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Investigating the importance of soft skills for project success in complex projects

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Foreword

This master's thesis marks the completion of a two-year master's program in Business administration with a specialisation in Industrial Economics at the University of South-Eastern Norway.

I would like to express my gratitude to the company and the participants of this research for taking time to share their experience and knowledge with me. Despite a busy schedule, the participants have welcomed my questions, and they have been a valuable asset to this work.

I would also like to thank my supervisors Ole Boe and Roland Hellberg for guidance and discussions throughout this research. It has given me reflections, insight, and encouragement to continue and finish my work.

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Last, but not least, I would like to thank my two daughters, Isabelle Josefine and Linnea Marie, for their incredible patience and understanding throughout these years.

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Summary

Almost all organisations strive to use their resources as efficiently as possible. Project management literature has a lot of focus on development of tools and methods to help project managers to manage their projects. What has not been discussed to any great degree yet is that soft skills and human behaviour have a bigger influence on the process of project execution than previously assumed. The overarching question in my research is therefore "*To what extent do soft skills influence project success in complex projects?"* The theoretical framework is first and foremost project literature, but the framework is later expanded to include the data from the case studies I conducted.

Construction, architecture and engineering projects are complex activities, involving a temporary grouping of people and companies, with different agendas and experience, coming together to achieve a project goal. The case studies demonstrate how projects use tools and methods in project execution and how soft skills contribute to achieving project success. My emphasis was on group dynamics, internal communication and motivation. I have also examined to what extent projects followed the formalities introduced by the company.

The case studies showed that people's communication and motivation differ which in its turn influences the group dynamics and the choice of tactics that the project manager chooses for managing the project team. My analysis also showed that the company invests huge resources into implementing project management methodology and that everyone within the company are aware of that good project management is important and profitable. However, when it came to the practical application of project management tools and following up the routines that were set up, my cases showed that there is a variation to what extent the theory, tools and methods were applied. Ultimately, the project managers' flexibility adapting their leadership style as well as close monitoring was equally important for project success as the use of project management tools.

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1 Introduction

1.1 Background

Projects drive business innovation and change. In fact, as Shenhar and Dvir (2007) point out, the only way organisations can change, implement a strategy, innovate, or gain competitive advantage is through projects. During the last century, the demand and growth for innovation has escalated as well as the amount and complexity of projects. Not only did the product life cycle become shorter, but also customers today demand greater variety and more choices. In addition, market globalisation is forcing businesses to respond to local demands and to low-cost competition around the world (Shenhar & Dvir, 2007). All these factors challenge project management as a discipline.

The fast-changing world makes the process of project delivery unpredictable. Customers' needs, requirements or external conditions can change quickly. Thus, despite good scope definitions and clearly specified requirements, project managers inevitably receive requests to change specifications or a project's scope. Consequently, the changing external environment influence the way project management is executed. It requires more involvement from each project member throughout whole project execution process as well as closer communication among team members.

To realise any project, be it large or small, complex or simple, requires the interaction of a variety of organisations and individuals with complementary knowledge, skills and abilities (Emmitt, 2010). Projects involve real people with their own ideas, habits, ambitions, strategies, strengths and weaknesses. There are many indications that it is the manner in which a project team interface during the life cycle of the project that determines how successful or failed the project will be. Technical skills alone are not sufficient; people in the project team must also possess the necessary social skills to be able to work together efficiently and effectively (Emmitt, 2010). Social interaction is an important facet of successful projects. Failure to deliver objectives to agreed standards, time or budget is very often a result of poorly conceived projects in which the team members find it difficult to interact effectively with one another. As Emmitt (2010) points out, what is often the root cause in failed projects is not the complexity of the project, but the incompatibility of the team members, organisations or systems, reinforced by indecisive leadership and poor communication.

What is unique about today's projects is the way they blend technical and behavioural challenges (Pinto, 2020). Project managers are required to be skilled in project selection, budgeting and resource management, planning and scheduling, use of project management tools, etc. This is the technical side of project management. At the same time, project managers face the equally strong challenge of managing the people side of projects (Pinto, 2020).

Research as well as newspaper headlines show that projects continue to fail although there are many different standards and methodologies that have been developed by professional organisations during the last 50 years in order to help project managers to keep projects on track and deliver projects on time, within budget and to agreed quality. Much of the research focus on identifying the process and building models for how project management should be handled in future projects. But it does not seem to help. If it is not the tools and methods that fail, then it is time to look somewhere else to find the root cause to the problem and do something about it. My approach in this research is therefore to turn to the soft skills in project management.

The project management literature recognises that there is a need for more awareness around soft skills and the recognition of complex social processes throughout a project's life cycle (Cicmil et al., 2006). Professional organisations, like Project Management Institute (PMI) and the UK's Office of Government Commerce, are criticised for failing to explain the soft skills that are necessary in projects (Thompson, 2019). For example, PMBOK Guide (PMI, 2013) introduced an appendix to only briefly list interpersonal skills (Thompson, 2019). Research interest in identifying the soft skills needed by project managers has increased, but there is also a need to increase awareness around soft skills of the other team members involved in project execution, not only the project manager skills.

1.2 Research question and objectives

Based on the background information presented above, the following research question has been formulated:

To what extent do soft skills influence project success in complex projects?

Questions to be answered:

- Does a better communication among the team members increase project success?
- Does a better group dynamic contribute to project success?
- Does motivation play any role in the quality of task performance?

The main objective of this research is to improve the understanding of the processes and factors involved in project success. In order to do this, I am going to:

- Present a theoretical background in order to understand the concepts and context of project management in complex projects.
- Present a literature review about group dynamics, communication and motivation and how these factors are influenced by people's personalities, background and culture.
- Conduct case studies of five complex projects in order to map and understand the human behaviour when performing their tasks and interacting with each other.
- Analyse the empirical data with regard to the main factors that define project success.
- Provide recommendations for further research based on the results from the case studies.

1.3 Scope and delimitations of the research

The case study is conducted analysing five complex projects in a consulting company that operates within construction and infrastructure sectors. The projects I chose to include in my case study represent both sectors.

The projects are taken from a company that can be characterised as a matrix organisation. A matrix organisation means that there is a dual or multiple managerial accountability and responsibility within the organisation (PMI, 2020). The chosen company has several departments and cross-functional project teams, and the same people are involved in several projects at the same time.

The research focuses on the tactics used to manage the human factor in project execution. People's personalities emerge through communication and teamwork, and, consequently, influence how project tasks are managed and executed. The research does not look at how budgets are estimated, whether they are realistic, or what specifications tender documents include. Furthermore, it only explores three soft skills – team dynamics, communication and motivation, as earlier research has defined these soft skills as the most important ones in project management (Azim et al., 2010).

1.4 Structure of the thesis

This thesis is structured in five chapters. The first chapter introduces the background for the research topic and defines the goals and the scope of the research.

In the second chapter I present a definition of project and project management before I go further and elaborate on project success criteria and project success factors. I also look at the definition of complex projects and systems theory before I turn to the theory on human behaviour and soft skills. Bourdieu's theory of project-as-practice and theory on team building, communication and motivations is introduced. The literature review presents the main findings from previous studies on successful teams and motivation factors.

Chapter three presents the chosen research methodology. The research strategy and the underlying philosophy is discussed. This chapter also presents research approach, describes data collection and explains research methods. The reliability and validity of the research as well as ethical considerations are discussed at the end of the chapter.

In chapter four the empirical results of the case studies are presented. I start the chapter by presenting empirical findings and continue by analysing the findings against the theory.

The last chapter includes conclusion and highlights the implications and limitations that were incurred in the research process. I end up the chapter providing some recommendations for the company I made research in and some suggestions for further research.

2 Literature review

This chapter presents a systematic review of the literature concerning project success, complex projects and influence of soft skills on project success. The information on project management is abundant so it was important for my search to limit my focus to some basic sources. Based on my chosen topic, I have searched for relevant literature using databases such as ResearchGate, JSTOR, Science Direct, Wiley as well as leading project management journals. My search words included but were not limited to project success, why projects fail, complex projects, strategic management, project manager skills, soft skills in project management, teams in projects, and human factor in project management.

Another source that I found helpful in finding relevant literature was reading previous master and PhD thesis about various project management topics and reviewing the literature used there.

I found several good reports on "Brage-åpent vitenarkiv" on the website provided by Directorate for ICT and joint services in higher education and research (UNIT, 2020). This was useful for two reasons. First, I could get an insight into what other students found interesting to make their research on and what their findings were. The other reason why I found this type of literature search useful was because in this way I could review the sources that others used earlier and, in this way, make a more relevant literature selection. Last but not least, as I was not interested in writing about something that many others before me had written about, it was useful for me to get confirmed that my chosen approach towards project success could give new insight into project management research.

I start my review with the definition of a project, project management and project life cycle on a more general level. I then present two major concepts of project success found in project management literature: the first one is called project success criteria, the second one is called project success factors. A large number of research has been conducted describing why so many projects encounter huge cost overruns and then come up with new tools and "best practices" that are believed to help projects to have a better control over their budgets, time and quality. Delivering a project within agreed budget, time and quality has been long considered to mean that a project has been successful.

Project complexity has escalated during the last fifty years. Projects are no longer seen as static and linear processes (e. g., Pinto, 2020; Shenhar & Dvir, 2007; Singh & Singh, 2002). Neither is project success measured only against budget and revenues. Many new theories have emerged trying to explain the complexity and the constantly changing environment that todays' projects have to embrace. Systems dynamics, chaos theory, diamond approach, systems thinking, project-as-practice are just a few of many new approaches contributing to a better understanding of project management process. For my research, I have chosen to focus on project-as-practice approach. This theory is based on observations and empirical contributions that will help me understand and cast a light on the importance of understanding and facilitating the soft skills of knowledge workers.

2.1 Project management

2.1.1 Defining project and project management

In order to understand project management, first it is important to get a clear understanding of what makes projects and project management unique. There are many definitions of what a project and project management is. Project Management Institute (PMI) (2013) probably has the simplest definition of a project. It defines a project as *"a temporary endeavour undertaken to create a unique product, service or result"* (p. 553). The definition suggests that a project has a clear beginning and end since it is temporary, and it arises for a specific purpose or to meet a specific goal. Projects have become the main form of activity that drive business innovation and change (Shenhar & Dvir, 2007).

Since project, as a method of working, has become so widespread, so has the management of projects become one of the most important means for carrying out a project. Project management is defined as *"the application of knowledge, skills, tools and techniques to project activities to meet the project requirements"* (Project Management Institute, 2013, 554). The definition implies that there are standards that have to be followed when we manage a project if we want to achieve the requirements implied by the project. In other words, if a project manager has a necessary knowledge and skills and applies the necessary tools and techniques then the projects should be successful.

The practice of project management is widespread and differs from other areas of operational management (Geraldi, Maylor & William, 2011). One of the reasons for this is that project management is highly dominated by the professional associations. These associations establish their statements of "best practice" which provide a baseline for organisational practice and individual competence or knowledge assessment (Geraldi, Maylor & William, 2011). The largest association is Project Management Institute (PMI) and it has over a million certified Project Management Professionals (PMP) worldwide (official PMI website, 2020). The standard is based on an American National Standard, and its use is mandated in US. In Europe, the UK's Office of Government Commerce standard PRINCE2 is a predominant "best practice". Having one of these certificates is often a demand from a client as it is assumed that knowing those "best practice" tools will assure the success of the project.

2.1.2 Project life cycle

Every project goes through certain phases from its initiation to its closure. These phases form a project's life cycle. A good understanding of these phases allows managers to better control resources and achieve goals. According to Kerzner (2017), there is no agreement among industries or companies today about unanimous life cycle phases of a project. So, while every project has a definite start and end, the specific deliverables and activities that take place in between will vary widely from project to project (PMI, 2013). According to the PMI (2013) "best practice", the phases of the project life cycle include, but are not limited to, initiating, planning, executing, monitoring and controlling, and closing.
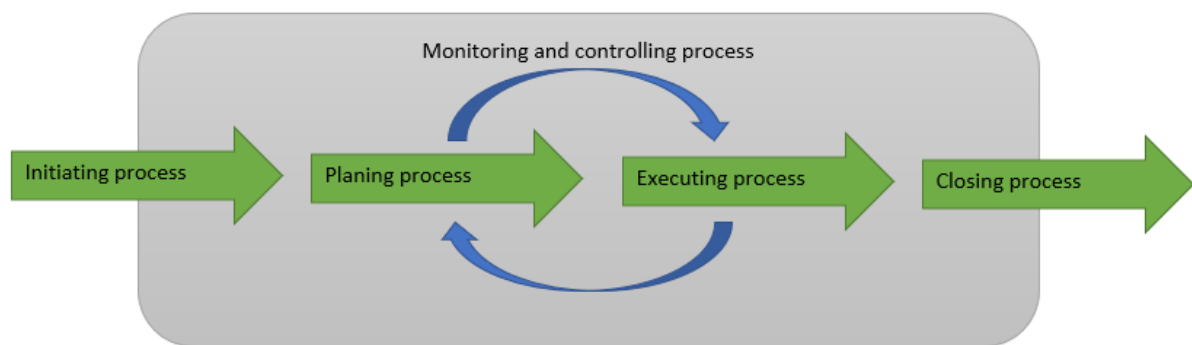
Figure 1: Project management process. PMI, 2013

These phases are the points at which the project team can evaluate both the project's performance and its overall status (Pinto, 2020). *Initiating* is the first phase of the project life cycle. During this phase the initial goal and technical specifications for a project are developed. In this phase, the scope of the work is determined, and the necessary resources are appointed to the project (Pinto, 2020). *Planning* is the second phase where all detailed specifications, schedules and other plans are determined. During the *executing* phase the plans created during the planning phase are implemented. It is during the execution phase that the majority of project teamwork is performed (Pinto, 2020). *Closing* of the project occurs when the completed project is transferred to the customer and the project resources are reassigned.

As projects get more and more complex, project managers feel also the growing need for tools that will help them to have a better control and improve performance of the projects. However, the assumption that performance improvement will result from the application of best practice tools and methodologies seem to be deceptive. Statistics of failing projects indicates that advanced tools and methods are not the only factors that should undergo change.

2.1.3 Project manager

Often, people desire to be project managers without fully understanding what it entails. Some believe that they will be given authority to make all decisions on the project, they will choose their team members as they wish and they will interface with executives within and outside the company (Kerzner, 2017). The reality is often a lot different. The real authority often rests with the project owner or financial manager. Project staff is mostly provided by the functional manager and it is a functional manager that can replace or reallocate the resource without the project manager's approval (Kerzner, 2017). Furthermore, the allocated resources usually are working on several other projects and it can be difficult to get his/her project prioritised and to get the project's requirements delivered on time.

In today's projects, project managers are expected to be able to make both project- and business-related decisions. They are expected to understand a company's business model and apply the company's business processes when executing the projects (Kerzner, 2017). As projects get more and more complex and they increasingly involve more and more different disciplines, project managers are also expected to be good at managing different people and being good "team psychologists". When it comes to decision making, it is impossible for a project manager to have knowledge about all the disciplines involved in a project. Their expertise may not be in any knowledge areas of the project (Kerzner, 2017). This suggests that today, the resources for each discipline should be able not just know their discipline but also have some of the managerial qualities, like taking decisions, budgeting, leading other people working with the same discipline, communicating their discipline to others in a simple and understandable language for other team members. I will discuss this later in the thesis.

As Kerzner (2017) states, project management is successful only if both a project manager and his/her team are fully dedicated to the successful completion of the project. This means that each team member of the project team as well as office is required to have a good understanding of the project requirements (Kerzner, 2017). Project management literature, however, focuses merely on project managers and their skill development, and neglects the rest of the team members.

2.2   Complex projects

Projects in different industrial sectors are increasingly being characterised as complex (Azim et al., 2010). But what defines a project as complex? There has been done a considerable amount

of research on "project complexity". However, it should be noted that there is a difference between complex projects and difficult or complicated projects. A complex project is not necessarily a difficult project. A project can be considered as difficult because the output is tangible. According to Snowden and Boone (2007), complicated contexts *"may contain multiple right answers, and though there is a clear relationship between cause and effect, not everyone can see it"*. Complex systems, on the other hand, are characterised by instability and unpredictability, and there are no apparent right answers, only emergent instructive patterns (Azim et al., 2010). Complex projects, thus, include ambiguity and uncertainty, and there are many team members or stakeholders involved. Managing a complex project, therefore, involves more than the ability to manage many things at the same time.

The Oxford dictionary defines complexity as *"consisting of many different and connected parts"* and *"not easy to understand, complicated or intricate"*. This linguistic definition was conceptualised by Baccarini to fit construction industry in terms of differentiation and interdependence where he also connected the second part of the definition with the concept of uncertainty, considering it as a subjective measure (Azim et al., 2010).

There is no accepted definition of complex project management (CPM). However, according to Queensland University of Technology (QUT), Brisbane Australia, the CPM strategic partner of the Australian Government's Defense Materiel Organization (DMO), complex projects are those that:

- Are characterized by uncertainty, ambiguity, dynamic interfaces and significant political or external influences; and/or
- Usually run over a period which exceeds the technology cycle time of the technologies involved; and/or
- Can be defined by effect, but not by solution (Hass, 2008).

Therefore, managing a complex project presents a series of challenges of greater scale than what is found in typical project management.

The fact that the surroundings are interconnected entails complexity. A change in an environment can lead to changes in other environments which in turn can have different effects on the achievement of goals in the project. The complexity also makes it difficult to see the consequences of changes in the environment. This emphasises the importance to understand and embrace systems thinking and importance to communicate internally in the team.

Some researchers approach the issue of complexity using different platforms, like classification by types in terms of their properties, or using complex systems theory to gain a better understanding in terms of behaviours (Geraldi & Adlbrecht, 2007). However, research on project complexity has been criticised for its lack of relevance to practice (Azim et al., 2010). The criticism is based on limitations in addressing the dynamic, social and complex contexts of projects because of a hard systems approach (Winter et al., 2006). This emphasizes the need for studying the practical side of the projects and focusing on practitioners' lived experience with projects (Cicmil et al., 2006; Winter et al., 2006).

The major attributes that are said to contribute to project complexity can be categorised into three areas: People, product and process, as shown in figure 2 below:
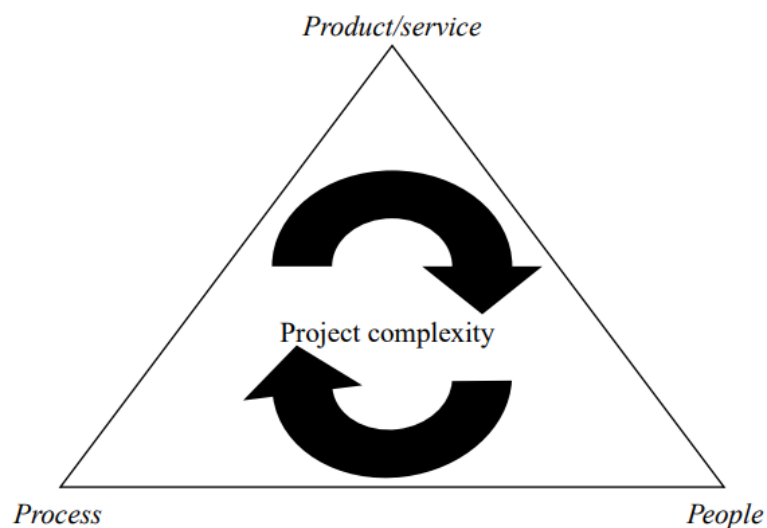
Figure 2: Project complexity triangle (Azim et al., 2010)

According to Geraldi and Adlbrecht (2007), the interaction of people is the most prevailing type of complexity in projects. Azim et al. (2010) supports their statement and says, that "people" factor is one of the more volatile and important factors affecting project complexity. Regardless of people's experience and project type, practitioners realise and emphasise the importance of social processes when dealing with project complexity (Azim et al., 2010). Consequently, by understanding those complex social processes that exist at various levels of projects will help practitioners understand the source of complexity and emphasize the importance of managing those social processes (Azim et al., 2010).

Azim et. al. (2010) performed a study where a questionnaire was administered to 120 delegates attending the plenary session of the Project Management Professional Development Program (PMPDP) run by the University of Manchester. Their study showed that the importance of

people aspect as one of the factors contributing to project complexity was emphasized by all the respondents regardless of their experience and role (Azim et al., 2010). The other factors that were emphasised by the respondents included technology related to the product or service. The complexity factors related to process included planning, many layers in the work breakdown structures, financial and contractual agreement, resource management and organisational structure. The results from their study are shown in figure 3.
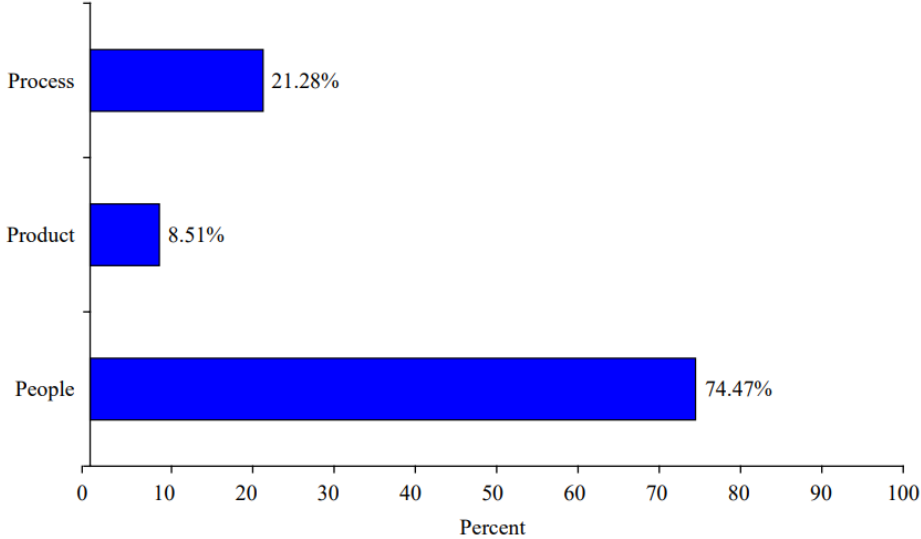
Figure 3: Level of impact on project complexity (Azim et al., 2010)

Their study confirmed the importance of people as the key element in the project complexity triangle. In order to manage people side of complexity, project manager and other practitioners should show understanding and skills in handling soft skills for the successful accomplishment of projects (Azim et al., 2010). I will elaborate on soft skills later in this chapter.

2.3 Project success

"There are few topics in the field of project management that are so frequently discussed and yet so rarely agreed upon as that of the notion of project success." (Pinto & Slevin, 1988: 68) Project success is a complex and ambiguous notion. Projects are initiated to create change, either it is to develop new products, establish new manufacturing processes, or creating a new type of service (Shenhar et al., 2001). Projects help companies to cope with today's competitive business environment. Thus, no matter why the project has been started, the project success should be linked to the project's effectiveness in the short and long run (Shenhar et al., 2001).

For the past forty years or so project success has been defined as the completion of an activity within constraints of time, cost and performance (Kerzner, 2017; PMI, 2013). However, today's projects are rarely completed within these constraints. The triple constraints are criticised for not covering the project performance sufficiently. Changes in projects are a well-known phenomenon in today's projects. In a modern project management theory changes are accepted as inevitable part of every project (Shenhar & Dvir, 2007). It is not a question anymore whether there will be changes in a project, rather how many changes there will be. To handle those changes and a constantly changing environment demands that management is more adaptive as well as it calls for more collaboration within project teams.

2.3.1 Project success criteria and project success factors

Whether a project is perceived as successful depends on who evaluates the project, when it is evaluated, what criteria is used and many other factors. Project management literature differentiates among two main notions of project success:

- project success criteria, and
- project success factors (Müller & Jugdev, 2012; Zwikael & Globersen, 2006).

Project success criteria are the set of principles or measures that are used to judge whether a project is a success or a failure. Success criteria answer the question "how do we determine whether a project is a success?" Success criteria are dependent variables. *Project success factors*, on the other hand, are the set of features or elements which, when influenced, can increase the likelihood of success (Müller & Jugdev, 2012). Success factors answer the question "what are the key things that must go right in order for a project to succeed?" Success factors are the independent variables.

All projects are developed with the purpose to follow some initially determined technical specifications (Pinto, 2020). Before the project is initiated, one usually knows what the project is supposed to do or how the final product is supposed to function. Project performance is then measured determining whether the finished product operates according to previously stated specifications or not. Until recently, it has been said that project managers work with a triple constraint when they manage projects, the so-called triple or iron triangle which was once the standard. The three constraints were budget, time and requirements. Today, the researchers identify the fourth constraint when working with projects (Pinto, 2020; Shenhar & Dvir, 2007). The new quadruple constraint includes client acceptance. Client acceptance argues that projects

are developed with customers or clients in mind, which means that their purpose is to satisfy customers' needs (Pinto, 2020). These four constraints, it is said, are the success criteria that defines whether the project will be considered a success. The four constraints are visualised in figure 4.
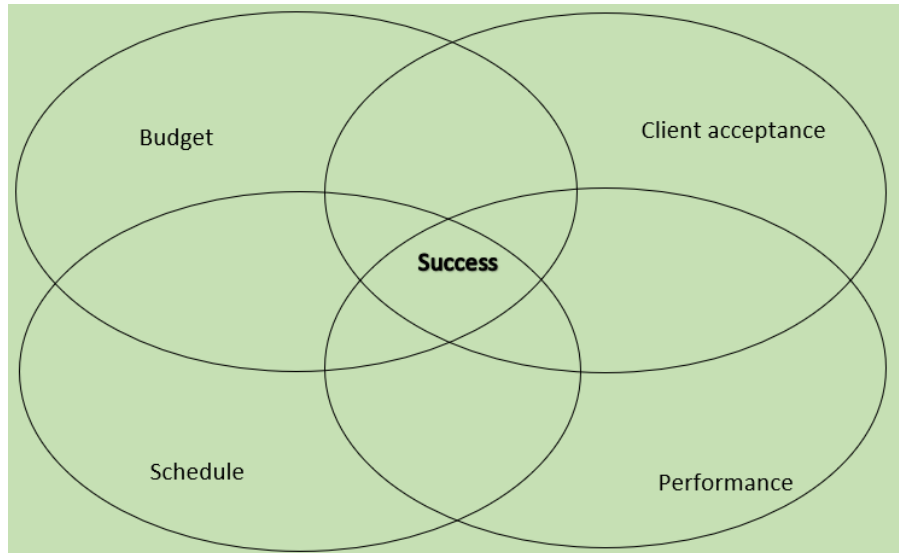
Figure 4: The Quadruple Constraint (Pinto 2020)

Researchers working in the field of project management have directed a significant part of their time trying to identify the critical success factors in projects. Some of the most acknowledged researcher on this topic are Pinto, Prescott and Slevin. The first major contribution of Pinto and Slevin (1988) was the development of a project management tool that they named Project Implementation Profile (PIP). They also identified ten critical factors that influence project success: (1) project mission, (2) top management support, (3) project planning, (4) client consultation, (5) personnel, (6) technical tasks, (7) client acceptance, (8) monitoring and feedback, (9) communication and (10) troubleshooting. These factors are predominant in different phases of a project. Success factors are not limited to these ten. In the years that followed, research continued to generate new insights and identify other success factors. For my research, I have chosen to concentrate on three success factors that are linked to people's soft skills. These are:

1. project team building,
2. communication, and
3. motivation.

Critical success factors can improve a project outcome, which in turn can be assessed by a set of measurements as indicated in project success criteria. This relationship can be shown as in figure 5 below:
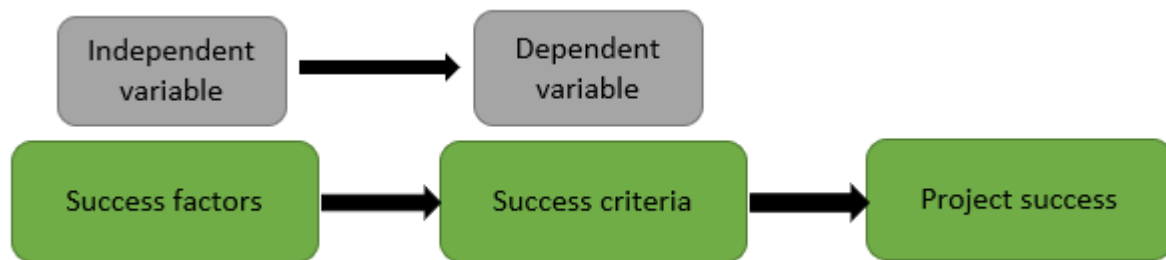
Figure 5: Success factors and success criteria adapted from Ø. H. Meland (2000)

The figure above implies that success factors can improve the project outcome, which in turn can be assessed by a set of measurements used to measure project success criteria. Therefore, by working on the success factors one can influence the success criteria and increase the likelihood of overall project success.

2.3.2 Project success and project performance success

Definitions of successful projects can be remarkably obscure (Freeman & Beale, 1992). It is also important to distinguish between project performance success and project success as these are two quite different things (De Wit, 1988). While the former refers to successful achievement of the measures of performance like cost, time and quality, the latter refers to the successful meeting of the overall objectives of the project. Other methodologies (e.g., PRINCE2) distinguish between result goals and effect goals where result goals correspond to project performance success and effect goals correspond to project success. Cooke-Davis (2002) argues that this distinction is important for project management. Whether or not the project has been successful will only be possible to measure after the project has been delivered. Project performance success, on the other hand, will be measured during the life cycle of the project.

An important thing to remember is that project success and project performance success are not necessarily linked. There have been many examples of projects that went way over their budgets and time schedules and did not follow the standard project management procedures, and yet, at the end, they were considered to be successful (Shenhar & Dvir, 2007). The same is true the other way round, those projects that followed all the procedures and successfully met their performance targets, were not considered being a success. Shenhar & Dvir (2007) mentions

building of the Sydney Opera House as a representative example when project success does not correspond with project performance success. The project encountered major cost and time schedule overruns. Judging the project only on this, it can easily be said that the project was a failure. However, today it is one of the most fascinating buildings in the world and no one cares anymore how the project was managed (Shenhar & Dvir, 2007).

The answer to whether the project has been successful will, thus, differ depending upon what criteria are being taken into consideration. It is also clear that meeting time and budget goals will only give a small part of the picture. In addition, it is possible to draw a conclusion that adhering to a project plan tells us nothing about achieving the long-term business goals for which the project was initiated in the first place (Shenhar & Dvir, 2007). Shenhar & Dvir (2007) suggests that a comprehensive assessment of project success in the short and long term should be defined by five basic groups of measures as shown in figure 6 below:

Figure 6: Project success criteria (Shenhar & Dvir, 2007)

These five measures present a universal framework for assessing project success in most cases and environments. As a consequence, the project success becomes a dynamic concept with both short- and long-term implications for both the company executing the project and the client (Shenhar & Dvir, 2007). It must be pointed out, however, that there might be other success dimensions that need to be defined if the nature of the project imposes it (Shenhar & Dvir, 2007). "*A company needs to establish a success-focused project environment that employs a multidimensional, flexible measurement approach and that pays attention to each success*

dimension during project planning and execution" (Shenhar & Dvir, 2007). In order to do this, several key steps are presented by Shenhar and Dvir:

1. Adapt your expectations to the project type.
2. Make project success dimensions part of project planning.
3. Accept greater responsibility.
4. Deal with the possibility of failure.

Organisations measure their organisational effectiveness all the time. Traditionally those measurements involved financial and accounting measures. Financial measures worked well in the industrial era where it was typical to produce single products with high variable cost. However, in recent years it has been agreed that these measures were not enough. They do not fit well with today's dynamic markets, companies producing multiple products and with high fixed cost environments (Shenhar et al., 2001). Kaplan and Norton developed the corporate Balanced Scorecard concept to address these issues (Kaplan & Norton, 1996). Their Balanced Scorecard includes four dimensions: financial measures, customer-related measures, internal measures, and innovation and learning measures (Kaplan & Norton, 1996). Other researchers have suggested including one more dimension – preparing for the future (Shenhar et al., 2001). Shenhar and Dvir (2007) suggest that the same dimensions can be used to measure project success as well. According to them, success measures must reflect the strategic intention of the company and the business objectives for three reasons (Shenhar & Dvir, 2007):

1. If a project does not give anything to the organisation – why should it take it in the first place?
2. Measuring of effectiveness should take place at different times during project execution as well as after the project has been terminated. Project success should therefore be observed with different time frame in mind.
3. When measuring success, the measurements should reflect the interests of various stakeholders who will be affected by the project's outcome.

The reasons above imply that internal factors, like team satisfaction, skill development, team member growth, etc. are factors influencing project performance success as well as project success, and, thus, should receive an equal part among other project management tools, and should not be taken for granted.

2.4   Soft skills in project management

The terms "hard" and "soft" are being used in the project management context when referring to projects, programmes, methodologies, systems, goals, knowledge, ideas, values and skills (Crawford and Pollack, 2004). However, generally, "hard" skills in project management context refer to processes, procedure, tools and techniques, whereas "soft" skills refer to dealing with human issues, i.e., the "people" side of the project (Azim et al., 2010). Human element in project management has become increasingly important because of increasing complexity of the projects (Azim et al., 2010). Dixon et. al. (2010) defines soft skills as *"a combination of interpersonal and social skills. Hard skills, on the other hand, include… technical or administrative"* competences (p. 36). Similarly, Muzio and Fisher (2009) relate hard skills to innate intelligence and soft skills to behaviour, motivation, and other aspects of human interaction. Soft skills can be classified into:

1. personal (e.g., self-awareness),
2. interpersonal (e.g., communication),
3. group (e.g., collaboration), and
4. organisational (e.g., leadership) (Levasseur, 2013).

For the purpose of this research, I adopt Dixon et al., (2010) definition of soft skills.

It is generally agreed that technical people lack soft skills (Levasseur, 2013). Muzio and Fisher (2009) attempted to explain it in the light of Maslow's hierarchy of needs model. Maslow (1987) developed a hierarchy of needs where he identified five needs from the most basic needs, physiological and safety, to the higher-order needs, love and belonging, esteem and self-actualisation. Muzio and Fisher (2009) appointed hard skills to being lower-order skills, and soft skills to being higher-order skills. Their reasoning for this was that hard skills are either innate or learned through education or training, thus making it a physiological factor. They are also more prevalent than soft skills. Soft skills, on the other hand, take time to work on and they are a result of interpersonal interaction and self-reflection. Soft skills would correspond with self-actualisation in Maslow's hierarchy.

Researchers agree that soft skills are equally important as hard skills in many disciplines, such as analytics and operations research, accounting, information systems, finance, project management, etc. (Levasseur, 2013). In their research of project management professionals, Azim et al. (2010) argued that the key to managing complex projects is soft skills. Their research also affirms that about three quarters of interviewees say that people skills are the most

important factor in dealing with project complexity. The researchers agree that the hard skills are important for planning and control of the project, whereas soft skills play an important role in the implementation of these plans (Azim et al., 2010). *"People deliver successful projects and not just the application of methods and tools"* (Azim et al., 2010 p. 397). Azim et al. (2010) identify communication, motivation, delegation, ownership, and sense of achievement as the most important soft skills. In my research, I have chosen to look closer at communication, motivation and team dynamics which I elaborate on below.

2.4.1 Project team dynamics

Successful project management requires more than the mastery of technical skills related to process, frameworks, and discipline (Lewis & Boucher, 2012). Soft skills define our personalities and influence our interaction with other people. Working close in a team, under stress and over a longer period of time makes personality differences significantly visible.

The word collaboration comes from the Latin word *collaborare*, which means to work together. Collaboration, thus, is about working together to solve specific tasks. This means that work tasks are divided between participants, and the participants commit themselves and are made responsible for these tasks. With good cooperation, the sum of the tasks performed will draw towards a common goal (Roschelle & Teasley, 1995). It is therefore important that team members work well together, so that their actions and work will bring the team closer to its goals. In order to achieve a good collaboration, it is important to have good communication within the team, and that the individuals complement each other. There are various theories about how to compose a team in order to achieve optimal cooperation. One of these theories is Belbin's (2012) model. He states that a team should consist of nine different roles. These nine roles are further divided into three categories: Thinking, People and Action. Those who are classified as "Thinking" are often more introvert and they like to think through actions and monitor group work. This gives them a more analytical character. Those who are classified as "People" most often want to facilitate good cooperation by focusing on the people within the group. They want to create unity and commitment through human resources, and they are often enthusiastic and caring. Those who are classified as "Action" focus on the completion of the tasks. They are prepared to complete the task, and they are disciplined and efficient (Belbin, 2012)

Staffing the project organisation can be a long and tiresome process, especially on large and complex engineering projects. According to Kerzner (2017), there are three major questions that should be answered:

- What people resources are required?
- Where will the people come from?
- What type of project organisational structure will be best?

When forming a project team, one should also consider factors like cost of the resource, their availability over duration of the project, their skill level, training needs and previous experience with that resource (Kerzner, 2017). To have continuity in projects is important. It takes time to develop good working relationship in a team, therefore, a project manager should prefer to keep the same resources throughout the whole project time. Resource shortage is very common in project organisations. Project managers competing for those resources is a normal procedure when setting up a project team.

In theory, there are many recommendations for how to form teams. However, in reality the theory is little applicable. Resources are usually scarce and the most important things that matter when forming a group for a project is people's knowledge and availability. Whether they complement each other or whether they will be able to work well together comes never as an issue. It is expected that they are professionals and will deal with it. At the same time, it is broadly accepted that people are different and that their manner and level of collaboration will differ greatly.

A challenge in a project driven companies is that each project needs a new customised team. Each project is unique. It might be similar to previous construction or infrastructure projects that a company has worked with before, however the people working with it are almost never exactly the same. Each project team can thus be treated as a newly formed team and go through the challenges of a newly formed team, like understanding the leadership style, interests, capabilities, communication preferences and so forth, before the team can focus fully on the task (Kerzner, 2017).

Kerzner (2017) lists a number of barriers that arise when developing an effective project team. These barriers are listed in the table 1 below. According to Kerzner (2017), a successfully performing project manager recognises these barriers and knows in which phases of the life cycle of the project they are most likely to occur. In theory, the team building barriers are easily solved by having an effective team building leader who understands the interaction of

organisational and behaviour variables and can foster a climate of active participation and minimal conflict (Kerzner, 2017). In practice, however, a project manager has already so many other roles to fulfil and deadlines to follow up, that team building gets little or no priority.

Table 1: Barriers to effective team building and suggested handling approaches (Kerzner, 2017)

Barrier	Suggestions for Effectively Managing Barriers
Differing outlooks, priorities, interests, and judgements of team members	Make effort early in the project life cycle to discover these conflicting differences. Fully explain the scope of the project and the rewardss that may be forthcoming on successful project completion. Sell "team" concept and explain responsibilities. Try to blend individual interests with the overall project objectives.
Role conflicts	As early in the project as possible, where they see themselves fitting into the project. Assign/negotiate roles. Conduct regular status review meetings to keep team informed on progress and watch for unanticipated role conflicts over the project's life.
Project objectives/outcomes not clear	Assure that all parties understand the overall and interdisciplinary project objectives. Clear and frequent communication with management and the client becomes critically important. Status review meetings can be used for feedback.
Dynamic project environment	The major challenge is to stbilise external influences. It is critically important to forcast the "environment" within which the project will be developed. Develop contingency plans.
Competition over team leadership	Clear role and responsibility definition often minimises competition over leadership.
Lack of team definition and structure	Regular meetings with the team will reinforce the team notion as will clearly defined roles, tasks and responsibilities.
Project personnel selection	Clearly discuss with potential team members the importance of the project, their role in it, what rewards might result on completion, and the general "rules of the road" of project management. If team memebers are still not interested in the project, the replacement should be considered.
Credibility of project leader	Credibility of the project leader grows with the image of a sound decision maker in both general management and relevant technical expertise. It can be enhanced by the project leader's relationship to other key managers who support the team's effort.
Lack of team member commitment	Try to determine lack of team member commitment early in the life of the project and attempt to change possible negative views towards the project. Often insecurity is a lajor reason for the lack of commitment. Conflicts with other team members may be another reason. Finally, if a team member's professional interests lie elsewhere, the project leader should examine ways to satisfy part of the team member's interest or consider replacement.
Communication problems	The project meader should devote considerable time communicating with individual team members about their needs and cencerns. Tools for enhancing communications are status meetings, reviews, schedules, reporting system, and colocation.
Lack of senior management support	Senior management should become an integral part of project reviews. It is equally important for senior management to provide the proper environment fo rthe project to function effectively.

Building a successful team is about more than simply finding a group of people with the right mix of professional skills. In 2012, a group of Google employees performed an investigation about what makes some teams successful, while others fail. The project was named *Aristotle project*. 180 teams were investigated in this research. Researchers began by reviewing a half-century of academic studies looking at how teams worked. They wanted to see how much it mattered that people had similar interests, same hobbies, same educational backgrounds, or the same motivation for the rewards. They also looked at how long teams stuck together and if gender balance made any difference (Duhigg, 2016). The results were surprising because they did not show any clear indicator for team success. No matter how researchers arranged the data, it was almost impossible to find any evidence that the composition of any team made any difference. They continued then looking at research that focused on what is known as "group norms". Using their findings about group norms as a starting point, the researchers identified five key factors for team success (Belbin, 2019):

1. *Psychological safety* – Individuals need safe space to take risks and make mistakes without fear of accusations, and where people are comfortable with being themselves.
2. *Dependability* – The team needs to ensure that work is done on time, and to a high standard. Knowing that the other team members take the responsibility and fulfil their part of the job, gives a boost to make a better effort.
3. *Structure and clarity* – Clear roles, plans and goals are essential. Each person on the team needs to understand where they fit, what their tasks are, and what they have to offer. With a greater understanding of each other's strengths, team members know who to consult and how project teams might shape up.
4. *Meaning* – Work should be personally important to each one of team member. Gallup has shown that employees who use their strengths every day are six times more likely to be engaged at work. In other words, it is important to feel that one takes ownership of his/her work and is acknowledged for the achievements.
5. *Impact* – People need to know that what they do matters and creates change. Knowing that what one does creates changes for the better inspires to perform better.

The results of this project indicated that teams can be very different in their style and personality composition, and still be successful and effective in their work as long as it follows commonly accepted group norms.

2.4.2 Communication

Research performed by Azim et al. (2010) showed that communication was one of the most important factors which was required within project team and externally with clients, since most of the problems in a project environment can be traced to some kind of communication problem (Azim et al. 2010). According to them, *"effective communication helps to achieve interpersonal acceptance, enhances teamwork and team motivation"* (Azim et al. 2010).

"Sometimes it does not matter whether we have a few or many channels of communication. Breakdowns can occur" (Kerzner, 2017). Communication becomes even more difficult to adjust to or follow up when we add people's differences in perception, personality, attitudes, emotions, and prejudice (Kerzner, 2017).

The communication matrix, which deals with who sends what through which channels with which effect. The starting point for building the matrix is what has been described as Lasswell's

model (Lasswell, 1948). The communication matrix is intended as a framework for the elements included in the matrix

According to Kerzner (2017), poor communication exists on four levels:

1. Communication problems among team members
2. Communication problems between the project leader and the team members
3. Communication problems between the team member and the top management
4. Communication problems between the project leader and the client

The most common communication problem is that team members simply do not keep others in the team informed on key project developments (Kerzner, 2017). This becomes especially crucial in today's complex projects for three reasons:

1. Changes occur in projects all the time and not communicating changes to others in the group or not doing it when changes occur costs money and extra work for the others in the group.
2. Knowledge sharing
3. Poor understanding of systems thinking causes team members to care only about their own discipline and not understanding how it is part of something bigger.

Other reasons of poor communication within the team can be low motivation level, poor morale, or carelessness (Kerzner, 2017). This in its turn lead to unclear objectives and poor control, coordination, and workflow.

Project management theory and research dedicates a lot of attention to communication between project leader and the team members, or how a project leader should be a more effective communicator. However, little research is done on the communication among team members and how people's personal differences influence the ways people communicate. Projects become more and more complex. Complex projects demand focus, collaboration and continuous communication throughout all the stages of a project life cycle. Complexity in projects is also defined by the dynamics in project execution process and adjustment of that process to continuous changes as the project matures.

According to Rajkumar (2010), the success of a project largely depends on the efficiency of its communication network. Unfortunately, research reveals that most projects experience a breakdown in communications (Rajkumar, 2010). The figure below illustrates very clearly the usual communication problems in projects.
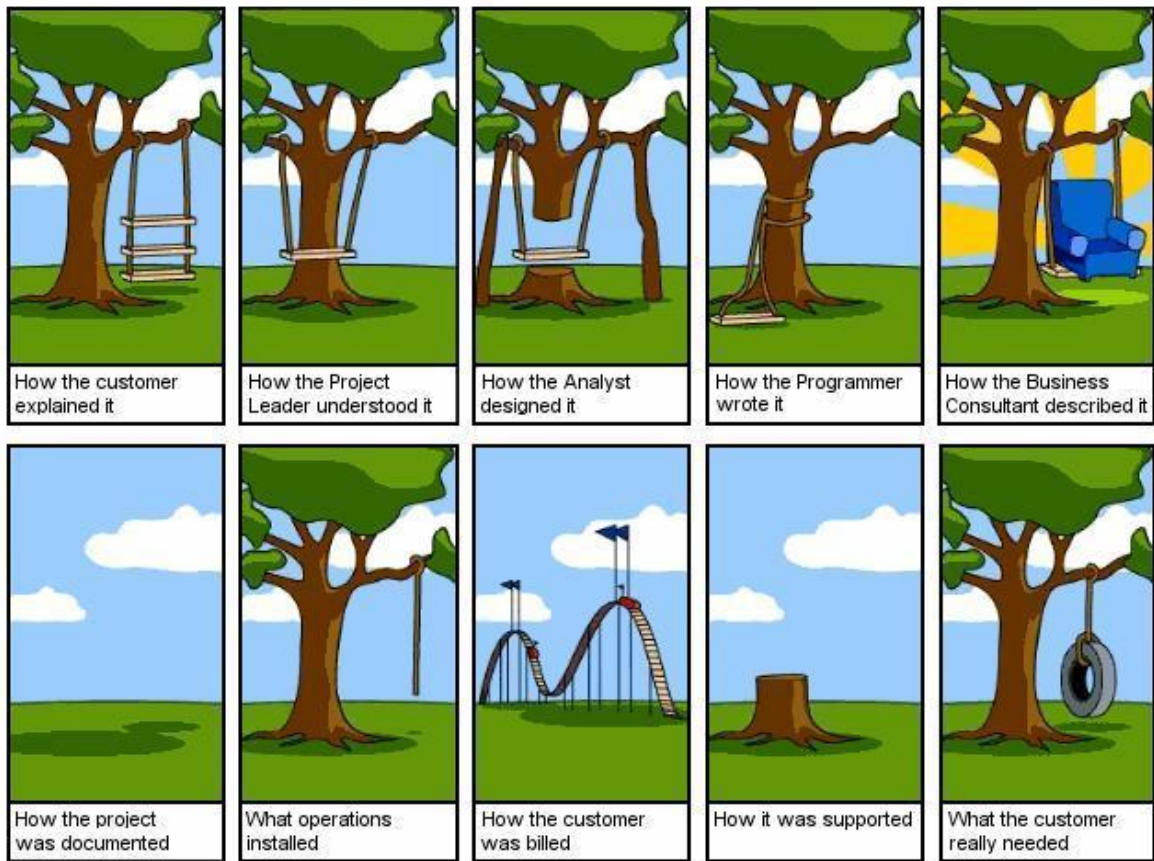
Figure 7: A breakdown in communications (source unknown)

One can never take for granted that the receiver will interpret the message at exactly the same way as the sender intended it to. Interpretation depends on one's previous knowledge about the subject, a person's background, experience, age, culture and many other things. Bad or inefficient communication at the beginning of a project can have great impact later in the project (Rajkumar, 2010). This is especially true in complex projects where different disciplines meet to work on the same goal.

The term "competence diversity" is used in connection with interdisciplinary work, and these terms are often used interchangeably. Interdisciplinary collaboration refers to differences in knowledge and skills in which the members of a team are specialised as a result of their work experience and education (Van Der Vegt & Bunderson, 2005). Interdisciplinary teams are thus a composition of people who complement each other and can solve large and complex issues. The motivation for the use of such teams is that when representatives from all relevant areas of expertise are gathered together, decisions and actions will cover the full range of perspectives and issues, which may increase the efficiency, and, consequently, success of a project. Hence, interdisciplinary communication becomes a vital prerequisite in complex projects.

Most complex projects in architectural, engineering and construction industries involve interdisciplinary collaboration and the exchange of big data between disciplines. Traditionally, collaboration across disciplines has been based on frequent exchanges of drawings and documents, but lately, the widespread focus on the use of computer-aided design (CAD) has generated several stakeholders in building information modelling (BIM). A number of BIM-compatible programs such as analysis tools, quality control and collision control are under development. BIM is used as an interdisciplinary communication platform for exchange of models across disciplines (Singh, Gu, & Wang, 2011).

Working together interdisciplinary is a good knowledge sharing arena. However, working with many different people with different backgrounds and different experience leads also to communication problems. Earlier research has shown that exposure to a diverse set of people's backgrounds, experiences and perspectives do not always promote collaboration (Van Der Vegt & Bunderson, 2005). Van Der Vegt & Bunderson (2005) suggest that teams should work on getting a sense of ownership in projects and identify themselves with common goals. This will improve interdisciplinary communication and collaboration. This is in accordance with what Aristotle project that I discussed earlier showed.

2.4.3 Motivation

Kaufmann and Kaufmann (2015) defines motivation as biological, psychological and social factors that activate, direct and maintain behavior in varying degrees of intensity in relation to goal achievement. Motivational psychology is concerned with explaining the driving forces that make people act, and what leads to differences in the efforts between different people who have the same prerequisites to perform an action (Kaufmann & Kaufmann 2015).

Like some other motivational theories, the *theory of self-determination* distinguish between external and internal motivation (Olafsen, 2018). In the theory of self-determination, however, the distinction between controlled and autonomous motivation is more central than the distinction between internal and external motivation. Controlled motivation is motivation that is linked to activities and behaviours that are driven by a feeling of pressure to have to perform an action. Autonomous motivation, on the other hand, is linked to actions and behaviours that are a result of a sense of self-will and free choice (Gagné & Deci, 2005). The theory of self-determination assumes that controlled and autonomous motivations vary both in how they occur and in the subsequent actions that are being performed. In addition, the theory of self-

determination describes amotivation. In contrast to controlled and autonomous forms of motivation, both of which are intentional, amotivation refers to a complete lack of motivation (Gagné et al., 2015).

Theories of needs are based on the fact that all motivated behavior is triggered by different types of fundamental needs. Besides looking at the needs in question, the theories of needs also examine what motives emerge from these needs, as well as how different motives affect each other either negatively or positively (Kaufmann & Kaufmann, 2015). It is known from psychology that motivation is a necessary prerequisite for good performance. But motivation is not a unified phenomenon. Therefore, besides looking at how much motivation a person has, one must also look at what type of motivation a person has.

Social theories look at people's experience of their relationship with their employees and how this has a motivating or demotivating effect. According to such theories, the absence or presence of various forms of justice will create variation in motivation among employees (Kaufmann & Kaufmann, 2015). Individuals will compare themselves with other relevant individuals or groups, when it comes to, for example, making an effort and awarding performance, and based on his/her assumption, assess fairness (Kopperud & Martinsen, 2016). The presence of equality leads to satisfaction, while the absence of it can give negative emotions and lead to demotivation (Kaufmann & Kaufmann, 2015; Kopperud & Martinsen, 2016).

Situational theories put the actual work situation at the center. More specifically, such theories focus on characteristics of the work situation that affect the employees' motivation and performance at work (Kaufmann & Kaufmann, 2015).

Socio-economic theory says, among other things, that a person acts to maximize self-interest. One assesses costs and benefits and makes decisions based on that.

It is important to note that different motivational theories do not necessarily compete with each other. Many theories can instead be considered complementary, which means that the use of one perspective does not have to exclude the use of another (Kaufmann & Kaufmann, 2015).

2.4.4 Project-as-practice

As I wrote earlier, a project, by definition, is a temporary job undertaken in the context of an organisation to create a specific product or service. Any project involves a team of people who possess the necessary knowledge and skills to use certain tools and techniques and who work

together in order to accomplish specific project goals. Especially in multidisciplinary engineering projects, where there are many different disciplines involved, it becomes more noticeable that each and every team member has a unique personality, and each personality can have a significant influence on the cooperation and interaction within the team. It has also impact on, among other things, how each person interacts, communicates, what motivates them and how willing they are to share knowledge with the team members. The interaction between team members is a natural part of any project where people mutually affect each other and the project process with their ideas, moods, verbal and non-verbal communication and emotions. It is, thus, logical to imply that soft skills that each team member possess influence the process of project execution.

According to PMI (2013), "soft skills" are behavioural competencies that include skills such as communication skills, emotional intelligence, conflict resolution, negotiation, influence, team building, and group facilitation. These soft skills are valuable resources when developing a project team. For example, a project management team can use emotional intelligence to reduce tension and increase cooperation by identifying, assessing, and controlling the feelings of project team members, anticipating their actions, acknowledging their concerns, and following up on their issues (PMI, 2013).

Research that is being made on projects can be divided into two main streams (Hällgren & Söderholm, 2011). The first stream is the traditional stream where the main focus is on the "best practice" recommendations and the development of tools and models. The traditional stream places a strong emphasis on technical knowledge, organisational form, routines and leadership styles (e. g., Pinto 2020; PMI, 2013). The second stream, on the other hand, is much more process oriented and is primarily empirical, with a descriptive focus (Hällgren & Söderholm, 2011). This second stream is concerned with understanding human behaviour and how it influences various processes within projects. The process stream sees projects as the sum of the actions of the people involved, which emphasises both how people that are involved in projects act and how their typical workdays are structured (Hällgren & Söderholm, 2011).

Projects-as-practice approach is yet another approach that is beginning to receive more and more attention. It appeals to the second wave but is not the same as process approach. The starting point for project-as-process theory in project management is that researchers have not studied the human side of project management thoroughly enough. As Kalogeropoulos et. al. (2020) argues, decision-making mechanisms are not only in technocratic knowledge, but also in the inner culture and personalities of the practitioners.

"Although both the traditional and process approaches have made valuable contributions in terms of developing tools and attending to social considerations, they both lack the ability to explain the situated activities of human beings, which suggests that the process approach does not incorporate the implications of actions in its final conclusions" (Hällgren & Söderholm, 2011). Previous approaches treated project activities as something that organisations applied normatively, regardless of their contexts and less as situated activities accomplished in a social setting. This arose critique and led to a new way of thinking. Projects-as-practice is, thus not to say that previous approaches were wrong, just that they were different (Hällgren & Söderholm, 2011). Differences between the process and practice approaches are summarised in the table below:

Table 2: Comparison of practice approach and process approach (Hällgren & Söderholm, 2011)

	PRACTICE APPROACH	PROCESS APPROACH
The role of activities	The activities and their meaning in a specific social setting, explain how the practice comes about.	The activities and how they flow, and their general development over time, explain the function of the processes.
Relation to the empirical setting	Viewed as the constantly renegotiated sum of people's practice.	Viewed as behaving according to a certain pattern.
Point of interes	Emphasis is on how a particular part of the project is achieved through micro-level practice.	Emphasis in on how things change on an organisational level
Type of investigation	Traditionally rely on participant observations	Traditionally rely on interviews
Research perspective	The understanding is constructed from a bottom-up perspective of the organisation.	The understanding is constructed with a top-down longitudinal perspective on the organisation
Example of research question	How is the project execution reflected in the practice of developing the Gantt chart in a construction project?	What are the milestones in the concurrent engineering process?
Examples pf studies	Brecky (2006); Whittington et. Al. (2006); Hällgren and Wilson (2007)	Lundin and Söderholm (1995); Midler (1995); Brady / Davies (2004)

Practice-oriented research has its origins in the field of sociology and social sciences, with a prominent contribution from Bourdieu's theory. Based on this theory, Whittington (2006) distinguishes three concepts on which project-as-practice theory has focused:

1. *Praxis*, which is concerned with actions of practitioners;
2. *Practice*, which is concerned with the overall rules and guidelines that direct the praxis of the practitioner; and
3. *Practitioner*, which is concerned with the actor who conducts the praxis.

These concepts give an important insight into human behaviour and help practitioners to see behind the actions that can have a considerable importance in project management and its success (Kalogeropoulos et al., 2020).

In project management, *praxis* refers to the actions of the people involved in execution of the project, what he or she does in a given situation. It involves both the project manager and all the other project workers on each discipline. The actions of the practitioners depend not only

on a situation and context, but also on the practitioners' previous experience, personality, education, etc. Bourdieu refers to this concept as "habitus" (Blomquist et al., 2010). The concept *practitioner* refers to the people that perform actions. In project management, this is the whole team working with the project. How the team acts, is believed to depend on both the practitioners' habitus and on the practices of the organisation. *Practices* are the various traditions, norms and rules that an organisation has, and which predetermines how the practitioner should act in certain situations (Blomquist et al. 2010). These practices can be expressed through the internal documents where all employees get an introduction into best practice or preferred practice in the company, or it can be told through exemplifying stories about "how we do things at the company".

According to Hendry and Seidl (2003), the concepts praxis, practice and practitioner are entangled with each other and grow into episodes. Episodes are limited events that occur in organisations in different situations, like meetings, planning sessions, deviation management etc. (Hendry & Seidl, 2003). Practice represents present thinking imposed by the organisation which is then subjected to a practitioner's interpretation in given situations. Afterwards, this interpretation is converted by practitioners into praxis through episodes. As long as the situation remains the same, practice and praxis will remain more or less the same. If the practitioner departs from the standard practices, new traditions can be created, which in its turn can become accepted practices (Blomquist et al., 2010). Such departures can also become a point of frustration or misunderstandings as other team members are not familiar or are not used to such practice.

Project management education today is mainly focused on teaching project management practices, i.e. tools, methods and "best practices". This is an important knowledge when managing projects. However, a better understanding of practitioners, praxis in addition to practices would be very helpful in understanding the project success factors as well as contributing to increased projects success.

According to Blomquist et al. (2010), there are two challenges that need to be dealt with when doing practice research. The first challenge is making practice research relevant for society, for the practitioners studied and for the understanding of projects. To perform a relevant research, the focus should be on presenting the research that is helpful both for the academics to understand project management, and for the project workers to better understand how they work and the conditions under which they work (Blomquist et al., 2010). The second challenge is

referred to as pattern challenge. In order to make a research that matters it is important to analyse not only individual actions but also the patterns resulting from the various actions.

Acknowledging soft skills in project management is not about mastering soft skills in a particular way or trying to change team members' soft skills. Rather it is about being aware of the differences each team member has and taking those differences into consideration when managing the team and managing the project. Raising awareness and understanding about such differences will help project managers adjust their leadership style to individuals, increase team efficiency and communication. As for the academics, expanding contextual knowledge of differences in human behaviour will broaden researchers' understanding of the processes and possible outcomes of those individual differences, which, in its turn, might make it possible to better customise project execution process and project management tools.

2.5 Summary

The purpose of this literature review was to conduct a deeper understanding of project management, various soft skills theories, and the criteria and factors that can influence a project success. The theory development during the last few decades within project management indicates that there is a shift from the traditional thought about project management towards seeing a project as a complex, dynamic system the success of which is influenced by more factors than only the use of proper tools or methods. The traditional iron triangle that indicated the three project success criteria has been expanded to include client satisfaction. The traditional project success factors that mainly focused on the methodological process of project management have been gradually expanded to also include soft skills, emphasising a more personal influence of each of the team members who work with the project.

To assist project managers in balancing the constraints, different Project management institutes publish standards and "best practice" that are supposed to help when carrying out projects. Although these standards contain tools and techniques to assist the project manager, project results continue to reflect scope deficiencies, and schedule and budget overruns. In addition, companies usually use the same tools and methodology for all their projects and still some of those projects go well, others fail. This fact suggests that there are other factors in project management process that have influence on project success and should be paid more attention to than only trying to develop new or more advanced tools or methodologies. Paying more attention to individual soft skills can be that factor which leads to increased project success.

3   Research methodology

The purpose of this chapter is to provide a thorough description of my methodological choices and my research process based on the formulation of my research problem. In order to answer my research problem, I have conducted an analysis of five projects in one consulting company working within construction and infrastructure industry. For analysis purpose, it was necessary to get an insight into internal processes within different project teams and try to map soft skills in the process of project execution. The analysis depended on choosing the appropriate research methods and collecting accurate data on the chosen topic. The summary of my methodological choices is presented in the table below.

Table 3: Summary of the methodological choices

Philosophical stance	Pragmatism
Nature of research question	Explorative/explanatory
Research approach	Inductive/abductive
Research strategy	Qualitative & quantitative
Research design/method	Case study. Embedded single-case design
Data collection methods	Primary data – interviews, questionnaire Secondary data – articles, reports, books

I begin by presenting the research philosophy that underpins my methodological choices. The choice of research approach and strategy is then presented before I move on to describing the research design and data collection methods. I end this chapter discussing issues associated with sampling, data quality assurance and research ethics.

3.1 Philosophical stance

A philosophical stance informs about what view of reality and knowledge the researcher has taken in a given study, which in its turn tells the reader about his/her viewpoints, approaches and methods (Savin-Baden & Major, 2013). Choosing a philosophical stance, forces researchers to make their minds about what they believe counts as knowledge and how that knowledge should be revealed. These are important elements as they influence how researchers will undertake a given study and how they will view their findings resulting from that study.

According to Brottveit (2018), in a research context it is necessary to clarify whether a question or a phenomenon is of an ontological or/and epistemological nature. Ontological views are

concerned with addressing the nature of reality. Ontology tries to answer questions for social researchers about whether something exists and in what form it exists (Savin-Baden & Major, 2013). Epistemological views, on the other hand, are concerned with addressing the nature of knowledge. It is concerned with what we can know about something and how to acquire that knowledge (Brottveit, 2018). Although these two concepts are different, they are closely related and they both can be prominent at the same time. The key concepts in this research are complex projects, project success and soft skills. The concepts are defined on the basis of theoretical framework. Consequently, questions related to what these concepts are will be ontological. Furthermore, a distinction is made in the ontology between realism (an objective perception) and idealism (a subjective perception). An objective reality is a concrete truth that is possible to test and identify. Realism suggests that there is an objective reality that exists independent of what an individual means or how he/she comprehends it (Savin-Baden & Major, 2013). A subjective perception of reality is based on the fact that reality cannot be observed in isolation, i.e. the reality is affected by social events and situations (Grenness, 2012). Different people have different perceptions and through the development of a common framework for the concepts that I mentioned earlier, a subjective reality can be constructed. Based on this, we can conclude that there is a subjective approach in this case, i.e. people may have varying descriptions and understanding of the same phenomena.

Savin-Baden and Major (2013) suggest that researchers should choose among six philosophies that guide most qualitative studies. The six philosophies are: critical social theory, pragmatism, phenomenology, post-modernism and post-structuralism, constructionism and constructivism. These philosophies are defined as philosophical paradigms that help researchers locate themselves and their studies (Savin-Baden & Major, 2013). Critical social theory believes that researchers should question and examine power structures and that researchers' ideologies affect their research. Pragmatism, on the other hand, says that research should reconcile theory and practice and that research should be done in a natural context. This philosophy has emerged in the US in the early 1800s and is focused on observing natural behaviour in a natural context (Savin-Baden & Major, 2013). Phenomenology focuses on human experience and believes that research should involve a search for deeper meaning (Savin-Baden & Major, 2013). Post-modernism argues that no matter what underlying structures there were, the researcher bias would still exist (Savin-Baden & Major, 2013). This philosophy was inspired by the work of French literary critics and searches for a deeper meaning in texts and subtexts. The fifth philosophy, social constructionism, focuses on dialogue and negotiation and it argues that

research should also focus on it. The last philosophy, constructivism, argues that researchers should seek to understand the way meanings are constructed (Savin-Baden & Major, 2013).

Saunders et al. (2016) proposes that philosophies should be viewed as a continuum rather than as opposite positions. It is not easy to take part in just one philosophy and it is not necessary to take parts because having different perspectives towards research can contribute to a richer understanding of a phenomenon. However, returning to my research question, I consider the pragmatic philosophy to be the most prominent philosophy to acquire for my research. Pragmatism focuses on the experience of people and emphasises the importance of change in the surroundings. Pragmatists believe that the world should be researched by the methods that are most appropriate for the research question (Savin-Baden & Major, 2013). Pragmatic research places "*the research problem as central and applies all approaches to understanding the problem"* (Creswell 2003: 11). This approach gives the researcher a possibility to choose analysis and data collection methods that he/she thinks are most appropriate to give the best insight into the research question. As a pragmatist, the researcher can try different methods and then evaluate them according to how effective they were. The main emphasis is on trial-and-error process (Savin-Baden & Major, 2013).

As Cicmil et al. (2006) argues, the project management literature shows the need for a pragmatist approach which can recognise complex social processes. Since I aim to explore social processes in a context of complex projects, a pragmatic research, where I make use of both qualitative and quantitative research strategies, is the appropriate philosophy to use. One of my objectives in this research is to see how theory matches practice and how the project management theory can be enriched by new insight into the importance of soft skills in change management. Therefore, my research hopefully can contribute to the existing body of knowledge within project management with a reflective, mature, and contextualised understanding of impact of soft skills in complex projects.

3.2   Research approach and strategy

Discussion of research approach is a vital part of any scientific study regardless of the research area. Research approach can be divided into three types: deductive, inductive and abductive. Deductive approach tests the validity of assumptions (or theories/hypotheses). It deduces hypothesis from an existing theory and then tests it through empirical investigation (Saunders et al., 2016). In deductive type of research, it is the theory that drives the process of gathering

data. In inductive type of research, on the other hand, the theory is the outcome of the research. Inductive approach observes processes in real life and then draws generalisable inferences from those observations. The third type of research, the abductive research, starts with "surprising facts" or "puzzles" and the research process is then devoted to understand and solve those puzzles (Bryman & Bell, 2015). It is important to point out, that the abductive reasoning is similar to inductive and deductive approaches since it applies logical inferences and construct theories. These three approaches are illustrated in the figure below:
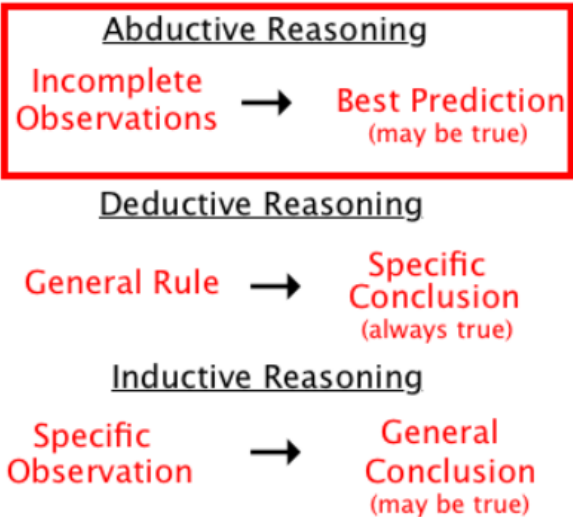
Figure 8: Research approaches. Source: Business research methodology

Given the nature of my research topic, the inductive reasoning is the appropriate one. The direction of the inductive research is "bottom-up" where the researcher is trying to understand the dynamics, robustness, emergence and resilience of the subject. The focus is on individual behaviour and constructing alternative futures. Inductive reasoning starts with detailed observations of the world and then moves towards more abstract generalisations and ideas (Neuman, 2003). However, my research is not completely detached from the theory and it contains deductive elements. Thus, it has elements of abductive reasoning, as it integrates previous research and theory to guide data collection and analysis.

Generally, the application of inductive approach is associated with qualitative methods of data collection and data analysis. Qualitative research is defined as "*a social research that is aimed at investigating the way in which people make sense of their ideas and experiences*" (Savin-Baden & Major, 2013). Quantitative research, on the other hand, is defined as a form of research that explains phenomena by the collection and analysis of numerical data (Aliaga & Gunderson, 2002). To study my research question, I chose to use a combination of qualitative and quantitative methods. The nature of the phenomenon that I investigate, as well as the main

research question in this study requires a qualitative approach. A qualitative approach is explorative, explanatory and descriptive, and assumes the value of the context and setting, as well as searches for the in-depth understanding of the phenomenon. A quantitative approach supplements my research with valuable quantitative data on the topic as it was not possible for me to interview all the people involved in my chosen projects.

In a qualitative research, the researcher goes in-depth on a narrow field. Empirical data are usually collected by means of interviews, observations or documents that are analysed. Common to this approach is that the researcher seeks to find out how people perceive the world around them and what reasons they give for acting the way they do. However, a quantitative research makes it possible to collect data from many respondents in a short time. It is especially valuable if a researcher has specific questions and wants to get input from as many respondents as possible. To answer my chosen research question the combination of qualitative and quantitative research method is, therefore, the appropriate one.

The purpose of the study can take an exploratory, descriptive or causal research form. An exploratory research design has the emphasis on discovery of ideas and insights. It is especially useful when breaking a broad vague problem statement into a smaller and more precise research question. It is also useful when clarifying concepts and testing measurement methods. Descriptive and causal surveys most often aim to describe and find connections between variables (Hansen & Faarup, 2010). My research is based on exploration of human behaviour and their soft skills and how these soft skills may affect the project success. It can therefore be said that I use an exploratory/explanatory survey approach since I investigate whether my chosen soft skills have any effect in the process of project execution. In addition, I also investigate how soft skills affect the complexity of projects. There is little theory related to this research area, and it will therefore be important to have an investigative and exploratory purpose. This can contribute with new insight into the research topic.

3.3 A case study approach

According to Saunders et al. (2009), there is a variety of research methods available – experiments, surveys, case studies, ethnographies to name a few. None of the methods are superior or inferior to each other, they simply serve different purposes. When choosing a research method, it is important to choose that one method that answers the research question

and meet the objectives of the study (Saunders et al. 2009). The chosen method should reflect the researcher's plan or description of how the study should be (Ringdal, 2018).

In this research, I have chosen to use a case study approach. Case studies are widely used in qualitative research as it seeks to gain an in-depth understanding of individuals, groups, organisations, as well as social, political and similar phenomena (Yin, 2018). A case study often emerges on behalf of the desire to understand a complex, social phenomenon, at the same time as the researcher has little control over the events (Yin, 2018). In addition, Yin (2018) explains that case design is suitable for research with an exploratory form, which is the case in my research.

Case study approach is characterized by the fact that researchers can study a lot of information about few units. I have chosen a case study as a research design because it allows me to go deep into the problematic area in project management process and analyse the different factors that emerge in projects. My chosen method is guided by my research question and research objectives, as well as my philosophical stance. Moreover, given my available time and resources, it will be possible for me to conduct and terminate the research within given frames.

3.3.1 Case study design

According to Yin (2018) case studies can be divided into two dimensions – single-case studies and multiple-case studies. Within these two dimensions she differentiates between whether there are single or multiple analysis units in each case (Yin, 2018). Within single-case designs, there are single-case holistic design (top-left) and single-case embedded design (bottom left). Within multiple-case designs, there are multiple-case holistic design (top right) and multiple-case embedded design (bottom right). All four are shown in the figure below.
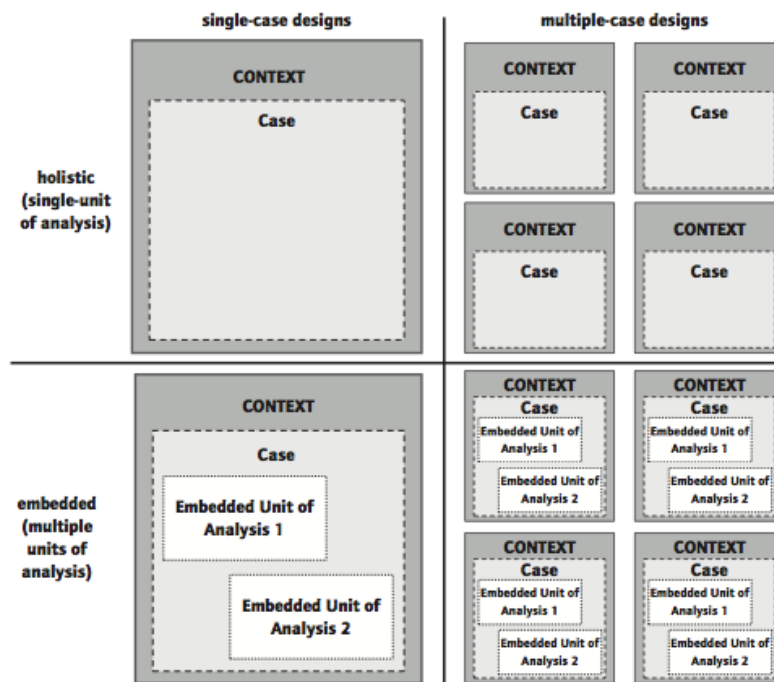
Figure 9: Basic types of designs for case studies. Source: COSMOS corporation

Regardless of the type of design one chooses each of them has both advantages and disadvantages. Both Yin (2018) and Eisenhardt (1989) believe that using multiple-case design is an advantage as it provides more robust studies and the possibility of theoretical replication, as well as better explanation than a single-case design. Dubois and Gadde (2002), on the other hand, believe that using single-case design is best suited for going in depth and developing knowledge, because a multiple-case design only provides greater breadth and not necessarily more in-depth understanding. In any case, Dubois and Gadde (2002) point out that it is difficult to know how deep or how wide one needs to analyse each problem.

Yin (2018) identifies five rationales for choosing a single-case design – critical case, unique case, representative or typical case, revelatory case, or longitudinal case. I consider my case to be both representative/typical case and a revelatory case. The objective in my research is to capture the circumstances and conditions of an everyday situation in a consulting company because of the lessons it might provide about the social processes related to my theoretical interest. I see my case also of revelatory nature as this phenomenon has not been research within the given context before. My theoretical framework showed that the topic of soft skills in project management is well acknowledged, but there is lack of research about what consequences it has in practice.

The same single-case study can involve units of analysis at more than one level (Yin, 2018). This happens if we focus on several subunits within the same case. Yin (2018) also points out

that the choice of one or more analysis units depends on the phenomenon being investigated and the research question. For my research, I have chosen to use a single case design with several analysis units. I have chosen this design because I wanted to go in depth into my case and develop a better knowledge about the influence of soft skills in different project teams in one company. This is an appropriate design because each project is unique, and it needs different competences depending on the nature of the project. Even those projects that are of similar nature get different team compositions depending on who has available capacity to take a project. Therefore, there is no point in distinguishing between what the different projects do individually, rather we should look at this as a whole and search for patterns. My chosen case study design is presented in the figure below.
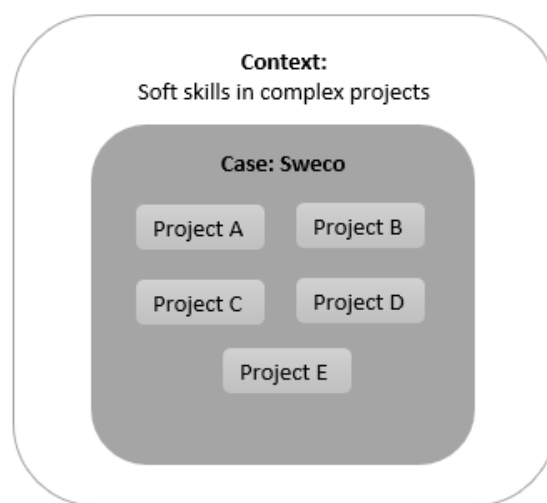
Figure 10: Case study design of my research

As mentioned before, a single-case study is a more in-depth research design that creates a deeper understanding of the problem, which in turn can provide good opportunities for developing new theory or hypotheses for further research. This makes the design well suited for the generalization of theory being extracted.

3.4 Sample description

Qualitative studies are based on strategic selections. This means that participants are selected on the basis of systematic assessments which characteristics or qualifications are strategic in relation to the problem underlying the study (Thagaard, 2018). When deciding on a sample, three factors should be taken into consideration – time, population and accessibility (Savin-Baden & Major, 2013).

The population of engineering companies in Norway is quite big. If we narrow it to the engineering companies working within consulting sector, there are still quite many companies to choose from. The five biggest consultancy companies within construction and infrastructure sectors in Norway are Norconsult, Multiconsult, Sweco, Asplan Viak and Rambøl. All the five companies are well known, and they often compete in obtaining the same projects. The project management organisation within these companies is also quite similar. This implies that conducting my research in one of these companies will make my findings representative for the other companies working within the same field.

Time is a factor that takes into consideration time needed to conduct qualitative research. This includes not only time needed to conduct interviews, but also the time that is needed to set up, debrief, travel, transcribe, analyse and interpret data (Savin-Baden & Major, 2013). According to Thagaard (2018), the sample should be large enough to provide an understanding of what is being studied, at the same time as it should not be larger than that it is affordable to carry out analysis afterwards. Taking this into consideration, I found that to be able to complete my research within the given timeframe I had to keep my sample limited to five projects.

The last factor that needs to be taken into consideration is accessibility. Accessibility considers whether it is possible to gain access to information, and especially access to the participants (Savin-Baden & Major, 2013). In my case, I base my choice on strategic selection of projects in the company I work. This gives me good accessibility to the participants and information I need for my research.

For my research, I chose five ongoing projects from one company. I did not have any particular criteria when choosing projects, however, it was important that my chosen projects represented the variety of the projects Sweco carries out. Therefore, two of the projects I chose are within construction industry and three of the projects are infrastructure projects. Most of the projects have an approximate budget estimation where the customer is invoiced by the accrued hours. A small part of projects are fixed price projects. My chosen projects represent both types of contracts. To answer my research question, it was also important to choose projects that are managed by different project managers as each leader has his/her own leadership style which can be an important variable when analysing the research problem. At the same time, I wanted to see whether the same project manager had the same leadership style when leading different teams. Therefore, two of the projects I chose had the same project manager. Having this in mind, I believe that my chosen projects represent the variety when it comes to both the variety

of projects and the variety of people working in the company. This, in its turn, makes it possible for me to generalise my finding to the whole organisation.

There are two main approaches for sampling in qualitative research – theoretical sampling and purposeful sampling (Savin-Baden & Major, 2013). Out of the two sampling methods, I found purposeful sampling as the preferred method. This is underpinned by the fact that my sample selection is conceptually driven by my research question. Within purposeful sampling there are many sampling strategies e.g., homogeneous sampling, theoretical or conceptual sampling, intense-case sampling etc. (Savin-Baden & Major, 2013). These are some of the many different strategies that have been developed over time. For my study I found conceptual sampling as the most logical sampling strategy. The rationale behind this choice is that this strategy selects people that are known to experience the concept or problem in focus. I want to map how team members of the chosen projects perceive project management, team collaboration and communication. My research involves specific projects and thus, I needed my sample to consist of those who worked with these projects. Making a random sample of different people within the company would not have given the necessary information for analysis about the projects.

3.5 Data collection

Case study evidence can come from a variety of data sources, both qualitative and quantitative (Yin, 2018). Using several data sources gives the researcher a possibility to see the complex phenomenon through more than one lens and understand multiple facets (Baxter & Jack, 2008). The most commonly used data sources are documentation, archival records, interviews, direct observations, questionnaires, to name a few.

Data sources are divided into primary data and secondary data. Primary data is collected by the researcher from first-hand sources during the research, whereas secondary data is the data that has been collected through primary sources earlier and has been made available for researchers to use for their own research (Ringdal, 2013). None of the sources has a complete advantage over the other (Yin, 2018). In fact, the use of several data sources is highly complementary and allows the researcher to address a broader range of issues. A good case study will therefore rely on as many sources as possible. This also means that use of several sources is likely to be more credible. My case studies were carried out using several types of data collection methods, interviews with project managers and a questionnaire with the rest of project team members, which I expand on below.

3.5.1 Semi-structured interviews

Interviewing respondents is often claimed to be the best method for gathering information (Yin, 2018). Depending on the level of formality and structure, interviews can be divided into structured, semi-structured or unstructured (Savin-Baden & Major, 2013). They can also be unformal and free-ranging conversations. Interviews can especially be helpful by suggesting explanations of key events as well as asking participants to reflect or give insights on various perceptions.

In case of semi-structured interviews, it is good to have some guiding questions or core concepts to ask about, but there is no formal structured instrument or protocol that the interview follows. The interviewer is free to move the conversation in any direction he/she feels. In my research, I have used face-to-face semi-structured interviews. The primary purpose of these interviews was to get a better insight into the projects and to understand the project managers' routines. My purpose with interviews was to gather relevant in-depth information about each project and have the informants tell their story. In this way I was able to understand and interpret the situations in the right way.

According to Patton (1990), there are two important points to be considered regarding semi-structured interviews. First, this kind of interview is used for collecting a more qualitative data; and second, a researcher interviews people to find out about things that he/she cannot directly observe. With the semi-structured interview, the interviewees were able to respond to my questions and talk about the topic freely at the same time giving information-rich answers to specific questions.

Despite this, there are several challenges when doing interviews (Savin-Baden & Major, 2013; Yin, 2018). Interviews are time consuming and resource intensive and their quality depend on the quality of questions asked (Savin-Baden & Major, 2013; Yin, 2018). Furthermore, because of the social setting of interviews, bias may be an issue (Yin, 2018). Bias can occur both because of the researcher and because of the interviewee. The quality of the interview depends on the interviewees' honesty, as they might withhold information, lie or provide the information they think the interviewer would like to hear. If the interviewee has poor memory, it can make narrative less reliable. To avoid or reduce bias the researcher can try to establish a trustful connection with the interviewee or support the information with the information obtained by other data collection methods (Savin-Baden & Major, 2013; Saunders et al., 2016; Yin, 2018).

As I myself work in the company I chose to do my research in, I felt that interviewees were comfortable with me interviewing them although I was not working with them directly. The fact that I knew the company and was part of it help the interviewees to open up and tell their story the way they experienced it.

3.5.2 The questionnaire

The self-completion questionnaire is another method of social research that has been used in my case studies. The difference between interview and self-completion questionnaire is that there is no interviewer to ask the questions; instead, respondents read each question themselves and answer the questions themselves. Moreover, as Bryman and Bell (2015) indicates, because there is no interviewer in the administration of self-completion questionnaire, the research instrument has to be especially easy to follow and its questions have to be particularly easy to answer.

The main step in drafting the questionnaire was to extract a list of situational, attitudinal and behavioural characteristics from the literature on project management, routines and team collaboration, and formulate easy relatable and understandable questions. This was problematic considering the multi-dimensional qualities attributed to the project management and soft skills by various writers and the imprecise and subjective natures of many of the variables involved. Nevertheless, the literature did reveal a number of core features that I could use in my questionnaire.

All in all, there were approximately 371 people registered working on the five projects that I chose to do research on. The questionnaire was sent out to all discipline specialists using Microsoft forms. As a big part of discipline specialists worked on several of my chosen projects, it resulted that approximately 190 people received the questionnaire. In total 77 answers were received within the period of two weeks. The number of the respondents points to quite a low response rate. As Bryman and Bell (2015) indicate, the lower the response rate, the more questions are likely to be raised about the representativeness of the achieved sample. But in a sense, this is only likely to be an issue with randomly selected samples. With samples that are not selected on the basis of a probability sampling method, it could be argued that the response rate is less of an issue because the sample would not be representative of a population even if everyone participated (Bryman & Bell, 2015). However, I have to acknowledge the possible

limitations of a low response rate although the purpose of the research is not to generalise the finding but to see the tendencies in practice.

Initially, the questionnaire had over 50 questions. However, as the research process went on, I realised that this was way too much to be included in the questionnaire and, moreover, hope that the respondents will take time to answer it. Respondents are more likely than in interviews to become tired of answering questions that are not very salient to them, and which they are likely to perceive as boring. Accordingly, as my research problem and my focus of research became narrower, I purposefully picked out the questions which were concentrating on my limited topic. Gradually, after I conducted interviews and after revising my research questions, I was able to narrow my scope of interest even more and reduce the number of questions to 34 questions picking out only those that were essential for my research question to be answered.

3.6 Data analysis

As mentioned earlier, for my research I chose to conduct semi-structured interviews. Before interviews, an interview guide was developed. An interview guide is a list of more or less detailed questions to be addressed, or topics to be covered (Bryman & Bell, 2011). The same interview guide was used in each interview. The topic and questions for the interview were developed while performing literature review for the research. The interviewees did not get the interview questions beforehand, but each of them received an e-mail with a short description of the topic I wanted to interview them about.

The interviews were carried out face-to-face and held in the workplace of the interviewees. However, because of the Covid situation, two of the interviews were carried out using Teams video calls. Observing interviewees' non-verbal communication is beneficial and helps to get a holistic impression of the interviewees and their feeling around the topic. The questions asked during the interview were of emerging nature rather than predetermined. In that way, the interviewees felt a little less formal and more open to express their points of view. None of the interviewees was against me recording the interviews. This helped me to focus on the person I was interviewing instead of trying to write all details down or try to remember what was being said. Although the interviewees did not express wish that their names would be anonymous, for the sake of simplicity I have decided to refer to the projects and the project managers that I interviewed as Project A, Project manager A and so on. The interview guide is available in appendix A.

I did not follow the interview guide slavishly. Almost all questions were open-ended allowing the interviewees to expand on their answers as much as they felt was necessary. In this way, the interviewees were able to give detailed answers without time pressure and they could supplement their answers along the way. As my interview guide was semi-structured, I could deter from it when I felt it was appropriate or necessary and was able to ask additional clarifying questions. This flexibility is an important factor in semi-structured interviews allowing the researcher to achieve rich and detailed answers (Bryman & Bell, 2011).

Each interview was scheduled to last one hour and most of the interviews were conducted within this timeframe. The interviews were scheduled by me as I had access to the calendars of the project managers and could set up time that suited all parties. The interviews were carried out in September 2020 and they were carried out in Norwegian. It was natural to do it in Norwegian as it is the native language of all interviewees. The recorded interviews were afterwards transcribed.

I interviewed five project managers in total. One project manager had two of the projects that I chose for my research, thus the interview included both projects although there was more focus on one of the projects as it was considered bigger. One of the projects had a project manager and an assisting project manager who changed their roles under the execution of the project. I interviewed them both as I considered it to be useful to get a complementary insight into the same project and how each of them experienced being a project manager for the same project.

After the interviews, the questionnaire was sent out to the rest of the team members who worked on those five projects. Some of the team members were involved in a couple of the projects from my research. These participants were asked to take stance to one of the projects as the questionnaire was not customised to include answers from several projects, and I could not expect that the same participants would fill out the questionnaire several times. A summary of the participants in each project is presented below. The questionnaire is also available in appendix B.

Table 4: Summary of the interviewees and participants in each project

Project	Interviewees	Team members	Answers to the questionnaire
A	1	90	40
B	2	83	18
C	1	62	9
D	1	29	5
E	1	66	5

Before sending out the questionnaire I had to customise the receiver list. After I received a list with all team members from all six projects I went through each list and excluded people being listed several times. This reduced my list from 371 participants to 245 participants. Next, I went through the remaining participants and excluded those who did not work at the company anymore. This reduced my list again to approximately 200 participants. Next step was to exclude project owners and controllers as their roles and contribution in the projects are limited. My end list thus consisted of 190 people that I sent my questionnaire to. 77 answers to the questionnaire were received.

When it comes to qualitative data analysis, unlike statistical analysis, there are few fixed formulas or established rules for analysis to use as guides (Bryman & Bell, 2011; Yin, 2018). Instead, much of the analysis depends on the researcher and his/her style of rigorous empirical thinking and careful consideration of alternative interpretations (Yin, 2018). Nevertheless, there are some analytical tools and approaches that the researcher can use. Savin-Baden and Major (2013) distinguish 13 methods of analysis and divides them into primary methods and specialised methods of data analysis. The primary methods are keyword analysis, constant comparison, content analysis, domain analysis and thematic analysis. Specialised methods include analytical induction, heuristic analysis, hermeneutical analysis, ethnographic analysis, narrative analysis, discourse analysis, semiotic and event analysis. Yin (2018), on the other hand, suggests five analytical techniques for case studies. These are pattern matching, explanation building, time-series analysis, logic models and cross-case synthesis. Yet another classification is presented by Ryan and Bernhard (Denzin & Lincoln, 2000). They propose two methodological approaches that can be used when analysing free-flow texts. They distinguish between words as unit of analysis and codes as unit of analysis. They also argue that grounded theory approaches prefer code-based analysis in order to reduce text data to manageable categories or themes (Denzin & Lincoln, 2000). As my research is of exploratory character and trying to find patterns, I consider the code-based analysis to be an appropriate one for this research. Code-based analysis includes analysis such as constant comparison, content analysis and scheme analysis (Denzin & Lincoln, 2000).

3.7 Data quality assurance

"To attain absolute validity and reliability is an impossible goal for any research model" (Le Compte & Goetz, 1982)

Validity and reliability are two research criteria that are used to ensure the quality of the research. The two criteria ask the researcher to consider whether one is researching what one thinks he/she is researching, and whether the measures that are used are consistent. Validity is often further divided into construct, internal and external validity (Yin, 2018).

Construct validity can be especially challenging in case study research (Yin, 2018). The critics say that a case study fails to develop a sufficiently operational set of measures and that it makes subjective judgements confirming something that a researcher has predetermined beforehand (Yin, 2018). If a researcher wants to increase construct validity, it is advisable to use multiple sources of evidence or to establish a chain of evidence (Yin, 2018).

Internal validity is mainly applied to explanatory case studies where a researcher is trying to explain causal relations (Yin, 2018). The main question that internal validity is trying to answer is whether the observed behaviour can be attributed to the theory that is being used, or whether there can be other explanations for the outcome. In my research I have only analysed some of the soft skills that can influence project success. The interpretation of the results may be critical because the interpretations might have been different if somebody else would have interpreted it. In all research, it is important to assess any biases that may arise (Saunders et al., 2016). I have tried to be neutral and I only had the theoretical framework in mind when I interpreted my data. However, it will still be a subjective interpretation as it is me as a researcher who interpret the data.

External validity is mainly concerned with generalisability and it means that research results should apply for others than those that have been researched. For my research it would mean that the results should be valid for other projects of similar character (i.e. construction or infrastructure projects) and not only for the projects included in the research.

Reliability, on the other hand, deals with the extent to which the study can be reproduced (Yin, 2018). In practice, this would mean that researchers who use the same research procedures should arrive at much of the same findings and conclusion as the original researchers. Thus, the goal of reliability is to minimise the errors and biases in the research (Yin, 2018). The problem is that getting opportunities to repeat case studies rarely occur. To approach the reliability problem, it is important to document the procedures followed in the case study, otherwise not even the original researcher will be able to reproduce his/her own work. Reliability is not the same in qualitative and quantitative research. Quantitative research has a stronger focus on consistency and accuracy. Quantitative studies, thus, can be reproduced to a much greater extent, compared to qualitative studies. As it is problematic to reproduce qualitative studies, a

stronger focus is placed on precise and thorough review of the procedure in the research process. This is referred to as internal reliability and deals with the extent to which researchers can use the conceptual apparatus in the analysis of collected data like the original researchers did. External reliability is linked to how other researchers will arrive at the same phenomenon and, not least, present the same concept in situations that are similar.

It is important that it is clearly expressed how a researcher's knowledge is used in an analysis. It is essential to keep in mind that the position one has as a researcher can influence the research work. It can be beneficial to have close knowledge about the research objects in order to be able to ask the right questions, but, at the same time, the researcher can bring with him/her too many prejudices if the researcher has a lot of knowledge about what is being researched (Tjora, 2013). In my case, I have quite close knowledge of the company where I perform my research. I have good knowledge about the routines and project methodology that is used for the projects. However, as I only worked in this company for half a year before I started my research, I did not know the people I interviewed well (project managers) and I did not know the engineering specialists that the questionnaire was sent to at all. In this way, I could get the best outcome for my research by being objective and by having respondents' trust. Understanding the internal culture and internal processes helped me to better understand what the respondents were talking about and I could supplement the interview with more accurate additional questions. Furthermore, I think it was easier for the respondents to open up for me since I was perceived as an inside person.

3.8 Research ethics

When doing research, it is important that researchers show good research ethics. As Ringdal (2018) points out, when conducting scientific research, it is important that researchers set some criteria for their ability to reflect over their own practice. Researchers must continuously adhere to ethical principles internally in research environment and in the surrounding environment (Thagaard, 2013). This means that all research should be considered according to established criteria that are neutral with regards to researchers' age, sex, nationality or relationship. Researchers should also stay impartial throughout their research in order to avoid bias. Last but not least, researchers should be critical of other researchers' work when using it in their own research, and their own work should be innovative and add new knowledge.

I have evaluated the potential ethical challenges that may arise during my research and how those challenges should be handled. Before the interviews, all the informants were informed in advance that they, as individuals, would be completely anonymous, and that all recordings from data collection would be removed upon submission of the master thesis. This meant, first and foremost, that the respondents could potentially speak more freely, and could be confident that what they said would be kept anonymous.

Another aspect a researcher must consider before doing a research is the law of personal privacy. A researcher must protect the privacy of the people that agree to take part in his/her research. This demand is defended by laws on personal information. The law says that all research projects that include some form of personal information or data must be registered at Norsk Samfunnsvitenskapelig Datatjeneste, also called NSD (Ringdal, 2013). Neither my interviews or the questionnaire asked about any personal information from the respondents and no one needed to give any information that would trace them. I also chose to refer to the projects and to the interviewees as Project A, B etc and Project manager A, B etc. Therefore, I considered it as unnecessary to send in an application to NSD regarding my research. The name of the company is not anonymised which was agreed upon beforehand.

To ensure the reliability of the research, I have sent my findings and analysis to the project managers I interviewed. By doing this, I ensured that the respondents recognised themselves in my research and agreed with the statements I came with. It is important that researchers do not draw conclusions based on their own values and assumptions. This is ensured by obtaining confirmation that the analysis is in accordance with what the respondents have stated. When using publications and other theory published by other researchers, I have been careful to quote these correctly and ensured that all sources are cited correctly. In my analysis and assessment of data material I acted neutrally, and I had no interest in distorting the data. Based on this, I consider my role as a researcher to be neutral. I believe that my research has followed ethical guidelines in a good way and that I have taken sufficient precautions to protect my respondents and participating company.

4 Empirical findings

This chapter will present the empirical results gathered from the five projects that I studied. This will be done in three parts: (1) case descriptions, (2) the empirical findings from the

interviews, and (3) the empirical findings from the questionnaire. The analysis of the findings will be presented in the subsequent chapter.

In the first part, I shortly present some of the characteristics of my chosen company, project management methodology that they use, and I shortly introduce each project. The organisational structure of the company is important to know in order to form a picture of how the company functions, understand its organisational culture, routines, how project teams are built and how communication flows within the company. The projects are given names Project A, Project B etc.

The second and third parts of this chapter present the main findings from each data collection method I chose. As I assumed before I started my research, project managers and technical resources see the projects differently as they have a different starting point. Therefore, it was appropriate to split the presentation of empirical findings as I did.

4.1   The projects

The projects in this case study are briefly described hereafter. All the projects I chose can be defined as complex projects because they involve many people and various disciplines that need to collaborate closely throughout the whole project in order to complete the project.

The company's project management methodology is based on "best practice" principles for good project management. It is adapted and further developed through workshops and interviews with the company's employees. The project management methodology consists of various tools divided into three themes: (1) planning, (2) interdisciplinary collaboration, and (3) management and follow-up. The methodology is illustrated in figure 11 below. The methodology describes a "basic plan", and, therefore, is expected to be adapted to each specific project and project phase.
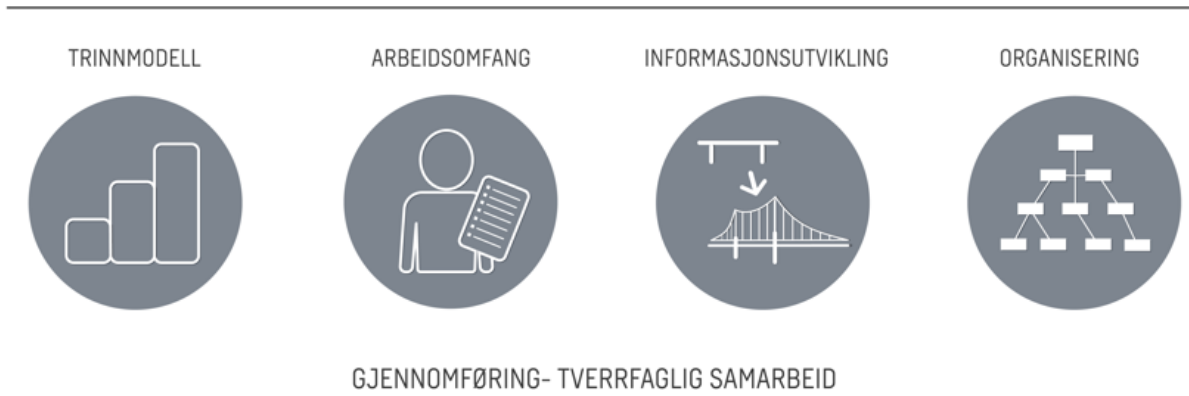
Figure 11: The company's project management methodology. Source: Sweco

All the projects in this study are contractors within construction and infrastructure industries. The projects are taken from the same company. The five projects belong to three different departments in the company. The company can be described as a matrix organisation with several departments and cross-functional project teams. Most of the activities in the company are executed as projects, only a limited part of it is of functional nature.

The projects I chose for my case study can be defined both as recurring and unique. Due to the demands from the customer and the situation, each project has unique specifications and circumstances, even in projects of a more repetitive nature. The projects are usually divided into different phases like preliminary phase, detailed engineering, follow-up during construction time, etc. It varies how many phases the company gets to be involved in or how long the phases are. Table 5 below summarises the characteristics of the projects.

Table 5: Summary of projects' characteristics

	Project A	**Project B**	**Project C**	**Project D**	**Project E**
Object type	Hospital	Tram tracks	Business area	Railway station	Railway station
Project start	2016	2016 autumn	2019 autumn	2018 Feb	2020 Jan
Phase	Detailed engineering	Follow-up during construction	Regulation plan	Detailed engineering	Detailed engineering
Duration	In progress	Finished 2020 Oct	Phase1 finished 2020 Dec	In progress	In progress
Budget	Start: 24,2 MNOK Now: 53 MNOK	13,5 MNOK	Fixed price 9,8 MNOK	15,5 MNOK	7,3 MNOK
Staffing	82	100	62	85	66
Project managers	Informant 1	Informants 2 and 3	Informant 4	Informant 5	Informant 5

Project A

The project is located in Haugesund. The project is a complex one as it involves many people from different engineering disciplines. Informant 1 has his education within project management and construction engineering. He had experience working both for a contractor and for a consultation companies. Project A was his first project in this company and this project is still in progress.

Project A started in 2016. It has several contractors, which means that the end customer has a contract with another contractor that is responsible to build the building (hospital), while Sweco has a contract with the contractor and gives consultation services for both the contractor and the end customer. The project's first phase was a sketch project which then went over to preliminary project. When the project manager took over Project A, the project went over to a new phase called detailed engineering phase. This phase was excreted from the previous phases as a totally new project as it also had a new contractor.

The objective of Project A was to build a new building and connect it to the old building. A hospital is a multifunctional building and to build it requires expertise from many different disciplines. Project A has a time-and-material contract form, which means that consultants bill the client for the hours spent on the project. Budget estimation at the beginning of the project (i.e., detailed engineering phase) was 24,2 MNOK. As the project went on and more details were determined and clarified, the budget underwent several budget increases and the estimated budget for the project per today is approximately 53 MNOK. The project is planned to be finished in May 2021. Project A has the same functionality and scope now as it had at the beginning of the project. The reason for why the sum is more than double now, according to

the project manager, is bad estimation of hour consumption. The project manager predicts the end sum to be around 60 MNOK. As the project manager explained:

"It is highly risky for consultants to give a fixed price for such a complex project as building a hospital, especially for technical disciplines it is difficult to anticipate hour consumption."

All the engineering disciplines that the company has at its disposal are involved in the project. *"All in all, it has been approximately 82 people involved in the project at some point of its execution. At its most, hour consumption exceeded 1.200 hours per week."*

Project A can be defined as a status project and it is seen as a plus to have it on one's CV.

Project B

The project is located in Oslo. Just as Project A, Project B is a complex project as it involves many people from different engineering disciplines. Project B had a project manager and an assisting project manager who changed their roles under the execution of the project. Informant 2 was a project manager from the start of the project, and Informant 3 went over to being project manager from approximately the middle of the project. Informant 2 is a civil engineer, and she has taken courses in project management. Informant 3 has a bachelor's in construction technology, he has also taken courses in project management. Both project managers have worked in the company for six years.

Project B was started in Autumn 2016 and was finished in October 2020. The project had two phases, each phase lasted approximately two years. The project's first phase was a detailed engineering phase, while the second phase was a follow-up phase under construction. As Informant 2 said, and later Informant 3 agreed:

"The two phases can actually be treated as two separate projects as they were very different. During the engineering phase the process went according to our own schedule whereas in follow-up phase, the contractor controlled the time schedule and we had to adjust us to their pace."

The objective of Project B was reconstruction of tram rails in the centre of Oslo. Project B, as well as Project A, had a time-and-material contract form. The original contract was budgeted to 13 MNOK. In addition, the changes that came along during the execution of the project amount to approximately 500 000 NOK. According to Informant 2, there has been approximately 100 people involved in the project during those four years.

Project C

The project is located in Oslo. The project manager of this project is a civil engineer. She is both a project manager and a group manager in infrastructure department in the company. Project C was her first project after she started working at the company in 2019.

Project C was started in September 2019. The project is in its first phase which will be finished in December 2020. The objective of this phase is to produce a detailed description for the regulation plan. After this phase it is expected that the company will sign the contract to work with the next step in developing this area which involves detailed engineering of the whole area. The management group in this project consisted of three managers who distributed responsibilities among themselves.

The objective of Project C is the development of business and living area outside the centre of Oslo. Unlike Project A and B, Project C is a fixed price project with a budget of 9,8 MNOK. Although it is a fixed price project, the changes that were not included in the contract were treated as changes and billed for the hours spent on the project. The total sum for this project is at the moment 11,5 MNOK.

The project has involved approximately 62 people from 15 different disciplines and, thus, is considered a complex project.

Project D

The project is located in Jaren. The project manager of this project is a civil engineer specialising in railway technology. Informant 5 has worked in the company for four years. Before that, he worked for many years at one of the customers of the current employer. Informant 5 is mainly a project manager, but he also works as a discipline manager within railway technology. He has been a project manager for Project D and E from the start.

Project D was started in February 2018 and the estimated completion of the project is in 2022. The objective of the project was the development of the railway platform in Jaren. The main task was the control of detailed engineering plan, professional review, create detailed specifications for the next phase, which is detailed engineering of the railway platform. And then, when the contractor is chosen, the company's role will be to assist the customer with professional follow up towards the contractor. The project is quite big as it involves the development of new railway platform, new platforms and parking areas, development of large storage facility as well as operational base with new buildings.

Project D has a time-and-material contract form. When the contract was signed the estimated budget was 2,3 MNOK. However, the project was expander underway and per today the changes amount to 13,2 MNOK. There are approximately 20 different disciplines involved in the project.

Project E

The project is located in Skarnes.

Project E was started in January 2020 and the estimated completion of the project is in 2022. The objective of the project is the development of the railway platform in Skarnes. This project is much smaller than Project D as it only involves the detailed engineering of the platform and not the area around it.

Project E has also a time-and-material contract form and the estimated budget in January was 4,6 MNOK. The changes that are currently registered in this project amount to 2,7 MNOK. As in Project D, there are approximately 20 disciplines involved in the project.

4.2 Interviews

In the successive paragraphs, the results from each interview are presented and the relationship between the concepts is explored.

The first questions I examined were the perception of the informants towards meeting time, budget, and performance as these are the criteria that are used to measure whether a project has been successful. As expected, these three dimensions seemed to be critical to them all. Furthermore, the project managers were convinced that this was their major job. Every month their performance was assessed by how well they met their projects' immediate goals and where they were on time schedule and budget. However, while all informants saw time and budget as important, the main part of their everyday tasks were focused on steering the project team, communicating with the customer and assuring that all team members at all times received and had the necessary information to perform their tasks.

4.2.1 Project team dynamics

According to the project management methodology the company uses, in complex projects, project managers do not have the authority to assign project teams. The team is set up by the project owner in collaboration with group managers. It is also the project owner who assigns a project manager to the project.

In Project A, the project team was put together by department and group managers who usually have best overview of people's availability and competence. When Informant 1 got assigned to the project the team was already set. There have not been any big changes in staffing during the project execution, however, there were a few resources that had to be changed halfway in the project and some had to be added to the project when the workload increased.

Informant 1 said that project managers in general have a more demanding task than people often think, and when there are many different disciplines involved, this process becomes even more demanding. The informants experience that it is more challenging to lead interdisciplinary teams than single-disciplinary teams. One of the challenges of leading interdisciplinary teams is related to the conflicts that can arise as a result of personal or professional mismatches.

> *Managing a team that is so diverse in their interests and ways of collaboration, is demanding.* Informant 1

He also admitted that trying to make everyone see the project as a common goal is still difficult. Technical resources come from different internally organised groups which means that they are accountable for different group managers and departments.

> *Each group has to fight for their own budget which results in that it simply does not work. The idealism that we all work for the same company and each group will deliver the same project stops at a point when group managers have to come in and distribute costs that have to be written down. It creates many negotiations and arguments, and it transmits to others within the project team. This influences the mood and collaboration.*
> Informant 1

This type of internal administration is unfortunate as it splits project teams and offsets the common goal of unity.

> *The pointing finger comes quickly up when someone makes a mistake because no one wants to pay or be responsible for the mistakes that others make.* Informant 1

No matter how many technical resources a company has, it is impossible to have enough resources all the time. There are periods with many projects and there are periods with little orders in stock. Companies try to adjust to an average situation, otherwise it would be expensive. In hectic periods, priorities have to be made and it often happens that projects do not get the resources they need. In matrix organisations, it is a group manager that owns the resources, and it is they who decide how they will be used. As Informant 2 pointed, when the company has a lot of similar projects, it gets very difficult to get the necessary resources for one's own project. In the case of Project B, there were four very similar projects going on at the same time and for the same customer. Some of the resources were key resources in all these four projects so it was a competition among those projects to get hold of the resources.

> *It is a group manager who owns the resources, so it means that you have to adjust to their work capacity.*   Informant 2

According to Informant 2, the biggest problem setting up a group for this particular project was to find resources for VA discipline (vann og avløp).

> *First off all, Oslo office did not have any resources available for this discipline. At the end, we received a resource from Hamar office. But then the project was postponed and then suddenly Hamar resources said that they actually had another project in progress, and they did not have time for Oslo project. You can't do much about it. You can't say that you do not like it or that the customer does not like it. And I understood them as well. They live in Hamar and want to build E6 that was near them. So, again we had no resources. Others were frustrated because they could not do their part of the job. Then we got someone from Porsgrunn. However, we had some work issues with them. It was not because the people we received were not good, but because they did not know the water and sewerage department in Oslo. There are different rules for all municipalities.*
>   Informant 2

The quotation above points out several issues. First of all, resource shortage as well as replacements affect both the project execution and the whole project team. It creates challenges when performing tasks and it delays the project. Replacements can also lead to uncertainty around responsibilities, role allocation and increased project costs as new people need time to familiarise themselves with the project. Moreover, information can be lost along the way. As Informant 2 said Hamar and Porsgrunn offices had a meeting where the new resources were

supposed to receive the necessary information about the project so long. However, VA resources complained later that the information they received was not sufficient and it required more time for them to familiarise themselves with the project.

> *Maybe it is also because there has been a money demand from the customer, and then everyone is trying to say that it was not their fault.*   Informant 2

Project manager 2 acknowledge that it always influences the project team when group members change.

> *You lose a little bit of history, in a way.*   Informant 2

Increased costs and delays as a result of resource shortage and resource replacements affect the overall project success.

When it comes to allocation of responsibilities within the group, Informant 2 said that:

> *We always have start-up meetings in my projects where we go through the contract and budgets and some other standard things, like, how to deliver documents, delivery plan and things like that. What I think is difficult to determine is the crossing points. It is quite clear what the responsibilities of the different disciplines are, but then there are some things that lie in between those responsibilities. I do not know if one can even clarify such things. It is more of a continuous process in a way.*   Informant 2

The other informants agreed with Informant 2 on this. In such situations it is important that the project team collaborates well, and especially collaboration across disciplines is crucial. Reports are often written in collaboration where resources from different disciplines have to supplement each other's information. If they do not collaborate, there might be complaints from the customer and demands to review the report.

> *Such things, I mean revisions of documents, are time consuming for everyone.*
>
>   Informant 2

Another informant said that he thinks it is necessary that project managers have more authority and power to determine. However, it is also important to keep in mind that there are many personalities in a team. This means that as a manager one has to see those differences and adapt their management style to those differences. Looking back at the project, Informant 2 said:

I think that perhaps I should have realised earlier that some disciplines did not deliver so well and that discipline managers did not do their part of the job. When I realised that I began following up each resource myself. Informant 2

To the question whether it would have been better if she was able to set up her team herself Informant 2 said:

I was quite new in the company, so it was just as good that the group was already set up for me. But for the next project I think it would be better if I set up my team myself. But anyway, you rarely get all the resources you want. This is just the way it is when you have to sell the resources into the projects and when you have to take into consideration people's capacity. Informant 2

Each project is unique not only because of the delivery object, but also because each team is set up of new people for that particular project. If a person has worked in a company long enough, he/she might have worked with several of team members before. However, there are always new people in the team, and they need to get to know their team members in order to trust them and to find their way in the team. Most of the projects last for at least several years and these people will influence their workdays for a long time. My study showed, however, that none of the project managers did anything in order for the team members to get to know each other better. Two of the informants agreed, though, that such get-to-know gatherings could help them adapt their management style. One of the informants concluded that:

People are different and with different personalities. Everything is person dependent.

Informant 5

Working on Project B, Informant 2 experienced that she had to go to every resource individually if she wanted the job to get done. One reason was that she did not feel that discipline managers did their job following-up the technical resources. But also, she wanted to create good relationship with the team members because she wanted to make sure that everyone knew what was expected from them. All in all, all informants agreed that they adapt their management style depending on the people working on the team.

4.2.2 Communication

When projects are complex, i.e., they involve many people, good communication becomes essential prerequisite to get the necessary information to all disciplines. When interviewing project managers, I tried to get an insight into the communication on four levels:

- Project manager and the rest of the group
- Project manager and discipline manager
- Discipline manager and discipline workers
- Co-workers within the same discipline

Communication in projects usually goes between a project manager and discipline manager, and between discipline manager and technical resources. Communication between the contractor and the customer also varies and it can be both between the contractor and the project manager or it can go directly to discipline managers. In latter situations, for the project manager to have control over the process it is always agreed that the project manager has to get a copy of every mail correspondence.

> *I have a responsibility for the contract and that everyone follows what is agreed upon in the contract, but I am not responsible for the communication towards technical disciplines. It was the most effective way for us to work like this.* Informant 1

As long as discipline managers understand their managerial responsibilities, this type of communication seems to work out and it seems to be the easiest one. However, the interviews revealed that almost every project had different communication patterns. According to the informants, they had to adapt to the situation and to the people who did not communicate as it was agreed at the beginning of the project.

> *I had one-on-one meeting with resources all the time, otherwise I did not feel that things were moving forward. Disciplines did not communicate much among themselves, meetings were exceptions, so I had to insure, that everyone had the information they needed and that the information was up-to-date."* Informant 2

Another communication problem that Informant 2 experienced was that some discipline managers had too much to do so it took long time for the information to be conveyed to those who were supposed to perform that work. Communication through discipline managers did not work for her, so she saw it as necessary to have direct communication with almost every team member.

Informant 1, on the other hand, kept his communication with technical resources solely through discipline managers. According to him, it worked well. His responsibility was to gather all discipline managers, external architects, the contractor and the customer at least once a week and go through the cases that were problematic.

> *It is impossible for one person to have meetings with every person separately when there are so many people involved in the project. That is why it was reasonable that discipline managers were responsible for the people working with that particular discipline and I only needed to have a meeting with discipline manager. His or her responsibility was to receive and convey the information to everyone on his or her discipline.* Informant 1

However, although communication with the discipline managers went well, he also noticed that there was a significant different how, how much and how well they communicated:

> *It depends on a person. Some discipline managers were very active and when they sent e-mails to other discipline, they seemed to be very eager and wrote long e-mails, with a lot of information, which for other disciplines were a bit overwhelming. I tried to explain to them that they should make their reports shorter and keep their information to the point, because not everyone wants or has time to read boring e-mails about things that do not concern them. It can also happen that important information can be lost.*
>
> Informant 1

On the opposite side, there were those that were extremely skilled professionally, however, they did not have any system in their work. As Informant 1 explained, he needed to use more of his time with such people, help them structure their work and follow them up more closely. In this way he could feel that the discipline manager had control over his or her subordinates, and that he as a manager had control over the project.

Another communication challenge that Informant 1 experienced was with automation discipline. Those working with this discipline are basically electrical engineers. Electrical engineers work usually with other tasks within their field and, thus they belong to separate groups and not one automation group. This meant that they had one manager in the project, but they had different managers outside the project that they were accountable for. Discipline manager for automation had, therefore, difficulties to make those people from separate groups to work and communicate together. This discipline manager did have a strong relation to any of the group managers that those subordinates were accountable to, so he struggle to get hold

of them and make them perform their tasks on time. This was a problem of authority which I also mentioned in the previous chapter

> *He was a discipline manager, but he did not own the resources. The resources belonged to different groups. So, we had to go deeper into this case, go to each person who worked with automation and agree with each and every whom they reported to. So internally, it was the most difficult case to solve.* Informant 1

According to Informant 2, some people are better at asking questions or requesting information along the way. It is also easier to ask questions if people work together and do not sit in different offices that are on different sides of the country. These things are difficult to know before you encounter consequences, e. g., delivery delays and so on.

According to Informant 2, there are communication problems when it comes to roles and responsibilities in the company in general.

> *I talked to a resource once as part of the evaluation of another project and then he said that it was the project manager's job to monitor his and others' time consumption and follow up the budget. In this project, it was also the case that I was the one who went to each resource and asked them to report on their hour consumption, they never came to me. So, it seems that there is a misunderstanding between the project management and the disciplines about who is responsible for the budget that they themselves have estimated.* Informant 2

Unclear roles within the projects makes it difficult for people to fell ownership in the project. They do not know why they are there, whether they have any reporting responsibilities or whether they are in the project just because of their expertise in a certain area. Uncertainty leads also to withhold of information.

To the question about interdisciplinary communication, all informants are quite unanimous in their answers.

> *It is generally a big problem and we have a great potential for improvement here. The fact that so many do not understand the consequences of the changes they make and that it also influences other discipline, it is very difficult. If disciplines communicated better among themselves, I think the project would have required less time from everyone* Informant 2

According to Informant 3, the problem of poor interdisciplinary communication has two sides. On one side, it is because of people's personalities that people communicate differently. But it also depends on the discipline and how it operates. For example, VA (Water and sewage discipline) is mainly used to work alone as they are often planning pipelines through the fields and do not take into consideration what other disciplines do. However, this project was in the middle of Oslo and it was a new experience for them to work interdisciplinary. This resulted in many discussions and misunderstandings trying to explain that their work and what they did influenced other disciplines.

> *When one is not used to cooperate with others it is difficult for them take into consideration other's work or see connection between disciplines. On the other hand, in their defence, there is less tolerance in VA discipline. What it means is that very often a particular pipeline MUST be planned exactly at that place and it is actually other disciplines that have to change their plans. It's just the way it is, and VA resources are a bit too much used to it. That frustrates other disciplines.* Informant 3

Although project managers are well aware of poor interdisciplinary communication and they are trying to force the discipline to communicate better, however the technical resources themselves argue that their communication is not a problem. A lack of awareness makes it easy to introduce changes.

> *We have Sweco employee survey where interdisciplinarity scores low. PA and BIM departments argue that disciplines are bad at cooperation, while the disciplines themselves say that they are good at it.* Informant 3

When people work with different things and the end product is a sum of those different things that must match each other, it is obvious that close communication is crucial. According to several informants, this close collaboration is absent. To the question whether it would help if there were clearly defined expectations and routines from the start of the project, Informant 3 said:

> *No. It would not help at all. It is the constant reminding that they have to communicate information and changes further to other disciplines and regular meetings that help. Otherwise, they simply forget it. As long as they are not forced to do it they do not do it. Interdisciplinary communication must become a habit.* Informant 3

Communication generally seems to be reactive. People do not think ahead.

Communication differences were clearly seen also in what communication channels people chose:

> *People are different. Some people communicate only on the phone so if you don't call them you will never hear from them. Others respond only e-mails and not when you call. So as a project manager, you just have to adapt to it and adjust project management based on the people who are on this particular project and base on the situation. We tried to use a common platform where everyone could communicate and get the information equally, but people simply did not use it.* Informant 2

What this shows is that, agreeing on a common communication channel does not automatically mean that everyone is going to use it. As another informant pointed out:

> *I tried to introduce another communication channel than e-mail, because in that system it would have been easier to trace themes of communication and it would have been much clearer for everyone. But it simply did not work. Most of the team wanted to continue communicating by e-mail so we just continued doing that.* Informant 2

To simplify coordination of so many people working across so many different disciplines it is important to reach a unanimous agreement how the team will communicate. There are various tools for that. One informant acknowledged that she would insist on more unanimous communication channel for all disciplines in her next project.

> *This is because it is easier to follow everyone and because of the history. It is easy to go back in conversation if you need to find some specific information. I would also make a common template for everyone to follow."* Informant 4

4.2.3 Motivation

Being able to motivate their employees is crucial in order to be able to realise the goals set for projects. My study showed that the informants agree that motivation can be increased by ensuring that everyone on the team is important and can contribute. If team members feel safe talking and expressing themselves in the team, they are more likely to make a greater effort for the project and others on the team. Unfortunately, my informants had to acknowledge that

projects are as a rule so hectic that there is seldom time for anything else than technical talks, reporting and making decisions.

Motivation is strongly linked to the people's ability to show commitment. Moreover, it is not only technical resources who need motivation. Project managers need that as well. In order to increase team motivation, some bigger projects began using a board group. Project A was the first one with such group and it functioned as a pilot project. Each discipline had a department manager who was also part of the board group. This group's function was to support project members whether they needed new people, or whenever managers encountered difficulties with the client or other problems.

> *I received really good help from the board group keeping focus on the project, pushing the right people when it was needed in order to obtain the necessary resources. It did not work all the time, but without this group it would have been much more difficult.*
>
> Informant 1

Several informants meant that it did not seem that technical resources were concerned with whether the project succeeded or not. According to them, they have their disciplines and work with what they have to work, without worrying about whether the project will be finished on time or within budget. The motivation and interest to work with the project seem to stop on their own discipline and does not include the project as a whole.

> *Engineers perceive administrative tasks as boring; they just want to work with their own discipline, and they are not interested in other things.*   Informant 2

Another informant agreed with her by saying that it is generally difficult to get technical resources estimate the hours they are going to use on a project. They are mostly concerned whether a project challenges them and whether it is interesting to work with the tasks, but when it comes to more practical things, they do it unwillingly.

One informant said that she felt that people liked working with her project, everyone felt that the project was clear and interesting to work with. She did not experience that people were demotivated as opposed to the two other very similar projects that were in progress at the same time. This shows that although this informant had much more follow-up work and some big challenges underway, the rest of the team felt that everything went smoothly. The reason for this might be that technical resources did not need to do the "boring stuff" since the project manager did the most of it, so they could focus on their own technical stuff.

When interviewing Informant 3, he agreed that he did not notice any unwillingness from the technical resources to work with Project B. He mentioned, however, that something should be done so the disciplines would feel greater ownership for the project. Usually, a project manager has one or two projects and maybe some small things on the side. So, they use a lot of time on that one or two projects and really dedicate themselves to those projects. Technical disciplines, on the other hand, work with many different projects and sometimes with too many projects so that they are not able to dedicate the necessary amount of time to all projects. Giving disciplines more ownership in the projects can help to increase their motivation.

If one manages to do that, I think it would go much smoother with all projects.

Informant 3

According to Informant 4 there were no problems engaging the resources in the projects. They seemed motivated and delivered things on schedule as agreed.

We felt that having a well-planned start-up meeting and good communication from the start was very important in order to get a good start and good motivation into the project. And even though not all discipline managers were there from the start, we got a close contact with all discipline managers early in the project. And then it was up to each discipline manager to ensure enough resources in his or her discipline.

Informant 5

4.3 Questionnaire

The self-completion questionnaire was sent out to all discipline specialists using Microsoft forms. As a big part of discipline specialists worked on several of my chosen projects, it resulted that approximately 190 people received the questionnaire. In total 77 answers were received within the period of two weeks. The results are distributed as follows:
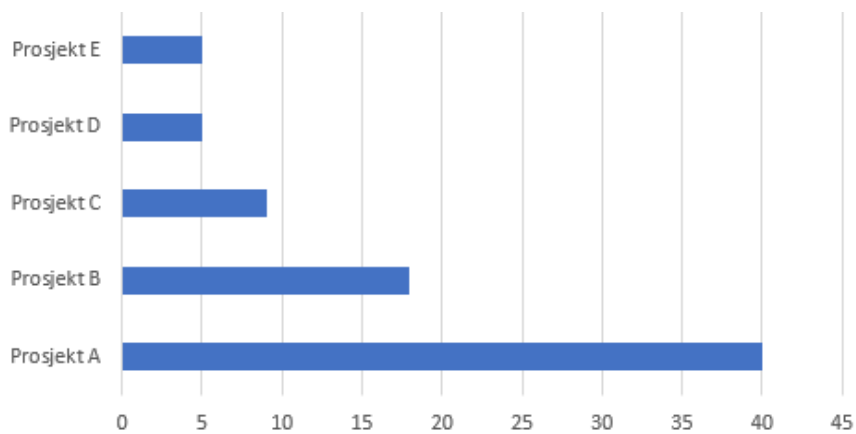
Figure 12: Number of received answers for each project

Over 50 % of the respondents had 3 or more other projects in addition to this project. Only 4 of respondence indicated that this was their main project. This implies that in busy periods, people have to make choices which projects will be prioritised, and which ones will have to wait. 67 % of the respondence had 9 or more years of work experience, and half of these again had more than 20 years of work experience. This shows that the projects had high project competence, but it also indicates that there were many people in the teams who used to their own ways of working.

60 % of those who replied to the questionnaire answered that they have been in the project from the start of it, 20% came into the project from the middle of it. This suggests that there have been some replacements in the projects, but these were not significant. As it was said during the interviews, some periods were extremely hectic so to reach the delivery deadlines extra resources were taken into the projects.

The results from the questionnaire support the findings from the interviews. I split the findings into three groups, the same groups as in previous chapter.

4.3.1 Project team dynamics

Three important factors have been identified in the literature review on group dynamics – clear roles, good communication and dependability.

The study shows that clear responsibilities and interface, group dynamics and that all disciplines have enough time to perform their work are the predominant factors when it comes to collaboration. Figure 13 below sums up the results. Moreover, in an open question about whether they would like to add something about internal work processes, several respondents

comment that teams often lack clear expectations, and that interdisciplinary collaboration should be much better. This is in accordance with what the project managers pointed out in the interviews.

● Respektert leder	14
● Tydelige rammer og felles stru...	28
● Avklarte ansvarsområder	38
● Avklarte spilleregler for samar...	19
● Gruppedynamikken	29
● At man skaper teamidentitet	18
● At vi har tilstrekkelig med tid å...	30
● At alle i teamet forstår prosjek...	28
● At teamet og prosjektet oppfa...	6
● Individuell motivasjon til å job...	19
● At man jobber med de samme...	7
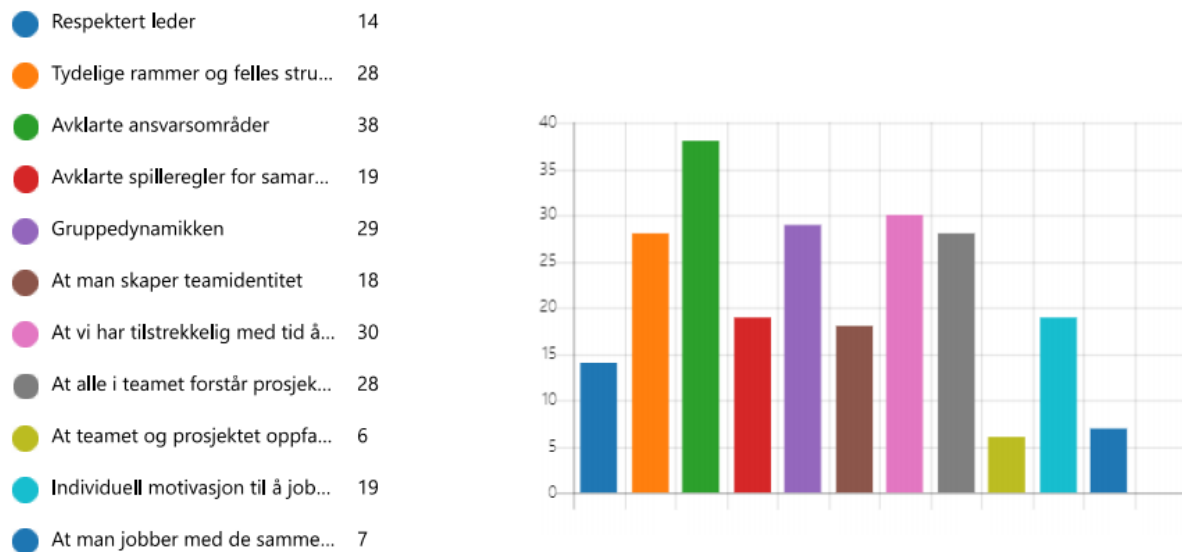
Figure 13: What factors do you think influence collaboration within the team most?

Lack of interdisciplinary collaboration comes up as an important issue in 50% of open answers. Answers to the direct question about interdisciplinary collaboration shows the same distribution among respondents. Results are shown in figure 14 below. Knowing that in complex projects interdisciplinary collaboration is one of the critical factors for the project success, it is a disturbing finding the study reveals.

Figure 14: To what degree was there good collaboration with other disciplines?

The keywords listed below are answers to the question "Is there anything you want to comment on with regard to internal work processes":

- Unclear expectations

- Must collaborate better interdisciplinary
- Closer collaboration between disciplines
- Must see dependencies between disciplines
- Team must be better at working interdisciplinary
- Lack of overall coordinator
- Replacements of key people in projects are unfortunate
- It is important with clearly defined roles and responsibilities within the group
- Internal coordination should be better

Aristotle's project that I presented in the theory chapter showed that clear roles and structure are essential prerequisites of a good team dynamics. Each person on the team needs to understand where they fit, what their tasks are, and what they have to offer. With a greater understanding of each other's strengths, team members know who to consult and how project teams might shape up. The results from my study indicate, however, that deliveries, deadlines, roles and responsibilities for each discipline and each technical resource were not always clearly defined. Average number to the questions regarding these factors ranged from 3,4 to 4,4 points on the scale from 1 to 5 where 5 was "Largely" and 1 was "not at all". Average distribution within respective projects is shown in figure 15 below.
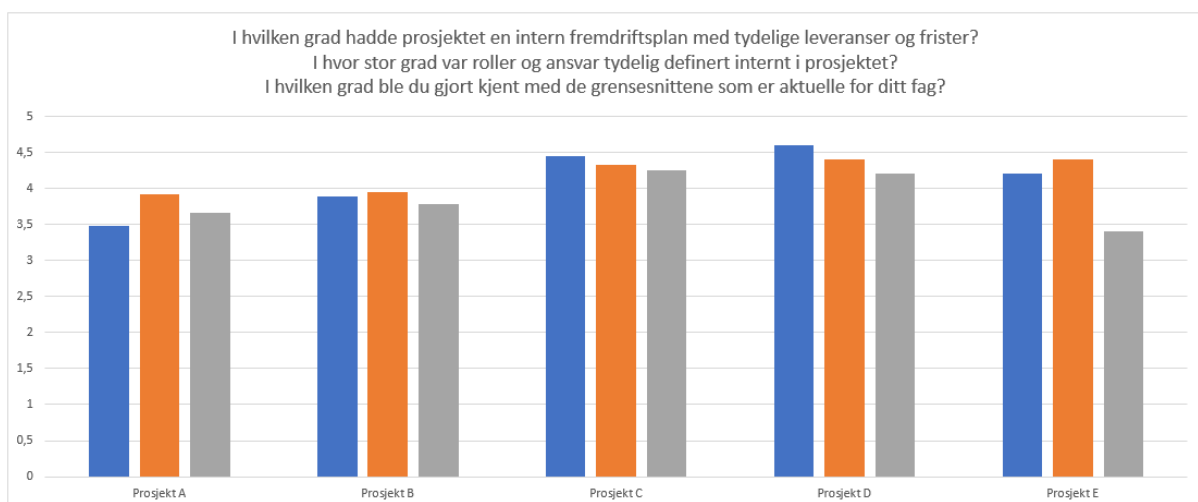
Figure 15: To what degree were deliveries, deadlines, roles, and responsibilities defined in the project?

Looking at the results from another angle, a third part of all the respondents regardless of what project they worked on, felt that their role and responsibilities in the project were vaguely defined. Vague role- and responsibility definitions create uncertainty for those who have to perform tasks. When one does not know specifically what is expected from her/him or what

one is responsible for, the chances that the job will not be done or that it will be done twice increase. This creates inefficiency. The results are shown in figure 16 below.

Figure 16: To what degree were roles and responsibilities defined in the project?

4.3.2 Communication

When projects are complex, i.e., they involve many people from different disciplines, good communication becomes essential prerequisite to get the necessary information to all disciplines. The projects in my study had between 60 to 100 people working on each project. It is not possible for one project manager to hold contact with each and every team member. For this reason, there are often several communication levels that help to narrow down a number of people project manager has to deal with. Discipline managers are appointed so that they can gather technical resources working on separate disciplines and be responsible for them. The interviews with project managers revealed that projects do not necessarily have the same communication patterns. Thus, if there are no clear guidelines for how team members should communication, it can cause uncertainty, the information can be withheld, or it can be information overload.

To the question about how well people felt the internal communication was defined, the answers indicate that a number of team members experienced uncertainty around that. The results are in the figure 17 below. The results to questions 9 and 10 (see appendix B) also showed that technical resources were less satisfied with communication with project management, rather than discipline managers.
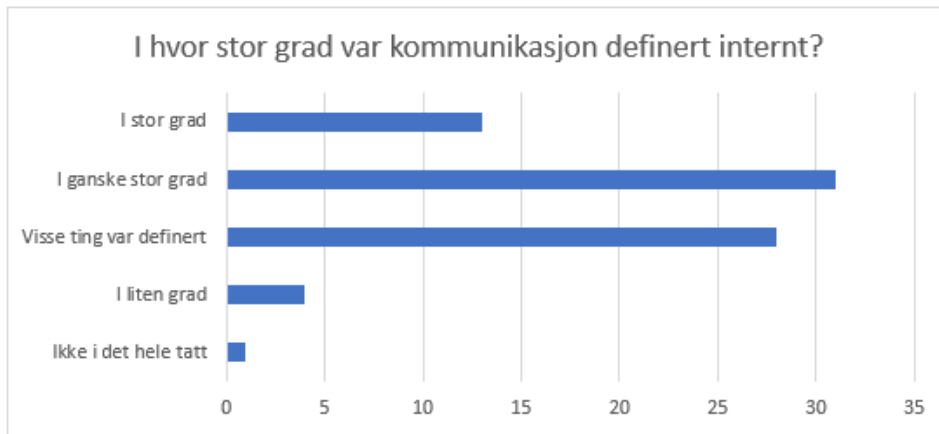
Figure 17: To what extent did you feel that the internal communication was defined for the project?

When communication is unclear, it creates uncertainty and misunderstandings. In addition, important information can be gone or come to those it was meant to too late. If people have to redo their work or correct mistakes because of internal miscommunication, the costs have to be taken by the company, which in its turn lowers project margin and affects project success. My study showed that several people in my chosen projects experienced that their work suffered due to unclear or bad communication. Figure 18 below confirms it.

Figure 18: To what extent did you feel that the internal communication was defined for the project?

When asked about how they think communication and collaboration in the group influenced their own work, people mostly experienced positive feelings. However, a better and clearer communication from the start would have reduced the negative experiences and increased overall productivity of the team. The results are summed up in the figure 19 below. Several choices were possible.

Hvordan kommunikasjon og samhandling i gruppen påvirket arbeidet ditt?	Antall av ID
Negativt, jeg følte at alle holdt på sitt og ville ikke dele informasjonen;	4
Negativt, jeg synes det var vanskelig å holde oversikt over hvem som var ansvarlig for hva;	8
Negativt, kommunikasjonen var dårlig og jeg visste ikke hvem jeg skulle kontakte ved spørsmål;	2
Positivt, jeg lærte mye underveis og det hjalp meg å utføre jobben min mer effektivt;	14
Positivt, jeg synes det var tydelig hvem jeg skulle kontakte og hvordan kommunikasjonen skulle foregå;	15
Positivt, jeg synes teamet vårt var flinke til å samarbeide og holde sammen;	21
Positivt, vi hadde oversikt over det meste på prosjektet og fikk god informasjon underveis;	14
prositivt, jeg fikk skikkelig avlastning av prosjekteringslederen da jeg ble syk;	1
Totalsum	**79**

Figure 19: How communication and collaboration in the group influenced your own work?

The keywords listed below come from the answers to the question "Is there anything you want to further comment on internal communication". It was not an obligatory question and the respondents could skip it if they wanted. The fact that many chose to elaborate on this topic shows that many team members have their opinion about how it should be and what they mean should be better:

- Status meetings should not only be about technical things in projects, but also general status, project progress, budget, risks etc.

- Effective project meeting with clear goals for the meetings.

- Visual plan for communication.

- Clear communication about what is expected is important.

- Communication was messy mostly because people were overworked, and communication line was not clear.

- In big projects we should have a separate coordinator or assisting project manager that we could communicate with.

- Positive atmosphere is important in a project. It is easier to convey information and people do not tend to withhold information.

- Important with reminders and regular status meetings

- Communication within my discipline was good, but there was almost no communication with other disciplines. Difficult to know the overall status.

- Start-up meeting worked very well, and it helped to understand my part in the project.

- Proactive project manager who had an understanding for several discipline made communication easier.

- It is highly important with good internal collaboration, Otherwise, we look like amateurs for the clients.

- We should have more ICE-sessions where all disciplines can work together simultaneously.
- We should be better at sending fewer e-mail because it becomes confusing. Short status meetings work better

Summing up, poor or unclear communication creates more work, and it slows down the project execution. The findings from the respondents indicate, that there is a huge potential for improvements when it comes to communication.

4.3.3 Motivation

All in all, the answers of the respondents show that they really enjoyed working with the projects. Those working on Project D were most satisfied. Figure 20 below shows the results.
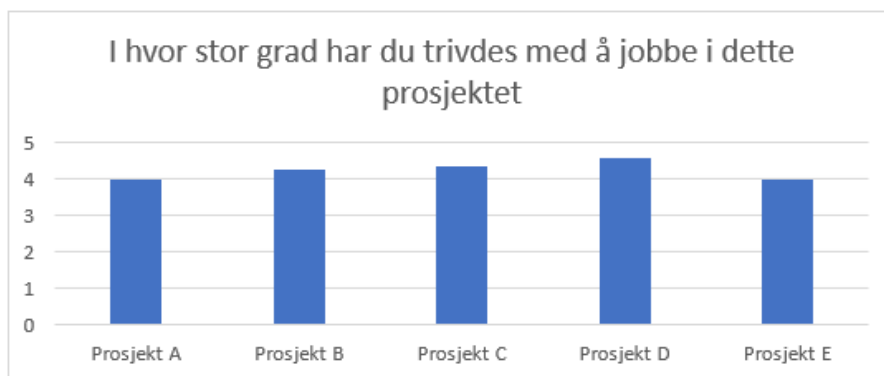
Figure 20: To what extent did you enjoy working on this project?

The study shows that although there have been misunderstandings, ambiguities and dissatisfaction when it comes to collaboration and communication, the overall motivation to work on these projects remained high. The interviews with the project managers confirmed the same experience. As one of the respondents commented in an open question:

"It was one of the best projects I have ever worked with."

The other comments that came up in the answers with regard to what people liked about these particular projects were:

- Our technical skills have been appreciated by the customer
- The tasks I worked with were interesting and challenging
- High degree of positivity in the team

- We have highly competent specialists who handled the customer in a very professional way
- We are good at keeping up the spirits
- We were professional towards our clients

The comments above indicate that people were challenged in their tasks and that they felt appreciated both by the customer and by their colleagues. These factors motivated them most to do their best regardless negative factors like time pressure, lack of information, lack of "team" feeling that were mentioned in the answers.

This implies that although a project does not go as planned and a project team meets many challenges and problems underway, there are certain factors that are important to be aware of that can boost the team's motivation and helps people to continue to do their best.

4.4   Summing up the findings

To sum up the findings from the interviews and the questionnaire, I list the main point below:

- There is a lack of interdisciplinary collaboration and communication.
- There are delays in dissemination of information which causes delays and extra work (=inefficiency).
- There is unwillingness to collaborate across disciplines.
- There are too many communication patterns which makes it more confusing for technical resources who work on many projects simultaneously.
- There is a need for clearer distribution of responsibilities
- There is a lack of a holistic understanding by technical disciplines
- Clear role and responsibilities help to perform more efficient
- Despite lack of interdisciplinary communication and clear responsibilities people are highly motivated by the tasks in the project.

These finding are analysed in the chapter below.

5 Analysis

In this section, the empirical data presented in the previous chapter is analysed and discussed. The data is analysed to answer the two components of the research question: to what extent do (1) soft skills influence (2) the project success. To answer the research question, three questions have to be answered:

- Does a better communication among the team members increase project success?
- Does a better group dynamic contribute to project success?
- Does motivation play any role in the quality of task performance?

My analysis follows these three questions and ends up with introducing a modified model and propositions. The results are derived from the empirical data collected by this study and presented in three sections in line with it. The derived model and propositions are the main outcomes of this study.
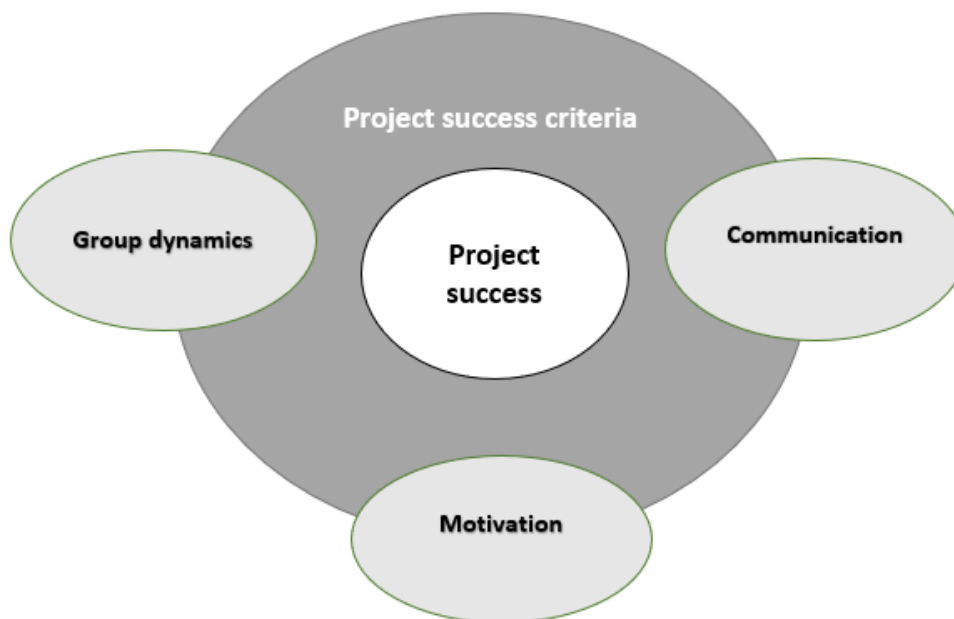
Figure 21: Structure for analysis chapter

In my theoretical framework I reviewed the existing knowledge and some theories on project success and complex projects. My literature review also showed a rising awareness around people's soft skills being an important factor when it comes to project success. Still, there is little research done on how and to what extent the different soft skills influence the project execution process and, consequently, the project success. Hence, I will generalise the findings presented in chapter 4 and draw some patterns that emerge from the findings. I also seek to establish a bridge between what technical disciplines are taught at universities and what they

actually are expected to handle at workplaces. The analysis will, consequently, give a foundation to answer my research question.

Through the course of this study, it was concluded that although project margins and contracts varied from project to project, in the end all of the projects could be defined as successful. Four of five projects that I studied had a time-and-material contract form. This implies that the company gets paid for the time it uses on the services they deliver. So, although there is an agreement on the budget when the contract is signed, there is also an open possibility to increase the original budget by issuing a change notice for extra hours. Although this is a usual praxis in consulting branch because of the risk and uncertainty that lies in a project, budget increase is not a preferred outcome either for a customer or the consulting company. Unless a customer comes with changes that are outside the contract, it is expected that the project will cost what is stated in the contract. Budget increases lead to irritation and unsatisfaction with the supplier. For the consulting company, budget overruns mean that there might be time consuming discussions with the customer and there is a big chance that not all costs can be invoiced to the customer. Consequently, the project margin will be lower. In addition, it causes frustration and extra work for already overloaded project manager and his/her team, and it damages the good relationship with the customer. Thus, although described as successful, the projects in the research have a big potential to be more successful with regard to time consumption, schedule delays and customer satisfaction. As my research shows, these project constraints can be improved by increased focus on soft skills.

Analysing the data from the interviews and the questionnaire several issues emerge. Human factor becomes clearly visible when dealing with how people interact with each other, how they understand their roles in a group and in the different expectations they have for their colleagues and managers. The study shows that the style the project manager chooses to use in the process of project execution depends on the team members and not on what management style the project manager prefers, or thinks is best for the project. As complex projects have many people involved in the project, it is obvious that it is impossible to adjust the management style to each person in the group. Consequently, the efficiency of the team may suffer.

Complex projects are subject to high levels of uncertainty, ambiguity and changing circumstances. At the initial stage of a project, scopes tend to be ill-defined and they are subject to changes. Through a process of revising and finetuning, a scope gradually becomes more concrete as new information becomes available and is shared among everyone involved.

Communication and group dynamics becomes a crucial factor that contributes to an effective information flow and, consequently, contribute to project success through more efficient handling of project success criteria. These two factors contribute also to a better understanding of customer's needs, reducing uncertainty and improving decision making process.

5.1 Communication and project success
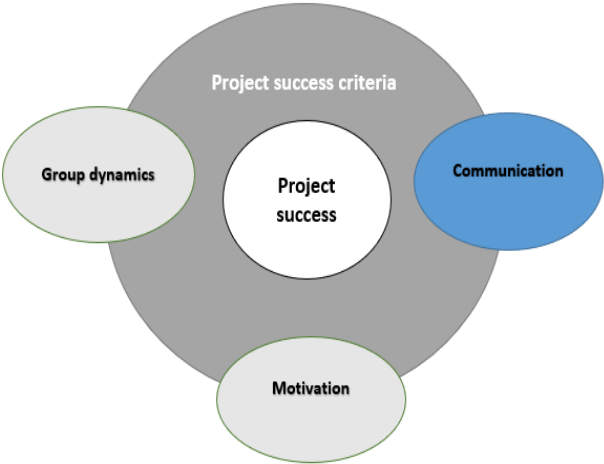
Communication is not defined separately at the company's project management methodology. Thus, it is up to a project manager and a project team to decide how they will communicate externally and internally. According to project-as-practice approach this implies that the "practice" is not specified and guidelines for "this is how we do it" are not given, thus the way "praxis" will go depends solely on the practitioners, who in this situation are everyone involved in the project.

Communication is a personality trait. Some people are extroverts, others are introverts, some people like to communicate on the phone, others prefer e-mails, some people are comfortable talking in front of others, others do not like it. Consequently, these differences influence how people communicate in a team. My research confirmed that these differences are clearly evident, and these differences remain present despite the team agreeing on common guidelines at the start of the project.

Previous research (e.g., Azim et al., 2010) indicates, that communication is one of the most important soft skills that is required horizontally and vertically, since most of the problems in a project environment can be traced to some kind on communication problem. This, in its turn, implies that poor communication reduces productivity and can increase frustration between team members. Project manager, on the other hand, can perceive a missing interaction with other team members as a sign of poor performance. My research showed that technical disciplines were more satisfied with the communication with discipline manager than project managers. The reason for this can be that in most big or complex projects, a discipline manager

functions as an intermediary between project manager and technical disciplines. Furthermore, discipline managers "speak the same language" as their technical resources and they understand each other better.

My research disclosed that projects within the same company do not necessarily have the same pattern of communication. The patterns that I observed are presented in figure 22:
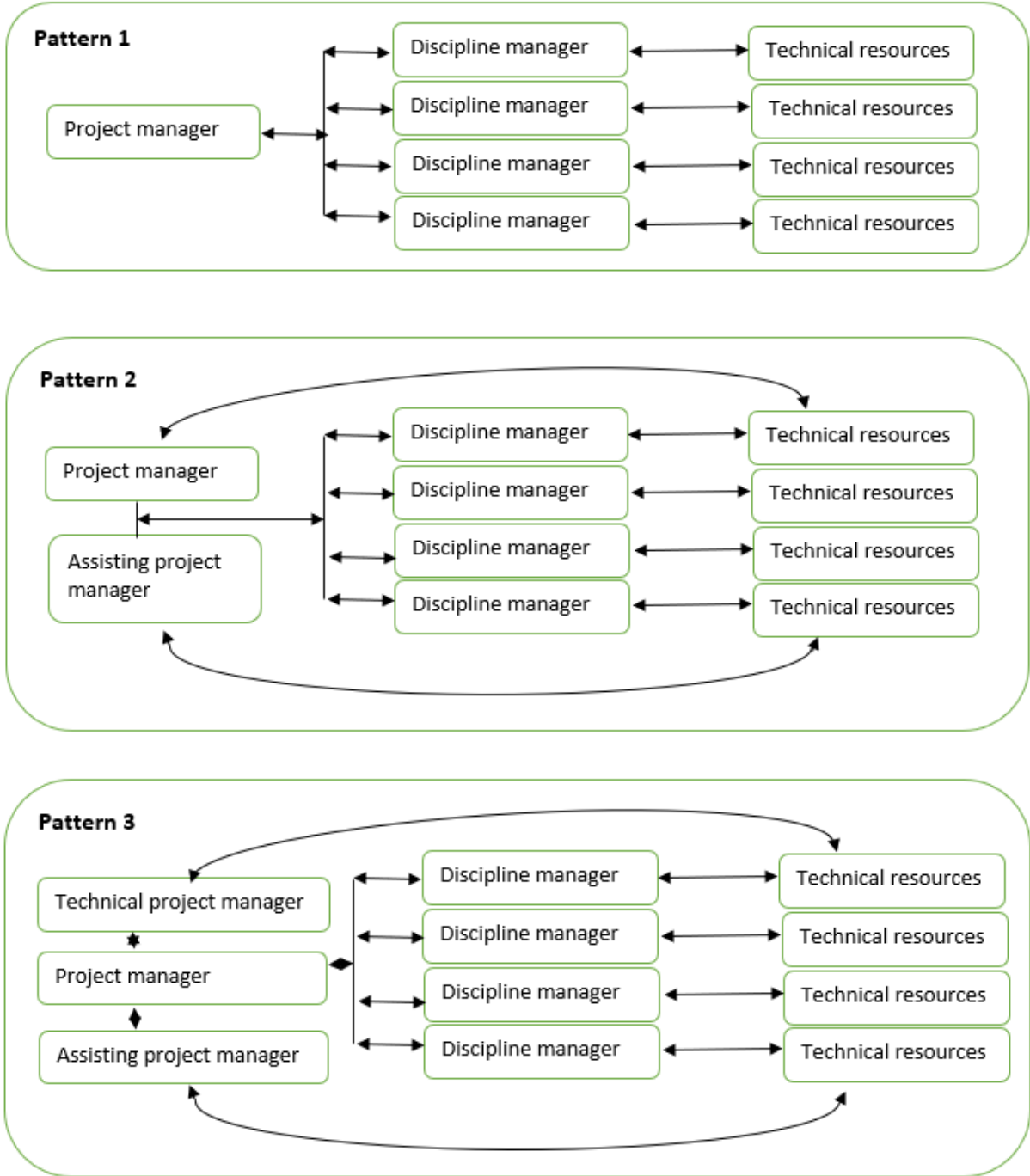

Figure 22: Communication patterns

The study showed that most of the discipline resources work with three or more, or even up to seven projects at the same time. If every project has a different communication pattern it makes it difficult for technical resources to remember which communication pattern is used in which project. This leads to misunderstandings, delays in information flow, frustration, and ineffective work. Knowing that technical resources have delivery pressure from several projects, it means that the quality of what is being delivered might suffer also.

Within the company, people are grouped in different groups, and those groups are further grouped into different departments. Group managers and department managers also demand regular reports on every project and general progress. Consequently, it is reasonable to assume that clearer interface and more standardised communication patterns would make everyone's work easier and, thus, more effective.

My research showed that the importance of good communication depends on what phase the project is in. For example, in Project C where the objective was to produce a detailed description for the regulation plan, close communication was not that important since each discipline focused on norms and regulations specific for their own discipline. However, in phases like detailed engineering or follow-up in construction phase, close communication turns out to be crucial. Nevertheless, as it is best to use the same team throughout all project phases, effective communication should be a focus from the start.

Table 6: Importance of communication

Project phases	Industry	
	Construction	Infrastructure
Regulation plan phase	Low	Low
Sketch project phase	Medium	High
Preliminary project phase	High	High
Detailed engineering phase	High	High
Follow-up in the construction phase	High	High

A clear communication of responsibility areas and task definitions from the beginning of the project was another point that was mentioned by several respondents as lacking in projects. Uncertainty in what one must do, work with or what is expected from him/her leads to misunderstandings and inaccurate deliveries since the expectations of those who will evaluate the delivery can be different. Communication in a project goes through several steps, and as it was pointed out in chapter 2, it can be interpreted differently by different people. The more steps the more it is likely that information can be misinterpreted. Correction of such communication mistakes is a non-billable cost for the company and has a negative impact on

the four project success constraints introduced in the literature chapter. Regular meetings and closer follow-ups by the discipline manager or project manager can be a way to reduce uncertainty and mistakes.

Interdisciplinary communication is crucial in complex projects. Construction and infrastructure projects involve many disciplines. The complexity lies in the fact that all disciplines must work simultaneously and deliver their part of the project simultaneously. If communication between disciplines fails or one or several disciplines do not deliver as agreed, the whole project must be delayed. Interdisciplinary communication and systems thinking is crucial for such projects. Holistic understanding of the project, seeing the importance of each discipline in what one does ensures a successful process with few delays, modifications and correction of mistakes. My study revealed, however, that the technical resources are not willing to work with each other. They often see their own discipline as a more important one and expect others to adapt to them. The consequence of it is cost overruns, write-offs and schedule delays. It also influences the overall quality of the delivery.

The above analysis of the findings indicates the importance of good and clear communication to project success. As Azim et al. (2010) points out, effective communication helps to achieve interpersonal acceptance, enhances teamwork and team motivation. According to the researchers, the other factors which play an important role in enhancing team spirit, sense of ownership and belonging to the team are responsibility, authority and delegation. In order to place responsibility on a discipline manager or a technical worker, one has first of all feel that that person can perform that particular task. This was not the case in Project 2 which made it more demanding for the project manager to follow-up all disciplines. Poor work distribution increases work overload and lowers productivity and efficiency. It also affects time consumption and time schedules.

5.2   Team dynamics and project success
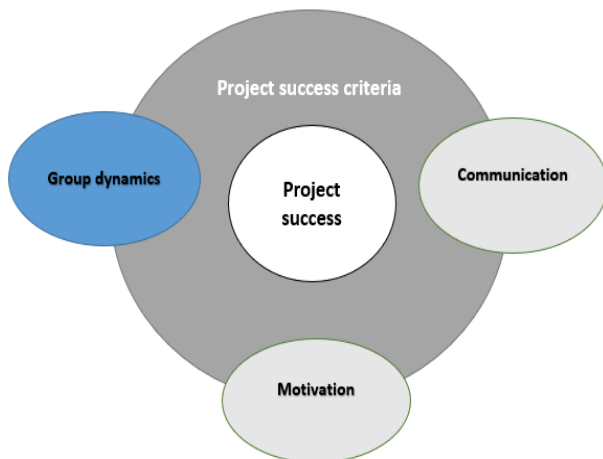
According to the theory presented in chapter 2, setting up a well-functioning and efficient team should be a carefully thought through process. My research shows, however, that the reality is quite different. Factors that determine who will get to work with a project is first of all availability. If there are several resources available, then cost and experience determine who gets it. When a team is set in this way, it is not certain that team members will manage to work together or that their way of working will be similar. This is a problem for most of project organisations as resources as usually scarce. This means that social activities, kick-offs or other activities encouraging team members to get to know each other better are more relevant in such situations. When people know each other better they are more likely to trust each other, open up, ask when unsure or in doubt and share information with others. Safety and dependability er also the factors that Aristotle project pointed out as vital for successful teams. Unfortunately, none of the projects in my study had any social activities for their team members for them to get to know each other better. If this is changed, it can help to achieve more trust among team members, which in its turn will increase communication and team dynamics.

The company I did research in has framework agreements with most of their customers. These agreements establish the terms for the future contracts, especially when it comes to rates, work experience and competence of the technical people that can work with their projects. This means that the company must provide the resources according to the framework agreement. The problem is that the resources with most experience are usually in high demand. They are usually fully booked, and they cannot take another project. In order to get a project and to meet the customer's requirements regarding senior technical resources, other people can be taken into a project for a while till the primary resource becomes available. Such replacements, although being the only solution at that moment, are unfortunate for the project as well as the people who get replaced. It affects team dynamics and motivation of those that are being replaced. The projects in my study were affected by such changes and the answers from the

respondents showed dissatisfaction around such situations. The loss of key people can also influence knowledge transfer.

Interdisciplinary collaboration comes up as an issue for both project managers and technical resources. Complex projects involve many different disciplines that depend on each other. Their work has to be coordinated and performed simultaneously. In addition, frequent coordination across disciplines helps to avoid that tasks will have to be done twice because of misunderstandings and thus, delayed. My research clearly shows that most of the respondents and informants agree that interdisciplinary collaboration is highly important, but at the same time it is largely missing in all projects. The lack of interdisciplinary cooperation influences the atmosphere within a group and cause frustration for those who need to do the same job twice or wait for necessary information. Such inefficiency affects all the project success criteria.

Complex projects are multidisciplinary and multidimensional, and in order to achieve project success it is essential that a project manager puts his/her trust in the team and delegates work because a single person cannot deal with multiple issues. If a project manager does not see that he/she can trust the team or the discipline managers, then it places a huge workload on the project manager trying to follow up each resource separately. This kind of work is inefficient. In addition, a project manager uses more time on coordination of all disciplines which was not included in the budget. Consequently, it leads either to cost overruns for the customer or lower project margin for the company. Both outcomes lower project success.

The study shows that technical resources (or engineers) lack a holistic understanding of a project. At the same time, they see the need and advantage of interdisciplinary collaboration. There seems to be a gap between engineer education (the theory) and what they actually have to deal with when they begin to work (the practice). Some companies try to close this gap by sending their employees to various courses. However, if this is a type of collaboration that every engineer should possess, it should be a part of their curriculum in university education.

The team dynamics is hindered by constant competition among internal groups and departments where each group has to fight for their budget and are not willing to accept costs. The hours that cannot be invoiced to the customer or that the customer does not accept due to the company's delivery errors must be distributed to groups internally as an additional cost. No one wants their group or department look bad. This may lead to pointing at each other and bad tone within the team if a project is behind its schedule or experiences cost overruns.

According to Levasseur (2013), it is generally agreed that technical people lack soft skills. This statement was also confirmed by my research as well as informal talks I had with other people from the company on the courses I took as part of my job in this company. Project managers, as well as discipline managers, agree that technical resources enjoy working with their own discipline and they are usually not interested in other aspects of the project, like estimating hours or reporting progress. As it was said in one of the interviews, technical resources perceive following up budget and time schedule as a job for a project manager or discipline manager, while their job was to focus on the technical part of the project. The problem is that discipline managers are chosen from the same technical resources. It is a role technical resources get appointed to at the beginning of a project depending on their experience. If discipline managers do not possess organisational skills or do not understand the importance of disciplinary collaboration or the importance of budgeting, the project has much bigger chance to suffer cost overruns, schedule delays as well as low motivation from other team members to work with the project.

Teams are essential in projects to be able to cope with complex work that requires varied knowledge and skills, stimulate creativity and innovation, give authority to employees, and other positive consequences. As it is not a choice whether to work as a team or not, understanding the processes that are taking place within the teams is crucial for project success.

5.3 Motivation and task performance
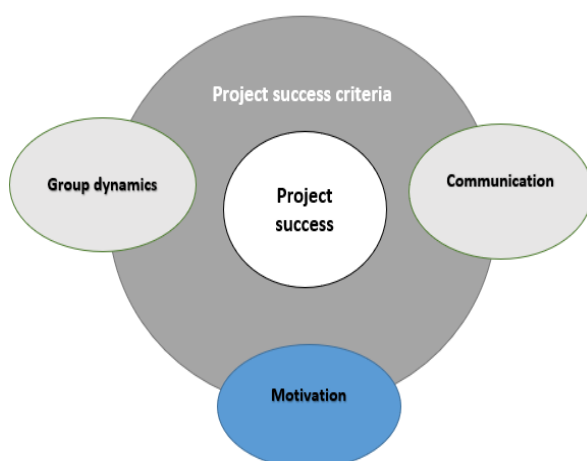
Motivation influences the project success in a different way than group dynamics or communication. Motivation can change during the process of project execution because it can be influenced by external factors. If a project has a team that collaborates well and has the group norms that appeals to a person, then it is easier to prioritise and be motivated to work with that project. On the other hand, if a person meets unwillingness from others to share

information or to be included in a new team, the motivation can quickly drop.

If people encounter many obstacles when performing their tasks, they can be demotivated no matter how interesting the project is. Thus, inner motivation will be influenced by the other factors like team dynamics and communication with other team members.

Motivation is also influenced by a total workload. My research showed that there is often shortage of technical discipline workers. This leads to work overload. In addition, if people feel that they have to perform work twice because of poor communication in the project or because others do not do their work properly, the motivation can drop quickly. Thus, a lack of motivation can lead to unwillingness to prioritise that particular project and rather work with other projects blaming on shortage of time. Consequently, it can be said that motivation has a great effect on the project's performance, and, thus, project's success.

People are motivated by different things. Theory on motivation distinguishes between internal and external motivation, controlled and autonomous motivation etc. People who are driven by controlled motivation like to have a feeling of pressure and they perform best under pressure. Depending on the project phase this type of motivation has an advantage. Project B's second phase was defined by Project manager 3 as especially demanding because the contractor controlled the time schedule for the project and all technical resources had to adjust their schedules to that one project.

From what has been said in the interviews, it can be said that most of the engineers have autonomous motivation. This type of motivation is linked to behaviour that is a result of sense of self-will and free choice. As one of the respondence remarked, technical workers love working with their discipline and they are not interested in other tasks that are part of the project process. This indicates that as long as technical resources get challenging and interesting projects they will be motivated to work with the project and will do their best for the project. The projects that I included in my research were defined as interesting to work with. In addition, Projects A, B and C were defined as "good projects to have on your CV". This combination weighed up for lack of interdisciplinary communication, unclear task specifications and extra work because of misunderstandings underway.

5.4   Model and propositions

The most important findings from my research can be summarised as follows:

- There is a lack of interdisciplinary collaboration and communication.

- There are delays in dissemination of information which causes delays and extra work (=inefficiency).
- There is unwillingness to collaborate across disciplines.
- There are too many communication patterns which makes it more confusing for technical resources who work on many projects simultaneously.
- There is a need for clearer distribution of responsibilities
- There is a lack of a holistic understanding by technical disciplines
- Clear role and responsibilities help to perform more efficient
- Despite lack of interdisciplinary communication and clear responsibilities people are highly motivated by the tasks in the project.

Research shows that soft skills do influence project success in complex projects. Complex projects entail a good deal of human interactions and as people are different, it affects the way they interact with each other.

Improving group dynamics, interdisciplinary communication and motivation will lead to more effective collaboration, less hour consumption, better relationship with the client and improved atmosphere within the team. Consequently, it increases chances for a project success. Companies should focus more on integrating the human factor into their tools and methodologies if they want their projects to succeed.

Interdisciplinary communication is highly demanded by both project managers and technical resources. However, this ability has not been developed during the years at school or higher education. As the understanding of the importance of soft skills is becoming more common among engineering professions, it is time that higher education institutions include soft skills competencies in their curriculum.

As most of the technical resources sooner or later acquire tasks as discipline managers, there is a need for at least basic project management understanding in order to make group dynamics and communication more efficient.

There is a need for a system that incorporates different disciplines and gives an immediate feedback across disciplines. It would simplify information flow and make human differences less visible and its consequences less crucial to project success.

The results of this study provide evidence supporting the existence of several relations between the project success factors. The findings suggest that success criteria (budget, schedule, performance and customer acceptance) are influenced by group dynamics, communication and people's motivation. Other relations between project success and other soft skills are also assumed to exist, although they have not been identified by the present study. The relationship between the soft skills, project success criteria and project success can be illustrated as in a model in figure below:
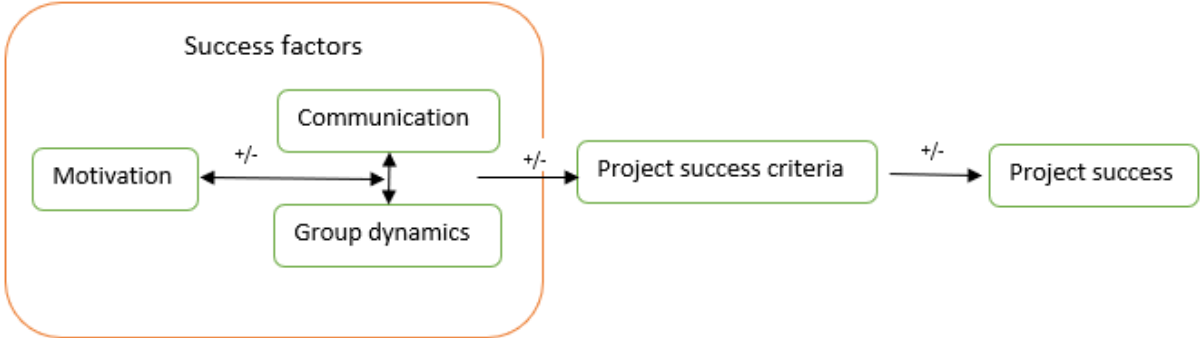
Figure 23: Relationship between motivation, communication, group dynamics and project success

The model implies that success factors not only affect project success criteria, which in its turn influence project success, but it also implies that these factors affect each other as well. This means that, for example, it is not enough for a company to only work with improving communication. If technical resources are overloaded with other projects or do not take into consideration other disciplines, it will affect their motivation and, consequently, group dynamics in a negative way. As a result, measures that were implemented to improve communication will have little effect on the overall goal, which is project success.

It is generally agreed that successful project management requires more than the mastery of technical skills related to process, frameworks, and discipline. However, the development of tools and methodologies seem to focus exclusively on improving budgeting or schedule follow-up routines and tools. The current focus can be summarised in a modified model as presented in figure 24.

Figure 24: Current focus of project management tools

The problem with this approach is that the tools and methodologies help to improve budgeting, planning etc. However, the factors that, as the research showed, really influence success criteria remain uninfluenced. The new project management tools or methodologies do not take into account the human factor and human differences and, thus, do not exploit the potential of either the tools or success factors. My research implies that by developing tools that take into consideration soft skills and human differences, can improve the project outcome, which, in its turn, will influence positively the success criteria. This new relationship is shown in figure 25.
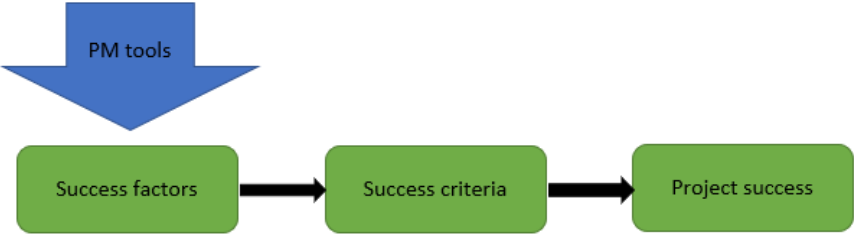

Figure 25: Recommended focus of project management tools

6   Conclusion

This thesis highlights two important research areas within project management, which are being recognised both in academia and industry. These are project complexity and importance of soft skills. It has been an increasing recognition of project complexity which is largely caused by people and interactions between people. Project management books, therefore, are criticised for still being more concerned with hard skills as compared to soft skills. The question, thus, arises whether it is reasonable for practitioners solely rely on the hard skills to manage complex projects by following the linear, rational and hard systems approach, or whether they need to change and adapt to a more flexible approach suitable for harnessing the dynamic nature of projects and complexities (Azim et al., 2010). My findings focus on a few main causes of project complexity – group dynamics, internal communication and individual motivation. When these causes are identified and well understood, only then the corrective steps can be taken to manage and influence the effects. This, in its turn, will lead to a higher probability of project success. The results indicate the importance of "people" not only as factor attributing to project complexity, but also "people" being the key element to project success, thus emphasising the benefits of soft skills in successful project management.

The study showed that group dynamics, communication and motivation do influence project success in complex projects. Complex projects require a good deal of human interactions, and as people are different, these differences come clearly forward when people interact with each other. The literature review stated that engineers in general are not those who are good with soft skills. They love their discipline, and they are eager to work on the tasks that concern their discipline. As a consequence, they are not willing to collaborate interdisciplinary or use time interacting with other disciplines. Paradoxically, the study shows that interdisciplinary collaboration and better communication within the team are in high demand by all technical disciplines, and they acknowledge that a clearer communication would both help them do their own job better and help the overall project execution process.

The analysis of the cases shows the need for different tactics and more awareness from everyone in the team and not only the project manager. Systems thinking approach, both in communicating and sharing knowledge with each other, appears to be missing. By using more time on developing the five "group norms" identified in Aristotle's project, project managers can gain more trust from the team and achieve a better functioning team collaboration. It is important for a project manager to be aware of those factors that give rise to complexity and use time to evaluate the impact of these factors across the project life cycle. There is an increasing need to realise that project management tools are helpful in planning the project, but when it comes to delivering these plans, the more important thing is people, their collaboration dynamics, communication skills and motivation.

6.1 Implications

There is a number of implications for practitioners as well as academics in this research. First, it is apparent that interaction and communication between project management team and disciplines is vital in managing project success. It does not determine whether a project will be a success or not, but, if well-managed, it increases the chances of success as the efficiency increases. Project managers are often taught and aware of the importance of communication since project management courses emphasise the importance of communication skills. Thus, the focus should be on developing awareness and managerial skills of discipline managers, and not only their discipline competence. The theoretical implication is that project success is not as straight forward as the description in the literature. Following the statements of "best practice" lined up by the professional associations does not guarantee project success. "People"

factor is the factor that contributes most to the complexity of a project (Azim et al., 2010). However, despite the increase in the recognition of this fact, current project management theory and research still lacks relevance addressing the dynamic, social and complex contexts of projects due to a prevailing hard systems approach.

Emergent tactics and project manager's adaptation of management style depending on a project and situation is present in each project that I studied. Nevertheless, the research shows that discipline managers play an important role being a binding led between a project manager and discipline resources. Discipline manager function can be defined as being a "project manager" for his/her discipline. Therefore, there is a need for a better understanding of managerial and organisational skill on discipline manager level as well as the importance of soft skills in the process of successful project execution.

In order to increase project success, there is a need for both formal tools and a more dynamic interpersonal interaction. The results of this study may have several implications for project management tool developers and practitioners at large. If propositions are tested and they support the findings of this study, then project management tool developers should adopt a wider approach to the concept of project success. As the findings suggest, group dynamics and communication are of a highly relative importance, thus, these factors should receive more attention in adjusting project management tools to a human factor. These factors can also be used as a benchmark measure when evaluating project success and learn from the factors that attributed to it.

6.2 Limitations

The results of this study should be evaluated taking the following limitations into account. The cases in this study were selected based on the recommendations and available access to the projects in progress. As a result, the selection of the projects could have been biased as not all viable candidate cases were considered.

Another limitations that should be mentioned is concerned with generalisation. Given the time frame of my study, only five projects were used to shed light on the phenomena. This might indicate that my study has not revealed other important project success factors that project companies should pay attention to. The sample size of the research and the chosen limited amount of possible success factors, thus, does not allow for generalisation. However, seeing the

high level of consistency among the respondence and informants, gives credible certainty for the study's validity.

It should also be mentioned that the main part of this research employed a qualitative data. Thus, although I tried to be objective in my interpretation of data, the data could be interpreted differently by another researcher. The challenge of qualitative data is the bias during data interpretation, especially when data is collected and analysed by a single, quite inexperienced researcher of qualitative data. However, the quantitative data from the questionnaire counteracts this bias to some degree. By conducting a quantitative survey, I was able to reach a larger range of relevant respondents, and thus confirm or refute the findings from the qualitative data. Thus, validity and reliability issues of this research are considered to be taken into consideration.

The author of this research is employed in the company the research was conducted. This connection has both advantages and disadvantages. A major advantages was a relative ease of getting access to off-record information and other data. A second advantage is the familiarity with the company, its culture and the markets in which it operates. As a result, although I am quite new in the company, I could generally relate to the interviewees situations, views and examples given. On the other hand, the disadvantage of this relation may be exaggeration or dishonesty by the informants in attempt to either profile oneself or downplay others. Alternatively, politeness bias could have played a role as informants may not have wished to offend or be impolite and therefore withhold some information. Despite these drawback, I was under a general impression that the interviewees were sincere, open and willing to discuss and elaborate on all issues. By acknowledging the above risks early in the study, I maintained a sensitive and alert attitude towards any inconsistencies during the data collection phase.

Finally, despite utilising a research strategy which focused on understanding the dynamics within a single setting, and not be confined by pre structured responses, it is imperative to point out that the theory developed here may not have taken into consideration the most important human factors that influence project success. Nevertheless, this study offers a range of propositions that can be used for further research, either theory building or theory testing. Some suggestions for further research are discussed below.

6.3 Further research

The findings from this study can be a good starting point for further research on the same or other soft skills that affect project success. The suggestions can be tested and replicated in similar or other industries to enhance robustness and generalisability of the theory. However, it is recommended to assess the availability of reliable data sources at the beginning of the study in order to facilitate the case selection process and avoid introducing bias to the research. This study was restricted to the consulting company perspective of soft skills on project success. Other studies could contribute by incorporating the perspective of other stakeholders, like contractors, customers, or a combination of stakeholders.

Further research on project success and soft skills should contribute with knowledge to help companies understand and improve their group dynamics and communication within the teams. This, in its turn, would contribute to an increased project success. There seems to be a gap between what project manager expects from the project team and what project team thinks they are hired to do, and it is important to close this gap. As the research indicates the importance of soft skill, it is vital with a better understanding of it and in what ways it can be influenced so as to enhance project success. Further research could extend, test and examine the influence of other soft skills as well.

The use of formal tools or methodologies to follow up the process of project execution could be supplemented by further research and more awareness around people's differences and how these differences influence project success. Mapping team members' soft skills should be considered as part of project management planning phase, and that being aware of these differences can represent possibilities, not only challenge.

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Appendix A – Interview guide

Introduksjon:

1. Kan du raskt fortelle litt om deg selv, bakgrunnen din og den nåværende jobben?
2. Hvor lenge har du jobbet som prosjektleder (generelt)?
3. Hvor lenge har du jobbet i dette selskapet?

Prosjektet generelt:

1. Kan du fortelle litt om prosjektet (hva det er, hvor, varighet)?
2. Har du vært prosjektleder fra starten?
3. Hva slags kontrakt er brukt i prosjektet (fastpris eller honorar)?
4. Hvor mange fag har det vært involvert i dette prosjektet?
5. Hvordan ble teamet til prosjektet satt opp?
6. Har det vært utskifting av opprinnelig teamet i løpet av prosjektets levetid?
7. Hva har vært grunner til det?
8. Hvordan foregikk kunnskapsoverføring fra forrige person til den nye personen?
9. Hva slags rutiner etablerte du i starten av prosjektet mtp informasjonsformidling mellom fagene, avklaring av ansvarsområder, kommunikasjon osv?
10. Var alle fagene involvert helt fra starten av prosjektet, dvs fra tilbudsfasen?
11. Var alle involverte godt kjent med kontrakten før oppstart?
12. Hadde dere et oppstartsmøte hvor man gikk gjennom rutiner og kommunikasjonskanaler for prosjektet? Samme mot kunden
13. Har det vært mange endringer/avvik i prosjektet?
14. Hva skyldtes det?
15. Når en endring/avvik oppstår, hvem blir involvert i prosessen?
16. Hvordan var kommunikasjonen rundt endringer/avvik? Hvor kom det fra, hvem fikk vite om det (alle eller kun de man antok at det gjaldt?
17. Synes du noen er flinkere til å håndtere endringer/avvik enn andre?
18. Hva tror du det kommer an på/skyldes?
19. Hva kunne vært annerledes sett fra ditt synspunkt for å gjøre avvikshåndtering mer effektiv?
20. Hadde avvikene stor påvirkning på budsjett eller brukt tid?
21. Hvordan synes du kommunikasjonen internt i prosjektgruppen har vært?
22. Har du som prosjektleder gjort noe for at teamet skulle bli bedre kjent før oppstart av prosjektet?
23. I hvilken grad var du fornøyd med kommunikasjon mellom deg og fagpersonene? Hvorfor (både hvis ja og nei)
24. Opplevde du noen utfordringer mtp at folk er vant til å kommunisere forskjellig? Var det vanskelig å få informasjon fra fagene? Hvordan var informasjonsflyten?
25. Er du fornøyd med samspillet mellom prosjekteringsgruppen og fagene?
26. I hvor stor grad opplevde du at prosjektmodellen ble fulgt i dette prosjektet?
27. Synes du en del av avvikene kunne vært unngått med bedre planlegging eller var det andre ting som bidro mer til at avvikene oppstod?
28. Hvordan tror du håndtering av endringer og avvik har påvirket kundeforholdet på dette prosjektet?

Appendix B – Questionnaire

1. Hvilket prosjekt har du vært med på? (har du vært med på flere av disse prosjektene vennligst velg det som du har vært lengst med på) *

2. Hvor lang arbeidserfaring har du? *

   ◯ Jeg er nyutdannet, jobber første året

   ◯ 2-3 år

   ◯ 4-8 år

   ◯ 9-13 år

   ◯ 14-20 år

   ◯ Mer enn 20 år

3. Hvilken type rolle har du hatt i prosjektet? *

   ◯ Som en del av prosjektledelsen

   ◯ Prosjektstøtte

   ◯ Fagansvarlig

   ◯ Fag person/prosjektmedarbeider

4. Hvor mange andre prosjekter hadde du samtidig med dette prosjektet? *

   ◯ Dette var hovedprosjektet mitt

   ◯ Jeg hadde et par andre prosjekter i tillegg til dette prosjektet

   ◯ Jeg hadde 3-5 andre prosjekter i tillegg til dette prosjektet

   ◯ Jeg hadde 6 eller mer prosjekter i tillegg til dette prosjektet

   ◯ Min del i dette prosjektet var liten og jeg jobbet mye med andre prosjektet ved siden av

5. Hvor lenge har du vært med i prosjektet? *

○ Jeg har vært i prosjektet helt fra starten

○ Jeg har vært i prosjektet kun i startfasen

○ Jeg kom inn midt i prosjektet

○ Jeg kom inn mot slutten av prosjektet

○ Jeg var med kun en kort periode pga spesiell ekspertise

○ Jeg var med kun på noen oppgaver for å avlaste hovedpersonen

○ [   ]
   Annet

6. Har det vært mange utskiftinger i teamet underveis i prosjektet?

○ Ganske mange

○ Noen få pga veiende årsaker (f. eks. noen sluttet eller gikk av med pensjon)

○ Noen , fordi de ikke hadde kapasitet å fortsette

○ Kun noen få

○ Prosjektet ble avsluttet med/har fortsatt det opprinnelige teamet

○ Vet ikke

7. I hvilken grad har du trivdes med å jobbe i dette prosjektet? *

	1	2	3	4	5	
Ikke i det hele tatt	○	○	○	○	○	I stor grad

8. Hvor fornøyd er du med innføring i prosjektet, var denne god nok for å gjennomføre oppgaven? *

	1	2	3	4	5	
Misfornøyd	○	○	○	○	○	Svært fornøyd

9. Hvor fornøyd er du med prosjektledelsen og kommunikasjonen med prosjektledelsen for prosjektet?

	1	2	3	4	5	
Misfornøyd	○	○	○	○	○	Svært fornøyd

10. Hvor fornøyd er du med fagansvarlig innenfor ditt fag og kommunikasjonen med fagansvarlig for prosjektet?

	1	2	3	4	5	
Misfornøyd	○	○	○	○	○	Svært fornøyd

11. Hvordan kommunikasjon og samhandling i gruppen påvirket arbeidet ditt? (flere valg mulig) *

☐ Negativt, kommunikasjonen var dårlig og jeg visste ikke hvem jeg skulle kontakte ved spørsmål

☐ Negativt, jeg synes det var vanskelig å holde oversikt over hvem som var ansvarlig for hva

☐ Negativt, jeg likte ikke å samarbeide med de andre som var i gruppen

☐ Negativt, jeg følte at alle holdt på sitt og ville ikke dele informasjonen

☐ Positivt, jeg synes det var tydelig hvem jeg skulle kontakte og hvordan kommunikasjonen skulle foregå

☐ Positivt, vi hadde oversikt over det meste på prosjektet og fikk god informasjon underveis

☐ Positivt, jeg synes teamet vårt var flinke til å samarbeide og holde sammen

☐ Positivt, jeg lærte mye underveis og det hjalp meg å utføre jobben min mer effektivt

☐

Annet

12. I hvilken grad hadde Sweco en intern fremdriftsplan med tydelige leveranser og frister? *

	1	2	3	4	5	
Ikke i det hele tatt	○	○	○	○	○	I stor grad

13. I hvor stor grad var roller og ansvar tydelig definert internt i Sweco? *

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

14. I hvor stor grad var kommunikasjon definert internt i Sweco? *

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

15. I hvilken grad ble du gjort kjent med de grensesnittene som er aktuelle for ditt fag?

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

16. I hvilken grad har det vært et godt samarbeid/tverrfaglig koordinering med andre fag?

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

17. Har du noe du ønsker kommentere eller utdype når det gjelder interne arbeidsprosesser?

18. I hvilken grad fikk du påvirke budsjetteringen av oppdraget? *

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

19. I hvilken grad ble budsjettene tydelig kommunisert? *

                  1   2   3   4   5

Ikke i det hele tatt ○ ○ ○ ○ ○ I stor grad

20. Hvordan gikk det å holde seg til budsjettet? *

○ Jeg avsluttet arbeid innenfor budsjettert tid/jeg er innenfor budsjettert tid

○ Jeg gikk over budsjettet mitt

○ Jeg hadde ikke noe budsjett

○ Vi var flere som jobbet med samme fag og det var vanskelig å holde seg til budsjettet

21. Hva mener du var årsaken til det? (velg alle som passer)

☐ Dårlig planlegging

☐ For optimistisk budsjettering

☐ Det ble avdekket en del ting som vi ikke visste om i startfasen

☐ Kunden endret spesifikasjoner

☐ Dårlig samarbeid mellom de som jobbet med samme fag

☐ Dårlig samarbeid mellom fag og prosjekteringsgruppen

☐ Motvilje å dele informasjon innen gruppen som forårsaket ekstra arbeid

☐ Prosjektet var mer komplekst enn først tenkt

☐ [   ]

Annet

22. Hvor ofte fikk du informasjon om gjenstående budsjett underveis i prosjektet?

○ Vi hadde statusmøter med jevne mellomrom hvor vi gikk gjennom økonomien

○ En gang iblant

○ Sjeldent, eller med mindre jeg spurte om det selv

○ Jeg holdt en god oversikt over budsjettet selv

○ Vi hadde ikke økonomigjennomgang i løpet av prosjektet

○ Vi hadde gjennomgang når vi så at vi hadde nesten ingen timer igjen

23. Hvordan gikk det å overholde tidsfrister i prosjektet? *

○ Vi holdt oss innenfor tidsfrister gjennom hele prosjektet

○ Vi måtte utsette noen frister pga forsinket leveranse

○ Sluttleveranse ble forsinket en del

24. Hva tror du det skyldes/hva mener du var årsaken til det?

☐ Dårlig planlegging

☐ For optimistisk budsjettering

☐ Det ble avdekket en del ting som vi ikke visste om i startfasen

☐ Kunden endret spesifikasjoner

☐ Dårlig samarbeid mellom de som jobbet med samme fag

☐ Dårlig samarbeid mellom fag og prosjekteringsgruppen

☐ Motvilje å dele informasjon innen gruppen som forårsaket ekstra arbeid

☐ Prosjektet var mer komplekst enn først tenkt

☐ [   ]

Annet

25. I hvilken grad har Sweco hatt nok ressurser og tilstrekkelig med ressurser til å løse oppgavene? *

	1	2	3	4	5	
Ikke i det hele tatt	○	○	○	○	○	I stor grad

26. I hvilken grad har det oppstått behov for omprosjektering eller mer prosjektering som følge av feil og misforståelser på grunn av intern kommunikasjon i Sweco? *

	1	2	3	4	5	
Ikke i det hele tatt	○	○	○	○	○	I stor grad

27. Hvem informerte om avvikene/endringene i prosjektet? (flere valg mulig) *

☐ Prosjektlederen

☐ Kunden

☐ Prosjekteier

☐ Fagansvarlig

☐ Et annet fag

28. I hvilken grad ble endringer/avvik håndtert på en ryddig måte? *

	1	2	3	4	5	
Ikke i det hele tatt	◯	◯	◯	◯	◯	I stor grad

29. Bruker du noe verktøy for håndtering av avvik/endringene? *

◯ Ja, excel ark

◯ Ja, jeg bruker bedriftens prosjekteringsmetodikk og verktøy som ligger der

◯ Nei, trenger ikke det

◯ Nei, men jeg vet at det finnes

◯ Nei, det tar for lang tid/er for komplisert

30. Hvordan tror du endringene/avvikene påvirket prosjektet? *

◯ Prosjektet merket ikke noe særlig til avvikene

◯ Leveransen måtte utsettes

◯ Det ble brukt mange timer å rette opp i avvikene som vi ikke fikk betalt for

◯ Avvikene ble meldt inn til kunden og vi fikk betalt for ekstra tid som påløp

◯ [   ]
Annet

31. Opplevde du at det var uklarheter underveis i prosjektet? *

- ( ) Ikke som jeg har lagt merke til

- ( ) Noen få som jeg fikk avklart ganske fort

- ( ) Det var en del uklarheter underveis, men jeg fikk avklart det fort

- ( ) Det var en del uklarheter som jeg ikke fikk avklart eller som det tok lang tid å avklare

32. Hvilken setning beskriver best din måte å jobbe på? (flere valg mulig) *

- [ ] Jeg spør alltid hvis det er noe som er uklart og jeg formidler informasjonen videre dersom jeg får kjenskap til noe som er prosjektrelatert

- [ ] Jeg forholder meg til avtalt kommunikasjonsmatrise i prosjektet og formidler informasjonen videre i henhold til den

- [ ] Jeg foretrekker å ha struktur og forutsigbarhet, og forventer at lederen/prosjektlederen setter guidelines for prosjektet som jeg kan følge

- [ ] Jeg foretrekker å lage min egen struktur og følge den

- [ ] Jeg forventer at alle vet hva de må gjøre og gjør det uten at jeg sjekker det

- [ ] Jeg synes det er viktig med struktur og tett oppfølging så ofte som mulig

- [ ] Jeg setter tydelige rammer og forventer at man rapporterer når det er behov for det

- [ ] Jeg rapporterer med jevne mellomrom (f.eks. statusmøter) om min fremdrift og hva som gjenstår

- [ ] Jeg liker å diskutere med andre fag/prosjektledere om hvordan det går med prosjektene og utfordringene vi møter

- [ ] Jeg synes det er viktig å dele kunnskapen med andre fag/prosjektlederen fordi vi er et team og har et felles mål

- [ ] Jeg gjør jobben min, men jeg har ikke tid til å sjekke hva andre fag gjør eller hvor langt de har kommet

- [ ] Det kommer an på hva som er avtalt i starten av prosjektet. Jeg tilpasser meg

- [ ] Jeg foretrekker å jobbe alene

- [ ] [   ]

  Annet

33. Har du noe du ønsker kommentere eller utdype når det gjelder intern kommunikasjon, samhandling og samarbeid?

34. Hvordan hadde du beskrevet kunnskapsdeling generelt i prosjektene i Sweco? *

- ○ Vi deler erfaringer og har en rutine for det

- ○ Vi deler erfaring hvis det er tid til det

- ○ Vi deler erfaring, men kun om det som har gått galt

- ○ Det er stort tidspress så det er ikke tid til avsluttende møter etter at prosjektene er levert

- ○ Vi har kunnskapsdeling som et punkt i prosjektmetodikken, men vi får aldri tid til å gjennomføre det

- ○ Vet ikke, jeg er ikke villig/har ikke tid til å dele erfaringer med andre

- ○ Det varierer fra prosjekt til prosjekt og gruppesammensetning

- ○

  Annet

35. Hvilke faktorer synes du påvirker samarbeidet i gruppen mest? (flere valg mulig) *

☐ Respektert leder

☐ Tydelige rammer og felles struktur

☐ Avklarte ansvarsområder

☐ Avklarte spilleregler for samarbeid og beslutninger

☐ Gruppedynamikken

☐ At man skaper teamidentitet

☐ At vi har tilstrekkelig med tid å gjennomføre oppgaver

☐ At alle i teamet forstår prosjektets viktighet og jobber mot felles mål

☐ At teamet og prosjektet oppfattes i bedriften til å gi verdifullt bidrag. Det gjør at man prioriterer prosjektet og er mer aktiv

☐ Individuell motivasjon til å jobbe med prosjektet

☐ At man jobber med de samme folk som man har jobbet på andre prosjekter

☐ [   ]

Annet

36. Er det andre ting du ønsker å si noe om som er relevant for evalueringen av prosjektet? Hva fungerte bra og hva kunne blitt gjort bedre?

[   ]