Communication in mega-projects
- the consultant’s perspective
# Master of Science thesis

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Abstract

Today’s large-scale construction projects can easily be mistaken for a regular project but with an increase in size and cost. However, as projects surpass a point where one manager cannot single handily control the project, conditions change. Many may refer to this as the point when one looses the ‘helicopter perspective’ of the project. What this illustrates is the ability to have a holistic view of the project. This is especially true in projects that are classed as mega-projects.

As societies develop, grow larger and need to support more inhabitants, the need for infrastructure, health-care and other public services grows. With an introduction from Margret Thatcher, the use of Public Private Partnership, PPP, when building mega-projects has become increasingly common and influential all around the world. These partnerships have led to the possibility of creating projects with larger budgets and fewer legal restraints compared to projects that to a lesser degree involve the element of public and politics. The world now faces many new mega-projects, both with and without the aspects of PPP, which will continuously face the scrutiny from politics and the public, and the aspect mega-project will therefore be a focus of this thesis.

In mega-projects where project managers, as well as project members, loos the helicopter perspective, the communication has shown to become an more problematic than in regular projects. The importance of addressing and continuously improving the communication within mega-projects can therefore not be understated. This is why the question of what is required of the communication in mega-projects needs to be answered.

The purpose of this thesis is further to, from the perspective of a consultant; explore the communication within the design phase of a mega-project. With this limitation, the objectives are to investigate what is required of the communication and describe what tools of communication are needed in a mega-project.

The method used is a qualitative, inductive, case study with semi-structured interviews, observations and document investigations. The primary data collected will be analyzed with respect to the secondary, theoretical data that collected.

The thesis’ main conclusions state the importance of face-to-face communication, the necessity of a project office, the benefits with an adaptable project portal and finally the importance of having a vision in a mega-project.

Keywords: communication, mega-project, construction industry, design phase, project office
Acknowledgement

As we began our search for a project and a topic to study we had never imagined we would end up at Sweco and ÅF’s cooperative design project office. It has been a unique, thrilling and inspiring opportunity to examine the communication in the NKS project office itself, but also hear what their colleagues at other, remote offices have to say. Through the interviews we have gotten a deep insight in a unique project, and to many of the complex issues that exist for the individual employee. This has contributed to an invaluable personal development for the both of us.

We would like to give a special thank to our supervisors Patric Eriksson and Susanne Christiansson at Sweco Management as, without their help, our experience at the project design office, would not have been possible. We would also like to thank the Sweco and ÅF project design team at NKS, and especially the interviewees, as they have continuously helped us build up an understanding and knowledge of the complex project. Lars Tapper, Johan Wallgren, Ann-Charlotte Andersson, Göran Dalaryd and Patric Eriksson, all part of the project design management team - thank you for spending your valuable time explaining the ‘ABC’s’ of organizational structure, relationship management and project portal usage at the NKS project.

Many thanks to our supervisor Tina Karrbom Gustavsson for all the help with the fundamental structure of the essay, great discussions and important theory on our subject. It has been of great value to write this masters thesis in the manner that you had planned and structured, and receiving your feedback has indeed helped us to further improve our thesis.

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CHAPTER 1 – INTRODUCTION

This chapter will introduce the reader to the context of this master thesis, stating background information and the purpose of this thesis. Further the research questions will be presented, followed by the limitations set. Finally the thesis structure will be outlined.

1.1 Background

The importance of communication lays the foundation for this thesis. Authors of the theory regarding communication all concur that communication is one of the most important features of a project. Although united in this belief there are varying opinions on exactly what areas are the most important within communication. Therefore there is an abundance of theories discussing to what extent communication actually saves money, increases quality, shortens the time plan and increases the potential for knowledge management. Furthermore, as mega-projects (projects larger than USD 320 million, with a significant socio-economic impact [Altshuler and Luberoff, 2003] and with a lifespan of over 50 years [Bruzelius et al., 2002]) grow more common, the need to understand a new, more robust and effective communication arises.

To understand the real-life issues and problems, a case study on the communication, from a consultant’s perspective, has been made on the mega-project, the New Karolinska University Hospital, NKS. NKS is one of the largest procurements made in Sweden and is currently being planned and constructed in parallel. The project is divided into several phases and as the detail design of each phase is completed the Sweco ÁF design team delivers the ‘as built drawings’ to the client SHC, Skanska Health Care. This effectively makes the parallel plan and build process possible.

The communication at Sweco and ÁF’s project design office at NKS has been assigned on behalf of Sweco Management. According to Sweco the project has proved more challenging due to its sheer size. Numerous researchers have written articles and other literature on the subject of communication. Therefore, by using the case study and this theory, this thesis will focus on communication within construction mega-projects.

1.2 Purposes & objectives

There are two main purposes to this thesis. Firstly to contribute to the knowledge database of how communication works in mega-projects. Secondly to create a general understanding of the pros and cons of the communication that takes place at Sweco’s detail planning office, which will be documented for the benefit and use of Sweco.

The objectives are to create an understanding of how the unique features of a mega-project affect the project communication and its channels. Furthermore to elaborate on how a project vision might enable smoother communication and problem in a mega-project.
1.3 Research questions

The essay seeks to discuss and answer: what is required of the communication in a mega-project and what improvements must be made to the communication tools and communication channels?

- What is required of the communication in a mega-project?
- What tools or channels are required to improve communication in mega-projects?

1.4 Limitations

The purposes and objectives will be achieved by making a detailed analysis of the current situation at the project design office at NKS. This means that the study is limited as it aims to look only at Sweco and ÅF’s project office and the communication within it. It should however be noted that the communication at the project office constantly involves external parties such as the contractor, the client and the municipality. However, these communication occurrences and channels have, due to the size of the project, been excluded.

Although PPP significantly affects the character of the project, this will not be discussed in more detail. In short, the reason for this is that a PPP project does not significantly affect the communication within the project design office, rather, it is the size of the project that has the largest impact on the communication.

Nor will the thesis deal with the creation of a communication plan; although its importance is spoken of in the thesis, developing the communication plan is a detailed and intricate project in itself.
CHAPTER 2 – METHODOLOGY

In the Methodology chapter the work process, the type of study and research method used is presented. How the chosen method, case study, will be executed is then described. Then the choice of data collection; literature review, interview, observation and document inspection, will be motivated. Moreover the chapter will include criticism of the sources and the thesis’ credibility.

2.1 Work process

The work process can be divided into several milestones, most of which were predefined due to the outline of the master thesis course. The work process revolved much around the accomplishing of the objectives stated in the Purpose & objectives sub-chapter. The work process’ different milestones were:

January
1. Finding area of interest
2. Presenting and discussing chosen method at seminar 1
3. Theory research A
4. Holding discussions and interviews with key persons
5. Theory research B
6. Presenting and discussing chosen theory at seminar 2
7. Analysing findings
8. Presenting and discussing analysis at seminar 3
9. Final presentation and discussion at seminar 4
10. Handing in of master thesis
11. Final presentation for Sweco/ÅF

June

Chapter 1 – Introduction lays the foundation for the thesis and outlines the thesis relevance to the current situation within the construction industry. Chapter 2 – Methodology presents the method, data collection choice and criticism of sources. It is the result of the theory read on academic methods. Together these chapters and the thoughts and facts presented in them have been subjects to discussion and presentation at seminar 1.

Chapter 3 – Theoretical framework lays out the theoretical basis for the thesis and is the result of research, relevant to answering the questions set in the section of Research questions. The framework was created both before and after the collecting of the empirical results. Theory research A, aimed to create a general understanding and theory research B, to pinpoint the specific areas of interest. The choosing of these research areas was also affected by the discussions in seminar 2.

In Chapter 4 – Empirical Results findings from observations, interviews and document inspection are presented. Chapter 5 – Analysis is the result of combining the theory and the findings and discussing these. Together, the empirical findings and the analysis constituted the discussions for seminar 3.
Chapter 6 – Conclusions laid the base for the presentation held in seminar 4, furthermore the opposition and feedback received here was used to develop the thesis further before the final deadline.

2.2 Type of study & research method

A case study on the NKS project’s detail-planning office has been chosen because it would give the chance to focus, in-depth, on the communication that occurred between Sweco and AF. Further a qualitative, inductive study was made as the thesis seeks to address soft aspects such as relations, trust and confidence. Using semi-structured interviews the more abstract aspects of trust and confidence could be studied. Using document inspection and general questions an understanding for the projects setting could be formed. The combination of the deductive aspect and the understanding of the project setting granted understanding as to how the relations worked.

2.2.1 Case study

“In business studies, case study research is particularly useful when the phenomenon under investigation is difficult to study outside its natural setting and also when the concepts and variables under study are difficult to quantify.”

(Ghauri and Grönhaug, 2010, p. 114)

As Ghauri and Grönhaug mention, the case study is a tool to be used when there is difficulty in grasping and measuring the studied object. Choosing a case study came naturally because the NKS project is unique in many aspects, first and foremost because it is a project, and projects are unique, secondly because communication is difficult to quantify.

A case study can be structured in two main ways, comparative case study and single critical case study. The comparative case study is where two or more objects are studied, all in the same manner and the findings compared to each other. The more objects studied the more generalizable the results. (Buchanan and Bryman, 2009) To maintain some generalizability, Yin (2009) explains that a case can also be examined in a single critical study if there is a clear set theory and circumstances to which the theory can be applied. In that sense someone who cannot carry out more than one study can still find relevance to previous studies. However, the generalizability then depends on the similarity between the study and the theory. (Yin, 2009)

2.2.2 Research method

Buchanan and Bryman describe a research method as a means or tool to collect data. They focus on qualitative data collection but recognize that there is much controversy regarding to what extent something that is qualitative can actually collect factual data. They describe that applying a research method to an area of science grants the researcher certain means to then collect data. In their example they focus on social sciences, a generally qualitative science, where the fundamental data collection techniques are observations, asking questions or inspecting documents. (Buchanan and Bryman, 2009) These means or tools are also supported by Yin (1994) who states six different ways to collect data; collect evidence, documentation, archival records, interviews, direct observations, participant-observations and physical artefacts. Yin (1994) also urges, in
order to increase the trustworthiness, the importance of using multiple means when collecting the data. (Yin, 1994)

Since the thesis aims to understand the communication in the project design office at the NKS project, which is within the area of social science, the three, above mentioned, data collection techniques, observations, asking questions or inspecting documents are relevant.

2.2.3 Inductive study

“Through induction we draw general conclusions from our empirical observations. In this type of research the process goes from observations → findings → theory building, as findings are incorporated back into existing knowledge (literature/theories) to improve theories. In this research, thus, theory is the outcome of research.”

(Ghauri and Grönhaug, 2010, p. 15)

The research will be made based on conclusions drawn from semi-structured interviews and then studied with respect to theory gathered from articles. An inductive study allows for the findings to be analyzed at the site of study with regard to the theories that previous studies have developed.

2.2.4 Link between case study & research method

The data collection techniques go well in hand with a case study since well-founded case studies "include contextual data, stakeholder perspectives, source triangulation and multi-factorial analysis". (Buchanan and Bryman, 2009, p. xxxiv)

Generally speaking, the strong link between a case study and the data collection techniques related to social sciences lies in that, contextual data, stakeholder perspectives, and source triangulation are easily acquired through observations, questions and document inspection. Also multi-factorial analysis is only possible if several sources have been acquired in the gathering of data.

2.3 Data collection

The data collection was conducted in two ways, firstly through interviews and secondly through theory. The interviews provided the study with primary data and the theory provided the study with secondary data. Since a single critical case study was conducted, the goal was to use the data collected in the interviews and analyse it with respect to the theory. This was to be done by discussing concepts or larger theories found in the literature with the findings from the interviews. It would also allow generalizable conclusions from primary data to be drawn.

As mentioned in the section about the Work process, a theory research was conducted. This was made in two steps, A and B. Step A, mostly observations and chitchats with employees served to create an understanding of the project. This took place before the interviews were held so as to maximise the understanding and collection of data during the coming interviews.
In step B, after the interviews had been held, a deeper understanding was acquired of what areas of theory were most relevant in order to create a generalizable and still useful theoretical base for the thesis.

2.3.1 Interviews

2.3.1.1 Sampling

The chosen samples or interviewees were to a large extent handpicked and there were two reasons for this. First of all interviewees from the entire organizational hierarchy were chosen, from the top manager to the actual CAD-designer. Earlier research stated that when choosing samples, the quality of data depends on the range of samples chosen (Ochieng and Price, 2010). Because communication is a part of the entire organization it was important, in order to get the most accurate picture of the communicational situation, to interview a wide spectrum of the project’s employees. Secondly, the interviewees chosen needed to be expressive and willing to discuss thoughts they had about the communication within the NKS project. This was in order to maximize the amount of data from the eleven interviewees.

Help from one of the project managers effectively solved these two sampling issues. His knowledge about the project staff and organization provided the names of the ones to interview. The perhaps subjective view of the project manager could bias the sample selection and to counteract this every role interviewed, had one cross-reference.

The interviewees had the following roles:

- One Project Management Leader
- Two Project Managers
- Two Building Design Managers
- Two Technical Design Managers
- Two Designers

2.3.1.2 Semi-structured interview

The interviews carried out can be described as semi-structured interviews. Kvale describes that a semi-structured interview is connected to qualitative research as it allows for an openness and thematic way of posing questions. The interviewee does not produce knowledge but is rather interpreted in the way he or she forms their meaning. In essence, a semi-structured interview can be summarised as follows: (Kvale, 1996)

“*It has a sequence of themes to be covered, as well as suggested questions. Yet at the same time there is an openness to changes of sequence and forms of questions in order to follow up the answers given and the stories told by the subjects.*”

(Kvale, 1996, p. 124)

“*semistructured interview…relies on the possibility of following up unanticipated leads from the subject and of posing questions not prepared in advance.*”

(Kvale, 1996, p. 113)
2.3.1.3 Environment

The interviews were all held in small, soundproof rooms with three or four chairs and a table. They gave the feeling of a private environment and were meant to imbue trust between the interviewee and the interviewers.

2.3.1.4 Interview channels

Ten of the interviews were held at the site office through a face-to-face conversation. However, one interview was held over Skype where the interviewee was situated at a Sweco office in another city in Sweden. Still, the interviewers sat in the same place as the previous interviews, which assured soundproofing from their side.

2.3.1.5 Length

The interviews were generally a little longer than an hour and only one interview reached two hours.

2.3.1.6 Atmosphere

According to Kvale it is important to create a relaxed atmosphere where the interviewee feels safe enough to be open and explain their feelings and thoughts. To create this atmosphere, firstly the interviews were held in a room where it was clear that no one else heard what was being said. Secondly, an interview technique called funnel-shaped interview was held, which means starting with general, broad questions and continuously narrowing the questions to get to specific information. According to Kvale this technique is appropriate when posing sensitive questions that may have an emotional impact on the interviewee. (Kvale, 1996)

2.4 Criticism of the sources

The interviewees were picked from as wide a spectrum as possible in the hierarchy of the organization. Multiple interviewees from the same hierarchical position with potentially similar views on subjects were not selected. Therefore criticism can be aimed at the lack of cross-references so as to increase the occurrence of opinions stated. This leads to a further weakening of the generalizability of the studies findings and conclusion.

The sample selection is slightly biased as they were much influenced by the project manager. One could argue that with a restricted amount of sources selected, making sure to select those with most opinions and thoughts was for the better of the study outcome. However, the best way would have been to, at random, select all eleven interviewees. This is because the area studied, communication in the project office, occurs between all participants. There may also be some sense in that communication problems occur where people do not express thoughts and concerns.

2.5 Credibility

In their book, Waltz and Lenz state that credibility can be categorized into three parts, validity, reliability and generalizability. Validity implies that there is truth-value in the findings, analysis and overall reality of the data. Reliability concerns to what extent the study is trustworthy and if there is a consistency in the interviews. Generalizability can be
seen as “external validity or transferability” (Waltz et al., 2010, p. 229). Generalizability influences to what extent the study can be compared to an existing theory and if the study can be seen as adding value to the applicability of the existing theory. (Waltz et al., 2010)

A higher degree of validity will be achieved through choosing multiple sources both in theory and in interviewees. Furthermore, constructing unbiased questions for the interviews and defining concepts used in the text clearly will improve the validity. (Waltz et al., 2010)

Reliability will be achieved by consistently following the same theme and questions set out beforehand. The answers will then be gathered and analyzed in parallel. Reoccurring views and opinions will be seen as trustworthy and ‘orphan-views’ will be scrutinized, and depending on their manner and relevance to theory, they may still prove trustworthy. (Waltz et al., 2010)

To ensure generalizability, part of the questions posed will compare the interviewees’ previous experiences in similar projects. The interviewees will also be a mix of different hierarchical positions in the organization. (Waltz et al., 2010)
CHAPTER 3 – THEORETICAL FRAMEWORK

The definitions and concepts described in this chapter aim to explain the terminology that is specific and relevant to the understanding of coming theory and analyses. Depending on how thorough the understanding of the terms need be for later purpose, the more elaborate the description under each of coming subjects will be.

3.1 The construction industry

3.1.1 The construction process

The construction process is not always a linear process, but with some simplifications and generalizations it can be said to consist of some main phases. After a project is initiated, a feasibility study is carried out. This serves to evaluate whether the project will be conducted or not - if it will be a ‘go’ or ‘no-go’. (Gould and Joyce, 2009)

If the project is a ‘go’ the design-phase is started. This phase is notably different from the other phases because of the large degree of information-flow and handling of documents. The most active participants in the design phase are the architects and the engineers, where the architects are typically part of the projects initiating and lead the design. The engineers join in progressively and create the detailed, technical design. During this phase the construction documents, drawings and other specifications are prepared so that they can be used in the procurement of a contractor and the estimation of materials. The winning contractor of the procurement then uses the drawings and documents created in the design-phase as they construct the building or infrastructure project during the succeeding construction-phase. The completed structure will then be handed over to the client who will operate it. (Gould and Joyce, 2009)

In reality however, the process consists of more stages, has more of an iterative appearance and a continuous overlapping between the phases. (Gould and Joyce, 2009)

3.1.2 Public Private Partnership

To finance large public infrastructure; such as hospitals, power plants, roads and bridges, a public sector authority can enter a partnership with one or more private-sector companies. The private actor funds and operates the asset in exchange for a rent, usage fee or toll, which is collected during a specified period of time. A Public Private Partnership (PPP) is both a project delivery method and a type of contract to transfer risk from the private actor to the public. (Gould and Joyce, 2009)

To carry out PPP procurement a so-called Special Purpose Vehicle (SPV) is typically formed by a private consortium to plan, build, maintain and operate the asset. The SPV usually consists of a contractor, a facility management or maintenance company and one or several project investors. It is the SPV that signs the contract with the government and is also responsible for delivering the project.
A hospital building is a common example of a PPP project where a SPV, put together by private actors, finances and constructs the building and leases it back to a hospital authority. The private actor then continues to act as landlord for several years after the completion of assembling the building and then provides all kinds of operation and maintenance, except for medical services. The hospital authority provides the medical services.

An incentive to proceed with PPP procurement is the fact that the government do not lock their funds and can carry out more projects in parallel. Furthermore PPP projects are renowned to keep large and complex projects within the budget and designated time. (PWC, 2012)

PPP projects, which tend to be of a larger size, are often executed with overlapping phases. Due to their size it is favorable to start the construction phase of one part when the design of this one part is done, but before the design for the whole project is done. (Gould and Joyce, 2009)

3.1.3 Mega-projects

There are mixed opinions regarding how large a mega-project actually is. Below follow descriptive and numerical explanations from different authors within the subject.

“…large-scale government investments in physical capital facilities—mega-projects, we label them—to revitalize cities and stimulate their economic growth.”

(Altshuler and Luberoff, 2003, p. 2)

The same authors also define a mega-project as projects that cost more than USD 250 million with the inflation rate of 2002 (Altshuler and Luberoff, 2003). Calculated with an inflation calculator, using annual inflation rate of 2,43% between 2002-2012, today the value would be approximately USD 320 million. (Dollartimes, 2012)

In an article by Seung Heon et al., mega-projects in Korea are “typically defined as project that is over US$ 1 billion with more than five years in durations.” (Seung Heon et al., 2009, p. 243) Simply calculated with an inflation calculator, using annual inflation rate of 2,39% between 2009-2012, todays worth would be approximately USD 1,1 billion. (Dollartimes, 2012)

Adding an aspect to this, Bruzelius et al. state that, a mega-project should have a considerable life expectancy, in their case the projects need to stand more than 50 years. (Bruzelius et al., 2002)

3.2 Communication

The field of communication is extensive and it includes theories suitable for different types of studies. The type of communication discussed here will focus on supporting qualitative studies. There are areas within communication, which regard the mathematical and physics aspect of communication, however, such areas are not part of the study and will therefore be excluded.

Dainty et al. describe communication as a link between people where information flows. He uses the word information to not try to define, but rather encapsulate the vast spectra
of activities that can take place when communicating. Further, Dainty et al. list five different aspects that together constitute the science of communication. Firstly it is fundamentally a flow of information; secondly it aims to work as a tool to aid interpretation; thirdly it is a skill governed by social ability; fourthly it is the foundation to building interpersonal relations; fifthly it is a necessity when exchanging information within a multi-faceted group. (Dainty et al., 2006)

Without diving into each aspect specifically one can conclude that communication controls how one person or entity receives information from another. (Dainty et al., 2006)

### 3.2.1 Project success factors

In the article *The success of international development projects, trust and communication: an African perspective* the authors Diallo and Thuillier attempt to point out the success factors and success criteria of projects. They state that team performance, which is an implicit part of the project success function, is problematic to summarize. However they attempt to summarize variables defining it as: descriptive factors, support factors and more abstract factors. The descriptive factors could be for example team structure, organization or diversity. Support factors could be competencies and communication. Finally more abstract factors are concepts such as cooperation, team members’ commitment and empowerment.

### 3.2.2 Effective communication

As could be understood, communication dictates most of the interaction between humans and therefore its use in business is a widely discussed subject. Dainty et al. address this point, “the business world has begun to shift towards what is now described as a ‘knowledge-based-economy’” (Dainty et al., 2006, p. 7). Further encouraging this through stating that the spread of service-based-business has caught up with manufacturing-based-business. The real life example drawn is that many construction firms have today gone from supplying multi-faceted labor such as different skilled carpenters to instead supplying project management knowledge.

Other authors support the idea that there lies a change in future activity for organizations:

> "Future competition will be managerial competition, and the focus of competition among organizations will be effective communications among the members of the organization and with external organizations."

(Tai et al., 2009, p. 137)

While the above states that there is an expected change in how future communication efficiency will develop on a macro level, Dainty et al. argue that the same changes are expected to protrude on a micro level. They state that further division and outsourcing of projects leads to the need of an effective and communication-intense interaction. (Dainty et al., 2006)

Much research has been made on effective communication and some conclude that effective communication may be the biggest factor in a project’s success and failure. The
Project Management Institute, PMI, states, with a project manager as an example, that effective communication can be achieved only if the project manager is aware of the communication styles of others. These can include cultural issues, relationships, personalities and the overall context of the situation. The author also presses the point that, with effective communication, although expressing oneself is vital, listening is just as important. (Project Management Institute., 2008)

Dainty et al describe how many authors, writing about how to manage people, have discussed important principles of how to communicate effectively with the workforce. Two of the more important statements are about how to motivate employees and to understand the needs of the workforce:

"Motivating employees - the degree to which an individual is motivated to work effectively for their organisation is dependent upon the responsibility they have and the scope for achievement afforded by their role. Feelings in this regard will depend upon the quality of communications from senior managers within their organisation."

Understanding the needs of the workforce - for organisations to be able to respond effectively to the needs of their employees, it is vital that they develop an efficient channel of communication. This two-way channel must allow for feedback from the workforce on organisational policy in a way that encourages an open and honest dialogue between employees at all levels and the top-level managers of the organisation."

(Dainty et al., 2006, p. 6)

3.2.3 Project communication

As a project has a defined time period it can often create stressful situations, hence project participants often call for intense and creative communication. It is known that a person or entity primarily chooses the most efficient channel or means for communication, for example often the telephone or, if a number of people are involved, a meeting. (Wikforss, 2006)

Within project-based work Johannessen and Olsen point out the fundamental communication processes as being the exchange of information, developing mutual understanding, coordinating activities, influencing and socializing. (Johannessen and Olsen, 2011)

The construction project restricts the otherwise vast science of communication to regard information exchange in two levels, firstly the formal exchange of for example documents and secondly the informal problem-solving interaction. (Wikforss, 2006)

3.2.4 Informal communication

Informal communication can be succinctly described as the information exchange between sender and receiver through channels such as face-to-face, meetings, telephone, email and text messages. Unlike formal communication the informal does not necessarily follow authoritarian lines. (Dainty et al., 2006)
Dainty et al. refer to informal communication as an important piece in the puzzle to enable project success. Looking at an organizational chart, which in itself is a formal communication tool, informal communication can be identified as the communication channels and paths that emerge naturally, see Figure 1. These natural paths should however not be seen as wholly uncontrolled, instead as semi-controlled paths, manifested to let the project participants achieve their mandate in an efficient manner. They also argue that informal communication enables projects to be completed without major delay. (Dainty et al., 2006)

![Figure 1: Formal and informal communication routes in a project. (Dainty et al., 2006)](image)

### 3.2.5 Formal communication

Formal is that which is communicated according to rules or structures erected in forehand. In the literature regarding formal communication these rules and preconceived ideas are the effect of “procurement strategies and contractual forms” (Dainty et al., 2006, p. 33). Dainty et al. state that formal communication patterns are imposed on the project team and are pre-designed rather than evolved. In the essay, formal communication is regarded as information that follows the organizational hierarchy or instructions set in a control document such as a communication strategy. (Dainty et al., 2006)

Dainty et al. refer to several authors who together agree that formal communication systems such as organizational charts often are inaccurate, out-dated (Hage et al., 1971 in, Dainty et al., 2006) and usually reflect an over-optimistic expectation on communication and relationships within the workforce (Dalton, 1987 in, Dainty et al., 2006). On the same point, Maurer states that it is impossible to, in advance, construct an organizational structure that will be dynamic enough to cope with the changes that take place along a projects lifetime, this is especially true in projects that are complex. (Maurer, 1992 in, Dainty et al., 2006)

Wikforss describes how formal IT-systems are used in situations to aid problems with bureaucracy but often only contribute to a general chaos. Such situations, where the formal channels do not suffice or lack the ability to be integrated with a destined need, the informal channels develop and serve as bridges, covering problematic communication gaps. (Wikforss, 2006) However, in combination with expectations in contracts, there needs to be formal and specifically stated tools and paths for
communication. Construction project do not succeed through participants simply being stubborn and in a good mood. (Ottoson, 2009)

3.2.6 Tools for communication

Project office, face-to-face communication, videoconference systems, project planning documents, meetings, project portal, email, telephone and smartphone are all regarded as tools or channels to communicate information.

3.2.6.1 Project office

Stryker and Santoro describe how, today, the project management team’s most difficult and crucial tasks is to facilitate communication in the project team. They concur with other authors that face-to-face communication is the most effective problem-solving communication medium and that, especially in R&D (research and development) projects, the project managers’ objective should be to facilitate this communication form. (Stryker and Santoro, 2012)

However, they continue with explaining that it is not sufficient to simply gather the project team in an open work-space office and expect face-to-face communication to arise. They describe the need of combining an open workspace with a well thought through strategy as to how the communication should arise. (Stryker and Santoro, 2012)

To put a number on the importance of the physical office, Stryker and Santoro state that the top 500 most fortunate companies in the world spend in average 25 percent of their assets on office space. This is the second largest spending that these companies have, after employee costs and benefits. (Stryker and Santoro, 2012)

They state that workspace proximity, proximity to shared spaces and workstation openness and visibility, all affect the face-to-face communication. (Stryker and Santoro, 2012)

“The probability of F2F communication between two people is inversely related to the distance separating them.”

(Stryker and Santoro, 2012, p. 52)

In order to facilitate face-to-face communication, the proximity to other team members is, through studies, proven to be optimal when the distance between members is about 10m. However, an optimal proximity of 10m does not guarantee that face-to-face communication will occur as other things such as team-membership play a huge role. (Stryker and Santoro, 2012)

Stryker and Santoro discuss, in their research, that earlier studies on openness or visibility in an office leads to an increase of communication within the entire office. Also, these studies confirm that people sitting adjacent to main corridors of movement through the office or public spaces, communicate more than those distant from these areas. (Stryker and Santoro, 2012)

They continue to describe that public spaces can become so called ‘centres of gravity’ with the effect of facilitating formal and informal communication. However, they stress that these public spaces should be planned when inserted, placing them at places that are
central to the office’s physical layout. An informal ‘centre of gravity’ or gathering point could for example be a coffee room. A formal gathering point could be meeting rooms. Other rooms that can facilitate the communication are for example the printing room, toilet or kitchen. (Stryker and Santoro, 2012)

3.2.6.2 Face-to-face communication

In a study made by Gorse et al. the authors interview several architects and engineers. They examine what communication methods these professions prefer and conclude that both architects and engineers believe that face-to-face communication is the most effective way to communicate. (Gorse et al., 1999)

They describe face-to-face communication to include meta-communication; communication about communication. They describe this with an example: If a person who is trying to communicate something sees that the receiver, through facial expressions, misunderstands the message, the person who is describing is, immediately and succinctly, able explain himself or herself. (Gorse et al., 1999)

Through their study, the interviewees showed that the key to solving an increasingly difficult problem was to have a face-to-face meeting with relevant participants. (Gorse et al., 1999)

Furthermore the study showed that informal communication forms were preferred compared to informal ones. In their study, many of the interviewees attested to the fact that problems were more often solved under informal circumstances. However, an example in the study stated that there had been legal disputes in one project, which required formal, face-to-face meetings, in order for the parties to solve it. (Gorse et al., 1999)

One issue described with face-to-face communication was that at times, the type of issue made it so that the affected parties did not want to meet face-to-face. The problems manner was of such character and sensitivity to the participants, that they would rather choose other ways to solve their disputes. (Gorse et al., 1999)

3.2.6.3 Face-to-face substitute – videoconferencing tools

Dainty et al. describe how projects that have physically non-present members, such as teams that are situated at other locations, today have the potential to communicate efficiently. They state that videoconference tools enable audio and visual communication with simple, built in, picture or model sharing programs. (Dainty et al., 2006)

Still, the authors Gorse et al. state that videoconference tools, whilst bridging a gap, long sought, in long distance project communication, only partially draw from the strengths of pure face-to-face communication. The videoconference tools support facial expressions, voice and document presentation, which constitute a great part of the face-to-face communication, but they are still not thought to be as effective as the physical meeting. (Gorse et al., 1999)

Today Skype, through products developed by technology companies, offers rather well functioning and affordable videoconferencing services. For example, a device with built in camera and microphone that plugs in to a television through a HD port. This device, developed by Tely Labs called the Tely HD, is meant to function as a meeting tool
compared to earlier, more restricted, web-cam devices. In a review made by PCWorld, a media technology magazine, the reviewer, Arar, walks through the usage of the Tely HD listing features such as high-resolution screen, picture sharing and docking for SM-cards, which are cards used in most digital cameras today. (Arar, 2012)

Another, smaller sized videoconferencing tool, which is free if the user has a web-cam, is also offered by Skype. On top of the actual functions that are possible with Tely HD, this single service Skype also lets you share screens. This shows the persons you are talking to your own screen, and vice versa, whilst you are talking to them. (Skype, 2012)

3.2.6.4 Project planning documents

A part of structuring a project lies in producing documents that describe in detail and on paper the how, what and why of organizational relationships. These documents can generally be gathered under the term communication strategy where each document elaborates on information regarding formal or informal linkages between individuals and communication paths. Dainty et al. highlight, with the help of other literature sources, that although there is an overabundance of problematic examples due to the neglecting of using such critical documents, projects seem to underuse the documentation. Two sorts of documents that are especially emphasized are those that describe the organizational linkage also called 'organigram' and those that describe the social relations as viewed by the employees also called 'formaligram', 'informaligram' or 'sociogram'. Dainty et al. also sheds light on the importance of there being an understanding from all project participants regarding the information that these documents seek to portray. The documents should be stored and available on site and maintained as they change continuously. (Dainty et al., 2006)

However, whilst Dainty et al. discuss how organizational charts can be used as tools in project management, improving it and creating an organizational transparency, they also mention the backside of this planning. According to literature cited by Dainty et al., the organizational chart often explains how managers would want the communication to occur, but in reality the charts are unsuccessful in capturing the actual routes used when communicating. (Dainty et al., 2006)

3.2.6.5 Meetings

Dainty et al. describe meetings as tools to distribute specific information to a small group, for example a group of managers. Given that the organization is hierarchical, these managers in their turn distribute the information to their subordinates. This trickle-down nature of information-distribution, from the top out to the poles of the organization, is particularly effective and useful in projects. This is because the members of construction projects often are scattered. (Dainty et al., 2006)

In his article *First Aid for Meetings*, Hawkins describes how meetings often can be a fundamental piece in company and project communication. He states that meetings often occur with too many participants and that the ideal number of participants, when trying to generate ideas, is 5-7 but no more than 10. He further states that the people who should be invited are those that can best help solve the problem, not those that, for political or hierarchical reasons, should be invited. It is instead better to inform these people in another meeting. (Hawkins, 1997)
The author continues to describe that there should be a facilitator present, someone who is not the senior leader or head manager, but who still steers the meeting. This person should keep the group focused by not letting it stray off from the topics in the agenda, stay topic-neutral and try to not influence either side in the discussions and finally create an air of seriousness combined with humor.

To stay focused in meetings is another problem that Hawkins discusses. He states three ways to increase the focus during meetings. The first way is to use stand-up meetings, the second way to plan meetings just before lunch or at the end of the day and the third way is to use group note taking. Stand-up meetings help most people not to become drowsy and meetings before lunch or at the end of the day use the fact that people may be hungry, something that makes them more focused, as an advantage. Taking notes as a group helps keep people focused and also enables the most urgent and important notes to be summarized and sent out after the meeting.

3.2.6.6 Email & the project portal

Email and project portal are two internet-based tools the have, during the past years rapidly been taken into use in the construction industry. This is primarily due to the fact that they can spread vast amounts of information with high speed and efficiency. (Dainty et al., 2006)

In particular, the usage of email and project portal is to aid the exchanging of documents. Document exchange plays the largest role in the exchange of information with high-detail, such as drawings and specific requests or orders. The introduction and implementation of this technology has however not been so timely. As of 2006, experts questioned the use of project platforms as a means of exchanging documents because the use of such programs seemed to waste more time than they granted. Wikforss states that ever since the 70’s and 80’s, when the construction industry first saw potential in communication-aiding software, there has been a negative trend compared to what was expected. Many professionals will confirm that tools such as computerized modeling software and project platform software have not sufficed in situations when they have been expected to. However, within recent years there have been investments in national and international standardization programs, which may suggest that formal IT-communication-tools are on the verge of becoming more efficient and time saving. (Wikforss, 2006)

In one of the projects, Sockenplans subway station, Wikforss describes the conflict between intended use and actual use of communication tools. The author accounts for how the initial plan in the project was to distribute documents through a project portal. However, as the project began, many of the documents were instead sent via email, as it was the most effective means for doing so. This effectively undermined the project management teams intended use of the project portal. Wikforss describes the fact that there needs to be an early and distinct implementation of the portal where, if necessary, rigid rules need to be set in order to sway file sharing in emails to file sharing through the project portal. (Wikforss, 2006)

Regarding project portals, in an article written by Miller, the discussion is how to manage to make a project portal compelling to the users. The answer, argues Miller’s interviewees, is that one must build the portal around the users’ work and processes. If the portal solution you provide them with is not compelling, if it does not enhance their process and working ability, they will not use it. (Miller, 2003)
The interviewees in Miller’s article describe how they have noticed many companies using project portals to create virtual workspace for geographically distant team members. This has been successful as long as the portal, as mention above, is compelling to the users. Different programs and functions that have been added on create the possibility to have online team building. Such functions are phone-directories, chats and virtual team rooms. (Miller, 2003)

In an article based on a study made on the use of emails in an engineering design project, Wasiak et al. conclude that engineers tend to inform, manage and facilitate rather than solve problems via emails. It was found that engineers would rather use face-to-face communication to solve problems. (Wasiak et al., 2011)

3.2.6.7 Telephone & smartphone

Mobile telephones are known to have radically changed the way in which people are available for communication. It is a means to communicate whilst on the move or in the midst of work activity. (Dainty et al., 2006)

Smartphones are currently widely spread and integrate not only screen sharing and voice communication but also support video conversations and videoconferences. The only requirement for such a service is, with more advanced use, a fee and a strong Internet connection, something that is a standard feature in most office buildings. Smartphones also act as a portable email and Internet devices.

3.2.7 Long distance project communication

In Diallo and Thuilliers article they refer to the term ‘electronically mediated teams’. They state that adding an electronically mediated team to a project means adding participants with dissimilar needs to those on site. It is therefore not the same as expanding a site office to house a larger, on site project team. (Diallo and Thuillier, 2005)

3.2.8 Communication in mega-projects

In the literature regarding project success, also referred to as critical success factors or CSF’s, one often reoccurring factors is the communication. In some mega-projects, where decisions need to be managed through long-distance communication, problems arise due to the communications diminished ability to exchange the full spectra of information. That is why one of the reasons for poor project completion in mega-projects is that the control remains local, i.e. within the project, while the decisions that affect the development of the project are taken at another level, by other institutions and social systems not present in the actual project. (Diallo and Thuillier, 2005)

3.2.9 The importance of communication

Many prominent authors on the subject of communication give different but concurring views on the importance of the area.

In Communication in construction: Theory and practice, Dainty et al. expresses the importance of communication as being the “lifeblood of any system of human interaction” and without it there can be no elaborate activity. (Dainty et al., 2006, p. 3)
Winch begins his book with arguing that the principal problem with construction projects is that of project management and more specifically the managing of information. (Winch, 2010, p. 3)

In their article, Johannessen and Olsen refer to how the importance of communication can be downplayed and that the only time this view would be remotely just is if the project is “limited in its rate of change and complexity”. They argue that some authors in the subject of project failures overlook communication, treating it instrumentally and taking it for granted. (Johannessen and Olsen, 2011, p. 31)

Some authors and professionals do not recognize communication as an explicit factor in project failure (Assaf and Al-Hejji, 2006) and instead blame factors such as inadequate leadership, external factors and changing objectives that fail projects (Engwall, 2002, Johannessen and Olsen, 2011). However, Johannessen and Olsen mean that these factors implicitly hold traces of communication and overseeing the subject leads to a neglecting of communications importance. (Johannessen and Olsen, 2011)

Furthermore, Johannessen and Olsen refer to a study made by Norwegian oil company StatoilHydro where the company highlighted the most reoccurring problems in their projects. The result, which came from over 1600 gathered reports, was topped, in order, by the following 5 areas: communication, human resources, scope, integration and procurement. Time, cost and quality were areas that were ranked lower. (Johannessen and Olsen, 2011)

3.2.10 Communication in complex projects

Johannessen and Olsen argue that, with an increase in the rate of change as well as an increase in complexity, there comes a different social need. As reference, a less complex project or organization can be seen as requiring coordination of the areas cost, quality and time. Coordinating less complex projects with low rate of change is not the same as doing such in a project with high complexity and high rate of change. In a more complex project it is no longer sufficient to coordinate through solely cost, quality and time. (Johannessen and Olsen, 2011)

The authors propose a logical correlation; when projects grow larger they also grow more complex. The projects are transformed from a cost-, quality- and time-manageable, into what they describe as a social system, increasing the importance of communication in order to handle coming, unforeseen issues. (Johannessen and Olsen, 2011)

They say that part of creating a social system, which is needed in order to withstand the increased difficulties associated with a larger project, lies in defining several, specific communication capabilities. These capabilities are defined as:

“…the unique (distinctive) competence pertaining to an organization or a project, which distinguish the project or the organization from other projects or organizations, and constitute therefore a critical competitive advantage, because they bind together and integrate social systems to an organic whole.” (Johannessen and Olsen, 2011, p.33)

The authors divide communication capabilities into economic/technical communication, management communication, social communication and cultural communication.
They consider economic/technical communication to be the here-and-now situations that deal with technical and economical questions that arise, continuously coordinating problems that face the project in its meandering process. It can be considered as an “error control feedback system” (Beer, 1981 in , Johannessen and Olsen, 2011, p. 34), which implies a process that ends with an understanding and knowledge creation of what went wrong. (Johannessen and Olsen, 2011)

Management communication is related to the here-and-now management, continuously communicating the different problems and outcomes found. It relates to succeeding in distributing problems to the relevant departments, for example distributing specific technical problems to a relevant department. The safer, more efficient and more structured way this information can be communicated the more successful the management communication is. The management communication can be seen as dealing with the detail level of activities and processes. (Johannessen and Olsen, 2011)

The cultural communication is explained as the communication related to the future, something that is needed to manage change. A functioning, well-balanced and stable cultural communication will play the main, underlying role, when a project continues to develop and eventually faces unexpected events. The authors stress the point that cultural communication is a catalyst in the knowledge management and innovation of projects. They add to this that cultural communication has been de-emphasized in previous literature and point at the prioritization of economical/technical communication and management communication. (Johannessen and Olsen, 2011)

Finally, the social communication is closely linked to the management communication only that it is above the management communication. It deals, not with the detail level of activities and processes, but the part-whole relation. It serves as a tool to coordinate between the different capabilities and seeks to balance economical/technical communication and management communication with cultural communication. In the article the authors state that social communication concerns “…stability and change in order to promote dynamism, creativity and innovation.” (Johannessen and Olsen, 2011, p. 34)

3.2.11 To communicate a vision

Christenson and Walker, authors of the article Understanding the Role of “Vision” in Project Success, try to develop the definition of vision. They cite The New Oxford Dictionary of English, which declares it is “the ability to think about or plan the future with imagination or wisdom”. (Christenson and Walker, 2004, p. 40, in, Oxford, 2001, p. 2066)

In order to create a more useful and understandable definition of vision Christenson and Walker refer to Kotter. Kotter firstly alludes vision to sight and that it helps develop a sense of direction. Secondly the author describes vision to be something more than a method where problems are inserted and solutions are extracted. Finally, that a successful vision will not only, help to develop a sense of direction and extract solutions from problems, but will do so with committed purpose and enthusiasm. (Kotter, 1996, in, Christenson and Walker, 2004)

Dainty et al. introduce their view of communicating a vision by saying that an effective leader clearly communicates a vision to give employees a meaning with their work and keep them inspired. (Dainty et al., 2006)
Dainty et al. mention that it can be problematic to communicate a vision, especially in mega-projects or companies, where there is a large organization (Dainty et al., 2006). Weick stresses the importance of a vision in such situations. The author reasons that systems of sense making, for example a vision, are important when segregation due to specialization or decentralization of teams or people occur. The reason for this is that segregation leads to differentiation of processes when conducting an activity. (Weick, 2001)

Dainty et al. concur that vision plays a crucial role to the project management team. They state that it is in fact one of the project management teams’ roles to create a project vision based on the organizational vision. The team should then efficiently communicate this vision and direct the project teams’ efforts towards this vision-goal. This implies that communicating a project vision is important for the organizations success as it makes the relation between organization and project more natural to the employees. One could see it as if the organization makes a vision-imprint in the industry with each project it executes. (Dainty et al., 2006)

Christenson and Walker state that most challenging for the project management team is perhaps to direct and lead the team members who are physically absent from the project office. This is because, especially physically absent teams and people, differ in their motivations, priorities and agendas, and therefore do not always cohere with the objectives of the project. (Christenson and Walker, 2004)

### 3.2.11.1 Implementing a vision

Prominent project management commentators Briner et al. talk of the importance of a vision and what questions can be asked when founding one.

“The most significant success factor for project teams is that they have a common and shared idea of what difference they are trying to make as a result of the project. Such a vision can be built up by exploring questions with stakeholders and project team members, such as:

- How will this project make a difference to the organisation [sic]?
- How would we know that this project has been highly successful?
- What in our wildest dreams would you like this project to achieve?”

(Briner et al., 1996, p. 89)
CHAPTER 4 – EMPERICAL RESULTS

Chapter four will describe the empirical results, the interview findings, according to the different topics, which have been brought up during the interviews. The aim is to highlight similarities and dissimilarities from what the interviewees have described.

4.1 Case - NKS

To meet a need of a new, modernized and highly specialized hospital in the growing city of Stockholm, the Stockholm County Council (SLL) decided to replace the current Karolinska University Hospital in Solna. This decision was taken in 2008 and it was decided to be realized through a Public-Private-Partnership (PPP) procurement. This hospital will be called New Karolinska University Hospital, NKS, and will be situated besides the existing Karolinska University Hospital, in the northern part of Stockholm, see Figure 2.

Figure 2 - Aerial photo of the position of NKS in Stockholm (Stockholm-County-Council, 2012b)

The NKS project is the first PPP project of its kind to be initiated in Sweden and the largest of its kind in Europe (Wenström, E., 2010). As it is the first PPP project of its kind in Sweden it has attracted many international stakeholders, especially from the United Kingdom. Its estimated final cost has been presented to the public and is approximately SEK 14.5 billion (Stockholm-County-Council, 2012b). This classifies the NKS project as a mega-project and the size in square meters corresponds to 25 of the skyscrapers at Hötorget in Stockholm.

Despite the high cost, the project will be an important socio-economical investment. The alternative to constructing this new, top modern facility would mean many years remodeling and renovations of the existing Karolinska University Hospital. This would cost as much but would give a less functional hospital and to a larger extent disrupt the on-going care activities. (ÅF, 2012c)
The cost of the NKS project is SEK 14,5 billion (Stockholm-County-Council, 2012b). Converted into USD, this is about USD 2 billion using the exchange rate of SEK 10 = USD 1,43. (Forex, 2012) According to Dollartimes, Altshuler and Luberoff this defines the NKS as a mega-project.

Currently, the project is in a parallel phase of planning and construction. The NKS project is further divided into six project phases. Phase 3 of the project, the first hospital building being completed, is expected to be finished and ready to treat its first patient in December 2012. See Figure 3. (Stockholm-County-Council, 2007)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Building</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Technical Building</td>
<td>May 2014</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Garage Car Park</td>
<td>December 2012</td>
</tr>
<tr>
<td>Phase 3</td>
<td>Hospital Part 1</td>
<td>Start of operations 2016</td>
</tr>
<tr>
<td>Phase 4</td>
<td>Hospital Part 2</td>
<td>October 2017</td>
</tr>
<tr>
<td>Phase 5</td>
<td>Research Laboratory</td>
<td>September 2016</td>
</tr>
<tr>
<td>Phase 6</td>
<td>Patient Hotel and Garage</td>
<td>July 2016</td>
</tr>
</tbody>
</table>

Figure 3 - The different phases of the NKS project (Stockholm-County-Council, 2011)
4.1.1 SLL’s Mission & vision

SLL’s motto is *patient first*. This refers to “that anything that is created, built and organized within the framework of the project always puts the patient first, and is based on the patient's perspective.” (Stockholm-County-Council, 2012a)

4.1.2 Project Goals

Further SLL have set some general goals to be achieved:

“1. Health care, research and education shall be integrated to such an extent that they efficiently support the development and dissemination of knowledge for the treatment of severely ill and injured patients.

2. The project shall create attractive and humane environments with high architectural values, both within and around the hospital.

3. The health care processes shall be made more efficient, and the utilization of resources shall be optimized.

4. The project shall work as much as possible with generally applicable solutions permitting continuous operational development.

5. The hospital and its activities shall be allotted a prioritized and clear role in the city.

6. The project shall work on all levels from a sustainability perspective.”

(Stockholm-County-Council, 2012a)
4.1.3 Contractual relationships

SLL, the initiators of the NKS, procured the project as a Public-Private-Partnership. The contract was sold and is now owned by the investment-controlling company Swedish Hospital Partners, SHP. They have in their turn procured the contract with Skanska who have created a special purpose vehicle, an SPV, called Skanska Health Care, SHC, to complete the project to a sum of SEK 14,5 billion. In the contract SHC have agreed to take the full responsibility for designing, building, maintaining and operating the asset during a period of 30 years. To be able to fulfill this in the most satisfying way, SHC, have procured the FM-services, facility management, with Coor Service Management, and the architectural design with White Tengbom Team, a consortium formed especially for the NKS project. Sweco and ÅF have through a joint venture taken on the role as designers of the mechanics, electronics and plumbing (MEP). For structural design Skanska Teknik are responsible. Several other consultants have been and will be involved in the project. Skanska and multiple sub-contractors will carry out the production. See Figure 4.

Figure 4 - Contractual relations within the NKS project
4.1.4 Project office

In Figure 5 all actors inside the pink marking sits at the NKS project office. The project office is situated close to the construction site and has a view over it. The project office is divided into two levels and Swedish Hospital Partners, Coor Service Management, Skanska Health Care (SHC), White Tengbom Team, Sweco and ÅF, Skanska Teknik and some other consultants have a varying number of seats at the office. Each individual sits together with its team and shares office space with his or her own colleagues from his or her company. There are no barriers, like locked doors, to isolate the individuals from each other. Instead everyone can walk around and talk to each other freely. See Figure 5 below to view the map of the project office.

4.1.5 Sweco & ÅF

Sweco is an international technical consultant company with engineers, architects and environmental experts based in 12 different countries and with assignments in over 80 countries. The number of employees has reached 7600 and Sweco’s headquarter is situated in Stockholm, Sweden. (Sweco, 2012a)

4.1.5.1 Sweco and ÅF’s assignment

Sweco and ÅF have formed a joint venture where they each own 50 percent of the contract. The assignment that they have taken on is mainly within the field of mechanics, electronics and plumbing, further referred to as MEP.
ÅF is a technical consultant company with focus on energy and the environment, investments in infrastructure and projects for industry (ÅF, 2012d). ÅF has about 4500 employees with their base in Europe, their headquarters in Stockholm and clients all over the world. (ÅF, 2012a)

Their role has been to assist the client through consultation and construction planning work. They have worked with developing program documentation, system documentation and the detail design for the tendering documents. Further they have taken on the task to create the construction drawings, the operation and maintenance instructions, cost calculations and to participate during the construction. (ÅF, 2012b)

The project has extremely high energy and environmental requirements. These are hard to achieve in a hospital where the environment requires zones with different cleanliness classes, temperature requirements and air circulations. There are also significant expectations set on the reliability and redundancy on backup systems such as electricity, heat, cooling and medical systems. To meet these expectations, Sweco and ÅF applied two different classification goals, LEED Gold and Miljöklassad byggnad. (Sweco, 2012b)

4.1.5.2 Sweco & ÅF’s Vision

Sweco’s vision is to become Europe’s most respected knowledge-based company within technology, environment and architecture. (Sweco, 2012c)

ÅF’s vision is to be the best partner for the best customers. (ÅF, 2012e)

4.1.5.2 Roles in the project

In the project there are several roles. In order to get, an as holistic view as possible, eleven people from the organization, with as spread roles as possible, have been interviewed. See Figure 6.

4.2 Interview findings

Empirical data was gathered through eleven interviews with employees from Sweco and ÅF at the cooperative project office. This data was, as mentioned in the method chapter, acquired through semi-structured interviews.

The main areas of discussion were the project characteristics of NKS, the different communication tools and channels being used and how a vision can contribute to a project.
4.2.1 Project characteristics of NKS

When asked about how they perceived the NKS project, with a united opinion, all interviewees described the character of the project as unique. First and foremost it was the size of the project that differed from that of other projects. Although this consensus, that size is the most prominent feature, there were mixed opinions regarding what effects the size of the project had resulted in.

General issues included constant time shortage, heavy workload, high stress level, constant changes, unclear or no decisions, planning and building in parallel, difficulties to interpret roles in a matrix organization, large costs connected to changes and a high level of in-house expertise. Each of these general effects have in different ways been found to influence the communication.

4.2.1.1 Competitors cooperate

When the interviewees along with the other NKS project members from Sweco and ÅF return to their respective company headquarters, they are told to be as competitive as possible on the market and to be aware of their main competitor; ÅF/Sweco. Therefore the interviewees were asked how they perceived the cooperation between Sweco and ÅF in the NKS project. No one suggested anything else than that it had always been a smooth and well functioning teamwork. Most interviewees recollect that when the tender had begun there had been slight suspicion in the air from both parties. But after approximately six months this suspicion had completely faded away. At the point of time when the interviews were held, approximately one and a half year after the collaboration had started, the project members, according to the interviewees, did almost not know which company their colleagues belonged to; they were all a part of the NKS family.

One thing that a designer pointed out to be a cultural difference between Sweco and ÅF was how they composed emails. To this interviewee people at Sweco tended to write much longer and dissolute emails, while people from ÅF were more concise in their way of writing. She assumed that this could be a danger if, the way emails were read, differed between the two companies as well. She had once been told by her manager that:

“If you send me something that you want me to answer; write it in the first sentence. Else, I will not read it.”

Hence, she had gotten used to short emails and was neither good at nor patient enough to read through long emails in detail. She continued to outline that she had noticed how the emails from her colleagues, from both organizations, had begun to look more and more alike in both style and length. Even in this particular phenomenon the NKS family had started to build their own organizational culture.
4.2.1.2 Project Management

From Sweco and ÅF there are five project managers in the NKS project and all are experienced in the field of management. In the summer of 2011 a decision to make one of them the project management leader was taken. The four others were given specific responsibility areas to manage; phase manager, technical manager, economical manager (controller) and support manager, see Figure 7.

![Diagram of project management team]

The phase manager is responsible for coordinating the Building Design Managers, who in their turn are responsible for the MEP design in a specific phase. The technical manager leads the Technical Design Leaders, who are responsible to make the technical solutions united between the different phases. The economical manager is responsible to control the time and cost of the project. The support manager is responsible for the in-house support team who provide functions that help facilitate all usage of IT-tools.

The roles of the managers are mainly concerned with communicating and informing subordinate managers and employees. This implies a lot of time in meetings and an overload of emails, which gives them little time to implement and perform more executive tasks.

4.2.1.3 Communication issues when planning & building in parallel

Because of the way the NKS project is procured the planning phase of the project overlaps with the construction phase. This gives the employees working in the planning phase a couple of new conditions to work with. The interviewees, especially the ones working as designers, have described a returning issue of the contractors either passing through the Sweco/ÅF office to get a face-to-face chit-chat or that the contractor calls the designer on the phone with the intention to get an answer on an urgent question. These chit-chats and questions occur continuously and may concern a change due to practical issues, a request of a drawing not yet published or information unclear to the construction workers. As the designer is an expert within the areas concerning many of these questions or requests, he or she often helps the contractor. However, the designer does not have the mandate to do so since it might not be an adopted decision or established in a construction document.
Especially in the NKS project; where the construction site is situated close to the project design office, the construction managers have the opportunity to pass by, and where there is a long cooperation between the different actors, making the actors keen on building good relationships – does it become a problem for the designer to reject a partner.

An experienced design consultant often understands the issues occurring for the contractor and in most cases the consultant can solve the issues instantly. However, the consultant has promised the client to do a specified amount of work for a specified number of hours. If changes occur this will take extra time for the consultant, which is fine, as long as the client is willing to pay for those extra hours needed. If he is not, the consultant will not be able to charge for those hours.

The dilemma for the design manager is then to control his designers to not take on the up-front confrontations with the construction managers, but instead pass the question on to the design manager him- or herself. The reason why this is hard to control is the fact that the designers know that his or her help would benefit the project as a whole and it thus becomes illogical, for the designers, to say no.

From the interviewees it has been understood that it is harder to say no to someone if he or she is asked to do something face-to-face and, especially so, if it is someone that they have a relationship with.

4.2.1.4 Abandoning communication

A few of the interviewees mentioned that conflicts of opinion or conflicts due to interpersonal relations could deal blows to the communication, temporarily maiming it, leading to glitches in the otherwise problem solving nature of the project.

The result became abandonment of the communication. However, there was a general consent that this could not continue for long as team cooperation and mutual project success was the main goal and because communication played a vital role in this.

4.2.1.5 To communicate with different opinions

Many interviewees agreed that there was an overabundance of opinions, more so than in other projects. There were several ideas as to why this was but many agreed that generally, since the project is so large and deals with extremely complex functions, it has employed some of the most prominent consultants in the industry. These people were all competent and had experience of how successful solutions, within different fields, might look. Many of these employees were likewise unfamiliar to work in an organization with as many managers and leaders as in the NKS project. Usually these employees were used to have a helicopter perspective over the project, which was not the case here.

According to some of the interviewees this state of many opinions had for instance led to disagreements regarding technical solutions as well as managerial styles.

4.2.1.6 Communication in a matrix organization

Some of the interviewees mentioned the, sometimes conflicting, roles of the Building Design Managers (BDM) and the Technical Design Managers (TDL). They explained a
situation where a decision given by a BDM did not correlate to what the TDL communicated.

The ones mentioning these issues were however united in the belief that these roles were necessary and should remain as they were.

Some other interviewees did not find these roles conflicting at all. Instead they thought it was clear which decisions and questions were to be treated by each role.

4.2.1.7 Communicatory circumvention

In the question asked, the hypothetical example set was if the interviewee had known of managers being by-passed by those around him or her. Here, by-passed referred to information that did not pass through the manager although it had effect on change of the managers’ areas of responsibility.

A number of interviewees agreed on the fact that this had occurred and that it was due to the sheer size of the project. They explained that when questions had been posed, the person asking them was faced with long, unexpected time delay due to time shortage of the manager.

One interviewee, working with designs and who had been one to finally circumvent a manager, stated that at first the time delay for the answer to return was no problem. There is usually a buffer between the time when the question is posed and the time when it is needed. However, as larger and more complex questions emerged and it took longer for replies to return, other paths of communication grew natural. These paths served as more direct channels of communication.

Due to the constant time pressure that many interviewees emphasized that they were put under, some communicational issues had occurred. They meant that from the beginning they were faced with a time lag, which they never were able to catch up with. This resulted in a generally higher stress level and poor patience, which resulted in a need to get quicker answers. In turn, this meant a higher degree of communicatory circumvention.

Two interviewees with managerial positions described that direct communication paths was for the better. Efficient communication was the result and goal of the ingenious combination of client, contractor, designer, architect and consultant under the same roof. However, as the new direct paths grew more resourceful so did the complexity of the questions posed through them. This left the managers with a problem, the effectiveness of communication was a good thing but the fact that the managers were omitted from knowing of these questions and their answers was a problem. The managers described that they have a responsibility to decide over questions that affect the budget or change the design plan.

4.2.1.8 Long distance communication

A consistent opinion among the project team members was the importance to bridge the communication between the project office and their colleagues working remotely. To serve this need the interviewees demanded a videoconference tool. They felt a huge difference in having a videoconference compared to a phone conference, as in the videoconference one could see the other persons’ faces and expressions. It was the
intention of the project management team, at the start of the project, to install such a tool but this was delayed. As time went by the value of this investment was questioned and as of today there is still no videoconference tool. Many of the interviewees pointed out that the result of this was an unnecessary risk for communication misinterpretation with remote offices.

A manager working with a lot of remote offices was often engaged in long distance communication. His office was also located outside the project office and the Stockholm area. Once a week he visited the project office and was then fully booked with meetings from morning to afternoon. During these days, outside of the meetings, he had a chance to chitchat with many of the on-site project members. According to him, this gathering encouraged and led to building of relationships. He had also tried to implement the use of the, Internet based, video call tool Skype, but usually met reluctance from those that were asked. He was convinced that Skype and the possibility to see each other’s facial expressions contributed to a closer relationship and a better end result.

An opinion about the difficulty to engage co-workers over long distances was expressed. A manager, of such long distance co-workers, believed that this was due to commitment issues. Since the co-workers had other projects that were located physically closer to their home office, they tended to prioritize these projects. These, more local projects, were usually initiated by a local and/or known client, which the remote employee would personally benefit from seeing to.

### 4.2.2 Communication tools & communication channels

When the interviewees were asked to what extent they use tools and channels such as telephone, email, meetings and face-to-face communication to deliver information, the general consent was that “it depends”. If time was of the essence many chose to use the telephone or face-to-face discussions depending on the persons availability. In other cases, where mass-communication was necessary, meetings or emails were the key method.

Below, each one of these tools and channels will be considered through their use and misuse as portrayed by the interviewees. The perception of the project office is also included in this part.

#### 4.2.2.1 The project office

The project office has the shape of an L, see Figure 8. At the part closest to the entrance the project management team is situated along with most BDMs and TDLs (middle managers). The underlying thought of this positioning is to enable all team members to pass and interact with the management team. This positioning is also essential as it allows, the many visitors who come to visit the project managers, immediate contact.
The upper segment of the L seen in Figure 8, is to the project team known as the gut. Here the designers are seated, separated from the management team. To some of the interviewees, this was the reason to a sometimes split team which gave them a feeling of them and us.

In the gut the designers have their desks closely set, which makes it very crowded. The interviewed designers expressed dissatisfaction since they often felt disturbed and distracted by the dense surroundings.

Since many of the interviewees, representing a large part of the Sweco/ÅF venture, rarely returned to the employing organization, they also saw the NKS project office as their permanent office. This made some of them feel that they lacked some requirements and standards compared to what they were used to at their home office. For instance some of them lacked an office manager. Other lacked a human resource manager. They also lacked more tangible things such as more meeting rooms, more toilets and resting rooms. Further, observations have confirmed this lack of meeting rooms as the lunchroom often has served as a meeting room.

The interviewees were asked about what they think of the project office. Several interviewees stated that they did not like it at all due to above-mentioned factors. Further discussing their perception of the project office it was understood that all of the interviewees actually regarded the project office as a necessity. The interviewees pointed at the absolute need of face-to-face communication.

**4.2.2.2 Face-to-face**

All interviewees were positive to the proximity of fellow workers. On the same account but to a lesser extent were they positive to the random discussions and small talk that was the result of this nearness.
However, all agreed that face-to-face talk was value adding to the product, although it at times led to swaying away from the task at hand. Some said that they would become disturbed at times due to small talk but summarized their opinions with two things. Firstly that it was usually possible to find vacant places where it was quiet, even if the lack of vacant rooms was another concern, and secondly that they thought there were positive, subconscious effects from listening to these discussions, which they themselves weren’t always actually a part of. One interviewee stated that most of what was said in the discussions, held at random in the project office, were work related and therefore added potential understanding to those tapping in to the discussion.

The positive outcomes of the face-to-face opportunity due to the proximity of the work colleagues were many according to the interviewees. These implicit, soft outcomes were not easily explained but one manager described how she thought the face-to-face communication added value. First of all the reason to why face-to-face communication is more effective than other channels, even meetings, is that it creates a relation which within time translates into trust and understanding. These, she meant, were keys to problem solving and long-term project success. Work-ways and procedures can be taught to those who are new but the important and more challenging part is to build motivation and effective teamwork into the workforce. This is done most efficiently through face-to-face interaction and building of relationships.

4.2.2.3 Face-to-face substitutes – videoconference tools

One interviewee with a managerial position, located at a remote office, expressed his concerns with the absence of videoconferencing tools:

“It is amazing that there is no videoconference equipment, when half of the work force is located outside the project office.”

He thought it was beneficial to not only hear from the tone of voice but to see from facial expressions, what was implied by the person he was talking to.

The interviewee said that there initially had been an intention to get videoconference equipment. Due to an ordinary videoconference equipment’s high cost, this had not happened and with time the investment had become less profitable and felt unnecessary.

The same interviewee mentioned that he sometimes used Skype to have video meetings and that he would be open to do so more often. However, he did not feel that his colleagues were as open and willing to try this program. This, he considered, was a result of ignorance and/or unaccustomedness.

4.2.2.4 The project description manual

Before holding the interviews, the project description manual was read at the recommendation of a project manager. He said that there was only a short chapter with the topic communication but that the document in itself was a description of how to communicate. There was no trace of a specific communication plan within it, but instead fragments of routines regarding communication as well as professional descriptions.

All interviewees had read the manual at least once or the parts in it related to them, and some had also continued using it as a source of information regarding the professional descriptions. The descriptions would aid them in understanding each employee’s area of
responsibility. When the idea of having a communication plan or strategy included in such a manual was addressed, most interviewees recognized that there was little or no trace of guidance in how to communicate in the NKS project organization.

Within the manual there were an abundance of charts, graphically illustrating the project organizations members and their hierarchical positions. The charts were meant to fill the function of expressing the relationships and planned communication routes within the project. The interviewees felt that they got help from looking at the organizational chart within the document but some of them mentioned that substitutes, such as personal contacts for getting the information, were used.

A problem stated by the interviewees was the abundance of other documents that the project description manual pointed at. This made it almost impossible for the project members to even cover the documents specifically important to them. Further, the interviewees said that there sometimes were duplicates of the same documents with differing information.

4.2.2.5 Meetings

Interviewees, those with managerial positions, considered meetings to be a necessary tool, one that they could not do without. The reason for being that it was the ultimate forum for discussions, mass communication and where misunderstandings, due to technical issues, were minimized.

However, the same people had opinions regarding the backside of meetings. All said that meetings could be very ineffective due to the diversity and abundance of specialists often represented. This problem of many opinions would occur in meetings and end in lengthy, time consuming discussions.

Another problem that was mentioned was the tendency of some meeting participants to not pay attention. A problem was that some participants would fidget with their telephones creating remoteness between them and the discussion.

When observing and chitchatting with the project managers it became apparent that some meetings held were generally ineffective due to the composition of meeting participants. One manager argued that meetings could be very effective if only used and managed in the right way. She had suggestions that there should be a reform in how meetings are held. This involved being very strict about who should attend the meeting, having active meetings where people would stand rather than sit and following a strict agenda. From her point of view people tended to become a bit too relaxed when they sat in meetings and discussions sometimes tended to grow longer than necessary.

She had also found that taking general notes, during meetings, added further value. When taking general notes she would jot down the main decisions made during the meeting, so that she directly after the meeting, could send the notes via email to her affected subordinates. In that way her group members would be aware of the main decisions as soon as possible, even before the meeting protocol arrived.

On Wednesdays a weekly meeting with all members of the Sweco/ÅF cooperative organization at NKS was held. During this meeting the project manager of the MEP design team typically informed about general on-going processes. Occasionally guests were invited to inform about general project activities, such as new BIM regulations or to
introduce new employees. Interviewees have stated that these meetings tend to become focused on project management issues. Rather, the interviewees request a more interactive meeting where general information about their team process could be described for their colleagues.

One interviewee reflected on the absence, which he felt, of a meeting where he would be able to word his progress to fellow designers and his manager. To meet this absence, he suggested a short, weekly occurring meeting. To him, these would serve a need to be noticed and to get an opportunity to share and reflect on the issues he faced.

4.2.2.6 Project portal

MEP-zone; the project portal, which Sweco and ÅF have chosen to work with in their assignment to do the MEP design at NKS, was implemented from the very start of the project. MEP-zone is a software based on Microsoft Share Point, which has the ability to be changed and developed for specific projects and further modified while it is used.

The interviewees were asked how they perceive the project portal MEP-zone and to what extent they used it. Most of them thought it had been to a great advantage to have this portal in the project. Some others even described that MEP-zone was the best project portal they had ever worked with. The reason for this, they said, was probably due to the opportunity to make changes in layout and add or remove features lacking or being redundant.

However, some interviewed project members expressed more reluctance towards using the project portal than others. The ones who were not fully satisfied with MEP-zone thought that it was rather complicated to find the files that they were looking for, but they also admitted that they after a while had figured out how to use it. Hence, it more seemed to be a question of how easily taught one was.

One interviewee described how the IT-group continuously received input from those using the tool. Each section or project phase of the hospital had its own forum in MEP-zone, and could therefore be developed in a flexible manner.

Another reason for the good perception of the project portal, an interviewee explained, was that resources were set-aside for a project-dedicated IT-group. Due to this managerial decision it became possible to answer needs, which were not thought of at the start of the project. The interviewee mentioned that an in-house project-specific IT-group is a special benefit, which is only possible to finance in large-scale projects.

In an interview a project member confirmed that the decision to erect an IT-group capable of committing time to develop the project portal, along with other IT issues, had been long discussed. The main concern was if the benefit of having a group of employees fully committed to continuously adapt and develop the project portal would outweigh the cost of this labor. In retrospect this interviewee believed that the benefits far outweighed the costs and added that the tool had lent itself to functions that he could not have imagined. He further described that roots to his own questioning of a conventional project portal was the size of the project. Its complexity would most likely result in unknown changes to the project; hence flexibility would be a dire function.

One interviewee pointed at the difficulty to implement such a tool as MEP-zone. This interviewee agreed that the implementation of MEP-zone had been a success, but that
there still were many features, which could have been to a great advantage for the project, which were not used at all or to the desired extent.

4.2.2.7 Email

The main area for discussion when it came to emails was that people in the project received vast amounts of emails each day. Ranging from 50 to 100 emails per day, depending on the person’s role, the reading and understanding of each email was a problem for all.

The good thing, many said, was that emails do not need to be answered immediately; rather they should be seen as pending questions. However, many said that they needed to spend at least an hour or two each day working through their emails as to not get overwhelmed.

Although many of the interviewees felt that they received too many emails, they still valued the possibility to have a conversation saved in written format. They equally valued; the opportunity to return to the dialogue to recall the discussion being held and the obvious benefit of having a decision saved in written word.

A restriction on not being allowed to send files via email was set in the project. Instead the interviewees described how they had to copy a link from MEP-zone into the email when sharing a file with a colleague. The reason for this was to minimize the risk for document leakage and to control that only one file version existed.

The project members all felt the same way about receiving emails addressed to them. The expectation would be that receiver was supposed to both read and answer the email. However, regarding courtesy copies of emails (CC’ed emails), the interviewees had different expectations and perceptions on how to handle these. One of the interviewees described how she never reads or responds to the emails that were CC’ed to her. Whereas others always read these CC’ed emails and responded only when they regarded issues concerning them. Another interviewee saw little difference between CC’ed and directly addressed emails. He stated that all emails with issues that he could contribute to he would interfere with. The differences in understanding to what extent one is obliged to respond in a CC’ed contra directly received email brings an air of uncertainty to it. The interviewees said that if the understanding of a message’s coding is not equal between a sender and receiver then it is very likely that misinterpretation occurs.

Due to the long distance communication between different offices, the interviewees described that problem solving over email was an occurring phenomenon. Usually they tried to solve problems over email but when a problem could not be solved and resulted in emails being sent back and forth, the interviewees would instead turn to use a telephone.

4.2.2.8 Telephone & smartphone

None of the interviewees used the telephone much, but in pressing situations when immediate contact was necessary, most would use the telephone. However, those that worked closely with people in other regions of Sweden used the telephone in order to bridge gaps left by the email communication. They emphasized how one phone call could solve multiple email replies regarding a certain issue.
Some said that when they work closely with people in different locations they use screen-sharing tools, as a complement to a phone call, to connect and see spatial problems in for example CAD-models. The possibility to use this tool was crucial to effective work for many of the designers.

4.2.3 Vision

When the interviewees were asked what they perceived to be the main issues in the NKS project a reoccurring topic was the lack of a clear vision. They expressed how they were not aware of a well-defined mutual vision. One of them said:

“The only thing we know for sure is that we are going to build a hospital. But what the end product from us is supposed to be is not clear. I believe that we are supposed to deliver a BIM model of the hospital, but others believe that we are supposed to deliver a real hospital. However, in the contract it says that we are supposed to deliver both.”

By having a clear mutual vision, this employee stated, it would be easier to communicate what to do and how to do it.

Trying to dig deeper into the absence of a vision an answer was:

“Well, they say it is supposed to be ’a hospital in world class’ but that’s pretty vague, isn’t it?”

To another manager this absence of a clear vision was described to open up for free interpretations, which to her had lead to more inefficiency.

“This takes an incredible amount of time. At first you thought ‘no, no, a mutual vision is not that important’ but as the project progressed this has lead to larger effects and overworking.”

At two different occasions there have been tries to create a mutual vision for the MEP team. However, a joint decision has been hard to agree upon and no specific, design related, vision has been determined. A manager felt that they would have needed more time to discuss and create a good vision. A great lack of time was the excuse for not fully accomplishing this task.

One of the interviewees, who, amongst others things, had a role to introduce new project members at the project office, pushed on the fact that a vision should not only be communicated orally but also visually in pictures and models. She suggested that a vision should be written down, printed and posted on one of the office walls. Further, she would like to see a model of the planned NKS buildings, pictures of what it will look like, both in- and outside, and a projection screen in the lunchroom with a slideshow showing what the project looks like as well as how the progress is going.

However, not all members of the project are situated at the NKS project office and the interviewees stressed the need of also implementing a vision through the web-based portal.

An interviewee pointed at the importance of having a vision in such a project as NKS, since there are many participants having detailed, technical tasks. Their ability to see the end product and the commitment of their job will lack if no higher purpose is set. A strong mutual vision would help the ones only working with detailed, one-sided tasks, who elsewise would not get the holistic view of the project.
CHAPTER 5 – ANALYSIS, DISCUSSION & SUGGESTIONS FOR IMPROVEMENTS

In chapter five the theoretical framework will be connected and compared with the empirical results. This aims to give the reader a credible and generalizable analysis of the material presented in chapter three and four. Furthermore this chapter will contain discussions and suggestions for further improvement of the communication.

5.1 Project characteristics

The character of the NKS project is unique according to interviewees. They state that the feature of being a mega-project affects several other project-related aspects. The authors, referenced to in the theory chapter, describe that working in a mega-project will contain a certain issues and conditions. Some of those issues and conditions will be further analysed and discussed in this chapter.

5.1.1 Project management

In the literature Johannessen and Olsen suggest that the communication in a project should be divided into different areas and aspects. They stress that this is especially important when dealing with mega-projects and it therefore applies on the NKS-project. At the NKS-project the top managers, all dealing with managerial communication, have been given specific roles to handle and communicate within. This means that one of them are more focused on communicating technical matters as another is more focused on communicating economical matters.

The importance of this kind of division of roles also aligns with the interviewed project managers’ experience of more efficient and smooth working communication flow after the reorganization, where their roles became clearly stated.

5.1.2 Abandoning communication

Amongst the interviewees, one manager described that he had experienced how the communication could cease to function because of conflicts. In the theory face-to-face communication is shown to be the most effective and best way to solve problems. But when the problem handles sensitive issues that can develop into a conflict, face-to-face communication is the first type of communication to be abandoned by the involved parties.

5.1.3 Communicatory circumvention

In the case study the interviewees have stated how they purposely take other communication paths than the ones shown in the organization chart. This action is usually taken by the designer in order to get an answer on a posed question. Interviewed managers feel positively about this initiative since they encourage efficiency. However, as the managers also mentioned, they have a responsibility to oversee changes in cost or the
time plan of the project. According to Dainty et al. informal communication is, from the manager's perspective, a necessity to be able to coordinate efficiently. The authors mention that semi-controlled paths, or communication paths that evolve naturally and under supervision of the manager, are the key for the manager's ability to effectively manifest his or her mandate. The mandate would in reality be referring to the combination of two things, firstly, the manager’s responsibility to take part of cost and time changing discussions and secondly for the manager to solve the problems facing his team in the most effective manner.

5.2 Communication tools & channels

5.2.1 The project office

Through having a project office in the NKS project the necessity that Stryker and Santoro describe, to facilitate communication in the project team, is partly achieved. A platform for face-to-face communication is effectively created through this office, which the interviewees agreed to be a necessary meeting point.

On the one hand the positioning of the project management team, by the project office entrance, creates several natural encounters between the employees and the project management team; arriving to the office, going for lunch, taking a coffee and leaving at night. On the other hand this positioning divides the project team into two parts. It also strengthens the project managers’ and the designers’ preconceptions about each others’ hierarchical and cultural differences.

As Stryker and Santoro say, the ones sitting furthest away from each other tend to communicate less. They also state that sitting close to public spaces, such as coffee rooms, meeting rooms and toilets, will promote natural communication. It is therefore suitable to place the ones, who require communication the most, close to those public spaces. This is the placement-strategy of the management team in the NKS project.

Although Stryker and Santoro suggest that sitting close to each other generates more communication and is for the better, the interviewees in the NKS project have expressed dissatisfaction about how close they sit to each other. Their concerns regarded the high disturbance resulting from a too compact workstation-placement. In accordance with the interviewees Stryker and Santoro do not propose that simply sitting next to each other is the key for successful communication.

Due to few meeting rooms the lunchroom serves as a meeting room. According to Stryker and Santoro it is important to have separate venues for formal and informal meetings. When the lunchroom is turned into a meeting room, the otherwise informal atmosphere is obstructed and a formal status is given the room. It is therefore questionable whether, mixing formal communication with informal venues, is a good idea.

5.2.1.1 Suggestions

A suggestion for a more effective project office layout would be to have a more uniform office space with the centre of gravity in the middle. This to further enable the project members’ encounters in public spaces but also to let them have their desks closer connected to each other.
It would be preferable to have a sufficient amount of each type of communication room, meaning enough meeting rooms as well as other more informal places to interact.

5.2.2 Face-to-face substitutes

Mega-projects will without exception lead to long distance communication. These kinds of projects tend to be too large to be held in one city or even one country. Therefore extra attention needs to be put on the communication in mega-projects. According to Dainty et al. communication with remote teams is problematic, but could still be made effective through the use of videoconference tools, which enable audio and visual communication.

Gorse et al. say that seeing one and other when communicating is important due to meta-communication. This allows the sender of a message to see the facial reactions of the receiver. Hence, the sender is given the opportunity to quickly correct misunderstandings of the receiver, which the sender is able to perceive. This connects to what an interviewee with a managerial position, located at a remote office, expressed in his concerns with the absence of videoconferencing tools. He wanted to be able to see the face of the person he was talking to even though he did not think this was a full substitute to a physical face-to-face meeting. In concurrence with this, Gorce et al. point out the short comings of videoconferencing and that it needs to be combined with physical meetings for the communication to reach its full potential. The same interviewee as above agreed on this and stated the importance of the meetings he had a chance to attend at the project office once a week.

Diallo and Thuilliers reflect on the importance of paying attention to electronically mediated teams and their dissimilar needs. In the NKS project, a necessity to enable the communication with the remote project members seems to be a videoconference tool or an acceptance of using Skype.

5.2.2.1 Suggestions

As the interviewee at the remote office suggested; a cheap alternative to installing ordinary videoconference equipment could be to implement the usage of Skype. Skype could, according to Arar at PCWorld, also function as a ordinary videoconference tool by adding on the Tely HD tool on a television. A way to implement this could be to promote and visualize this for all employees at the Wednesday meeting.

5.2.3 The project description manual

The interviewees mentioned that they found no particular guidance on how to communicate in the project description manual, as no communication plan was included. They thought that the project description manual mostly referred to other, more specific documentation. However, the organization charts filled an important function for many of the interviewees. They described how they could use this when asking themselves how to contact other employees for a specific question and that it actually filled a particular communication-aiding function.

Dainty et al. argue that it is important to keep the manual and its charts up to date. They also bring up the fact that, in projects with high complexity, it is especially true that organizational charts and predesigned communication routes fail to fulfill their functions.
This is because it is nearly impossible to keep them up to date and, in advance, foresee the dynamic communication paths that will arise.

Dainty et al. also argue that formal communication, in the form of such predesigned communication paths, often reflects how the communication should work based on regulations in contracts and norms but fail to show the actual, efficient paths used. However, Ottoson argues that although formal, planned, communication can seem stiff and less dynamic, it is necessary because success will not come from being stubborn and in a good mood. The authors finally conclude that there is indeed a need for the formal, planned communication paths and the natural, efficient, informal paths. In the NKS project some informal communication routes, which were not supported in organization charts, had developed. As the Ottoson and Dainty et al. say, this is for the better and leads more efficient communication. However, the existing organization charts are important in order to keep control of important decisions, which need to be communicated.

Dainty et al. also stress that documents like communication strategies tend to be under used, which is not specifically the case in the NKS project. Here, the employees attempt to read these documents, but there are too many and it is difficult to grasp them all.

5.2.4 Meetings

As PMI states; a key to effective communication is that project members both get the opportunity to express their opinions and the chance to listen to other members’ opinions. This is confirmed in the reflections of a project designer, who felt the need of short, reoccurring meetings where he would be able to share and reflect on the issues he faced.

The interviewees confirmed that some meetings could become ineffective because of poor composition of meeting attendants. As a consultant, it is always important that time spent on activities, such as meetings, generates solutions. If these meetings fail to solve problems, due to poor participant composition, it is generally a waste of time and an expense that the consultant must bear himself. It is therefore important, as Hawkins states, that the person responsible for the meeting either, states that no one but those directly able to help solve an issue are invited, or, refers to such rules which could be included in the communication plan.

As Hawkins states, it is important to have a person who acts as a facilitator in the meetings, and that this person stays neutral in the discussions, constantly trying to guide and enrich the discussions. However, although such a person would most likely contribute to further increasing the efficiency of the meetings, it would mean an additional resource and potentially added cost to the project. Still, it can be of value to the people who often act as chairmen of meetings to remember what a facilitator should aim to accomplish. After observing the way meetings were held, it was clear that there was a lack of such a moderator. To have this role present would most likely improve the structure and outcome of the meetings. In the NKS project everyone is overloaded with work and already have to participate in too many meetings, which is why it can be hard to facilitate this role.

As one of the interviewees stated, meetings tended to be held in an ordinary manner, referring to sitting meetings with people occasionally fidgeting with their smartphones or simply not paying attention to the problems being discussed. She felt the need to change
the way that the meetings were held and her ideas very much aligned with what Hawkins describes as ways to create more focus in meetings. The interviewee thought that meetings, where the participants would stand up, could get people more involved and focused. Furthermore, as she had experienced herself, taking personal notes kept her focused and made it possible to quickly send out the most important minutes of meeting to her team members.

5.2.4.1 Suggestions

Every BDM or TDL should be advised to hold short, reoccurring meetings so all their team members will get the opportunity to be heard and listened to. This, since it has shown to be a fundamental need, to most project participants. Furthermore, to have a facilitator at meetings is a strong recommendation. This in order to keep better control of the meetings held and to make them more efficient. If it is not possible to set aside an individual to act as a facilitator during meetings, a suggestion could be to have a rotating role where one of the meeting participants enacts the facilitator.

A suggestion to control the meeting composition would be to gather all managers and let them discuss which employees they would like to see on which meetings. A list of meeting participants, to each meeting, could then be created. Other attendants who might be suitable to include in specific meetings should be included as an exception when needed. The chairman of each meeting should also be responsible to check that all ordinary meeting participants actually are needed at each meeting. In this way only the relevant people will be participating at the meetings, saving invaluable time.

Another suggestion to get more focused and efficient meetings would be to delegate the responsibility of meeting documentation. This is a way to get more active project participants.

5.2.5 Project portal

According to Dainty et al. the usage of a project portal can be efficiency enhancing when transferring information. In the reference project, when working with the project files, the project portal has been of vital importance.

An IT system can as well, according to Wikforss, contribute to a general chaos when it tries to aid bureaucratic problems. The author regards this is a problem derived from a vague implementation at the start of the project. At the department working with MEP issues in the NKS project, the employees find their project portal to be well functioning. This concurs with Wikforss’s discussion and confirms the importance of an early and strict implementation.

The interviewees confirm that the use of the project portal has been invaluable; saving time and enabling detailed information exchange, no matter where an employee is located. Many interviewees also stated that they were very pleased with the way that the project platform worked compared to what their experiences had been in earlier projects. This united opinion about a successful use of a project portal, contradicts to the difficult implementation described by Wikforss. According to Wikforss, members of earlier projects have rejected these kinds of tools due to an experience of not being content with the tool's features. This sudden change of opinion regarding project portals may be connected to the way in which the IT-team works with it at the NKS project;
continuously upgrading the project portal to aid the current issues and constantly support new needs.

Wikforss describes that when there has been a difficulty with implementing the use of a project portal, project members tend to use their email to share files since they find this to be more effective. In the studied case, where a set restriction prohibited the file sharing via email, this phenomenon was regulated.

5.2.5.1 Suggestions

An early implementation, of a project portal, is a strong recommendation when using such a tool in a project. This implementation will affect whether the project portal will be used in an effective way or not.

To be able to update a project portal has shown to be of great advantage in a project with a high rate of change. In these kinds of projects the flexibility of a project portal is necessary to meet the needs occurring along the project lifetime.

To have restrictions or rules to control the communication flow can sometimes be a good solution. When the individual effort for each employee, at an initial stage, seems to be less when communicating in the wrong way a rule could help to control the communication path. To make this employee understand the advantage of choosing a more complicated way of communication, a rule could be useful. This, more complicated way of communicating, is in the long run more beneficial for the project and should therefore be pushed upon.

5.2.6 Email & telephone

In this project the problem solving cannot be restricted to face-to-face interaction. Due to the long distance between some employees, it is necessary to discuss issues and solve problems through emails. Although Wasiak et al. state that employees prefer to solve problems through face-to-face meetings, this cannot always be achieved in large projects. Another reason to use email is its possibility to recall previous conversations.

Dainty et al. state that the mobile telephone radically has changed the way that people are available for communication. To connect remote offices to each other and the project office, the interviewees underlined the central role of communication over telephone. However, some project participants did not use their mobile telephones to a large extent. They posed that most communication was made through email or meetings and that mobile phones only became a complement when they were on the move. For example, one manager recounted how she mainly used her smartphone on the bus on her way to and from work.

Although many of the interviewees mentioned that the project was a very stressful one, they somewhat contradict what the theory states about stressful situations and the communication channels this leads to. The theory states that when a person is stressed, he or she tends to use the telephone to a larger extent. However, this has not been the case in the NKS project. Here, the telephone is not so frequently used, which relates back to that the managers and designers want to have information black on white, in a written format, and therefore are more comfortable with using email and meetings where protocols are written.
5.3 Vision

Christenson and Walker discuss why it is important to have a vision and state that it will create committed purpose and enthusiasm to an employee’s work. Also, Danty et al. points out the importance of clearly communicating a vision to give employees a meaning with their work and to keep them inspired. Further, Briner et al. say that the most significant success factor for project teams is a shared idea of what difference they are trying to make as a result of the project. As an interviewee mentions some employees, working with detailed design, may not have the ability to feel committed and able to see the reason to his or her work. To make these detailed designers, who constitute the core producing function in the project more committed, a clearly communicated vision is, according to above-mentioned researchers, of the absolute essence. Such is illustrated in Figure 9.

A problem with the vision-making of the NKS project could possibly be the split input of visions carried along from the mother organizations Sweco and ÅF, combined with Skanska Health Care’s vision: to create a hospital of world class. According to Dainty et al. a successful creation of a vision should align with, the organizational vision, which the project members belong to. This is both to get the employees accustomed to this vision and to make an organizational imprint in the project vision. In the otherwise well-functioning cooperation between Sweco and ÅF, to create a vision seems to have been problematic. That the project management team has not fully succeeded in creating a mutual vision may be due to the difficulties in combining visions from all three companies.

Dainty et al., describes that it can be problematic to communicate a vision, especially in mega-projects. However, it is increasingly important as the projects become larger and consist of more differentiated groups. The issue with implementing a good vision in the NKS project may also be due to its sheer size.
People’s motivation, priorities and agendas differ when they are physically absent from the project office, states Christenson and Walker. This aligns with a manager’s opinion about how his employees, working at remote offices, are harder to engage and get committed. According to Christenson and Walker the, creation and implementation of a vision, is especially important in such projects that include physically remote personnel.

5.3.1 Suggestions

When managing a mega-project it is advisable to create a vision and to make sure that this vision is communicated to the project. To create such a vision is complicated, and time and effort is needed to accomplish this. This is especially true when many organizational cultures are combined and expected to work towards a mutual vision.
CHAPTER 6 – CONCLUSION & FINAL REMARKS

The final chapter of this master thesis will answer the research questions posed in chapter one in a generalizable manner. This will be achieved by looking at the applicability of discussed results. Finally further research areas will be suggested.

6.1 Conclusion

When communicating in mega-projects, special requirements apply. It is in the design phase, of such a project, vital to work with a well functioning project portal. Preferably it should be possible to develop the project portal continuously as the need of the project changes.

The study has shown that some controlling regulations, in order to achieve a desirable communication flow, can be advantageous. For example this could mean the prohibition of sending files via email in order to avoid multiple versions of a certain file. In mega-project such regulations are not only advantageous but also required to keep certain communication flows under control.

Except from a well functioning project portal, other IT-tools seem to be of great importance in a mega-project. The access to videoconferencing, screen sharing and Skype video calls is important in a mega-project where a large part of the project team is spread out to different, remote offices. The possibility to see each other’s facial expressions satisfies certain fundamental needs when communicating. To be able to see such expressions leads to a deeper understanding of the message being transmitted, which in the end gives a better result.

The need for good communication tools, when contacting remote project offices, is to be able to meet one of the largest challenges in a mega-project. This challenge is to integrate the remote employees and make them fully committed to the task at hand.

In a mega-project it is found to be of importance that the organization chart is held up to date. This is because there is a need for the employees to have a directory or ‘address book’ when the number of employees in the project has surpassed a number which makes it impossible to keep track of all colleagues.

When communicating, in small projects as well as mega-projects, it is universally true that face-to-face communication is the best and most effective way to solve problems. However, it is important to understand its vulnerability when conflicts occur and to be prepared to manage those conflicts to enable a functioning communication flow.

One of the most reoccurring opinions in the studied case was the want of a vision. Even though this did not seem to be an issue, which the employees discussed during meetings or lunch breaks, it was constantly raised in the interviews. As the theory stated it is very important to have a vision; the vision is an important tool to enable engagement and commitment to the employees.
6.2 Possibilities for further research

A field that has not been as investigated to the wanted extent is how to make a communication plan for a mega-project. Many authors have entered the field of how to make a communication plan, but what special requirements such a plan would need in a mega-project has not been as investigated. Hence, this topic would be interesting to further look into.

Moreover, an interesting field to look into would be how to create a perfect project office; suitable for the specific actor, but also how to make the different actors interact in the best possible way.

As vision is of great importance in a mega-project, it would be of interest to large companies, to develop a method to create and adapt a vision for projects.
REFERENCES


PROJECT MANAGEMENT INSTITUTE. 2008. A guide to the project management body of knowledge (PMBOK® Guide), Newtown Square, Pa., Project Management Institute, Inc.


WIKFORSS, Ö. 2006. Kampen om kommunikationen: Om projektledningens informationsteknologi, Stockholm, KTH.


