview.

## What is the MAPS method?

The MAPS is an abbreviation of Mapping to Avoid Project Surprises. It is a method to help initiate new projects and map the information flows within the project. This is meant to help with the coordinate within the project, especially with harmonizing the goal for the project and the information about the progress towards that goal.

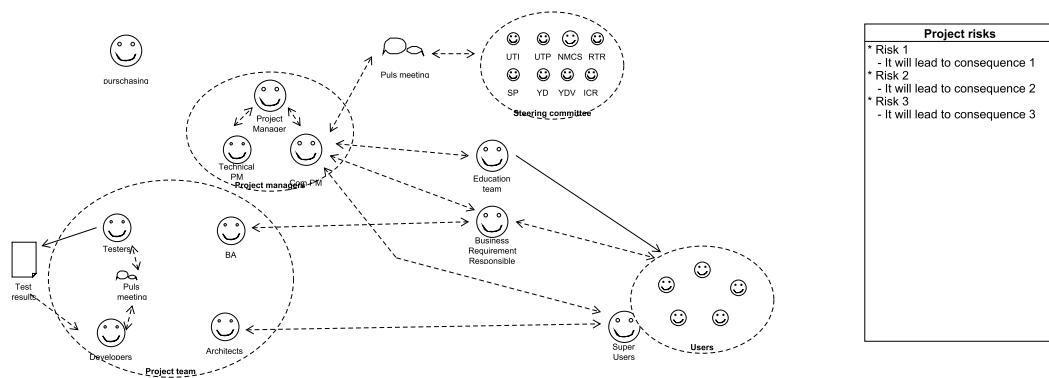


Figure 1: Example output from the MAPS method

## Why is this interview conducted?

This interview is to get your point of you of the project. It is a part of the stakeholder elicitation to map the project. It is also a part of the risk identification. Those are the more formal parts, it is also meant to build a relationship between the interviewee and the interviewer.

In figure 1 example output is shown. This interview will be one of the inputs to build this map for the current project.

## How should this interview be conducted?

The interview should be conducted one-on-one to give the interviewee a chance to give her point of view and enhance the interaction between the interviewer and interviewee.



# MAPS mapping template

Template to apply the MAPS method.

Name:		Role:	
Date:		Context:	
		Organizational unit:	

## You

Questions about the interviewee and her role within the project.

**1. How much experience do you have of the product domain?**

*No knowledge is that you have never heard about it and Expert is 5+ years of working within the domain*

No knowledge   ———————   Expert

**2. Where is the desk at which you conduct most of your work?**

*Building, Floor, Room*

---

**3. How much experience do you have in your current role?**

*The role you have within this project*

0-6 months    6 months - 2 years    2-5 years    5+ years

**4. How long have worked for your current company?**

*In total*

0-1 years    1 - 3 years    3-5 years    5-10 years    10+ years

**5. Do you have a strong desire to effect the processes the project will work with?**

*Where no desire is that you is fine with any process as long as the goal is achieved and very strong desire is that you advocate strongly for a certain work process*

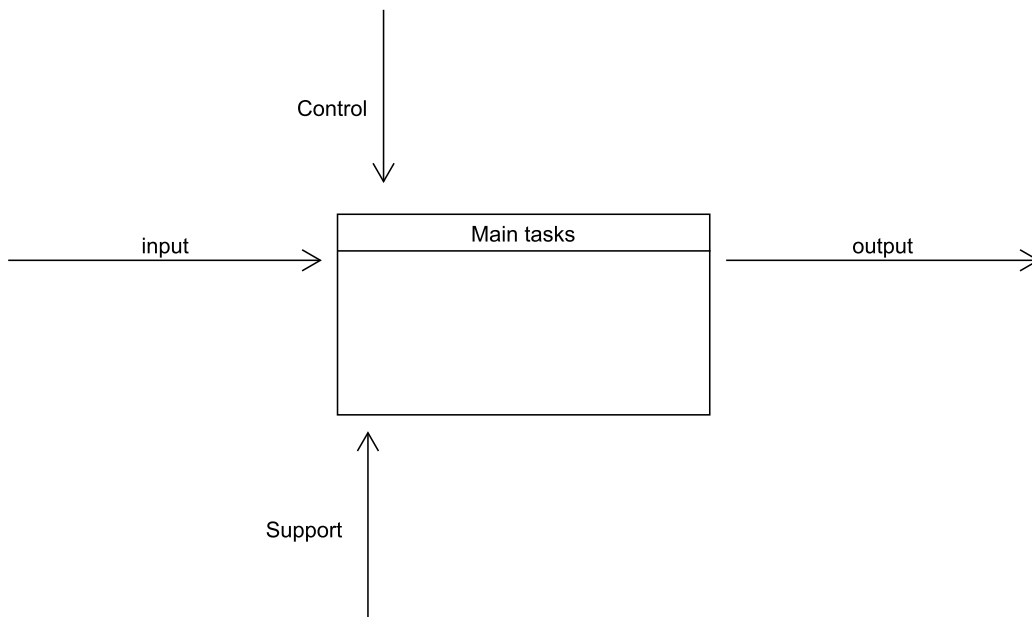
No desire   ———————   Very strong desire

## Your work

Questions about the work that the interviewee will conduct in the project.

**6. Fill in the framework with the three main tasks that you will perform in this project**

*Each of the control and input items should be rate on a scale 1 to 7 with regard to how easy they are to comprehend. 1 is completely incomprehensible and 7 is always clear and no risk of misunderstandings*



## Stakeholders

Questions to capture the stakeholders for the interviewees work.

**7. Who are the stakeholders of your work?**

*It may be the customer that buys your test data or the NGO that wants you to reduce emissions*

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**8. Who tries to affect your work?**

*Closely related to the previous question, it may be your sister organization that wants you to use the same processes as them*

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**9. Who are you trying to effect?**

*The same as the previous question but in reverse, how do you want to effect?*

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**10. Why do you want to contribute to/effect this project?**

*Why do you have an interest in this project? Were you assigned to it or did you volunteer*

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**11. How do you interact with the other stakeholders?**

*Who do you regularly talk to?*

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## Goal and project progress

Questions about the goal of the project and the project's progress towards that goal.

**12. How did you get the initial information about goal of the project?**

*Have you gotten any? Who informed you? Did you attend any meetings?*

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**13. Do you feel that understand the goal of this project?**

*Did you understand the information?*

Have no idea what it is about         Have a very clear picture

**14. How do you get information about adjustments/changes of the goal?**

*Budget restrictions may be imposed which leads to a less ambitious goal*

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**15. How do you get information about the project's progress towards that goal?**

*How do you know that tasks are completed? How do you get information about delays?*

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**16. Do you feel that there is many misunderstandings that stems from a lack of common understanding of the goal in your recent projects?**

*No misunderstandings is that in your recent projects no misunderstandings have been because of different views of the goal and daily misunderstandings is that these misunderstandings occurred daily because of different views of the project goal.*

No misunderstandings         Daily misunderstandings

**17. Do you have any suggestion to reduce these misunderstandings due to different understandings of the goal?**

*In your point of view what would enhance the understanding of the project's goal*

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**18. Do you have any suggestions about how to efficiently communicate the progress of your work to this project's stakeholders?**

*Is there ways to predict delays? Do you always update some system with your progress?*

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## Risks

Questions about risks with the project and some specific risks with the communication.



# **Appendix C**

## **MAPS Evaluation form**

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# MAPS Evaluation

Template to evaluate the MAPS method and the project for the thesis.

Name:		Role:	
Date:		Context:	

## MAPS

Questions to evaluate the MAPS Method in general

**1. Do you think that the MAPS method would have helped?**

*Based on the MAPS map and the interview you just took part in.*

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**2. How well do you understand the MAPS Map?**

*Show example map*

Can't read it ——————— Completely understand it

**3. How useful would you find it to have this map in projects?**

*Show example map*

Completely useless ——————— Would use it every day

**4. Comments about the MAPS Map?**

*Anything missing? Should something be removed? Is it easy to understand?*

---



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---

## Goal

Questions to evaluate the goal sharing

**5. Did you understand the goal of the project?**

*Show example map*

No knowledge about it at all ——————— Completely understood it

**6. During the project, how well did you know about the current progress?**

*Did you always know about deviations from the schedule and why they occurred?*

Never received any updates —————— Always knew about progress

**7. How did you experience the progress updates in the project?**

*How did you receive the updates? Did you understand them?*

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**8. Do you have any suggestions to improve the progress updates?**

*Less meetings? Keep the webpage updated?*

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**17. How much of the information you received in the project was relevant for your work?**

*Rate both aspects*

**Direct relevant** mostly irrelevant ——————— Only relevant information

**Good to know** mostly irrelevant ——————— Only relevant information

**18. How was the technical level of the information?**

Too few details —————— Too many details

**Risks**

Questions to evaluate the risk management

**19. Did any risk you saw for the project occur that the PM got surprised by?**

*Due to lack of communication or she forgot*

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# Kommunikation för ett lyckat IT-projekt

POPULÄRVETENSKAPLIG SAMMANFATTNING AV **Mattias Mellhorn**

KOMMUNIKATION ÄR IDAG EN AV DE STÖRSTA UTMANINGARNA FÖR ATT NÅ ETT LYCKAT IT-PROJEKT. MEN HUR SKA MAN VETA VAD OCH HUR MAN SKA KOMMUNICERA? MAPS STÅR FÖR **M**APPING TO **A**VOID **P**ROJECT **S**URPRISES OCH ÄR EN METOD SOM HJÄLPER TILL ATT SAMLA IN INFORMATIONEN SOM BEHÖVS FÖR ATT SKAPA EN BRA KOMMUNIKATIONSPLAN.

## Lyckade IT-projekt

Idag blir mjukvara och IT-tjänster en allt viktigare del av de värdeerbjudanden som företag presenterar. Stora kommersiella applikationer, IT-stöd och Appar finns runt oss varje dag. Mjukvara blir även en större och större del av de produkter som produceras. Så behovet av lyckade IT-projekt blir därav bara viktigare.

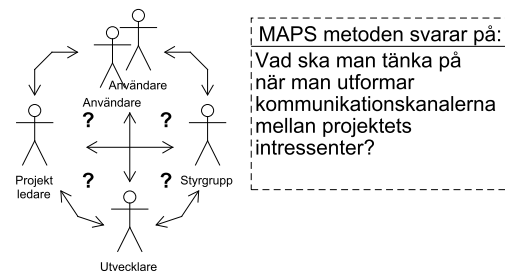
För att projekt ska upplevas som lyckat måste det som levereras uppfylla de förväntningar som projektets intressenter har, det vill säga alla de som berörs av projektet. För att lyckas måste ett gemensamt mål definieras. Detta kräver god kommunikation mellan alla inblandade, t ex användare, projektteam, styrgrupp, och externa intressenter. Detta är ingen lätt uppgift! Förändringar och hur projektet ligger till jämfört med målet behöver också nå ut till intressenterna för att justera deras förväntningar. Kommunikation är därmed en väldigt viktig komponent för att uppnå ett lyckat projekt.

## MAPS metoden

För att lyckas med kommunikation i ett större projekt, med många intressenter, behövs en kommunikationsplan så ingen glöms bort eller får fel information. En bra kommunikationsplan innehåller bl.a. information om vilka som ska kommuniceras med, vilken information de behöver, och vilka förväntningar som de har. MAPS metoden är en arbetsmetod för att samla in denna information. MAPS fokuserar på att kartlägga ett projekts kommunikationskanaler, dvs vem som kommunicerar omkring vad, och kan användas på de flesta större projekt.

Mer konkret fokuserar MAPS metoden på att den som koordinerar projektet, i de flesta större projekt är detta projektledaren, genomför intervjuer med alla intressenter för att få informationen direkt från en förstahandskälla. Genom personliga intervjuer kan man trycka på att information ska användas för att förbättra för intressenter så hon får rätt information. Under intervjun kartläggs kommunikationskanaler in och ut från intressenten, detta med utgångspunkt i hennes arbetsuppgifter och den

information hon behöver för att utföra sina arbetsuppgifter. De nya intressenter som eventuellt identifieras under intervjun blir ombedda att också ställa upp på en intervju. På detta sätt identifieras fler och fler intressenter vilket till slut leder till en komplett karta.



Kommunikationsavstånd i de olika kommunikationskanaler identifieras under intervjun. Dessa kommunikationsavstånd kan vara skillnader i kunskapsnivån för produkten eller skillnader i erfarenhet. Avstånd kan leda till missförstånd om de inte hanteras och genom att kartlägga dessa på förhand kan missförstånd, som kostar tid och därmed pengar, undvikas.

## Fördelar

MAPS metoden identifierar kommunikationskanalerna, och information om dem, mellan de relevanta intressenterna. Genom att samla in denna information i en direkt kontakt med intressenterna är även information bättre förankrade hos dem, vilket leder till att en bra kommunikationsplan kan utformas. Med bättre kommunikation inom projektet kan målet och förväntningarna hållas gemensamma för alla intressenter och öka sannolikheten att projektet kommer upplevas som lyckat. Med ett gemensamt mål kommer intressenterna att sträva åt samma håll vilket underlättar koordineringen inom projektet. Om intervjuerna görs på ett skickligt sätt kan även mjuka fördelar erhållas. Att inkludera personerna som berörs av kommunikationsplanen i planering ökar sannolikheten att de följer planen vilket också kan bidra till ett lyckat projekt.