



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY

---

# **Managing a megaproject as a program**

A case study from an internal  
communication perspective

*Master of Science Thesis*

*in the Programme Design and Construction Project Management*

ANTON BADMAN

VIKTOR SJÖBERG



MASTER'S THESIS E2016:094

# Managing a megaproject as a program

A case study from an internal communication perspective

*Master's Thesis in the Master's Programme Design and Construction Project Management*

ANTON BADMAN

VIKTOR SJÖBERG

Department of Technology Management and Economics

*Division of Service Management and Logistics*

CHALMERS UNIVERSITY OF TECHNOLOGY

Göteborg, Sweden 2016

Managing a megaproject as a program

A case study from an internal communication perspective

*Master's Thesis in the Master's Programme Design and Construction Project Management*

ANTON BADMAN

VIKTOR SJÖBERG

© ANTON BADMAN & VIKTOR SJÖBERG, 2016

Examensarbete E2016:094/ Institutionen för teknikens ekonomi och organisation,  
Chalmers tekniska högskola 2016

Department of Technology Management and Economics

Division of Service Management and Logistics

Chalmers University of Technology

SE-412 96 Göteborg

Sweden

Telephone: + 46 (0)31-772 1000

Managing a megaproject as a program

A case study from an internal communication perspective

*Master's thesis in Master's Programme Design and Construction Project Management*

ANTON BADMAN

VIKTOR SJÖBERG

Department of Technology Management and Economics

Division of Service Management and Logistics

Chalmers University of Technology

## SUMMARY

Megaprojects have a history associated with cost overruns and benefit shortfalls with opportunities for improvements. Today, megaprojects are becoming more common, making research on megaproject management adequate. The management of such projects is posed with an overflow of data and information and unclear communication channels. The thesis acknowledges the need for management of internal communication, which is considered an important aspect for project success, in the complex environment of construction megaprojects. This thesis studying the Hospital Mega Project (HMP), a project that due to size, complexity and interrelatedness of sub-projects are managed as a program. Program management refers to the processes of managing interrelated projects in a coordinated way in order to obtain synergetic benefits. In this thesis focus is on internal communication and information coordination benefits.

The purpose of this thesis is to increase the knowledge and understanding of the challenges with communication and coordination of information in large and complex project organisations. The thesis describes the challenges within a megaproject case to compare and suggest improvements based on program management literature.

The authors have studied relevant literature and the HMP case through an abductive research approach. Thirteen semi-structured interviews, two meeting observations and two document analysis have been carried out. Communication and megaproject literature provided general knowledge and program management literature proposed solutions to enable cross-boundary communication, creation of high-quality information from unstructured data and creation of processes and tools to simplify communication and make responsibilities clear.

The thesis showed that there are communication and information coordination challenges within large and complex projects and that program management literature contains ideas that can reduce these communication challenges (e.g. cross-functional communication and uncoordinated information). A program management office has the competence necessary to create, implement and oversee program tools and processes related to communication and information coordination. This, in turn, can unburden the program manager who can focus on analysing and using the information gathered and presented in the organisation. Last, the authors argue that the administrative staff present in the case have an important role for communication, a role that should be developed and used in the entire organisation.

Keywords: Megaprojects, program management, internal communication



Att driva ett megaprojekt som ett program

En fallstudie från ett internt kommunikationsperspektiv

*Examensarbete inom masterprogrammet Organisation och ledning i bygg- och fastighetssektorn*

ANTON BADMAN

VIKTOR SJÖBERG

Institutionen för teknikens ekonomi och organisation

Avdelningen för Service Management and Logistics

Chalmers tekniska högskola

## SAMMANFATTNING

Historiskt sett är megaprojekt förknippade med överskridna budgetar och brister i produkten som levereras och det finns således möjligheter för förbättringar. Idag blir megaprojekt allt vanligare, vilket gör forskning inom megaprojekt relevant. Projektledningen av megaprojekt ställs inför utmaningar i form av stora mängder data och information samt oklara kommunikationskanaler. Detta examensarbete poängterar behovet av internkommunikation, vilket anses vara en viktig aspekt för att lyckas med komplexa projekt. Examensarbetet studerar *Megasjukhusprojektet*, ett projekt som på grund av dess storlek, komplexitet och hur delprojekten är inbördes relaterade, drivs som ett program. Programmanagement kan ses som processerna att koordinera de relaterade projekten inom programmet för att skapa synergifördelar (bl.a. effektivare riskhantering, bättre planering av logistik och tidplan m.fl.). Detta arbete fokuserar på internkommunikation och informationskoordinering inom programorganisationer.

Syftet med arbetet är att öka kunskapen och förståelsen för utmaningar kopplade till kommunikation och informationskoordinering som finns i stora och komplexa projektorganisationer, samt att beskriva utmaningarna i en megaprojekt-fallstudie för att jämföra och föreslå förbättringar baserade på programmanagementlitteratur.

Författarna har genom ett abduktivt förhållningssätt studerat relevant litteratur parallellt med fallstudien. Tretton semistrukturerade intervjuer, två mötesobservationer och dokumentanalyser av två typer av dokument ligger till grund för denna studie. Litteratur om kommunikation och megaprojekt gav allmän kunskap och programmanagementlitteratur gav ramverket utifrån vilket förbättringar för att möjliggöra gränsöverskridande kommunikation, kvalitetssäkra information skapat av ostrukturerad data och skapandet av processer och verktyg för att förenkla kommunikationen och förtydliga ansvarsområden kunde tas fram.

Studien påvisade att det finns kommunikations- och informationskoordineringsutmaningar i stora och komplexa projekt samt att programmanagementlitteratur innehåller vissa idéer som kan minska dessa utmaningar. Ett programmanagement-office (likhet med projektstab) har kompetensen som krävs för att skapa, implementera och se över de programmanagement-verktyg och processer som är relaterade till kommunikation och informationskoordinering. Detta skulle avlasta programmanagern, som kan fokusera på att analysera och använda information som är framtagen och presenterad i organisationen. Till sist hävdar författarna att den administrativa personalen i fallstudien har en viktig roll för kommunikationen. En roll som bör utvecklas och användas i hela programorganisationen.

Nyckelord, Megaprojekt, program management, internkommunikation

## TABLE OF CONTENT

|  |             |
|--|-------------|
| <b>SUMMARY .....</b>   | <b>V</b>    |
| <b>SAMMANFATTNING.....</b>   | <b>VII</b>  |
| <b>TABLE OF CONTENT .....</b>  | <b>VIII</b> |
| <b>PREFACE .....</b>   | <b>XI</b>   |
| <b>DEFINITIONS AND ABBREVIATIONS .....</b>   | <b>XIII</b> |
| <b>1 Introduction.....</b>   | <b>1</b>    |
| 1.1 Purpose and research questions.....  | 2           |
| <b>2 Background .....</b>  | <b>3</b>    |
| 2.1 Megaproject.....   | 3           |
| 2.1.1 Different use of characteristic terminology.....   | 3           |
| 2.2 The complexity characteristic and program management .....                                 | 6           |
| <b>3 Theoretical framework.....</b>  | <b>8</b>    |
| 3.1 Communication.....   | 8           |
| 3.1.1 The importance of efficient communication .....  | 8           |
| 3.1.2 Formal communication.....  | 9           |
| 3.1.3 Informal communication.....  | 9           |
| 3.2 Program management.....  | 9           |
| 3.2.1 Two standard approaches to program management.....                                       | 10          |
| 3.2.2 Challenges with communication and information coordination in program<br>management..... | 12          |
| 3.2.3 Proposed solutions in literature to program communication challenges .....               | 14          |
| <b>4 Methodology.....</b>  | <b>18</b>   |
| 4.1 Research approach.....   | 18          |
| 4.2 Literature review .....  | 19          |
| 4.3 Unit of analysis.....  | 21          |
| 4.4 Data collection and analysis .....   | 21          |
| 4.4.1 Part 1: Pre-study.....   | 21          |
| 4.4.2 Part 2: Document study .....   | 22          |
| 4.4.3 Part 3: Observations.....  | 23          |
| 4.4.4 Part 4: Interviews.....  | 23          |
| <b>5 Description of the HMP case.....</b>  | <b>25</b>   |
| 5.1 HMP as a Megaproject.....  | 25          |
| 5.2 HMP as a program .....   | 26          |
| <b>6 Results.....</b>  | <b>28</b>   |



|          |   |           |
|----------|---|-----------|
| 6.1      | Document Analysis.....  | 28        |
| 6.1.1    | Cost object documents .....   | 28        |
| 6.1.2    | Staff cost prognosis documents.....   | 30        |
| 6.2      | Observations.....   | 32        |
| 6.3      | Interviews.....   | 32        |
| 6.3.1    | Organically constructed communication network and work structures .....   | 32        |
| 6.3.2    | Informal vs. formal communication.....  | 34        |
| 6.3.3    | Use of information and communication infrastructure.....  | 37        |
| 6.3.4    | Key information flow through the administrative unit .....  | 39        |
| 6.4      | Summary of key findings from HMP .....  | 40        |
| <b>7</b> | <b>Discussion and conclusions .....</b>   | <b>43</b> |
| 7.1      | <i>What are the challenges with internal communication in large complex programs?</i> .....                               | 43        |
| 7.1.1    | Lack of cross-functional communication.....   | 43        |
| 7.1.2    | Uncertainty and uncoordinated information.....  | 43        |
| 7.1.3    | Lack of database.....   | 43        |
| 7.1.4    | Conclusion: sub-question 1 .....  | 44        |
| 7.2      | <i>Can findings from the case be relevant for the challenges found in program management literature?</i> .....            | 44        |
| 7.2.1    | Puls meetings .....   | 44        |
| 7.2.2    | Administrative Staff as project scouts and promoters of standardisation.....  | 44        |
| 7.2.3    | Conclusion: sub-question 2 .....  | 45        |
| 7.3      | <i>How can program management address the challenges with internal communication in large and complex programs?</i> ..... | 45        |
| 7.3.1    | Database and common metrics and methods.....  | 45        |
| 7.3.2    | PrMO as coordinators of information and creators of communication processes .....   | 46        |
| 7.3.3    | Conclusion: Sub-question 3 .....  | 47        |
| 7.4      | Future research.....  | 47        |
| <b>8</b> | <b>Reflections of the process.....</b>  | <b>49</b> |
| <b>9</b> | <b>References .....</b>   | <b>50</b> |



## PREFACE

During the spring of 2016, this master thesis has been conducted full time to finalise our education in civil engineering at Chalmers University of Technology. First of all, we would like to thank our supervisor Pernilla Gluch at Chalmers that has guided us through our thesis process and always answered our questions. Second, special thanks our two supervisors at the Hospital Mega Project that made the case study possible. And third, we would like to thank all the interviewed employees and other employees that helped us at the Hospital Mega Project.

Gothenburg, June 2016

Anton Badman and Viktor Sjöberg



## DEFINITIONS AND ABBREVIATIONS

### Key definitions:

**Grapevines** – a word which describes the communication network created through informal relations between the actors in an organisation (Dainty et al., 2006).

**Information coordination** – in this thesis defined as the distribution of the same information to different stakeholders. Uncoordinated information would hence be the use by stakeholders of different versions of a document. It is an essential part of clear communication.

**Information/data** – the difference is the functionality of information which answers a question such as who, what, when, where and how. Data is gathered and through a process converted into information (Ackoff, 1989).

**KISS** – "Keep it simple, stupid", an approach to creating simple and usable tools and processes (Kendall and Rollins, 2003).

### Abbreviations:

**AS** – administrative staff making up the administrative unit.

**HMP** – The case Hospital Mega Project

**MSP** – Managing successful programs, a standard on program management by the British office of governmental commerce (Sowden, 2011).

**OGC** – The Office of Governmental Commerce, British governmental office that has developed a standard approach to managing programs

**PM** – Project Manager

**PMI** – Project Management Institute, which has developed several standards on project, program and portfolio management. If not stated, the use of PMI refers to their standard on program management (PMI, 2013c).

**PrIS** – Program information system, closely related to gathering and retrieval systems

**PrM** – Program Manager

**PrMO** – Program Management Office, referred to as support office or project support office with almost identical functions



# 1 Introduction

When construction projects become larger and more complex, they are reliant on many people's abilities to communicate in an efficient and effective manner. The communication is one of the most important foundations of a project's success (Dainty et al., 2006), and when an increasing number of people are dependent on more information to make the right decisions, the importance of communication grows further. Hence, it is essential that the communication and the flow of information are easy to understand and follow.

The largest construction projects are referred to as megaprojects. Megaprojects have a history of extensive cost and time overruns (Flyvbjerg, 2014, Van Marrewijk, 2007, Sun and Zhang, 2011, Haidar and Ellis, 2010, Giezen, 2012). Megaprojects are becoming more common (Flyvbjerg, 2014, Eriksson, 2016), and it is estimated that megaprojects currently account for more than eight percent of the total global gross domestic product (Flyvbjerg, 2014), which makes the frequent time and cost overruns a problem on a national economic level. Historically, there is a somewhat lacking research made on efficient megaproject management, but recent interest is growing (Eriksson, 2016).

Maylor et al. (2006) highlights that today, interests goes beyond single projects and project management, and that organisations now getting more interested in multi project management and program management to find solutions. A program is a temporary organisation that is built up of interrelated projects and sub-programs, and program management is described as *"a group of related projects, sub-programs, and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually"* (PMI, 2013c, p. 3). A program is made up of several projects, thus, project management is still an important part of programs. A fundamental difference between programs and projects is the number of people involved and the need for coordination between them (Pellegrinelli, 1997). It is not possible to scale up tools and methods from a project to fit a program setting since the difference is nonlinear and require its own specific tools.

Program management can be described as an approach to managing multi-projects in a coordinated way in order to reach a common goal (Aritua et al., 2009). The authors of this thesis, along with several scholars (Aritua et al., 2009, Eweje et al., 2012), argue that there is a similarity between programs and megaprojects through the characteristic of complexity, and that the program management literature can provide new inputs to the research of megaproject management and vice versa. Shehu and Akintoye (2009) argues that the construction industry needs to adopt program management due to clients' requirements and limitations with project management.

In this thesis we have studied one megaproject, managed as a program, the Hospital Mega Project (HMP). The HMP case is interesting since it is possible to study the communication in a megaproject that is managed as a program. The program is made up of three different interrelated sub-programs being carried out in parallel over a time span of more than 10 years and is still in its initial phase. The program management team that represent the client is made up of over 70 people from different backgrounds, companies, and disciplines. The program management team has various areas of expertise ranging from senior management, program managers, project managers, operations/occupation, quality managers, communication, and various experts to name a few. In addition, thousands of people are involved in the design and construction, all with a need of getting the right

information at the right time. Furthermore, due to HMPs size, the program management team has to coordinate the sub-programs construction phases in order for them not to compete for the limited labour force in the entire region. The design is carried out in parallel with the construction phase, hence, there is a great flow of information regarding a wide area of knowledge, which is essential for the entire organisation to deliver the project. This flow puts pressure on the communication and coordination of the information in the project.

HMP show many similarities with the findings in program literature, both regarding challenges and implemented functions and processes. HMP has adopted an organically structured organisation which is adaptable to the ever-changing environment of the program. They use a program management office which can be used to unburden the program manager who needs to focus on strategic management. The most interesting aspect from the case is that HMP has understood the need for an administration and has hence employed an administrative staff which works as a core communication unit in the program. The emphasis on administration is downplayed in program management literature and should not be underestimated.

This thesis uses program management literature to set a new light on megaproject management and especially to identify possibilities on how to improve internal communication in a megaproject.

## **1.1 Purpose and research questions**

The first purpose of the thesis is to contribute to the increased knowledge and understanding of the challenges with communication and coordination of information in large and complex project organisations within the construction industry.

The second purpose is to describe the communication and its challenges within the program management team of a megaproject case and to compare and suggest improvements.

The thesis has one main research question and three sub-questions. The main research questions is:

*How can a megaproject's internal communication benefit from being managed as a program?*

The three sub-questions, supporting the main question, are:

*What are the challenges with internal communication in large complex programs?*

*How can program management address the challenges with internal communication in large and complex programs?*

*Can findings from the case be relevant for the challenges found in program management literature?*



## 2 Background

---

The purpose of this chapter is to present the relevance of the literature chosen and why it was chosen for the HMP case. It gives the foundation of the literature presented later in the thesis and is presenting relevant definitions and context for the reader. Megaprojects are the context of the thesis and program management is what we study. The characteristics of megaprojects brought the authors to complexity and eventually program management which is the management of related, often large and complex, groups of projects.

---

### 2.1 Megaproject

Flyvbjerg (2014) starts his definition on megaprojects with a focus on financial aspects which is common in other literature on megaprojects. However, even though the costs of a project is a frequently used characteristic in literature, there is more to defining the characteristics of a megaproject. Hence, the original meaning of the word mega, from the Greek language, fits better as a summarizing definition of what constitutes a megaproject; namely large. However, such a broad definition is not satisfactory for the purpose of the thesis. Therefore, the chapter will go into more depth of the characteristic terminology used by scholars.

#### 2.1.1 Different use of characteristic terminology

Scholars writing on the subject of megaprojects use various defining characteristics and attributes to define megaprojects. Some scholars use one or few simple characteristics such as size or cost to define megaprojects (Giezen, 2012). However, other scholars in recent literature, such as in Flyvbjerg (2014) and Haidar and Ellis (2010), writes thoroughly about and problematizes the concept of megaprojects, and their research suggests that the concept is not as self-explanatory and implicit as first argued.

First, megaprojects are not necessarily construction projects and can e.g. be ICT systems, change programs, mergers and acquisition, aircraft development, events such as Olympic games, space programs etc. (Flyvbjerg, 2014, Esty, 2004). In the construction context the focus is often on infrastructure projects (Flyvbjerg, 2007, Van Marrewijk et al., 2008, Priemus et al., 2008, Giezen, 2012). However, it is argued that the findings in the research are applicable in other similar construction projects (Flyvbjerg, 2007, Priemus et al., 2008), such as e.g. large-scale signature architecture, dams, hospitals etc. (Flyvbjerg, 2014, Priemus et al., 2008).

Second, scholars use various characteristics of megaprojects. The various use of definitions can to some extent be explained by the theoretical approaches used by the different authors. When research is carried out on early decision making and the governance aspects of construction megaprojects, there is a focus on its political nature, impact on society and failures. The latter which has become a defining characteristic and synonymous for megaprojects (Esty, 2004, Haidar and Ellis, 2010). The various use of defining characteristics, ranging from ambiguous and interpretivist aspects to simple quantifiable data. The characteristics found in literature are summarised in table 1 & 2.

*Table 1 - The table shows the simplified characteristics of a megaproject found in literature and how the scholars define each characteristic. The simple characteristics are possible to quantify.*

| <b>Simple Characteristics</b> | Possible to quantify with basic comparable data.   |  |
|-------------------------------|--|--|
| <b>Characteristics</b>        | <b>Description</b>   | <b>Defined by source</b>   |
| Financial                     | Is referred to as costs, budget, and/or investment. Mostly measured in the currencies GBP, USD or EUR. Varies between 0.1-multiple billions, or only referred to as costly or expensive. | More than 1 billion dollars (Sun and Zhang, 2011, Bruzelius et al., 2002, Van Marrewijk et al., 2008, Payne and Turner, 1999)<br>EUR 0.5 billion (COST, 2011)<br>Large projects (100 M - several billion) (Flyvbjerg, 2007)<br>Costly (Plotch, 2015, Priemus et al., 2008)<br>Expensive (Giezen, 2012) |
| Time                          | The time characteristics refer to the time it takes to complete the building.  | Time frame for completion over 2 years (Sun and Zhang, 2011)<br>Time frame for completion over 5 years (Haidar and Ellis, 2010)  |
| Life time                     | Life time is expected life time for the mega project product.  | A lifetime of a minimum of 50 years (Sun and Zhang, 2011)  |
| Size                          | Referred to with ambiguous words such as colossal, large or captivating. Also quantified with area of the project  | Colossal in size (Priemus et al., 2008, Plotch, 2015)<br>Captivating because of the size (Priemus et al., 2008, Plotch, 2015)<br>Project area (Haidar and Ellis, 2010)   |

*Table 2 - The table shows the complex defining characteristics of a megaproject found in literature and how the scholars define each characteristic. The complex characteristics are more ambiguous and qualitative.*

| <b>Complex Characteristics</b>        | Ambiguous and interpretive in its nature. Hard to quantify with comparable data.  |   |
|---------------------------------------|---|---|
| <b>Characteristics</b>                | <b>Description</b>  | <b>Defined by source</b>  |
| Social, economic and political impact | Megaprojects have multiple impacts. They need to have either social, economic or political impact.  | Multiple social impact (Sun and Zhang, 2011)<br>Funding and mitigation packages are controversial and affect third parties (Priemus et al., 2008, Plotch, 2015)<br>Important symbols (Plotch, 2015)<br>Politically sensitive (Van Marrewijk et al., 2008)   |
| Stakeholders                          | There are multiple stakeholders involved in megaprojects. The stakeholders have their own interests which have an important effect on the project.  | Invested and/or commissioned by the government (Sun and Zhang, 2011, Van Marrewijk et al., 2008)<br>Multiple stakeholders with conflicting interests (Flyvbjerg, 2007)<br>Control issues due to identification of key stakeholders (Priemus et al., 2008)<br>Involving large number of parties (Van Marrewijk et al., 2008) |
| Complexity                            | Most often only referred to as the word complex which is defined as: "Project complexity is the property of a project which makes it difficult to understand, foresee and keep under control its overall behaviour, even when given reasonably complete information about the project system." (Vidal et al., 2011, p. 719) | Extreme complex (COST, 2011)<br>Not standardised technology (Flyvbjerg, 2007)<br>Complex (Plotch, 2015, Van Marrewijk et al., 2008)<br>Complex design and execution measured in number of parts, entities, specialisations and their interrelatedness (Haidar and Ellis, 2010)  |
| Risk and Uncertainty                  | Risk and Uncertainty are closely related to complexity. Project risk is defined as: "an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost, and quality." (PMI, 2013a, p. 310)  | Inherently risky (Flyvbjerg, 2007)<br>Risk and uncertainty of design, funding and construction (Priemus et al., 2008)<br>Uncertain (Van Marrewijk et al., 2008)   |
| Change                                | The evolutionary or organically built structure of the ever changing megaproject.   | Scope and level of ambition will change over time (Flyvbjerg, 2007)<br>Scope creep (Giezen, 2012)   |
| Performance                           | Often united by failure of project through cost overruns and/or benefit shortfalls.   | Cost overruns and/or benefit shortfalls in majority of projects (Flyvbjerg, 2007)<br>Costs are often underestimated (Priemus et al., 2008)  |

Complexity can be viewed as an important characteristics of megaprojects and sub-chapter 2.2 on complexity and program management explains the relation and how other characteristics such as size, change and uncertainty.

## 2.2 The complexity characteristic and program management

The term program can be used differently. Pellegrinelli (1997) points out that in some cases, program is used to describe large projects although this is not an accurate description. According to Eweje et al. (2012), megaprojects are programs that have combined a number of projects that is aligned with a strategic goal, into one megaproject. In most cases, program is used to describe a set of interrelated projects (Pellegrinelli, 1997), which is similar to the definition by The Project Management Institute (PMI) *“A group of related projects, sub-programs, and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually.”* (PMI, 2013c, p. 3).

The complexity characteristic can be used when describing programs. One common definition of complexity is used in Vidal et al. (2011): *“project complexity is the property of a project which makes it difficult to understand, foresee and keep under control its overall behaviour, even when given reasonably complete information about the project system.”* (Vidal et al., 2011, p. 719). This definition is also the root for the definition provided by Senescu et al. (2012) which breaks down complexity into six main characteristics. These characteristics are:

- 1) Multiplicity – the more parts a project consists of, the more complex. Includes the size characteristic of megaprojects.
- 2) Casual connections – the connections between the parts. The more connections, the more complex. The most complex projects have casual feedback loops which through a number of steps, in the end affects itself. This is related to the change characteristic of megaprojects.
- 3) Interdisciplinary – how dependent parts of the system is on other parts. In complex systems, it is not possible to remove any parts without affecting the systems overall performance. If the components of the system influences each other and their actions, the system is complex.
- 4) Openness – is it a clear boundary between the system and its environment? The more blurry boundaries, the more complex.
- 5) Synergy – the system is more complex if the parts combined has a synergetic effect; i.e. one plus one equals three.
- 6) Nonlinear behaviour – a system is more complex if changes to one component are not proportionate to the change of the overall system.

In table 3 the relations between the complexity characteristics and programs are summarised.

*Table 3 - The table describes the relation between programs and the defining characteristics for complexity. The relations are important to understand how program management is affected by complexity*

| <b>Complexity characteristics</b> | <b>Relation to program management</b>  |
|-----------------------------------|--|
| Multiplicity                      | Programs are built up by numerous of sub-programs and projects. Each project can consist of several parts within its project team (PMI, 2013c).  |
| Casual connections                | When looking at programs, it is possible to see feedback loops in several activities e.g. communication and standardisation (PMI, 2013c).  |
| Interdisciplinary                 | The projects that simultaneous runs within a program are dependent of each other or influence each other in several ways (PMI, 2013c).   |
| Openness                          | How open the system is to adopt to the environment. In programs, this is usually done in order to control the external risks or to adopt to changes in the business environment.   |
| Synergy                           | This is applicable on programs as e.g. risks are better handled collectively in programs than in each project separate (Aritua et al., 2009, PMI, 2013c). The purpose with program management is to effectively coordinate projects in order to reach synergetic effects (PMI, 2013c).   |
| Nonlinear behaviour               | In programs, the non-linear behaviour becomes apparent when looking at e.g. the appropriate management tools and activities. It is not always possible to use scaled up versions of project management tools, but they needs to be refined for a program setting. The management tools and techniques are different in terms of both scope and content (Pellegrinelli, 1997, PMI, 2013c, Aritua et al., 2009). |

The term program management is, among others, one term used for multi project management. Terms as mega-, meta- and super-projects are also used as synonymous (Aritua et al., 2009), which implies that there is a connection between programs and megaprojects in literature. Another frequently used term for multi project management is portfolio management which in some literature is almost equated with program management although there are major differences (PMI, 2013b, PMI, 2013c). A portfolio is a collection of projects, programs and other processes that are managed collectively in order to reach the organisations strategic objectives (PMI, 2013b), thus, it is at a higher level than program management. A fundamental difference from programs is that the projects and programs within a portfolio are not necessarily interrelated. The definition of portfolio and program management implies that the portfolio management is more strategic than program management and that it is more focused on finding and choosing the right projects rather than managing them (Aritua et al., 2009).

### 3 Theoretical framework

---

This chapter explain literature and theory used in the discussion of the thesis. The literature on program management starts with a broad introduction since it entails more than just communication related aspects. The findings in the communication related program management is divided into challenges and proposed solutions which are later used to compare the case to the literature. There is a contradiction between the need for standardisation and the recommended evolutionary growth of the program which is an important aspect for the discussion and conclusion of the thesis.

---

#### 3.1 Communication

Communication is complex, and as term it can have different meanings depending on the context and situation in which it is used, which makes it difficult to define (Dainty et al., 2006). In management, communication is one of the most commonly used words (Remington, 2011). Several scholars view communication as the process where information is exchanged between persons (Den Otter and Prins, 2002, Maier et al., 2008, Senescu et al., 2012, Dainty et al., 2006). Maier et al. (2008) adds that it is a cognitive and social process and that the process should generate a meaning. Den Otter and Prins (2002) argues that the purpose of the process is to align the information of the involved parties. Den Otter and Prins (2002) distinguish three fundamental steps in the communication process. *The first step* is the activities created by the sender. It involves the collection of information and the spread to the receiver. *The second step* is the receiver's activities, which is to acquire and interpret the information. *The last step* is to store, retrieve and make use of the information, an activity that can be recognised by both the sender and the receiver. Already in this definition, it is possible to identify a problem with communication as it is a risk that the proposed meaning will be distorted or lost during the steps (Den Otter and Prins, 2002).

Dainty et al. (2006) breaks down the term communication into six characteristics. These characteristics can be summarised as a two-way exchange of information between persons (or organisations, teams etc.). This is similar to Den Otter and Prins (2002), who argues that in order to call it communication it needs to be both sending and receiving. It is influenced by social behaviour and norms that determines how the information is interpreted.

##### 3.1.1 The importance of efficient communication

From a managerial point of view, a necessity for motivating employees and to secure accurate results is to have downwards communication from upper management down to subordinates with clear and precise instructions (Armstrong, 2006). A bottom-up communication is important to both enable the managers to monitor and control the performance, and enable subordinates to transfer their knowledge and expertise upwards in the organisation (Armstrong, 2006). A two-way communication is also important for the internal and external relations (for the purpose of this thesis, external relations will be excluded) (Armstrong, 2006).

Along with Armstrong (2006), Dainty et al. (2006) argue that good communication is vital to make employees interpret and react to management decisions in an accurate way. Consequently, managers will better understand its subordinates and create a synergy (Dainty et al., 2006). Communication will also inform employees about the plans and roles in an organisation, and makes changes possible (Eckert and Clarkson, 2004).

### **3.1.2 Formal communication**

Formal communication is following the rules and structures that are established in the organisation (Den Otter and Prins, 2002). Formal communication process can be slow and inflexible (Dainty et al., 2006). These problems can partly be derived from the organisational chart. An organisational chart cannot be constructed in advance to predict all future contingencies. This is especially true where the uncertainty is high and where the organisation is situated in an unstable external environment. These charts will soon be outdated by informal communication and new unplanned flow of information in the organisation (Dainty et al., 2006). Formal communication can also facilitate important communication infrastructure and its rules governing the use. One example is the use of an intranet and the guidelines on how to use it and what information that should be uploaded. Another example can be a controlled meeting structure.

### **3.1.3 Informal communication**

According to Den Otter and Prins (2002), informal communication is a spontaneous form of communication that is more flexible than formal communication. Dainty et al. (2006), argue that informal communication is important to enable projects to be completed within its time constraints (Dainty et al., 2006).

The informal communication has evolved through needs, and extends outside the organisational structure, and formal communication network (Dainty et al., 2006). Informal communication networks, often called “grapevines”, are an inevitable part of organisations. The grapevines are common where ambiguity and uncertainty is high and where there is a lack of formal communication, and can lead to inaccurate information or misinterpretations (Crampton et al., 1998). An example of a grapevine network can be seen in figure 3 in chapter 6.1.1. A semi-controlled informal communication is preferred where employees get empowered to establish communication routines together with all levels of management (Crampton et al., 1998). Informal communication networks do also work under the premises that it is self-organising, and thus, the relationship between the parties is essential and new parties can be difficult to integrate, and can have the implication that some information will be missed or biased (Remington, 2011).

## **3.2 Program management**

Multi project management can benefit from management principles such as program management to manage the interrelations of projects (Aritua et al., 2009). Program management refers to the processes of manage the interrelatedness of projects within the program in a coordinated way in order to obtain synergetic benefits easier than when managing them individually (PMI, 2013c, Sowden, 2011, Kendall and Rollins, 2003). The projects within a program does not need to deliver specific project objectives, but create, trough better organisation of the projects, clear benefits (Lycett et al., 2004).

Due to the interdependence of the projects within a program, one of the main objectives of program management is to coordinate the projects and processes. Otherwise there would be no difference between a group of single projects and a program of projects. This focus on coordination in program management is emphasised early in the theoretical birth of program management (Pellegrinelli, 1997, Turner and Speiser, 1992, Ferns, 1991).

### 3.2.1 Two standard approaches to program management

The growing knowledge around program management has led to the development of standard approaches. Two of these are: the American institute, Project Management Institute's (PMI) handbook *The Standard for Program Management* and the British Office of Governmental Commerce's approach *Managing Successful Programmes (MSP)*. These standard approaches are frequently referred to by scholars, and can be seen as well-established view on program management. When looking into these approaches, there are several common themes. Most apparent are: the life cycle of the program, the organisational structure and hierarchy of program roles, and the program management specific processes.

#### The life cycle of the program

The program life cycle is close to the project life cycle (Lycett et al., 2004, Thiry, 2004, Blomquist and Müller, 2006b). In literature, there is some variety in the number of, and names of the phases, but they have similar in descriptions (Blomquist and Müller, 2006b, Lycett et al., 2004). The phases that are best defined and easiest to grasp is defined by PMI and are: program definition, program benefit delivery and program closure. The life cycle of the program is important to understand since it lays the foundation on which the management processes are based.

The first phase is the *program definition phase*. In this phase, the organisational strategy is articulated through the development of vision, goals and objectives. The definition phase is where the program organisation and governance structure is defined, the projects interdependencies are clarified, and a management plan is developed (Lycett et al., 2004, PMI, 2013c, Sowden, 2011, Thiry, 2004, Blomquist and Müller, 2006b). During this phase the communication plan, which is covered later in the chapter, is created (PMI, 2013c, Sowden, 2011)

The second phase is the *program benefit delivery phase*. During this phase the projects within the program are executed using the necessary program processes (Thiry, 2004). The program benefit delivery phase also includes monitoring and controlling of the program (Lycett et al., 2004). The plans defined in the program definition phase constantly needs to be reviewed through an iterative process to archive the intended benefits (PMI, 2013c). During this phase, the coordination of the projects is an essential part. There is continuous work to align the projects with the program goals and objectives (PMI, 2013c, Thiry, 2004).

The final program life cycle phase is the *benefit delivery phase*. The main objective is to evaluate if the program delivered the desired outcome (Lycett et al., 2004). In the program closure lessons learned work should be included in order to fully achieve the benefits of the program work (PMI, 2013c).

#### The organisational structure and hierarchy of program roles

A successful program requires an effective program organisation with clearly defined roles. Establishing the organisation is an ongoing task initiated in the program definition phase. In order for the program to be successful, the program organisation needs defined roles with clear responsibilities. The organisation should be provided with appropriate management structures and reporting arrangements (Sowden, 2011). Some of the most important roles in program management are the program manager (PrM), the project manager (PM), the program management office (PrMO).



*The program manager* is responsible for ensuring that the program goals are aligned and performs according to the organisations overall strategic goals. She is also responsible for the management of the interrelatedness and coordination between the projects (PMI, 2013c, Eweje et al., 2012). The PrMs should be highly skilled at communicating (Partington et al., 2005), and should be able to communicate through all different levels of the program. The leadership style should be encouraging the information flow within the program (Sowden, 2011).

*The project manager* is responsible for the management of the projects that are carried out within the program. Blomquist and Müller (2006a) emphasises the difference between the PrM and the PM who needs to be more aware of the wider program goal and uncertainty and open to change. Project management is more about details than program management and manages the project planning and execution. The PM is governed by program goals and objectives (PMI, 2013c).

The PM plays an important role in communication in the project organisation since they are responsible for the overall performance of the projects (Dainty et al., 2006). Communication is one of the most frequent activities for a PM (PMI, 2013a). There is a large amount of information that flows through the PM, and it is important that the PMs are effective and preferably also efficient in communicating to be able to reach desired goals. The PM needs to communicate both upwards and downwards in the organisation and supply chain, across organisations and project teams, be able to communicate with all levels of employees, from senior management to the blue collar workers, and with all types of specialists. At the same time, the PM needs to act under the pressure of scarce resources. Hence, it is important the manager knows how to communicate, and to communicate in an efficient way (Dainty et al., 2006).

*The program management office* has two main responsibilities. First, it should be a support to the projects and provide guidance for the initiatives. Second, the PrMO is responsible for the governance of the program, and should provide the standards and monitor and control the program performance (Sowden, 2011). The standardisation of processes is an important task. It provides a common language for the program in order to provide an overall picture of the program progress (Kendall and Rollins, 2003). Some of the responsibilities for the PrMO may be management of communication, finance, integration and coordination, procurement, quality, resources, risks, schedule and scope (PMI, 2013c).

### **Program management processes**

There are several program management specific processes presented in the program management approaches. In the PMI guide, there are two categories that are directly related to coordination and communication, and thus important for this thesis, namely: program communication management and program integration management (PMI, 2013c). The processes in the program approaches are built upon the program life cycle and the program's organisational structure (Lycett et al., 2004).

*Program communications management* is presenting activities that are necessary for the communication and decision making in the program (PMI, 2013c). Communications management relates to processes that are cornerstones in program management (PMI, 2013c, Lycett et al., 2004). Program communication management affects more parties than project communication management and includes both external and internal communication within and across the program (PMI, 2013c).

The communication management emphasises the need for a communication plan that should be defined during the program definition phase. The purpose of this plan is to align the program and to easier integrate new developed program components (projects).

Part of the program communication management is the information distribution that should be managed in order to make it efficient. The question who should have the information and what the purpose is, should be asked when distributing the information (PMI, 2013c). The information distribution should support the communication and facilitate the possibilities to communicate the right information to the right persons at the right time (PMI, 2013c, Thiry, 2004).

*Program integration management* relate to the processes needed to coordinate the program. These activities takes place during the whole program life cycle, and includes the processes to initiate and plan the program; execute, monitor and control programs; and closing the program (PMI, 2013c, Thiry, 2004).

The program integration management should define the organisational structure and the role hierarchy. It should develop the program infrastructure to support and enable the program to achieve its goals by defining the responsibilities, initiating a PrMO, and initiating communication management (PMI, 2013c, Thiry, 2004).

Monitoring and control of the program is a part of program integration management. This process is a two-way communication to manage alignment of projects with the program vision (PMI, 2013c). The process of monitoring and controlling also has the purpose of identifying critical interdependencies in the program and to streamline the execution phase (Lycett et al., 2004).

### **3.2.2 Challenges with communication and information coordination in program management**

Just because the definition of program management is to coordinate related projects does not mean that it magically happens by implementing the managerial tools and approaches. Coordinating projects in programs is complicated in its nature, and scholars emphasise the need for specific management competencies in order to succeed (Platje and Seidel, 1993, Müller et al., 2008, Gareis and Huemann, 2000). From cases on program management it can be argued that programs keep failing at doing exactly what they are set out to do, coordinate related projects. Many of the problems and challenges associated with program management are directly, or indirectly, related to intra-organisational communication and coordination of information. Elonen and Artto (2003) concludes their article *Problems in managing internal development projects in multi-project environment* with six common problems related to program management, of which three are related to communication and information, while the other three are semi-related by being potential solutions to communication issues if they are resolved correctly. PMI (2013c) writes that communication in programs is an aspect that should not be overlooked.

#### **Challenges with large quantity of data**

Programs are complex due to the structure of the interrelated projects, and normally large endeavours. Early program literature emphasises this aspect and the communication challenges that comes with the need for synchronising many projects interrelated in different levels of an organisation (Laufer et al., 1996) With this aspect comes an immense amount of information, flowing in all directions, (Thiry, 2002), which has to be processed

and handled (Laufer et al., 1996, Elonen and Artto, 2003, Shehu and Akintoye, 2010, Thiry, 2002). Due to time constraints and demand for fast decisions there is a need for higher quality of the data (Laufer et al., 1996) and reliable information is seen as a foundation for successful management of programs (Dietrich and Lehtonen, 2005). Elonen and Artto (2003) concludes that one of its six common problems in programs is inadequate information management and emphasise the problem of when, on what, to whom and in what format information should be delivered. This problem is primarily attributed to the lack of a common database for information storage (ibid), which is partly supported by Shehu and Akintoye (2010) who found that there were not enough resources spent on information systems or data analysis. The quantity of data, in combination with its often contradicting information (Thiry, 2002), creates a lack of quality in information and hence has negative consequences for decision making.

#### **Inadequate cross-functional communication**

A conclusion from the literature review on portfolio and program management in Müller et al. (2008) is that projects need to be seen in their context where they are both influenced by, and influence, other projects and functions in the organisation. The cross-functional communication, especially between the projects, is emphasised as one of the main challenges in literature written on programs. The problem is by some scholars attributed to unclear boundaries of the programs functions and projects (Elonen and Artto, 2003, Elbanna, 2010, Lycett et al., 2004) which creates uncertainties on the "when, what, to whom information should be delivered" -problem (Elonen and Artto, 2003, Elbanna, 2010).

One problem related to boundaries is that projects are isolated and its members do not see the need to share information with other projects (Elbanna, 2010), or, actively withholds information due to lack of trust between actors and projects (Laufer et al., 1996). Ideas, designs and possibilities are evaluated within the project boundary but are not communicated to the rest of the organisation (Ibid). A problem which results in the same work being carried out several times in different functions (Elonen and Artto, 2003, Lycett et al., 2004) and that the best solution is not necessarily implemented as a whole in the program. Furthermore, the scenario above does not only lead to loss of good reusable solutions, more importantly, it has a direct negative effect when information of decisions of cross-functional importance is not communicated to those affected by the decision. White and Fortune (2002) found that 46% of their respondents reported that decisions made in their projects had unexpected side effects, which according to the same study was mainly attributed to a lack of awareness to the context in which the project operates. Lycett et al. (2004) and Shehu and Akintoye (2009) adds that the problem not only leads to double work, but that the inadequate communication leads to work not being carried out at all due to the assumptions that specific activity should be carried out in another project or function in the program.

#### **Inadequate senior level management**

To a great extent, the management of program communication and coordination of information between project lies on senior level in the program, including PrM (Thiry and Deguire, 2007, PMI, 2013c, Eweje et al., 2012, Laufer et al., 1996). Blomquist and Müller (2006b) sees the PrMs role as a broker, in which she coordinates between projects by coaching PMs and implementing improved processes. However, this role is rarely unproblematic and it has been shown that various problems and challenges concerning communication in programs can be attributed to senior level management.

A common problem is the perceived ambiguity and misinterpretation of the PrM role. Pellegrinelli (1997) argues that the PrM takes on the role associated with that of the portfolio manager and focuses on resource allocation rather than coordinating interrelated projects. A similar problem arises when PrM takes on the role as PM. Elonen and Artto (2003) claims that senior managers fail to adopt their own role as decision maker and too often intervene in specific operational issues of which PMs are responsible. This can to some extent be explained by Thiry (2002) argument that PrMs are caught between strategic and concrete implementation, seen as evidence for an inconsistent and changing role of the PrM which is proposed by Elonen and Artto (2003). The unclear role of the program management is considered one of two major problems facing program management today (Shehu and Akintoye, 2010).

The PrMs' failure to take on the role as coordinator has negative consequences for communication between all levels and functions of the program. In Elonen and Artto (2003) study on managerial activities in portfolio management they conclude that roles and responsibilities are unclear and that flow of information is hindered by senior managers failure to implement communication tools and processes for communication. (Laufer et al., 1996) shares a similar view and compares communication flow in large projects to the traffic of a big city in which the successful manager takes on the role as designer and overseer of the infrastructure. Therefore, the PrM is not supposed to micromanage (specific, detailed management) the flow of information, she should promote and implement good means of communication. According to Laufer et al. (1996) the integration of information is the manager's main role. Hence, not taking on this role in an environment suffering from a massive amount of information, leads directly to the lack of quality in information mentioned in the section *Challenges with large quantity of data*.

Contradictory to the problem of the PrM to take on the PM role, as explained previously, Elonen and Artto (2003) finds support for a lack of commitment from senior management, including the PrM, on project specific issues. Hence, in the same study in which lack of coordination was apparent there was also a lack of project specific guidance from senior management. Therefore, it seems that the PrM neither take on the role of information coordinator nor information micromanager. One explanation to this contradiction is the evident ambiguous role of the PrM. However, Elonen and Artto (2003) explanation is lack of time due to other duties. Scholars on the subject do not seem to think that commitment to specific project issues lies under the responsibility of the PrM (Kendall and Rollins, 2003, Elonen and Artto, 2003). Instead, the PrM should adopt the role of consultant to guide the projects in the right direction (Thiry, 2002, Elonen and Artto, 2003). The commitment to project level from a communication perspective is to acquire information essential to the program (Laufer et al., 1996, Elbanna, 2010) compile that information (Blomquist and Müller, 2006b) and use it to guide the PMs in the right direction (Elonen and Artto, 2003), as well as support the implementation of information systems which coordinates information between projects (Kendall and Rollins, 2003). Hence, even though program members on project level are requesting support on project-specific aspects, it is not a recommended approach when it comes to communication.

### **3.2.3 Proposed solutions in literature to program communication challenges**

As stated previously, the PrM neither have time nor the responsibility to micromanage information flow. The PrM cannot oversee every flow of information or informal meeting between program members. Instead, she should encourage open and free communication

between the programs functions and at the same time make sure that systems for formal means of communication are available and used (Laufer et al., 1996, Kendall and Rollins, 2003). The two are equally important and address two of the main communication problems found in theory; to overcome the communication boundaries between project, functions and members (Laufer et al., 1996) and to sift through and create high quality information from the great amount of data in the program (Kendall and Rollins, 2003, Letavec et al., 2008). The two problems found are related to informal and formal communication, both important for the success of programs (Letavec et al. 2008).

The latter is the agreed up on and formally supported means of communication such as templates, information systems, meetings with protocols and formal information channels. While the informal covers the day to day conversations, spontaneous meetings and the overall interaction between program members. (Letavec et al., 2008)

#### **PrMO as a formal unit for communication**

*"Projects are not delivered by project managers but by teams"* (Laufer et al., 1996, p. 192) is written and emphasised clearly. This quote is equally suitable for PrMs, who needs to utilize the team of experts and specialists in the program in order to create the necessary communication channels and processes (PMI, 2013c, Laufer et al., 1996, Elbanna, 2010, Kendall and Rollins, 2003).

The utilization of a PrMO is one proposed solution to many of the communication challenges in programs (Kendall and Rollins, 2003, Thiry and Deguire, 2007, PMI, 2013c). It is made up of a team of experts who can both act as consultants to the managers and unit which creates common processes and methods through standardisation (PMI, 2013c, Kendall and Rollins, 2003). A successful implementation of a PrMO can be seen as a coordination unit of which communication challenges are a key concern (Kendall and Rollins, 2003). In order for a PrMO to be successful it needs to create value to all actors in the client organisation (Kendall and Rollins, 2003). From a communication perspective the PrMO best creates value by supplying senior managers with relevant information by gathering standardised data from all the programs functions, and to standardise, recommend, implement and oversee communication processes by negotiating its benefits and design with program members (Kendall and Rollins, 2003). Hence, a successful implementation of a communication manager as part of the PrMO could relieve the PrM of some of the communication responsibilities associated with her role.

#### **Communication plan**

The aspects of communication should be covered in the communication plan created by the communication manager (Letavec et al., 2008, PMI, 2013c, Sowden, 2011), by support and help from senior and project managers (Kendall and Rollins, 2003). The communication plan is the formal guiding document which covers the tools and guidelines to be used in the program (Letavec et al., 2008, Kendall and Rollins, 2003). In order to ensure its value to the members in the programs it is important for the communication manager to create the communication plan and its content in close collaboration with the program members from all levels of the organisation (PM, sub-PrM, PrM and the administrative unit) (Kendall and Rollins, 2003).

The communication plan should define to whom (distribution channels), when (guidelines), how information is presented (format) and what (defined level of detail). Blomquist and Müller (2006a) describes the information levels of the program and specifies that it is

important to manage the detail level of information as it travels upwards. If properly created, templates of documents used in various parts of the organisation, e.g. meeting protocols, assessments and reports addresses all four questions (Letavec et al., 2008, Kendall and Rollins, 2003, PMI, 2013c). The implementation of a communication platform is one of four recommendations to PrMs written by Müller et al. (2008). But a warning to utilise too complex tools are lifted by Kendall and Rollins (2003) who advocates the KISS approach, Keep it simple, Stupid. Otherwise there is risk of implementation boundaries which further acknowledges the need for collaboration with the end users of the tools. Hence, an approach to utilise **successful internal practices** and implement them program-wide is recommended in order to keep program specific solutions within the environment it works best (Kendall and Rollins, 2003).

### **Program Information System**

The communication plan should both cover and be in the program information system (PrIS) (Kendall and Rollins, 2003) which supports the "to whom" aspect of the communication plan. The PrIS contains the templates to be used for formal communication as well as act as the programs database in which specific information to the program is stored and available to its users. It is important that it is updated frequently so the information is accurate and contains summarised information condensed by data from the entire program (Letavec et al., 2008). Especially in large and complex program this is no simple task (PMI e al. 2013) due to the great amount of data flow (Laufer et al., 1996, Elonen and Artto, 2003, Shehu and Akintoye, 2010, Thiry, 2002) and it is recommended to use technology to process the information/data supplied (Letavec et al., 2008). One way of ensure the correct data being supplied is to use templates and common methods and metrics (Blomquist and Müller, 2006b) created and chosen by the PrMO in collaboration with the program members (Kendall and Rollins, 2003). It is however in the end up to the PrMO staff to gather, condense and distribute the information through the proper channels to the right people by using the communication plan (Letavec et al., 2008, Kendall and Rollins, 2003, PMI, 2013c).

### **Organically built formal structure for the program communication**

Both the communication plan and the PrIS is part of the organisational structure of the program. The PrIS builds on it and the communication plan is built around it and explains its function from a communication perspective. However, building a structure is not a simple task, especially for complex endeavours the size of megaprojects (Elbanna, 2010), in which the environment and needs are constantly changing (Blomquist and Müller, 2006b, Thiry, 2002, Lycett et al., 2004). That is, what seems simple on paper proves more difficult when creating structure from a complex mix of interrelated projects and functions. For this problem an organically and sequential built organisational structure, and the communication tools guiding members in it, is recommended (Thiry, 2002, Lycett et al., 2004). The structure and the processes in the organisation should gradually be created and implemented instead of creating one set structure early on (Shehu and Akintoye, 2010). The ability to change the organisation is key for program success according to Thiry (2002) who adds that PrMs usually ignores these issues. By acknowledge the need for transformation it is possible to create processes and tools from the need of the organisation (Kendall and Rollins, 2003) instead of prescribing one early solution that might not fit the problem, because it was not known at the time.

### **Informal communication to cross boundaries**

Dietrich and Lehtonen (2005) concluded in their study on management of interrelated projects, similar to program management, that formal procedures alone do not correlate with positive results for managing multi-projects and they argue that the informal and invisible processes are of interest for future study. Letavec et al. (2008) considers informal communication as the most significant form of communication during programs, but emphasises the need for informal communication to be accurate and consistent when the information is associated with formal communication, such as upcoming work, program status and risk, to mention a few. Failure to do so can result in sub-optimal decisions being made (Ibid).

However, informal communication is still of great importance to the program. These informal means of communication helps to create a collaborative environment between program members where information is shared, not withheld (Laufer et al., 1996). Elbanna (2010) concludes with a recommendation for the program members to create their own communication network which creates a holistic view of the program and unforeseen events can be mitigated. Fisk et al. (2010) recommend that managers of related projects should take additional steps and actually promote the informal communication by educating the members of boundary spanning activities. Focus on such social factors is something that few managers focus on today (ibid). Elbanna (2010) calls for methods to scan the project, in this case program, environment and recommends the use of scouts to actively cross the boundaries between functions and projects in order to acquire necessary information. These scouts can be assigned to one member in every project and function in order to spread and gather vital information from all other parts of the organisation (ibid). In order to achieve this holistic view through the use of scouts it is important to invest in methods, tools and training (Fisk et al., 2010).

## 4 Methodology

---

The thesis and the authors adopt a pragmatic research philosophy with a focus on the research question. Furthermore, the thesis uses a qualitative methodology with an abductive approach, which means that the process of collecting and analysing theory and case data are carried out in parallel. The theoretical and empirical context is megaprojects and program management, with a focus on internal communication within the program organisation. In order to enrich the findings of the case, the qualitative research is made up of three different kinds of data: observations, document studies and interviews with actors in the case.

---

### 4.1 Research approach

The research carried out in the thesis covers many aspects of complexity due to the nature of the case, HMP. Complexity is present in many different perspectives and aspects of building the new hospital.

The first aspect are specific to the construction and design aspects of building HMP. First, it is a hospital being built in a crowded central area, with active hospital services being carried out in parallel with the construction activities. Secondly, the HMP program is made up of three different interrelated sub-programs. Thirdly, the three sub-programs are made up of projects, sub-projects and pilot studies, of which some are interrelated to, and dependent on, projects within the same sub-program but also in between the three sub-programs.

The second aspect is related to the first aspect of building a hospital, but focuses on the organisational structure of HMP and the knowledge needed to build a modern hospital. First, the organisation of building HMP calls for different expertise from the construction industry but also project specific expertise from the hospital and health care industry. Secondly, due to the size of the project, and due to the wide expertise needed, it is necessary to employ a large program management team with actors who need to cooperate in between projects and fields of knowledge.

Due to the complexity we implement a pragmatic approach where the research questions steer towards different approaches for answering different questions. Since it seems inappropriate to take sense making and individuality out of the equation (it is communication the thesis is about, and communication is between people), while at the same time the aim is to find practical recommendations for the case studied. A pragmatic approach is deemed suitable in order to understand the difference between people's perception of communication and take that into consideration when recommending improvements. This does however create a problem with generalisability of the case and other megaprojects. Hence, the thesis has the case in focus, but might be helpful when researching other megaprojects and recommending improvement in communication.

An abductive approach is used for this thesis. Since we have one case to study we want to get a deeper understanding of it. The abductive approach is suitable for this purpose since we can carry out the case study while exploring literature and find new perspectives on both case and literature. (Dubois and Gadde, 2002) This suits the pragmatic approach since it leaves room for finding specific literature on aspects found in the case and vice versa. Hence, the literature and the case, in combination with the research questions, guides us towards the end. The literature gave us an initial understanding of the context of



megaprojects and later programs, and empirical data from literature could be compared to the case. The case, in turn lead us towards program management due to its interrelated and co-managed projects, and the focus on complexity was deemed suitable since it was a constant reoccurring characteristics in both literature and the case.

## **4.2 Literature review**

The two primary search methods throughout the literature search was google scholar and the use of cited articles in the articles found. Additional databases from Chalmers Library was used, especially if the articles of interest was not available on google scholar. In order to capture the contemporary literature on the subjects we aimed to use primarily literature published during the third millennium, however, to broaden our understanding of the emergence of megaprojects and programs some references from the 1990s were used. Standards of programs was deemed necessary due to the wide reference to them in program literature.

Since an abductive research approach was chosen the authors used an initial broad literary approach focusing on articles on megaprojects, in primarily construction and management academic journals. After establishing the context of megaprojects we entered the second phase with an addition of key words such as communication, information and coordination, to megaprojects. In addition we read articles which had been cited in the articles on megaprojects. Due to that the majority of the articles on megaprojects and communication, have a focus on communication with external stakeholders, we took a new direction by focusing on the characteristics of megaprojects and how those characteristics are related to communication. A third search phase was initiated where the characteristics of complexity of multi projects was the focus. From an internal management perspective on communication, the concept of program management seemed appropriate for our case. A forth search phase focused on finding additional theory on communication relating to the findings of the literature on program management.

Figure 1 visualises the various use of the literature. The initial megaproject literature in combination with general program management literature is used as the background context for the thesis. The intersection of megaprojects, program management and communication is our main literature. Our secondary literature includes communication, preferably within either a megaproject or program management context. Complexity is a characteristic found to some extent in all three themes of literature.

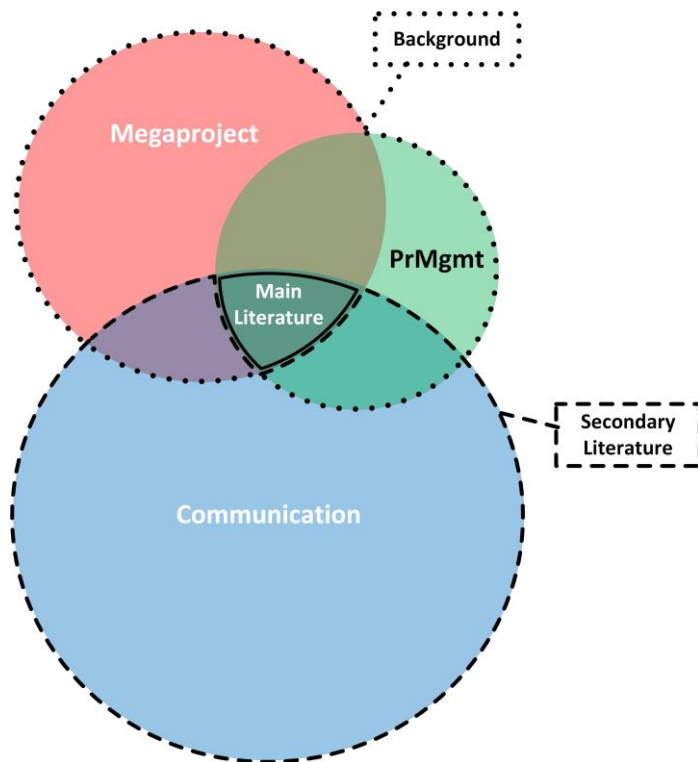


Figure 1 - The figure shows a diagram over the main topics of literature studied. Literature including megaprojects, program management or a combination of the two were used to provide a background for the thesis. The literature on communication and in combination with program management or megaprojects were used as secondary literature. Our main literature where literature including all the three main topics.

The keywords used during the four phases of the literature review where:

*Phase one:* megaprojects, management, client organisation

*Phase two:* megaprojects, communication, information, coordination,

*Phase three:* multi projects, complexity, communication, information, coordination

*Phase four:* program\* management, support office, communication, information, coordination, control

### Source criticism and literature relevance

The reason not to use megaproject as the foundation for this thesis was its focus on external communication management. First and foremost its ambiguous definition may cause bias in the researchers' findings. Especially since failure is an often cited characteristic of megaprojects. If anything can be regarded as a megaproject, how can anything specific and generalizable be found from it? However, since the focus of the thesis is to study megaprojects, it cannot be omitted from the thesis.

Program management literature suffers from a similar challenge but far from the same extent. And there is a greater consensus on the definition of program management in its field of research, especially due to the two standards widely referred to in the literature. The program characteristics are more condensed and are fewer than those used to define megaproject, and the focus of program management is primarily internal management.

An important aspect to consider is that the two standards (PMI and MSP) referred to in the thesis are created by profit-driven organisations. This is why they have been used primarily to explain what programs are, rather than how they should be managed. In order to avoid becoming spokespersons for the standards we used other scholars' case studies for empirical comparison to our case. Furthermore, the recommendations and solutions proposed in our discussion are based on program literature not directly involved with the two standards. The standards are however used if their recommendations coincide with those in other literature on program management or are contested by other literature. In conclusion, we have taken into consideration that PMI and MSP are influential in the program management community and we see similarities in research on the subject. Hence, due to the focus on programs there is a risk that other valuable sources related to internal management of megaprojects might have been overlooked, and it is important to keep in mind that the thesis is exclusively delimited to programs and its immediate related literature.

### **4.3 Unit of analysis**

The thesis aims to evaluate and improve the communication of the program management team of HMP. Included in the study are therefore both consultants and employees of program management team's mother organisation who are employed in the team. The primary unit of analysis is the process of the cost prognosis which is carried out once every six month in the program management team. It was chosen since it is an important process in order to successfully complete the program and since it concerns almost the entire staff of the program management team. In this way we believe that it is possible to capture and generalise the communication in the entire program management team.

### **4.4 Data collection and analysis**

In order to generate rich data four means of data collections were used: a pre-study, documents, observations, and interviews. Due to the use of an abductive approach, the four empirical data collections were carried out partially in a sequential order. Since the documents can be used throughout the entire study it was important to acquire them early in order to get a better understanding of the case and be able to find relevant literature. The document study in combination with three pre-study interviews was the foundation for the approach of theoretical context and research question. The observations were used together with the literature review to find suitable questions for the final semi-structured interviews. Hence, the data collection had two purposes, to shape the research method and as the basis for the final results. Since the early data collection helped to shape the study it can be argued that we were influenced by our first findings. However, the shaping helped us to find aspects which we had not been able to find if we had not changed the process during the course, and we could remain open for new insights and contradictions throughout the process.

#### **4.4.1 Part 1: Pre-study**

A pre-study was carried out by interviewing four actors working in the program organisation. They were chosen due to their involvement in the different functions and levels of the program and were; the program manager, a member of the PrMO, a sub-program manager and a project manager. The interviews were one hour long and conducted in a semi-structure fashion. Half of the interviews were conducted face to face and the other over telephone. Both authors of this thesis were present during the

interviews and the findings were used to shape our primary case study. The questions concerned the following topics specific for the HMP organisation: important actors for communication; who the respondent communicate with; what information is important; what works well respectively not well regarding communication. The findings helped to shape the design of the primary study by knowing what actors to contact for future interviews, as well as point us to relevant literature associated with the findings from the pre-study.

#### **4.4.2 Part 2: Document study**

Two types of documents were studied. First, a staff cost prognosis made up of six documents created by program and PrMO managers. In the program management team the documents were combined into one staff cost prognosis for the entire team. It was useful for the study since it spanned over all sub-programs and functions of the program of HMP. The document was initiated by senior management and each manager had to collect their information from their part of the organisation. The documents were created in parallel and sent to the senior management where they were composed into one final document.

In order to make a prognosis of the staff costs of the entire program management team, the three sub-PrMs, the PrMO coordinator and the PrM were asked to create a cost prognosis from their organisational needs. The six documents were sent to the economic function of the PrMO in order to create a unison staff prognosis for the entire HMP program. Hence, the actors who created the documents were either in the coordinating upper parts of the organisation (PrM and PrMO coordinator) or the sub-PrMs in charge of coordinating information between the sub-programs and the coordinating upper organisation. The involved actors can be seen in the organisational charts in figure 4 in chapter 6.1.2.

The documents were obtained by having the emails, in which the staff prognosis was attached as an excel document, forwarded to the authors of the thesis. Hence, in addition to the analysis of the documents it is possible to analyse the flow in which these documents reached its final destination of the economy function in the PrMO. The analysis carried out, in addition to the flow of documents, were comparison of the data/information in the documents to see the coordination of information and the email conversations in which the assignment was described.

Second, a specific cost object which was analysed due to its interrelatedness of two sub-programs and projects. It was made up of seven groups of documents which were created in a sequential order and based, to some extent, on each other. The documents were initiated in two sub-programs and travelled to senior management due to the importance of the cost object. It was useful since it was initiated on a lower level of the organisation and was communicated upwards.

The documents analysed refers to one cost object that spans between two of the sub-programs of HMP. The relationship between the two sub-programs and the cost object, seen in figure 3 in chapter 6.1.1, is that the PM from one project (project 1) under a sub-program 1 manages a part of a construction project that in turn is managed by a different PM from a sub-project under sub-program 2. Hence, the management of the cost object is primarily carried out in project 1 while results and costs ends up in the subproject under sub-program 2.

The documents are created over a nine month period by people from the organisations of both projects and the contractor. The documents are of varying nature, but have in common a specified cost or cost estimation, and made up of cost calculations, tender and offer documents, contracts, invoices and cost prognosis. The documents were created by six different people, of which five are part of the HMP organisation and one comes from the contractor in charge of carrying out the work documented.

The documents were analysed based on where in the organisation they were created, a comparison of the data/information in the documents in order to see the coordination of information was carried out, and last, how the documents were obtained since it sheds light on the availability of information in the organisation.

#### **4.4.3 Part 3: Observations**

The observations were carried out in two sittings. Both regarded meetings concerning the update of the cost prognosis for the entire program. Senior management, the three sub-PrMs (as authors defined them in this thesis) and the financial managers were present at the meetings. During the observation the focus was on how the participant communicated in a formal setting.

The observational study was carried out in two four-hour settings during which budget and prognosis related questions were to be discussed. The members of the meeting were the senior managers, the senior financial manager, the financial sub-PrMs from the PrMO, the three sub-PrMs and the PrMO manager. The senior financial manager held the meeting and no moderator was appointed or used. The author of the thesis attended both meetings and took notes of how the meeting was structured, how decisions were made and how information was coordinated. The focus was on all the members of the meeting and to describe their behaviour on communication related aspects.

#### **4.4.4 Part 4: Interviews**

We chose the respondents based on our earliest findings from the pre-study, the document and observational study. Their relevance for the study was discussed with the senior PrM and the financial manager who both approved our choices. The administrative staff was added to the study when their involvement came up during the interviews. None of them were present in person in the document and observational study which can explain their late addition to the study.

The interviews were semi-structured which allowed the respondents to talk freely and lead us into new interesting findings. As a result we changed or rephrased some of the questions, mainly in order to promote a more open atmosphere and allow the respondents own interpretation of the questions. One important change made was the lightening of the focus on specific communication-related questions. Specific questions based on findings from the observations and document analysis lead the respondents, during the pre-study, to limit their response when they felt their answer was not directly related to the findings. It was seen as a hindrance for the open atmosphere and hence these questions were downplayed during the main interview study. By allowing the respondents more freedom early on we instead asked specific follow-up questions related to their answers. We believe this improved our data collection since the answers contained more information and we still received valuable information regarding the findings from the document and observational study.

Thirteen, one hour-long, face to face semi-structured interviews were carried out during the main study. Respondents were all members of the organisation and found in the senior management, the PrMO, sub-program managers and project managers from the different sub-programs. The interviews were recorded with the permission of the respondents, both authors participated by asking questions and taking notes during the interview. The respondents were promised to be kept anonymous in order for them to freely share their experience of the communication in HMP. Every interview started off with the authors asking the respondents what the most important function for communication in HMP is, a person, software or part of the organisation? The question forced the respondents to think about aspects they previously had not thought about and gave the authors an idea of the respondents view on communication, both on what it entails and how it is important to them. This gave the authors an early idea of how the respondents communicate and the information need of the respondents. That is the two-way communication, sending and receiving, emphasised in literature. By knowing the need of the respondents it is possible to avoid a focus on information not necessary for the respondents. Further questions focused on to whom, when, how and why something is communicated and follow-up questions focused on making the respondents exemplify their statements, relate it to examples from the document and observational study and explain the consequences.

The collected data was analysed by finding themes of communication aspects. How information travels in the organisation, through whom it travels, how it is documented and its availability. In order to focus on the most important aspects emphasis was put on consequences of communication challenges and benefits. This helped us avoid a focus on irrelevant communication aspects for the thesis, i.e. communication with external stakeholders, actors who do not need to be communicate with, information not related to the program and communication between unrelated functions. There is an immense flow of data and communication in HMP and it is impossible and unnecessary for everyone to know everything and communicate with everyone.

## 5 Description of the HMP case

The chapter explains the relation between the case of the thesis and the literature of program management and megaprojects. To understand the thesis it is important to know how the case is related to the literature, and how the literature of program management and megaproject literature is related. In the chapter, we conclude, based on literature, that HMP is a megaproject managed as a program.

The program HMP is divided into three sub-programs. The three sub-programs are in turn divided into more than 20 projects or sub-projects.

Together they make up an investment of over 100 000 m<sup>2</sup> of hospital related real estate to a budget of close to one billion euros. The program and sub-programs are interrelated by the shared client organisation, budget and their effect on each other both during construction and future use. Replacement premises sub-program is carried out in order to evacuate hospital buildings for demolition to make room for the new healthcare facility. And it includes underground infrastructure of transport and technical culverts which are physically connected to the two other sub-programs.

### 5.1 HMP as a Megaproject

Using the framework from table 1 & 2 and inserting data and information of HMP in table 4 & 5 we see that all characteristics to some extent are covered. The failure aspect is not relevant for our case since it is still in the execution phase. Hence, due to the condensed literature on megaprojects and its characteristics we can conclude that HMP is a megaproject.

*Table 4 - The table is used to describe HMP as a megaproject. This table is based on table 1 and uses the same defining characteristics and the requirements that are defined by scholars. The table shows if HMP fulfils the simple characteristics or not with the HMP data presented.*

| Simple Characteristics | Possible to quantify with simple comparable data. |  |
|------------------------|---|--|
| Characteristics        | HMP   | Is HMP a Megaproject?  |
| Financial              | Secret  | Partially – HMP fulfils the financial characteristic. It has a budget that goes over most of the requirements defined by scholars. |
| Time                   | Over 10 years                                     | Yes – the highest requirement for a project to be called a megaproject is when the time is over 5 years.                           |
| Life time              | Over 50 years                                     | Yes – it has the same expected lifetime as the requirement.  |
| Size                   | Around 100 000 m <sup>2</sup>                     | No real quantity consensus in literature   |

*Table 5 - The table is used to describe HMP as a megaproject. This table is based on table 2 and uses the same defining characteristics and the requirements that are defined by scholars. The table shows if HMP fulfils the complex characteristics or not with the HMP data presented.*

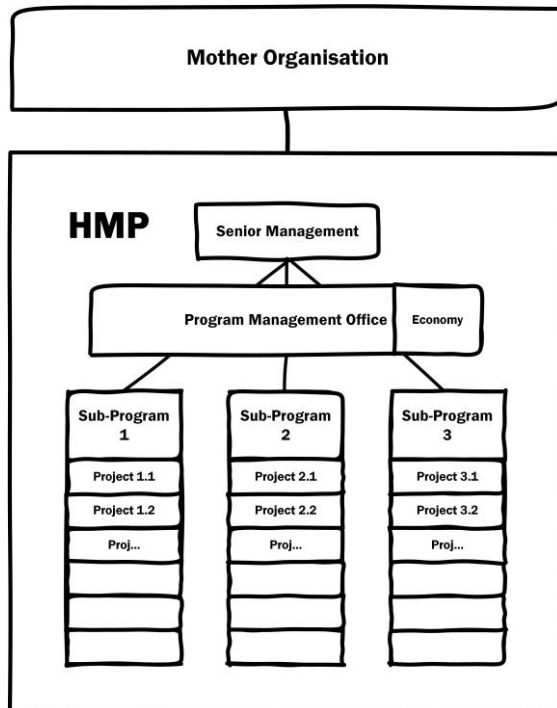
| <b>Complex Characteristics</b>        | Ambiguous and interpretive in its nature. Hard to quantify with comparable data.   |  |
|---------------------------------------|--|--|
| <b>Characteristics</b>                | <b>HMP</b>   | <b>Megaproject</b>   |
| Social, economic and political impact | Politically important project has an economic impact for the region and impact on society both during and after construction   | Yes – HMP impacts on all levels from economic, political and societal. Thus, it fulfils the requirements.  |
| Stakeholders                          | The entire population of the geographical region, its politicians and local businesses.  | Yes – according to the requirements, it can be argued that HMP fulfils the characteristic. There is several stakeholders involved, both public and private as well as the whole region's population.   |
| Complexity                            | Multi-disciplinary from both construction and healthcare. Many interrelated projects to be carried out both sequentially and in parallel. (Vidal et al., 2011, p. 719)           | Yes – It is in chapter 2.1 argued why HMP can be seen as a program. table 2 shows the relation between complexity and programs (and then also the case of HMP). Thus, HMP fulfils the complexity characteristic and can be called a megaproject. |
| Risk and Uncertainty                  | Multiple impacts, design is carried out simultaneously with construction. Utilisation of risk manager and uncertainty on future need of healthcare services (PMI, 2013a, p. 310) | Yes – because of the size of HMP and the financial, political and societal impact, it can be argued to be risky. The design is carried out simultaneously with the construction and is thus also uncertain.                                      |
| Change                                | Change of scope to include culvert network and decision to co-manage all three projects as a program   | Yes – it can be argued that HMP fulfils the requirements of the change characteristic.   |
| Performance                           | On time and on budget  | No indication so far   |

## 5.2 HMP as a program

Even though HMP is sometimes referred to as a project, it is not. By the actors involved in HMP it is referred to as a "project area" on which three projects are carried out on an already established hospital area, see figure 2 for organisational structure. Hence, HMP can be seen as a collection of projects that share resources and share a common goal. However, the reason the three projects were combined into one project area is due to them being interrelated. The projects do not only share resources but affect each other by being linked physically, through culvert networks (which are included in HMP), and share benefit by being managed collectively in order to avoid problems with logistics, coordinate procurement, utilise a PrMO to mention a few. One project is built in order to enable the demolition needed to start another project, and the third project is meant to support the other two projects when it has been finished. Hence, it can be argued that HMP can be seen as a program made up of three projects. However, that is not entirely true either. The three projects are, in turn, made up of its own interrelated projects and sub-projects. The boundaries of the different parts making up HMP are in some cases unclear. In the end, the parts of HMP are connected in a complex network of interrelated goals, time lines, budget, information flows etc.



Furthermore, as seen in figure 2, HMP has a mother organisation which manages the hospital real estates and new real estate projects in the geographical area. Some of the staff employed in the HMP project area have been taken from the mother organisation which means that HMP shares resources (human) with the other projects carried out by the mother organisation. Hence, in this thesis HMP is defined as a program, made up of three sub-programs and interrelated projects and sub-projects, which are all gathered under the portfolio of the mother organisation.



*Figure 2 - The figure show how HMP's organisation is built up as a program under the mother organisation. There are three sub-programs that contain several projects each. The senior management is situated closest to the mother organisation and the program management office between senior management and the sub-programs.*

Hence, through the common characteristics of, first and foremost, complexity, program management is a suitable literature to use for the study of the program managed megaproject HMP.

## 6 Results

---

The three data collections are analysed sequentially in the order they were gathered. The information from the data is structured in the themes found and in order to fit the discussion chapter. An important finding is the communication role of the administrative staff, the lack of proper communication challenges and the need for high-quality information on all the levels of the organisation.

---

### 6.1 Document Analysis

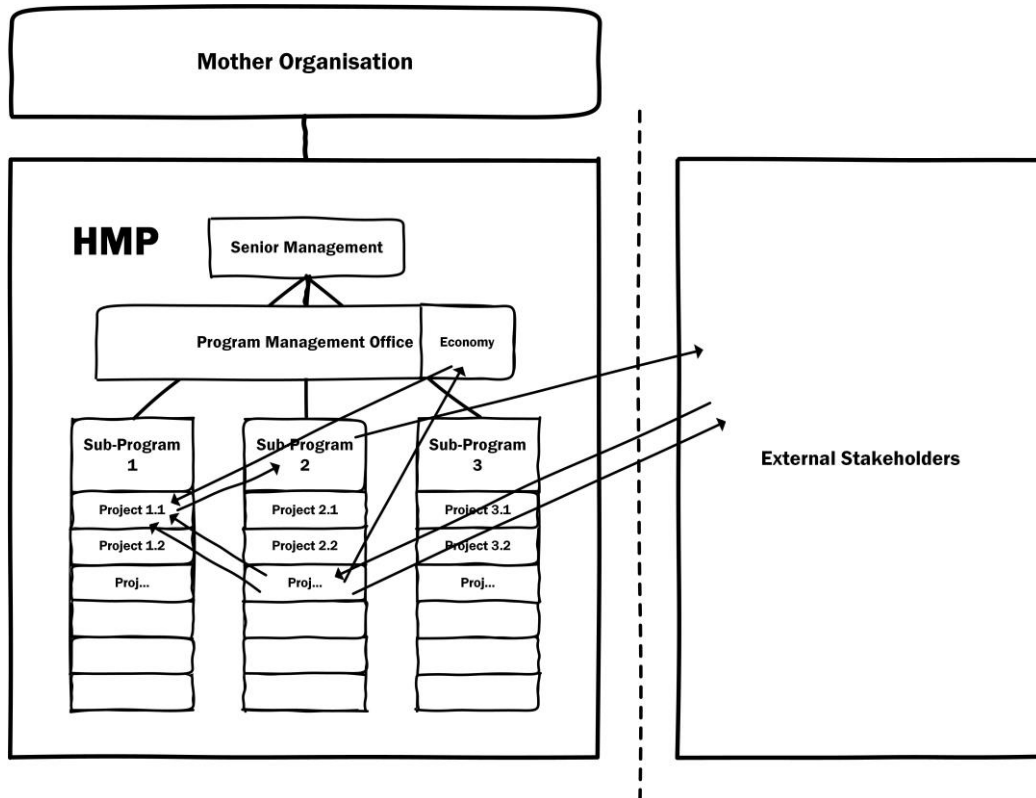
Two types of documents were analysed, first, several documents concerning one cost object, and second, documents related to the staff prognosis.

#### 6.1.1 Cost object documents

The arrows in Figure 3 visualises where in the organisation the documents were created. Hence, the arrows do not specify to which degree the documents are interrelated or based on each other.

From the analysis three communication challenges were found:

- Unclear information flow between documents
  - Difference in the amounts specified and the work specified in the different documents
  - Few or no references to the other documents in the flow
- Lack of standardised documentation
  - Comparison between document was time-consuming
  - Omitted information
  - Lack of explanations
- Unavailability of information
  - No centralised storage
  - Mix of analogue and digital storage in different places
  - Many people involved



*Figure 3 - The figure shows the flow of documents in the program and its environment. Each arrow represents a document. The start of each arrow is where the document is created, and the end of the arrows represent the destination where the document is sent. The purpose of the figure is to illustrate the grapevine effect in the program.*

#### **Unclear information flow between documents**

From a financial perspective, the discrepancies between the documents vary in two different ways: the cost estimation or prognosis specified and what specifics which are included in the cost object. The latter differs primarily in what is to be included in the workload that is to be carried out, and hence has an impact on the final cost of the object. References to another document are only present in one of the documents. Other than that one case, there is no sign of communication between the people who created the documents.

Hence, discrepancies between the documents describing the cost object can neither be explained, nor be analysed from a cost perspective without consulting the people who created the documents. However, considering both the cost estimates and the specifics included in the documents they are quite similar in their estimations. Hence, it is possible to assume that the documents, or the people who created them, have been consulted in the chronological order in which they were created, later supported during interviews. It does, however, pose challenges for obtaining an overview of the cost object by just using the documentation.

#### **Lack of standardised documentation**

Due to the difference of structure and use of information and data in the documents it took time to get an overview of the information stated. Going back and forth between the documents was time-consuming since information was stated differently or was not

present at all. Hence, the information was up to interpretation of the reader since no formal or standardised form of documentation was used.

#### **Unavailability of information**

This challenge is mostly related to storing and archiving of information and not what was actually stated in the documents. While obtaining the documents from the HMP organisation the documents were found in different mediums ranging from digital form in one of the actors email inboxes to a cardboard box locked into an administrator's filing cabinet. In order to get all the documents necessary the administrator had to come back from vacation, four other people had to be involved directly while others were contacted in order to find the person who had access to the documents. None of the documents used were found in the project database. Due to the difficulties obtaining the document it is possible that the same difficulties were posed to the creators of the documents, which could be an explanation to the lack of clear information flow mentioned in the first theme: *No clear information flow between documents*. That is, if the creators of the documents did not find the documents necessary to evaluate the cost object it is possible that double work had to be carried out.

#### **6.1.2 Staff cost prognosis documents**

Three communication challenges were found in the analysis of the documents and the channels in which they were sent:

- Unclear directions/responsibilities
- Varied response and quality of data
- Overlap of information

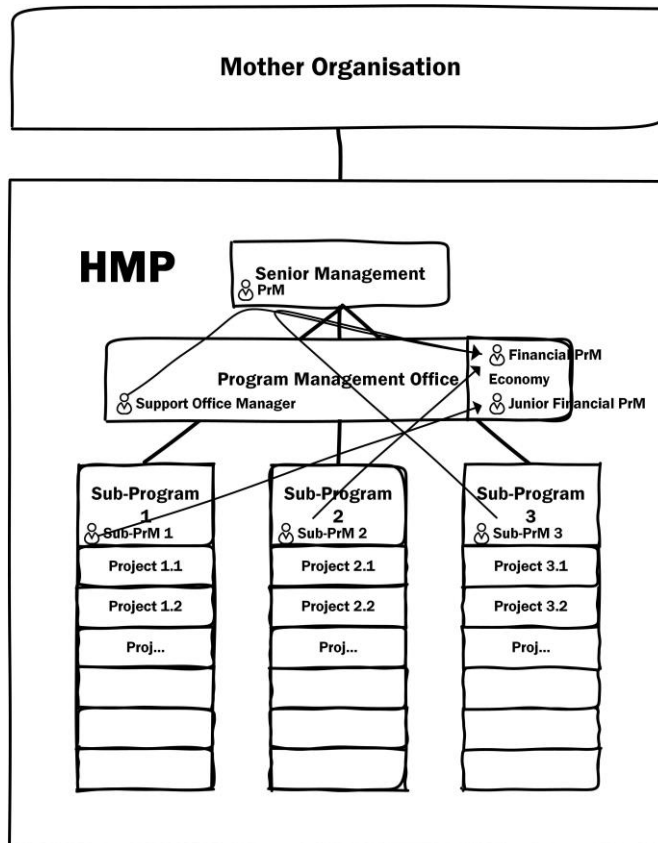


Figure 4 - The figure visualises how the staff cost prognosis documents were sent in the program. The start of each arrow represents the creation of each cost prognosis and the end of the arrow where the document were received. The bent arrows represent a middle step, where the documents were sent to the PrM who forwarded them to the financial PrM.

#### Unclear directions/responsibilities

A proposed structure for quantifying the staff prognosis was sent out by email to the sub-PrMs with the responsibility to create cost data for their own staff. The email asked the sub-PrMs to collect data for the upcoming cost prognosis meeting (observational study) but did not include direction of how to collect or present the data. The email has an excel spreadsheet attached but in the email, it is only referred to as how the sender created her own prognosis. Hence, the structure which was attached to the email can be seen as an example or recommendation for how staff cost can be quantified, not how it should be quantified. In the email, it is only expressed that the receivers (sub-PrMs) should start to think about their staff costs and that it will be further discussed during the cost prognosis meeting. The email did not include if a reply was needed nor to whom that reply should be sent, which might explain why the sub-PrMs responded to different people in the organisation. Their answers ended up at the original sender, the financial manager, and financial sub-managers, hence the emails with the documents had to be forwarded to the financial manager. The email did, however, include notions that the staff prognosis should include the entire program time span. Furthermore, due to the detail of the attached spreadsheet and the reference to it in the email, it should be viewed as a direction to use the same structure for the sub-PrMs to create their own similar spreadsheet.

#### Varied response and quality of data

The response from the sub-PrMs varied in detail, time span and use of software for attached files. One response included only a total cost for the staff for every year of the program. The

attached spreadsheets varied in level of detail and specified cost objects. There were no standardised layout or template used.

#### **Overlap of information**

Some of the spreadsheets included the same staff which created an overlap where the staff seemed to work more than 100%. Hence, the cost for one person was counted more than one time and the information had to be quality assured by the financial function in the PrMO.

## **6.2 Observations**

Two themes directly or indirectly related to communication were found:

- Open and free communication
- No formal documentation

Both observations showed a strong reliance on *open and free communication* in order to allow all participants to share their view on the process (update of cost prognosis) being carried out. An agenda was briefly introduced but seemed secondary in order to allow an open conversation where everyone was allowed to share their opinion. A negotiation took place between senior and sub-PrMs about the most suitable way to compile information from sub-program level.

The meeting members spoke freely and discussed their view on the process, which lead to a share consensus where everybody was heard. *No formal documentation* was taken and the participants wrote down their own responsibilities instead. Since the meetings purpose was to coordinate gathered information no decisions were taken. Rather the financial manager took down information that had changed during the time the participants had worked on the cost prognosis.

Last, the staff prognosis costs were shortly discussed and it was shown that the information in the documents was not sufficient for its purpose. The information lacked in quality and it was either decided that the PrMO should go through them, or that the program members were to remake them.

## **6.3 Interviews**

Four communication challenges were found from the interview study.

- Organically constructed communication network and work structures
- Informal vs. formal communication
- Use of information and communication infrastructure
- Key information flow through the administrative unit

### **6.3.1 Organically constructed communication network and work structures**

The respondents point to the difficulties with the large project organisation, an aspect brought up as a big difference from their previous experiences on smaller projects. They mention that this puts pressure on the communication and information flow since the project members need to coordinate between each other and the functions to a greater extent. The PMs cannot control everything themselves, but need to use PrMO functions and work together with more people than they are used to. One respondent with experience from larger projects emphasised the need for internal communication managers in HMP to manage the coordination of information. She requested not one but a couple of

communication managers (today there is one external communication manager, and an internal communication manager is on its way) that could structure and create processes for communication and information management.

The coordination of the team members is built organically throughout the program's lifetime and is, partially, based on a project structure used for projects in the mother organisation. This project structure is suited for the standard projects in the mother organisation which has a budget around 1,5 million SEK. A respondent from the program management level emphasises the difference between the standard projects and HMP which is in need of an organisation made up not only by managers. Whereas smaller projects are made up of one to two people, she adds, in such projects information is coordinated automatically and there is no need to manage communication. Thus, the structure needs modifications to suit a program that is around 4500 times as large as the standard project. This process is ongoing in HMP as it grows and enters new phases. One example is the internal communication manager which is employed based on needs and the project handbook which will hold the communication plan. When asked why these functions have not been implemented yet the same respondent explained that HMP has scarce resources and the program timeline would have been stretched two years in the future, leading to excess costs due to inflation and extra work. The latter, the respondent further argues, is especially important since it is impossible to know everything in advance when carrying out a complex and large program like HMP, and there is a great risk that the processes and functions created would not fit the program as it evolves.

Moreover, several respondents mentioned that the organisational structure and its communication cannot be copied from other projects or programs, but needs to be reconstructed for every new project. As a PrMO member said: *"there is nothing [communication structure] that can be inherited, it has to be developed in every new project"*, and one PM argued for employees to have an attitude that advocates change and said: *"the communication can always be better and if you have that attitude [that communication can be improved], it also will get better"*. According to most of the respondents, the communication within the program management team works well and that it is getting better and better as improvements are ongoing.

What can be seen from the respondents' answers is that the sub-programs work somewhat independently. A PrMO member describes it: *"my feeling is that the people in the sub-programs are working and communicating a bit like drainpipes, and does not take advantage of the other's [sup-programs] communication processes"*. The program is constantly evolving and the sub-programs is built during different time periods with the effect that the coordination between sub-programs is somewhat lacking and there are no standardised work structures used throughout all three sub-programs. According to some of the respondents, this is a question of time; it is still too early in the program lifecycle in order for it to be fully coordinated along the three sub-programs. A PrMO member said: *"The implementation [of work structures and processes] is difficult but very important, if it is not possible to implement, it is to no use"*. The PrMO member meant that there are difficulties with changing work structures once they are widely used. When trying to implement new structures and processes (that works but is not the most efficient), there is a risk that the new will not be used. Today, the sub-programs develop their own structures and once new directives come from the PrMO and or senior management, it is difficult to change the team members' behaviour and their own developed work structures and processes.

In the organically and sequentially built organisation, the responsibilities are not clearly defined. It is not clearly communicated who does what, and what tasks that belongs to whom. Likewise, the boundaries of the sub-programs seems unclear. This seems to be a question of coordination. For example, a respondent mentioned one case where the same task was simultaneously carried out within two different sub-programs. A spontaneous conversation in the program office corridor lead to the realisation of the same work being carried out in two different sub-programs. As soon as it was discovered it was easily dealt with, but it left the respondents worried about similar clashes unknown to them.

There was no communication between the sub-programs regarding the task, and thus the clash was realised at a critical time of execution. However, the opinions are divided, some thinks that the boundaries between sub-programs are clear, while others do not. The longer experience the respondents had working in larger projects, they interpreted the coordination to be less of an issue. Employees with less experience mentioned an uncertainty that they did not have the right information and relied more on their experienced colleagues. When looking inside each sub-program, this issue does not seem to exist, and according to some respondents, this is a result of well-established structures; everyone knows who to report to, and who is responsible for what. Several respondents believe that the recently implemented activity based office help to promote better coordination since informal meetings between sub-program team members will increase. Previously (one week before the interviews), the sub-program teams and PrMO were split up at different floors in the office building and did not share the same facilities and kitchen, while today, the whole program share the same space allowing them to work anywhere in the office.

Since HMP is early in its program lifecycle, the communication and coordination are a work in progress. Some of the aspects that are currently in the pipeline is a new structure for the meetings to make them more formal, a relationship analysis to get a better understanding of who will be affected by what and more defined role description with responsibilities of all the team members. These are improvements that are believed to solve some of the uncertainties regarding the coordination, especially in combination with the activity based office.

From the interviews, it becomes clear that there are few standardised approaches on how to relate to the other sub-programs, and the communication is primarily informal between members from different sub-programs. However, there are different opinions on whether or not standards should be defined from start or be developed out of the needs. Respondents argue for organically developed routines, although they can have the consequence that the implementation becomes more difficult since employees might need to change their habits accordingly. One example is the newly implemented database which has not been completely established amongst the program members yet, due to members still using the old software.

### **6.3.2 Informal vs. formal communication**

The communication and flow of information in the program is a mix of formal and informal communication. The respondents mention both pros and cons with respect to the two means of communication, and the issue is not which one is best, but rather when it is suitable to use one or the other. Formal means of communication are planned meetings, protocols, documents (drawings, contracts, tender documents, etc) and the processes



regarding information infrastructure (e.g. how to use the program webpage, where to upload documents and notify involved parties or communication procedures during tendering). Informal communication is spontaneous meetings and conversations, emails and phone calls. However, from the observations, it is apparent that even the planned formal meetings can have ingredients of informality (e.g. no formal protocol).

### **Informal communication**

Throughout the entire organisation there is a reliance on informal communication channels. All the respondents mentions the lunchroom and office corridor conversations as one of their main means of communication. Especially between those colleagues who do not work within the same sub-program or field of expertise. There are two different kinds of informal communication in the program: the first is spontaneous informal meetings or conversations that are started without any specific topic in mind, which at times leads to the acquiring of information the actors did not know they needed. The second is when an actor seeks out a colleague in the organisation in order to acquire specific information on a subject.

The first one is almost exclusively mentioned by PMs when it comes to describing communication between actors from different sub-programs or with the PrMO. The effect is increased awareness of what goes around in other parts of the HMP organisation, and, in some cases, the realisation of important unknown aspects (e.g. the example where two sub-programs worked with the same task without knowing it, and unintentionally became aware of it by the coffee machine). The second aspect of informal communication is more straight forward, a question needs to be answered and the person who holds the information is contacted. However, the person who holds the right information, is not always apparent to the one needing it. A couple of respondents find it difficult and time consuming to find the right person with the right information. Hence, they claim that they sometimes make decisions based on, what they feel may be, incomplete information (not all information needed) since they are unsure if they found the right information. One PM states: *"One has to run around [finding different people], get some ambiguous answers and then base your decisions on that [information]"*. The same respondent continued by describing the effect of process cited above: *"It creates insecurity and uncertainty"*. An example is presented in the document analysis where information were created by several different employees (sometimes outside their responsibilities). To gather all information, one has to track down all different people that holds the information. Depending on how long experience the employees have in the organisation, the hunting of the information looks different. Some of the less experienced managers tend to go and search information higher up in the organisational hierarchy to find the right information. Some of the respondents mentions the program webpage as a solution to these issues since they can find information on who is responsible for what, however, this does not always lead to the correct information.

Hence, the difference between the two means of informal communication is that the first coordinates information between sub-programs and function and helps to create a unison view of the program. While the second mean is used to seek out specific information needed in order to make a decision. The similarity is the way they both can create uncertainty, either through, as in the first case, not being aware of potentially important information or, as in the second case, not knowing that the information gathered is correct or sufficient for the decision making.

Even though informal communication is primarily considered positive by the respondents they also demand that some information is better suited in a structured and formal way. These are e.g. decisions being documented in the latest version, clear responsibilities and structured information flows, i.e. to whom, when, how and why something is communicated. It is emphasised due to the need for reliable information to base coordinated decisions on.

### **Formal communication**

The formal communication described by the respondent can be divided into two: meetings and the documentation created from them and the communication infrastructure such as an internal webpage and program databases. The latter is described in sub-chapter 6.3.3 *Use of information and communication infrastructure*.

By respondents, the most commonly mentioned formal mean of communication is the meetings conducted in all the levels and areas of the program organisation. The meetings can be divided into three categories: First, work meetings where challenges, issues, and the work process is discussed between actors who are involved with the subject of the meeting. Second, decision meetings in which decisions are made on both strategic level by the senior management group and project-specific levels by sub-program, project and sub-PMs. And third, *puls* meetings, a larger meetings with voluntary participation with the goal of creating an understanding of work in specific functions of the program organisation. The latter differs from the other and is further explained in the end of the sub-chapter.

The work and decision meetings differ partially by its use of formal tools and documentation. On all levels of decision meetings, a secretary keeps a protocol which is the foundation for the documentation of the decisions made during the meeting. While the work meetings have a less strict structure and documentation, if made at all, are made up of notes. However, the amount of documentation varies depending on the person taking notes and what subjects are being discussed. Hence, decision meetings may lack a formal protocol documentation and the work meetings may involve formal protocol documentation. The need for proper documentations from meetings was brought up by many respondents as an important aspect to create high-quality information. Several respondents mentioned that just having a formal protocol reduces the feeling of uncertainty although they are not always read. A request is to upload the documents on the intranet instead of emailing them since emails are sent to people not concerned about the meeting. Having them on the intranet makes them available for everyone who requests to read them.

From the answers of the respondents, it seems unclear to which degree and when documentations of meetings should be made. Respondents answer ambiguously that it is up to themselves whether or not to document meetings but that there are also some guidelines which are not necessarily followed. One respondent started using her self-made protocol during work meetings since the lack of clear documentation had led to meeting participants not remembering, or changing, what had been decided during the latest meetings. Overall, a more structured way of carrying out meetings and communicating the information from them is a concern by the respondents. This concern is emphasised especially by the actors working on a sub-program level.

The project and sub-PM are to a degree unsatisfied with the level of information produced during the decision meetings and how the information is communicated, especially from the strategic level. Respondents from both the PrMO and sub-program levels notes that

information does not always reach down, or is altered on its way down, to the projects and sub-projects.

However, other respondents argue that such a problem is due to people not informing themselves of what is going on in the organisation (e.g. attending *puls* meetings, looking at the program webpage or reading the protocols). One respondent's opinion on the subject is: *"You can't just sit still and expect to get everything [information] served to you"*. An opinion shared by others respondents. Hence, the respondents have differing opinions on how information should be communicated. There are those who find the information, as explained by one respondent: *"if you receive 25% [of the information] you have to acquire 75% [yourself]"*. And those who take a more passive role to the information flow. However, the passive stance is explained by two other respondents, who are new to the organisation, that it takes time to understand where information is available, i.e. who to ask or where to look. It should, therefore, be noted, that the two respondents, cited above, who argues for the individuals own responsibility for acquiring information, have been in the organisation since the beginning.

The *puls* meetings are voluntary meetings of which anyone in the program organisation can attend. The meeting is carried out on foot and the members walk around to the different project boards (white boards with drawings, schedules etc.) in the individual sub-program, where the responsible member explains the progress of the project. Respondents share a positive view of the meetings which was first initiated in one of the sub-programs and is about to be implemented in the other two. It is appreciated due to its voluntary and unstructured nature where members can attend if they please (which most do) and the conversation is open and information is free flowing. Respondents appreciate the way they get an understanding of the other projects in the sub-program and can be one explanation to why the communication in the individual sub-programs are considered successful. It is encouraged for members outside of the individual sub-program to attend the *puls* meetings, but today they are mostly attended by those in the same sub-program.

### **6.3.3 Use of information and communication infrastructure**

The information and communication infrastructure is built up by information gathering and retrieval systems, and information distribution methods. The main information distribution methods previously described in the chapter 6.3.2 *Informal vs. formal communication* but consists of parts of the PrIS. Within HMP there are several systems used, the program webpage, a newly acquired file sharing system described as the intranet, the mother organisations intranet, and two separate file sharing systems for drawings and other technical documents shared with the contractors. These systems are used simultaneously with various success. Overall it seems that the systems used for external information sharing work better than internally, as one of the PMs said: *"internal communication is usually taken with laziness, while in the external communication is usually a contract governing the communication and documentation"*.

#### **Program webpage**

The program webpage is used as a bulletin board for the program. This webpage is not used for external communication, but it is not locked for the contractors or other involved parties. The program webpage contains information about the team members, vision, mission, program goals, administrative questions, management questions, overall status of the program and other organisational questions.

All of the respondents are satisfied with this program webpage, and points out the advantage of having the webpage early on in the program lifecycle. This webpage is updated regularly by all employees (mainly administrative staff) and contains useful administrative information, and provides a possibility to read in peace and quiet. The program webpage is useful for one-way communication, and as one of the respondents said: *"the [detailed] information [sought for] is not necessarily there, but it informs you of how and where you will find it"*. One of the most useful features seems to be the employee information where it is possible to find the role of program members, which sub-program they belong to and their contact information. This feature can be used to understand the informal communication, e.g. look up who is responsible and then find her for an informal conversation.

According to the respondents, everything that is supposed to be on the program webpage is not there or updated to the latest version. It seems to be some miscommunication of what information that should be on the webpage and who has the responsibility for uploading it. In the future, the administrative staff will hold education in the program webpage in order for everyone to know their responsibilities concerning the page (e.g. who will update what information, how do you update the page and what information should be updated).

However, templates are uploaded to the webpage and one example, seen by the respondents as a successful method, is the template created by the financial manager used by sub-PrMs and PMs to share the financial progress of projects. The template is a spread sheet file in which financial data for specific work (consultant, contractors etc.) is inserted. The filled-in template is sent by email to the financial manager who compiles the information to cover the entire program. It is appreciated due to its simplicity since PMs and sub-PrMs can acquire most information from the contractors and consultants and then just insert it in the designated slot in the spread sheet.

### **Intranet**

The intranet is a new system and has only been up and running for a couple of months. According to a PrMO member, it will work as the program's "desktop" and it primarily function is internal information sharing. The implementation of the intranet has gained positive response from the program management team, and the respondents think that it will work well in the future. Although, it will take some time for everyone to get used to it. The intranet is built up by a folder structure with the purpose for it to be easy to follow. It contains for instance meeting protocols and reports and does also include a version control which is a useful feature and helps the structure. However, some of the information is not uploaded to the intranet due to lack of routines. As some of the PMs said: *"it should be uploaded on the intranet, although I will admit that I have not always uploaded everything"*.

Some of the respondents have a wish to use the intranet more in order to avoid mail bombing. They say that they spend a lot of time hunting and giving information over mail when it could be uploaded on the intranet; a challenge seen in the staff prognosis information flow. One respondent stated that it is important that the folder structure is clear and easy to use and navigate in, and that it is important that everyone uses the intranet the same way in order for it to be trusted. Since the intranet is newly implemented one person from the PrMO is in charge of coordinating the folder system with the structure of the program organisation.

### Mother organisations intranet

The mother organisations intranet is mainly used by the operation/occupation. This intranet is avoided by the respondents since there is a lot of information that does not concern the program but the mother organisations all other activities. Most of the useful information on this intranet is mirrored in the program webpage.

### Two external file sharing systems

These two file sharing systems are used for technical documents, mainly drawings, and are shared with contractors and other involved parties. These systems work well, although there has been some uncertainty due to changes from one system to another. The change is based on that the first system was not user-friendly, and they wanted to improve it. The change influenced several projects and some had to change system in the middle of the design phase which complicated the communication over some time. However, due to the standardised user framework all of the respondents knows were, and what to find in the systems.

#### 6.3.4 Key information flow through the administrative unit

The administrative staff is made up of coordinators, secretaries, and receptionists of the program organisation. They are present at all levels of the organisation, from the individual projects to the senior management see figure 5

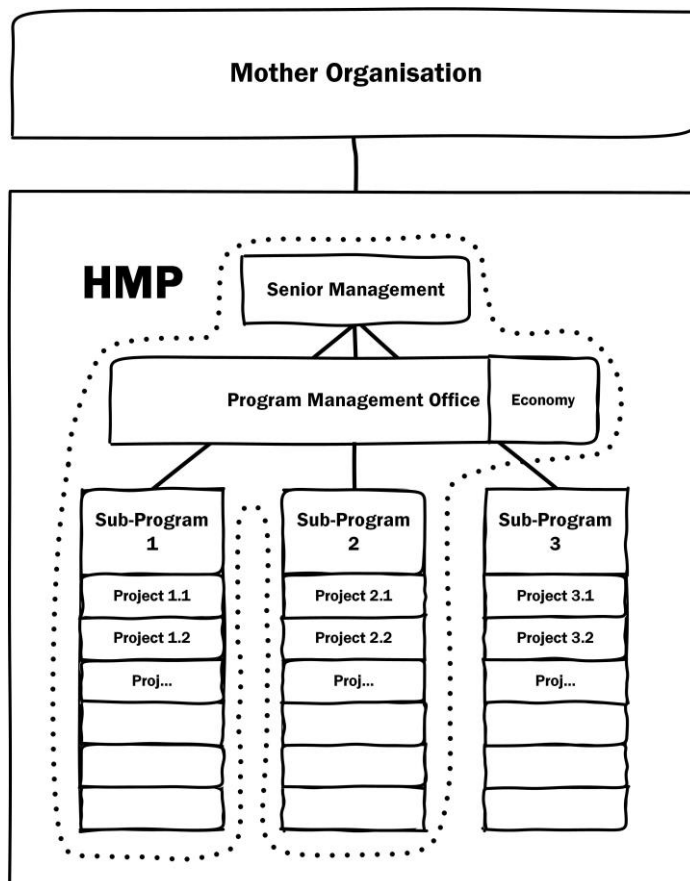


Figure 5 - The figure visualises where in the organisation the administrative staff is present as a dotted area surrounding senior management, program management office and sub-program 1 & 2.

From a communication and information coordination perspective the administrative staff (AS) of HMP have two roles; a formal role in which they write notes, protocols and distribute them as well as form and build the administrative structure of HMP; and an informal role in which they act as information coordinators between the different functions and levels of HMP. However, during interviews with PMs and sub-PrMs, it is the writing of notes and protocols that are mentioned regarding the AS roles in communication.

The formal communicative role to attend meetings and write/distribute protocols has a more informal role than it seems. The AS utilises internal guidelines where processes used in one part of the organisation is implemented by others in the AS. The AS holds their own meetings in which processes are discussed and information between the levels and projects of the program is shared. By attending many of the meetings held at HMP they have the possibility to gather information from all levels and later share them in their own internal meetings. The information gathered is then used in part to build the administrative structure of the HMP organisation.

Furthermore, one respondent from the AS explained how the meetings on project and senior levels, in combination with the AS meetings, results in information being shared and distributed throughout the programs members. Hence, they have an integrating role by being part of both the AS with its overall program focus and the individual sub-program and functions in the organisation. This role is, by the AS, seen as an informal way of spreading information over sub-programs, projects, and functions. The spread of information is made through spontaneous conversations in the corridors or in meetings in which they write the protocols. One respondent from the AS described her role in the program as that of a spider in a net. Another respondent from the AS sees it as one of her core functions to gather information from everyone and distribute it to the right people. She continues with *"there is so much information in HMP that it must be carefully selected and distributed"*. The other respondents share the view of the AS as spiders in a net, however, many of their other communicative roles are not seen or mentioned by respondents from outside of the AS.

The AS are promoters of the formal communication of HMP. They stress the importance of following protocol and using similar structures in them. In that way, as expressed by one respondent *"if they [members of HMP] recognise the structure [of the protocol] it is easy for people to find what they are looking for immediately"*. Creating a structure is one of the roles of the AS when building the administrative structure of the organisation. The building of the administrative structure is seen by one respondent as a way of keeping the organisation together and making it easier for the members of the organisation to find what they are looking for. One respondent from the AS stresses the importance of quality of the protocols, they should be easy to follow and contain no uncertainties. Not using proper documentations during meetings has been brought up as a problem by respondents from outside the AS. One respondent mentions the risk of Chinese whisper, where information is changed when it goes through the members of the organisation. Especially from top to bottom and when no protocols are available.

## **6.4 Summary of key findings from HMP**

The collected findings show that there is a primary reliance on informal communication and the information coordination is based on individual preferences. The respondents do not consider this to be a problem and emphasise the importance of such communication since it is a quick way of acquiring sufficient information. The observations of the cost prognosis

meetings was an open conversation which allowed the members to share their views. And the process was negotiated to help both senior and sub-program managers. However, respondents on sub-program level argue that meetings with open conversations can be the source of the Chinese whisper challenge, where information is altered or omitted as it travels downwards. On the other hand, the second observation, in which the results gathered since the first meeting was presented, showed that the issues discussed had provided results and the financial team of the PrMO was able to create a new prognosis based on the information received. Hence, the objective of the meeting was met and the information supplied by the meeting initiator had been received by its members who were able to provide the necessary information.

Respondents on sub-program level requested reliable information channels which are lacking in the email correspondence between those involved in the document studies. However, the findings show a strong use of informal communication which is mainly interpreted as positive from the interview data; while the document data is interpreted to be less positive since the information shared and gathered was unreliable and lacked in quality. With the upcoming implementation of the new database and the program handbook (containing the communication plan), uncertainty may be reduced due to the availability of high quality and reliable information and communication channels.

This brings us to an important aspect of the case, HMP is still in its initial phase and many of the processes are under development as the program adapts to its growth and changes. Two years ago the program team was made up of less than ten people and the processes necessary now would have been redundant then. On all levels of the program, there is an emphasis on the need for the program organisation to grow organically due to the risk of otherwise creating processes that would be obsolete six months in the future. During the past years, HMP has invested in administrative staff who coordinates information both formally and informally. They oversee communication channels and make sure that information is properly documented, and in the future properly stored in the database. The organisation has implemented *puls* meetings open to everyone in the organisation. The *puls* meetings are meant to spread information of the progress and challenges within the individual sub-programs and projects and are seen as a fruitful tool by the respondents in the program organisation. Furthermore, the organisation has recently moved to a co-located activity based office, not evaluated in this thesis, which by respondents is brought up as an effective way of breaking down barriers and increase communication between all levels and functions of the program.

Finally, HMP shares many of the challenges mentioned in the literature on program management as well as functions and tools recommended for programs. HMP is struggling with immense data flows which need to be managed and made into high-quality information to be used for decision making. The organically and sequentially built structure and processes solve problems but also lead to unclear information channels and role responsibilities. Informal communication spreads vital information but is hard for the program members to know if they have acquired the correct information. Boundaries are created which increases cooperation and communication within the individual sub-programs and functions but act as an obstacle for cross-functional communication. There are trade-offs between solutions and challenges. However, the HMP organisation is aware of these complex challenges and the need for proper management of communication which is already showing effects in the tools and processes implemented.

HMP has implemented or are about to implement, many of the functions and tools recommended in program literature. As well as created case specific tools which could be of interest to similar programs. Overall, communication in HMP works well but challenges will always be present when working in an uncertain and complex environment of programs. Improvements can always be made, as said by one respondent: *the communication can always be better and if you have that attitude [that communication can be improved], it also will get better".*



## 7 Discussion and conclusions

---

The structure of the discussion follows the three sub-questions in order to answer the main research question *how can a megaproject's internal communication benefit from being managed as a program?* The discussion is based on a combination of program management literature and the findings from the case study.

---

### 7.1 What are the challenges with internal communication in large complex programs?

The discussion around the first sub-question can be divided into three themes and are followed by a concluding section:

- Lack of cross-functional communication
- Uncertainty and uncoordinated information
- Lack of database

#### 7.1.1 Lack of cross-functional communication

Similar to the findings in program literature, HMP shares the challenge with lack of cross-functional communication (Müller et al., 2008). The most obvious sign of this challenge in HMP is the example of the one task that was carried out simultaneously in two of the sub-programs. Which lead to double work and the feeling of uncertainty on sub-program level. The members of the two different sub-programs were unaware of each other's activities regarding the task. Hence, HMPs cross-functional communication challenges are related to the isolated project proposed by Elbanna (2010) and not the intentional withholding of information proposed by Laufer et al. (1996).

#### 7.1.2 Uncertainty and uncoordinated information

HMP is relying on informal communication which has proved successful for the internal communication in the individual sub-programs. However, the information flow from the top down to sub-program levels is considered a challenge by the members of the organisation and a formal way of documenting decisions is requested. This was brought up during the interviews, where respondents mentioned unstructured meeting disciplines which may result in the members leaving the meetings with uncoordinated and contradicting information which they then supply to sub-program level. Contradicting information is, according to Thiry (2002), especially problematic in endeavors such as HMP due to the immense flow of data. The effect, in combination with the lack of a database, is that members on sub-program level worry about basing sub-optimal decisions on incomplete information. Furthermore, the informal communication with its "grapevine" creates uncertainty for new employees who does not know who holds or needs information.

#### 7.1.3 Lack of database

Due to the current lack of a database, HMP is struggling with an immense flow of uncoordinated data. This is most apparent in the two document studies where information concerning the entire program, or a greater part of it, is communicated through emails or as printed documents locked away in cardboard boxes. The literature on program management found similar problems in their cases and also attributed it to the lack of databases (Elonen and Artto, 2003; Shehu and Akintoye, 2010). However, it is important to mention that this challenge is acknowledged and a database is currently on its way in HMP.

#### **7.1.4 Conclusion: sub-question 1**

HMP shares many of the communication challenges found in program management literature, however, since we only studied one case it cannot be ruled out that it might be a coincidence. But hopefully, it indicates that the solutions from the same literature and our case to some extent are generalizable to programs.

#### **7.2 Can findings from the case be relevant for the challenges found in program management literature?**

The discussion around the second sub-question can be divided into two themes and are followed by a concluding section:

- *Puls* meetings
- Administrative Staff as project scouts and promoters of standardisation

##### **7.2.1 Puls meetings**

Development of the *puls* meetings of which anyone can attend is a recommended successful internal process to be implemented program-wide in order to promote cross-functional communication. With its loose formal structure (voluntary participation, no agenda) the *puls* meeting is an appreciated tool that spreads information beyond sub-program boundaries. The *puls* meetings cross-functional communication effect is today mainly attributed to the AS who attends both the *puls* meetings and their own internal meetings, in which information between all sub-programs and the PrMO is shared. The *puls* meeting was created in one of the sub-programs in order to spread awareness among its members about the progress and challenges in the projects and sub-project. In accordance with Kendall and Rollins (2003) the *puls* meeting, seen as a successful internal process, should be implemented on a program-wide level so that progress and challenges are shared between all projects in the program. Hence, it is a way to reduce the uncertainties found in HMP and improve cross-functional communication which is considered important by scholars (Muller et al., 2008; Laufer et al., 1996; Elbanna, 2010).

The *puls* meetings also support the idea to slowly implement processes organically from the needs present in the organisation (Thiry, 2002; Lycett et al., 2004). And HMP unintentionally follows Shehu and Akintoye (2010) recommendation not to implement every process or tool early on in one setting but instead allow the natural changes in the program to show the way. As the program grew, HMPs organisation found it necessary to implement the *puls* meetings and had another process been implemented years earlier it might not have had the same beneficial effects and unnecessary time had been spent on investing in sub-optimal tools. However, due to the open nature and the voluntary participation of the *puls* meetings we believe it could be used in similar programs early on, as program organisations grow. It is a simple tool much in the relation to the KISS approach, recommended by Kendall and Rollins (2003), and can easily be altered and changed for the specific need of other similar programs.

##### **7.2.2 Administrative Staff as project scouts and promoters of standardisation**

The AS are seen by both respondents and themselves as spiders in the net who have a connection to many functions in the program both formally through moderating meetings and informally by administrating tasks on all levels of the program. And since they are currently crossing the boundaries of the different functions of the organisation, by being part of both the AS and the individual sub-program or program function, they can be

considered project scouts (Elbanna, 2010, Fisk et al., 2010). Their work as project scouts can also be seen as a successful internal process (Kendall and Rollins, 2003) since the AS started holding their own internal meetings in which they share cross-functional information. Furthermore, the AS promotes common metrics and methods, both important for program management (Blomquist and Muller, 2006b; PMI, 2013c; Kendall and Rollins, 2003), by working on keeping a structured documentation through standardised protocols and upload them to the database.

### **7.2.3 Conclusion: sub-question 2**

One of the most important functions and interesting findings related to communication in the HMP is the role of the AS. The complex interrelated nature of megaprojects creates a need for an internal organisation of which the AS has a core function, due to their role as an information gatherer, provider, administrator and process creator. Today they hold the communication role which literature recommends for the PrMO. Hence, it is an internal successful approach for HMP, and we see no need to have the PrMO take over this role. The collaboration of the AS and the PrMO is, however, further developed in the conclusion of sub-question 3.

## **7.3 How can program management address the challenges with internal communication in large and complex programs?**

The discussion around the second sub-question can be divided into two themes and are followed by a concluding section:

- Database and common metrics and methods
- PrMO as coordinators of information and creators of communication processes

### **7.3.1 Database and common metrics and methods**

One way of improving both formal and informal communication is to adopt common methods and metrics, recommended by Blomquist and Müller (2006b). A widespread use of the same processes and metrics will not only support formal documentation with its comparable data, but the members are less likely to misinterpret or misunderstand each other while exchanging information in informal settings. In HMP, a common metric is already used for financial progress data which is gathered by the PrMO through the use of a template. This allows the PrMO to easily compile all the information into one document. However, as seen in the document studies, where information was hard to obtain or sent to the wrong people, HMP needs to create proper communication channels. We believe the database is a solution to this challenge.

HMP is currently building a new database based on the need of the organisation. It is created, as Kendall and Rollins (2003) recommends, by members of the PrMO team, and will be made up of a folder structure in which the members of the organisation uploads documents. The database needs to be administered so it can change and grow organically with the program. At the same time, it must be used similarly by all members of the organisation as stated by respondents in the AS, and supported by Letavec et al. (2008) who encourages template documents to be used and uploaded. The database is one of the communication forms where a strict formal approach is recommended. If the information in it is unreliable (use of incompatible data, documents with no clear dates or version number) it would not be used by its users and it will soon be abandoned. Documents and files uploaded should be marked with dates and version numbers in order to decrease

uncertainty, something requested by respondents from HMP. It is important that it is used the same way by everyone in order for the members to easily find the information they are looking for. However, it demands that the members actively search for the information.

Furthermore, we argue that the database should act as a channel for communication. Instead of emailing information, as in the case of the staff prognosis document study, the template document should be uploaded in a specified folder in the database with the involved members uploading their answers in the same folder. This is similar to the financial progress template used today in HMP, with the difference of it being uploaded to a folder instead of being sent by email. This creates clear communication channels for the immense dataflow (Elonen and Artto, 2003; Shehu and Akintoye, 2010) and unnecessary forwarding of emails and time spent on gathering information can be eliminated. In addition, the storing of the information in one designated folder simplifies updating of a new version when new staff prognosis is being made as well as reducing risks of information being lost. These aspects reduce the risk of double work which has been seen in other researchers findings (Elonen and Artto, 2003, Lycett et al., 2004); And hopefully, the risk of carrying out of the same task simultaneously in two different sub-programs will be reduced when information is available and easy to navigate through.

### **7.3.2 PrMO as coordinators of information and creators of communication processes**

The PrMO are essential in the creation of common metrics and methods for two reasons. First, they are situated between senior management and sub-programs and can adhere to the need of both parties. That is, the information needed by the senior management must be easy to acquire by sub-program members, and the information acquired by the sub-program members must be essential to senior management as pointed out by Kendall and Rollins (2003). The PrMO acts as a negotiator by finding a suitable common metric and a process for acquiring and condensing relevant information, all within the KISS approach. A Secondary effect is the sub-program and senior management-specific information acquired by the PrMO who hence gains an understanding of the communication need and ways of improving it. The PrMO is an active party in developing the program in the organic fashion, recommended by Thiry (2002) and Shehu and Akintoye (2010), by creating tools and processes as the needs appear (Kendall and Rollins, 2003). This, however, creates a contradiction between the organically, "create processes as we go", and the need for standardisation. If processes are created as needs appear there will be a timespan when no process is available. As seen in the two document studies the informal communication was not enough to coordinate information reliably. Hence, we argue that the PrMO needs to work proactively and learn from previous challenges.

This brings us to the second reason. When the different experts in the PrMO design tools and processes for information coordination it can be used as successful internal processes (Kendall and Rollins, 2003) and the PrMO members can combine tools to adhere to many of the different information needs in the program simultaneously. One example is the financial progress template currently in use in HMP. By adopting a similar template for other information needs, such as time prognosis, risk and/or environmental impacts, the program members, who have used the financial progress template, recognises the structure which increases the chance of implementation and lowers time spent on learning new tools. An aspect which is important due to time constraints mentioned in both our case and the

literature (Laufer et al, 1996) and in order to close the time gap where no process is implemented.

Furthermore, it creates high-quality information available for decision making on both senior and sub-program level, emphasised by Blomquist and Müller (2006b). However, we believe it is important to be critical when to implement internal processes since too many processes may cause confusion, uneven use, and abandonment of processes, which was seen in HMP with its use of multiple software for data storage. This aspect further supports our and scholars (Letavec et al., 2008, Kendall and Rollins, 2003) view that the PrMO should oversee these processes and coordinate them. Last, the PrMO and the AS should work closely together during these processes. In this way, the communication knowledge created through the scout role (Fisk et al., 2010) of the AS can be utilised by the PrMO staff who needs to gather and coordinate their discipline specific information.

### **7.3.3 Conclusion: Sub-question 3**

The organically built organization of HMP is in line with the recommended approach found in the literature on program management. However, sequentially built processes created when the need appears does create a time gap where no standardized process is used. With an integrated PrMO working proactively these gaps can be kept to a minimum. A closer collaboration with the members of the organization allows the PrMO to act more quickly to the changes in the program. However, projects are uncertain and the members of the program are aware of it and they know how to navigate in this environment as seen from the use of informal communication. By having the PrMOs staff integrated into the entire organisation through attendance of *puls* meetings and its utilization of the project scouts from the AS, these uncertainties can be found earlier and previously used processes and tools can be changed to adhere to the new situation. The database can create structure and allow simpler channels of communication when information is made more accessible which helps to further mitigate the uncertainties. The database should be managed by members of the PrMO.

The AS is a key mediator of information but they do not have the knowledge of every information need in the organisation, it is for example not recommended that the AS creates the template for the staff cost prognosis. Hence, the PrMO should use the communication infrastructure and processes used and created by the AS to relay and gather their information. One way of achieving this is to make one person from the AS the communication manager of HMP. Furthermore, a more integrated PrMO increases the possibility to implement successful internal processes, program-wide, and they alleviate the PrM from micro-management responsibilities wrongly associated with her role and she can instead focus on macro management.

## **7.4 Future research**

Our findings show an importance of the administrative staff and their impact on communication in megaprojects managed as programs. Future research should look at their overall impact in megaprojects, preferably with a focus on the different organisational needs compared to standard projects made up of a small project organisation.

Due to the lack of databases in our case and in the program management literature, IT solutions for communication in programs is an important research topic. In today's IT-society it seems obvious that major construction projects use databases, but it is apparent this is not the case while the consequences for communication are. Research carried out by

software engineers with the focus on databases in long but temporary projects may help find tools to mitigate the communication challenges seen in HMP and program literature.

Specific research opportunities from the HMP case are the effect of the activity based office which was being implemented during our research. Our case gives the opportunity to compare the communication prior to and after the implementation. And last, look into how the *puls* meetings create a holistic view of a program and the effects it has on performance.

## **8 Reflections of the process**

The authors of this paper decided early to invest two weeks of time to implement tools and knowledge acquired from our master program, Design and construction project management. A time plan was created early on to give us an understanding of the work ahead. Risks were assessed and added to the time plan in order to be able to stay on schedule if unforeseen events occurred.

We scheduled five 8 hour working days per week and booked the same room every day in order to avoid time being spend on finding a suitable place to work. Every Monday started with an internal evaluation during which we decided on the work that needed to be finished by Friday, the tasks were written down and crossed over after completion. This allowed us to see the progress and boosted our moral even in the most critical of times. This should not be underestimated, work breakdown structure makes, what seems like an impossible endeavor looks easy. The Monday meeting also included an internal evaluation of our team work. Even though nothing major was brought up as a problem, it was important to make it mandatory for us to feel secure in our two man team.

The structured work method allowed us to finish earlier than anticipated and we rarely felt stressed. We had the luxury to end early some days when the inspiration was lacking. We believe this is an important approach to writing a master thesis, if it becomes boring, stop for the day. Do not sit uninspired and let the hours roll by, take an early day, go home, meet friends and come back the day after, often with a new sense of inspiration. We took the time to celebrate when specific goals were met. The celebration was made up of a cookie and the song "Celebrate good times" by Kool and the Gang, do not underestimate celebration... time.

## 9 References

- ACKOFF, R. L. 1989. From data to wisdom. *Journal of applied systems analysis*, 16, 3-9.
- ARITUA, B., SMITH, N. J. & BOWER, D. 2009. Construction client multi-projects—A complex adaptive systems perspective. *International Journal of Project Management*, 27, 72-79.
- ARMSTRONG, M. 2006. *A Handbook of Human Resource Management Practice*, Kogan Page.
- BLOMQUIST, T. & MÜLLER, R. 2006a. *Middle Managers in Program and Project Portfolio Management: Practices, Roles and Responsibilities*, Project Management Institute.
- BLOMQUIST, T. & MÜLLER, R. 2006b. Practices, roles, and responsibilities of middle managers in program and portfolio management. *Project Management Journal*, 37, 52.
- BRUZELIUS, N., FLYVBJERG, B. & ROTHENGATTER, W. 2002. Big decisions, big risks. Improving accountability in mega projects. *Transport Policy*, 9, 143-154.
- COST. 2011. *The Effective Design and Delivery of Megaprojects in the European Union (MEGAPROJECT)* [Online]. European Cooperation in Science and Technology. Available: [http://www.cost.eu/COST\\_Actions/tud/TU1003](http://www.cost.eu/COST_Actions/tud/TU1003) [Accessed 160330 2016].
- CRAMPTON, S. M., HODGE, J. W. & MISHRA, J. M. 1998. The informal communication network: Factors influencing grapevine activity. *Public Personnel Management*, 27, 569-584.
- DAINTY, A., MURRAY, M. & MOORE, D. 2006. *Communication in construction: theory and practice*, London, Taylor & Francis.
- DEN OTTER, A. & PRINS, M. 2002. Architectural design management within the digital design team. *Engineering Construction and Architectural Management*, 9, 162-173.
- DIETRICH, P. & LEHTONEN, P. 2005. Successful management of strategic intentions through multiple projects—Reflections from empirical study. *International Journal of Project Management*, 23, 386-391.
- DUBOIS, A. & GADDE, L.-E. 2002. Systematic combining: an abductive approach to case research. *Journal of business research*, 55, 553-560.
- ECKERT, C. & CLARKSON, J. 2004. If only I knew what you were going to do. *Methods and tools for co-operative and integrated design*. Springer.
- ELBANNA, A. 2010. Rethinking IS project boundaries in practice: A multiple-projects perspective. *The Journal of Strategic Information Systems*, 19, 39-51.
- ELONEN, S. & ARTTO, K. A. 2003. Problems in managing internal development projects in multi-project environments. *International Journal of Project Management*, 21, 395-402.
- ERIKSSON, T. A. S. 2016. *Designing the Design Organisation - Client-Consultant Coordination in a Large Infrastructure Project*. PhD. New series, nr: 4038, Chalmers University of Technology.
- ESTY, B. C. 2004. Why study large projects? An introduction to research on project finance. *European Financial Management*, 10, 213-224.
- EWEJE, J., TURNER, R. & MÜLLER, R. 2012. Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. *International Journal of Project Management*, 30, 639-651.
- FERNS, D. C. 1991. Developments in programme management. *International Journal of Project Management*, 9, 148-156.
- FISK, A., BERENTE, N. & LYYTINEN, K. Boundary Spanning Competencies and Information System Development Project Success. ICIS, 2010. 96.



- FLYVBJERG, B. 2007. *Megaproject Policy and Planning: Problems, Causes, Cures*  
*Megaprojekters politik og planlægning: Problemer, årsager, løsninger*. Disputation,  
Aalborg Universitet
- FLYVBJERG, B. 2014. What you should know about megaprojects and why: An overview.  
*Project Management Journal*, 45, 6-19.
- GAREIS, R. & HUEMANN, M. 2000. Project management competences in the project-  
oriented organisation. *Gower handbook of project management*, 3.
- GIEZEN, M. 2012. Keeping it simple? A case study into the advantages and disadvantages of  
reducing complexity in mega project planning. *International Journal of Project*  
*Management*, 30, 781-790.
- HAIDAR, A. & ELLIS, R. Analysis and improvement of megaprojects performance.  
Proceedings of Engineering Project Organizations Conference, 2010.
- KENDALL, G. I. & ROLLINS, S. C. 2003. *Advanced Project Portfolio Management and the PMO:  
Multiplying ROI at Warp Speed*, J. Ross.
- LAUFER, A., DENKER, G. R. & SHENHAR, A. J. 1996. Simultaneous management: the key to  
excellence in capital projects. *International Journal of Project Management*, 14, 189-  
199.
- LETAVEC, C. J., ROLLINS, S. C. & ALTWIES, D. 2008. *Program Management Professional  
(PgMP): A Certification Study Guide with Best Practices for Maximizing Business  
Results*, J. Ross Pub.
- LYCETT, M., RASSAU, A. & DANSON, J. 2004. Programme management: a critical review.  
*International Journal of Project Management*, 22, 289-299.
- MAIER, A. M., KREIMEYER, M., HEPPELE, C., ECKERT, C. M., LINDEMANN, U. & CLARKSON,  
P. J. 2008. Exploration of correlations between factors influencing communication in  
complex product development. *Concurrent Engineering*, 16, 37-59.
- MAYLOR, H., BRADY, T., COOKE-DAVIES, T. & HODGSON, D. 2006. From projectification to  
programmification. *International Journal of Project Management*, 24, 663-674.
- MÜLLER, R., MARTINSUO, M. & BLOMQUIST, T. 2008. Project portfolio control and portfolio  
management performance in different contexts. *Project Management Journal*, 39,  
28-42.
- PARTINGTON, D., PELLEGRINELLI, S. & YOUNG, M. 2005. Attributes and levels of programme  
management competence: an interpretive study. *International Journal of Project*  
*Management*, 23, 87-95.
- PAYNE, J. & TURNER, R. 1999. Company-wide project management: the planning and control  
of programmes of projects of different type. *International Journal of Project*  
*Management*, 17, 55-59.
- PELLEGRINELLI, S. 1997. Programme management: organising project-based change.  
*International Journal of Project Management*, 15, 141-149.
- PLATJE, A. & SEIDEL, H. 1993. Breakthrough in multiproject management: how to escape the  
vicious circle of planning and control. *International Journal of Project Management*,  
11, 209-213.
- PLOTCH, P. M. 2015. What's Taking So Long? Identifying the Underlying Causes of Delays in  
Planning Transportation Megaprojects in the United States. *Journal of Planning*  
*Literature*, 0885412214566116.
- PMI 2013a. *A guide to the project management body of knowledge (PMBOK guide)*,  
Newtown Square, Pennsylvania, Project Management Institute.

- PMI 2013b. *The standard for portfolio management*, Newtown Square, PA, Project Management Institute.
- PMI 2013c. *The standard for program management*, Newtown Square, Pa, Project Management Institute.
- PRIEMUS, H., FLYVBJERG, B. & VAN WEE, B. 2008. Decision-making on mega-projects. *Cost-Benefit analysis, Planning and Innovation*. Cheltenham.
- REMINGTON, K. 2011. *Leading complex projects*, Burlington, VT;Farnham, Surrey;, Gower Pub.
- SENESCU, R. R., ARANDA-MENA, G. & HAYMAKER, J. R. 2012. Relationships between project complexity and communication. *Journal of Management in Engineering*, 29, 183-197.
- SHEHU, Z. & AKINTOYE, A. 2009. Construction programme management theory and practice: Contextual and pragmatic approach. *International Journal of Project Management*, 27, 703-716.
- SHEHU, Z. & AKINTOYE, A. 2010. Major challenges to the successful implementation and practice of programme management in the construction environment: A critical analysis. *International Journal of Project Management*, 28, 26-39.
- SOWDEN, R. 2011. *Managing Successful Programmes*, London, The Stationery Office.
- SUN, J. & ZHANG, P. 2011. Owner organization design for mega industrial construction projects. *International Journal of Project Management*, 29, 828-833.
- THIRY, M. 2002. Combining value and project management into an effective programme management model. *International Journal of Project Management*, 20, 221-227.
- THIRY, M. 2004. "For DAD": a programme management life-cycle process. *International Journal of Project Management*, 22, 245-252.
- THIRY, M. & DEGUIRE, M. 2007. Recent developments in project-based organisations. *International journal of project management*, 25, 649-658.
- TURNER, J. R. & SPEISER, A. 1992. Programme management and its information systems requirements. *International Journal of Project Management*, 10, 196-206.
- VAN MARREWIJK, A. 2007. Managing project culture: The case of Environ Megaproject. *International Journal of project management*, 25, 290-299.
- VAN MARREWIJK, A., CLEGG, S. R., PITSIS, T. S. & VEENSWIJK, M. 2008. Managing public-private megaprojects: Paradoxes, complexity, and project design. *International Journal of Project Management*, 26, 591-600.
- WHITE, D. & FORTUNE, J. 2002. Current practice in project management—An empirical study. *International journal of project management*, 20, 1-11.
- VIDAL, L.-A., MARLE, F. & BOCQUET, J.-C. 2011. Measuring project complexity using the Analytic Hierarchy Process. *International Journal of Project Management*, 29, 718-727.