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Project management efficiency and effectiveness to improve project control in public sector

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Problem definition

Through the last 17 years the hospital in Trondheim have been under-laid some major project management activities regarding a new, modern hospital. Three business units are considered as the owners of the project; St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU.

This study will aim to discover how the organizational project management can be effective through team management, and how project manager's competence and their leadership styles can help to achieve efficiency in projects. It will also consider what success factors that are related to the potential project outcome. In order to identify the project management efficiency and effectiveness to improve project control these steps are proposed to be followed:

1 - Discover the current best qualifications and activities in being a good project manager, according to theory, supposed to develop and manage a team.

2 - Analyzing how real project managers actually works and to find differences between the three project owners in the organizational project. It will also focus on what they emphasize mostly when building and managing a project team.

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Preface

This Master thesis report is the final part of the Master of Science degree in project management, Department of Industrial Economics and Technology Management (IØT), at Norwegian University of Science and Technology (NTNU) in Trondheim.

The research is based on the medical and health care service related public sectors projects. Three business units are considered as the owners of the project; St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU. The research work has been carried out from 8th January 2015- 11th June 2015.

We would like to thank our supervisor for the master thesis, Tim Kristian Andreas Torvatn (Associate professor at NTNU) for helping and giving a clear guidance throughout the entire research. We would like to thank the interview objects from Helsebygg Midt-Norge; Lillian Slåtsve and Bjørn Bakken, the interview objects from St. Olav's Hospital; Gunnar Bekken Anne Kari Steinsvik and Mats Hobber as well as the interview object from the Faculty of Medicine at NTNU; Nina Tanche-Nilssen. We also would like to thank the survey participants for providing insightful information regarding the topic. Their help and contribution are highly appreciated.

We also want to send a special thanks to our friends and families for being supportive through the entire project, and for believing in us until the very end.

Trondheim, June 11th, 2015

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Master of Science Thesis in the Master's Programme of Project Management

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Abstract

To achieve organizational goals, the use of effective project management is increasingly growing in the modern world. Efficiency of project management is an identical topic among top executive managers in the technology management industry. In this study it is focused on the competences of the Project Managers who leads the project, and the aim to blend the perspective of both academic and the project management expertise knowledge within a research frame work to discover how the organizational project management can be effective through team management, and how Project Manager's competence and their leadership can help to achieve productivity in projects. It considers project management to be a vital unit of the case company and that it brings awareness how to improve project control and Project Managers' competences to standard managerial methods. In the first part of this thesis a continual description of Project Managers' characteristics, team organizing and leadership and the project management success factors which affect the project to be successful is described. The final part of this thesis provides empirical evidence with depth analysis of Project Manager' skills, team management and leadership, as well as various success factors which are related to potential project outcome.

KEY WORDS: Project Management; Project Manager; Team management; Leadership behavior; Project management tools and techniques; Project management success factors.

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List of Abbreviations

BU	Business Unit
EVM	Earned value management
PV	Planned value
AC	Actual cost
EAC	Estimate at completion
ETC	Estimate to complete
VAC	Variance at completion
BAC	Budget at completion
WBS	Worked breakdown structure
CV	Cost variance
SV	Schedule variance
SPI	Schedule per index
CPI	Cost per index

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1 INTRODUCTION

In this research the focus is upon learning Project Managers competences and what kind of issues are related to efficient and successful project outcome and team management in the public health sector projects. This report applies primarily to Project Managers and other people in charge of or team members of project teams in the public sector of health, but could also be of use to Project Managers in the private sector and in other technology management industries. The report is useful for a general Project Manager to see how a team can be managed more effectively and efficient and for getting a better insight in how to become a better leader in projects. People working in a team could also benefit from this report by gaining more understanding on how they should act towards other team members and how they all are important resources for the Project Manager in the path towards reaching the project goal.

1.1 Research Scope

Efficiency in a project measures how well and creatively a manager uses his resources to reach the predefined goals, but in project management it is about knowing how to secure the right project team to perform project tasks and to operate project productively within the agreed project constraints scope, time, quality and budget. Project effectiveness identifies the relevance of the goals that organization is chasing and the degree of reaching their goals. However, this is a principal measure in project management since important aspects is operating knowledge, tools and techniques to achieve project goals. Project management effectiveness requires Project Managers to combine technical competency, i.e. tools, with the ability to develop leadership. Success and failure factors in project management point out the need for empirical studies of how project management tools and methods could be used to achieve a quality outcome. In addition, there is an increased need for knowledge about how these tools are used in actual project management practices within public organizations for improved project control.

By tradition, project management has concentrated on the management of projects on a single location either within one organization or between two or more organizations. At this moment, emerging trends are altering the way projects are structured and managed, creating new challenges in project management research and practice. The project management

process of an organization is adhering with its strategic goals to consider what types of projects are typically undertaken in terms of organizational successful business progression.

This research is based on Norway's largest hospital expansion with all the medical and health care service related projects that followed. It focuses upon the larger construction and logistic projects to smaller maintenance and service operational projects, some of the projects covered by the project portfolio. The overall project "the new hospital" was a project that lasted for 17 years, a construction project that included 226 000 gross square meters and an amount of around 12.7 billion NOK, and the entire project took place at Øya in Trondheim. The project goal was a university hospital in European top class with the patient demand in focus. Three business units are considered as the owners of the project; St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU.

This study aims to discover how the organizational project management can be effective through team management, as well as how the Project Manager's competence and responsibilities can help to achieve efficiency in projects. It will also consider the success factors that are related to the potential project outcome. In order to identify the project management efficiency and effectiveness to improve project control and discover the current best credentials and activities in being a good Project Manager with the focus on organizing and managing a project team, three research questions have been found to be of focus through the research. These research questions will be presented in the next part.

1.2 Research Questions

The purpose of the research is to investigate the potential value of the project management, Project Manager's characteristics and competences, team formulation and project leadership effects on public sector project. To identify a valuable conclusion to these issues the researchers have aimed to find three research questions to discuss upon and answer. These are as following:

1. What responsibilities and competence should the Project Manager have in order to achieve an effective, efficient and successful project execution?
2. To what extent can team management and project leadership styles affect the outcome of the projects in a portfolio?
3. How do success factors have the influence on the potential project outcome?

Relation between the findings and existing theories and best practices will be explored while answering those research questions.

1.3 Research Method

In this research project, both a qualitative and quantitative research approach was chosen as it allows collecting more extensive and rich data as well as ensuring more flexibility than by only using one of the approaches. This study has been conducted with the three business units St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU as these are the main owners of the chosen key project.

The data were collected through interviews and survey with relevant Project Managers from St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU. Individually, the case companies' project documentation was studied to increase the validity of the research findings. The organizational backgrounds were closely overviewed for the researchers to get an idea about how the business unit's organizations used to deal with their projects and how their management is. Project management skills, tools and techniques of the three business units are analyzed to find differences on how project activities are performed to meet the project requirements.

1.4 Limitation of the Study

There are certain limitations to the research study, related to the research methodology. The chosen research method may not provide the enough ground for statistical generalization of our findings because the projects are different in nature and each of the business units has their own goal with the projects; however it allows analytical generalization. The resources and time of the researchers were limited which constrained the amount of the collected data through survey, interview and documentation sources. The information that could be gathered within the constraints of time and resources may therefore not be sufficient enough to provide a satisfying study.

Because of the constraints of time and resources the researchers made a decision upon only focusing on projects performed by the three defined business units. With more time projects done in the entire region Helse Midt-Norge and its supply chain could be investigated for a better description on the project management in the health department. After further study the researchers found that also Høgskolen i Sør-Trøndelag (HiST) had a great part in this project

along with NTNU, but because of the constraints put up in advance of the research, there was not enough time to investigate an entire new business unit.

1.5 Dissertation Structure Overview

In this research project, the dissertation is structured in the following way:

Firstly, the existing literature and theories, both academic and non-academic, was reviewed in chapter 2, in order to develop the frame work of the study. Secondly, the research methodology is described in chapter 3 to find the answer for research question. The case organization is described in line with the research framework; including different type of projects in different business unit. Thirdly, the empirical data are presented in chapter 4, and fourthly; the research findings are analyzed and discussed in chapter 5. Lastly, an overall conclusion comes in chapter 6.

2 LITERATURE REVIEW

In this chapter literature that acknowledges the chosen topics of the research will be presented to give this study a theoretical perspective to go along with the case study. Literature on project management, the Project Manager, the organizing of the project team and success factors related to the project, the team members and the Project Manager is carefully selected and analyzed in order to give the best theoretical aspect as possible for this report.

2.1 Definition of Project Management

The question of what project management is cannot be answered in a short matter. Project management is so diverse and cannot fairly be explained in only one sense. To begin with it is necessary with a definition of projects. The Cambridge dictionary explains projects as either one of two things: "*a piece of planned work or an activity which is finished over a period of time and intended to achieve a particular aim"* or "*a study of a particular subject done over a period of time, especially by students"* (Cambridge Dictionaries Online 2015). These definitions explain that this paper is a project on how to manage projects. Then one can simply define project management as managing this planned work/activity or study. However, this definition is very unpretentious, and does not seek to cover the many different areas which the subject of project management exists of.

According to Atkinson (1999), there have been many attempts to define project management. Olsen (1971, in Atkinson, 1999) has written an article on to what extent project management actually can be defined. A definition from the 1950's is that project management is to use an ensemble of tools and techniques to direct the usage of different resources to accomplish a unique, complex and a one-time task within constraints of time, cost and quality (Olsen, 1971, in Atkinson, 1999). Another definition, from 1996, defines project management as the planning, monitoring and control of all phases of a project, and the motivation of the project team to achieve the set objectives within the set time, cost, quality and performance (The British Standard, 1996, in Atkinson, 1999). A third definition comes from the UK Association of project management (1995, in Atkinson, 1999), which states that project management is about planning, organizing, monitoring and controlling all parts of a project and that all involved in the project are motivated to achieve the project goals safely and within the stated time, cost and performance. The Project Manager is the one responsible for its team achieving

this (Atkinson 1999). Through all these definitions the suggestions of project management being successful according to the criteria of cost, time and quality remains.

2.2 The Relationship between Project, Program and Portfolio Management

Portfolio, Program and project management are always aligned with organizational strategies for achieving the strategic goals. Portfolio management aligns with strategies by identifying the right program, projects, prioritizing the work and providing the needed resources whereas program management harmonizes its different projects and control interdependencies in order to assure specified benefits (PMBOK, 2013).

2.2.1 Program Management

Program management is a widely used and accepted approach to manage products, service and infrastructure development efforts. "Program management is the coordinated management of interdependent projects over a finite period of time to achieve a set of business goals," (Milosevic, Martinelli et al. 2009, p. 9).

Characteristics about the nature of program management are described as follows:

1) Program management is strategic in nature, and provides a focal point for ownership and accountability for business result.
2) Program management aligns functional objectives to business objectives.
3) Program management is cross project and multi-disciplined which enables horizontal collaboration.
4) Program management requires a capable business leader (the Program Manager).

An organizational program management team helps to ensure that a program is closely aligned to and directly supports achievement of the business' strategic objectives. The program management link to strategy by mixing with the different project management which are interdependent projects, products or services, and deliver a project outcome that meets the predefined strategic plan (Milosevic, Martinelli et al. 2009).

According to PMI (PMBOK guide 5th edition, p. 8), table 2-1 shows the close relation of Project, Program and Portfolio across several dimensions within the organization.

	Projects	Programs	Portfolios
Scope	Each project has defined objectives, and the scope is progressively elaborated to the entire project life cycle.	Programs are about having larger scopes and delivering more significant benefits.	Portfolios have an organizational scope which changes with the strategic objectives of the host organization.
Planning	Project Managers progressively elaborate information into detailed plans to the entire project life cycle.	Program Managers are responsible for the overall program plan and provide guide on detail planning at component level.	Portfolio Managers create and maintain necessary process and maintain a good communication all through the cumulative portfolio.
Monitoring and Change	Project Managers monitor and control the work of products, service or results. Expected changes within the projects and organized by the Project Manager.	Program Managers monitor and manage the changes from the inside and outside of the program component to ensure the overall goal, schedules, budget and benefits.	Portfolio Managers continuously monitor strategic changes and aggregate resource allocation, performance result also risk of the portfolio.
Management	Project Managers manage the project team and is committed to meet the project objectives.	Program Managers manage the program staff and Project Managers to ensure the overall goals, schedule, and budget.	Portfolio Managers coordinate and manage portfolio, program and project management staff that is responsible for leading each project.
Success	Project Managers measure the success by project/product quality, budget and timelines, and degree of customer satisfaction.	Success is measured by the degree to which the program satisfies the needs and benefit of the ongoing projects.	Portfolio Managers measure the success by the aggregate investment, performance and benefit over the organization portfolio.

Table 2-1 – Project, program and portfolio dimensions within the organizational projects (from PMIBOK, 2013, p. 8)

2.2.2 Portfolio Management

Portfolio management discusses a collection of projects or programs and other task that are grouped together to facilitate effective management which meet the strategic business purposes of the organization. Portfolio management refers to the centralized management of one or more portfolios, which includes identifying, ranking, authorizing, managing, and controlling projects, programs, and other related work, to achieve explicit strategic business purposes. portfolio management emphases on ensuring that projects and programs which are revised with priority, and arrange resource for allocation (Project Management Body of Knowledge (PMBOK® Guide) 2013). A Portfolio Manager needs to understand how to relate the strategic goals, objectives and priorities with the portfolio component plan to reach the organizations goals.

Portfolio reporting ensures that there is effective communication between the Project Managers, the Portfolio Manager, the portfolio sponsor and the portfolio stakeholders. This portfolio reporting is tightly linked with other types of reporting within the organization that will influence discussions regarding priority, balancing, and directions of the portfolio (PMI, 2013).

2.3 The Project Manager

As project management, the Project Manager also has many definitions. A Project Manager could be chosen because of the preferred skills and knowledge, but also because of the leadership type. A Project Manager is not necessarily trained to be a Project Manager of the field, but could be someone who just fit the profile of the leadership style that is needed for the exact project.

According to Gaddis (1959) the role of the Project Manager is to create a product and the tools the Project Manager uses to accomplish this is a team of people who are specialists in different fields. These tools are used through all the project phases, from the project idea to execution phase (Gaddis 1959). In the time of when Gaddis wrote his article, however, the Project Manager was looked upon as a person creating an advanced-technology product which can be touched and seen. Today, this view has changed, and the outcome of a project is not necessarily a physical high-tech creation anymore.

According to the National Criminal Justice Reference Service (2015) the tasks of a Project Manager is to outline and manage the schedule of the project, to ease the communication

within the respective team members, to identify and manage the several risks that may occur during the project as well as to optimize the total project, not just having one task or assignment as a part of the project (NCJRS 2015). A competent Project Manager is also expected to do the right things right and get things done at or above a certain level of performance (Bredillet, Tywoniak et al. 2015).

2.3.1 Project Manager's Capabilities

It is not very difficult to understand that competent people have to be found to be the Project Manager in order to achieve the best outcome of the project. Projects and programs have been used more and more for achieving the strategic goals and objectives of a company, this through the last sixty years (Bredillet et al., 2015). Crawford (2005) defines the competence of a Project Manager as "*the knowledge and understanding, skills and abilities that a person brings to a job", "the core personality characteristics underlying a person's capability to do a job"* and *"the ability to perform the activities within an occupational area to the levels of performance expected in employment"* (Crawford, 2005, in Bredillet et al., 2015, p. 255). These definitions gives an idea that a competent Project Manager is a person who have expertise in the field of project management, have personal characteristics that will make the person capable of actually performing the project management and is able to accomplish the given tasks in a certain level of performance. Summarized, to define if a person is a capable Project Manager depends on the skills, the personality and the ability to perform of this person (Bredillet, 2015). An integrated competence model can be seen in figure 2-1.

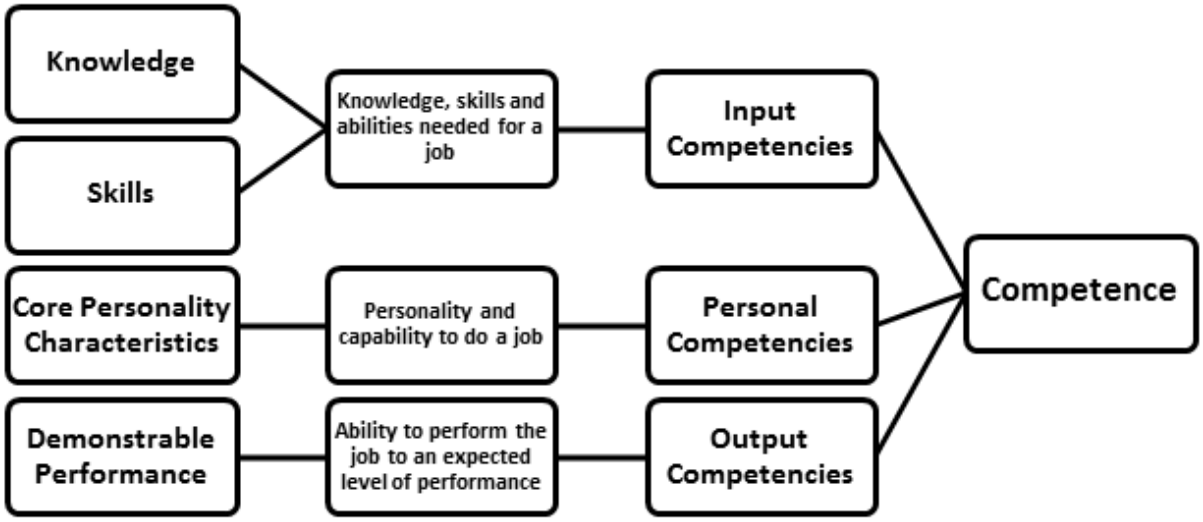

Figure 2-1 – An integrated model of components for competence (from Crawford, 2005, p. 9)

2.3.2 Project Management Skills and Knowledge

A good Project Manager is, as mentioned in the previous chapter, dependent on having knowledge, skills and abilities to perform the job that is given. The question is what kind of knowledge, skills and abilities it is that the Project Manager needs to fulfill the expected tasks. This, of course, depends a lot on the type of project that needs to be managed, but there are also some basis of knowledge, skills and abilities that the Project Manager needs for all kinds of project.

Crawford (2005) claims that there are only two required standards of input competencies for Project Managers, and these are knowledge from bodies of knowledge, (such as PMBOK® Guide (project management Body Of Knowledge Guide)), and a proof of results or use of project management practices from performance based competency standards (as for example the Australian National Competency Standards for project management) (Crawford 2005).

In 2000, Crawford made a list of all skill factors that were important for the Project Managers in different stages of the project. In this ranking the ability to lead and the ability to develop good teams were the most important personality characteristics. The ability to communicate and the technical performance were also highly ranked, while the lesser important factors were the monitoring and controlling of time, cost, quality, risk and scope (Crawford 2000).

2.3.3 Project Manager's Personality Characteristics

In project management, as well as any other profession, there are a lot of different personality types. The Myers & Briggs Foundation (2015) suggests that there are in overall 16 diverse personality types, where four contradicting personality qualities are combined in different ways. The way that a person looks at the world can tell if the person is either an introvert (a thinker) or an extrovert person (a talker). How the person deals with information tells if the person is dependent on sensing (looking at facts) or the intuition (looking at possibilities). When making decisions, the person can either be thinking (objective) or feeling (subjective), and when it comes to having a structured life, a person can either be judging (want closure) or percept (keep all possibilities open) (The Myers & Briggs Foundation 2015). All these different personality types can also be found in a leader as well as in a Project Manager and all personalities bring both good and bad qualities with them.

It is also important to remember that there is a difference between being a leader and being a manager. For example is a leader a person that people naturally follows, while a manager is just doing the job that he/she is set to do. Hellriegel et al. (1998) describe leadership as the process where a person influences others to reach a goal, and a leader as the person who does the correct things to inspire these people to accomplish their visions. A manager is, on the other hand, the person who guides the work of others and is responsible for accomplishing the expected results. This implies that not all managers implement leadership, they might be good at the job they are set to do, but not good at being a leader (Hellriegel, Jr. et al. 1998)

Further, Hellriegel et al. (1998) explain that a manager handles complexity through plans and budgets and achieve goals by organizing and staffing. They control the behavior of their teams to ensure that the goal is achieved. Leaders, in contrast, develop new strategies according to directions or visions of the future and recruit and keep the people that share the same vision. They motivate and inspire their teams in order to achieve the future goal and vision (Hellriegel et al., 1998). The differences between a leader and a manager are visually expressed in figure 2-2.

Figure 2-2 – The difference between managers and leaders (from Hellriegel et al., 1998, p. 302)

2.3.4 The Demonstrable Performance of a Project Manager

The demonstrable performance of a Project Manager can be calculated in the view from the respective team members and also in the evaluation of the project outcome and success. The Project Manager is the one in charge of delivering the project within time, budget, with the correct specifications and other specified criteria (Rahman et al., 2008). Rahman et al. (2008) also carried out a questionnaire for contractors, consultants, academics, private parties and public parties of different levels in three different countries (China, UK and Oman) where they could rank the most and least important skills and qualification of a Project Manager. The result from this questionnaire shows that the most important factor is that the Project Manager ensures project execution and meets the project objectives. To be proactive in decision making while considering the environmental influences and have sufficient knowledge and experience in the field of leadership is also very important, while the technical competency and the ability to influence the budget scores very low. This ranking also shows that there are to some extent a connection between the performance of the Project Manager and the project success (Rahman, Miller et al. 2007).

2.4 Tools and Techniques for the Project Manager

The Project Manager's tools and techniques can be useful far more widely than others can assume. Projects can be in different shapes and sizes, from small and straightforward to extremely big and complex. The Project Manager uses various techniques and project planning tools which are useful for operative tasks accomplishment in the project execution phase, and different outcomes are possible. At an early stage in the project planning phase, computerized software such as Microsoft Project, Excel, PrimaVera etc. can be used. In this study it is emphasized upon three major tools, described as follows:

1) Earned Value Management (EVM),
2) Risk management, and
3) Communication and conflict management.

2.4.1 Earned Value Management (EVM) in Projects

Earned value management is a project management technique for measuring project maturity, project performance and progress. It facilitates the planning and control of cost and schedule performance for improving project management visibility and understanding. The key practices of EVM for planning executing and controlling a project include the following components:

- Define product and project scope, and decompose work to a manageable level.
- Assign clear management responsibility for discrete work elements.

The EVM core concepts are to measure and compare the Value of the Work Performed with the Value Planned and Actual Costs, and to develop forecasts for Estimate at Completion (EAC), Estimate to Complete (ETC) and Variance at Completion (VAC).

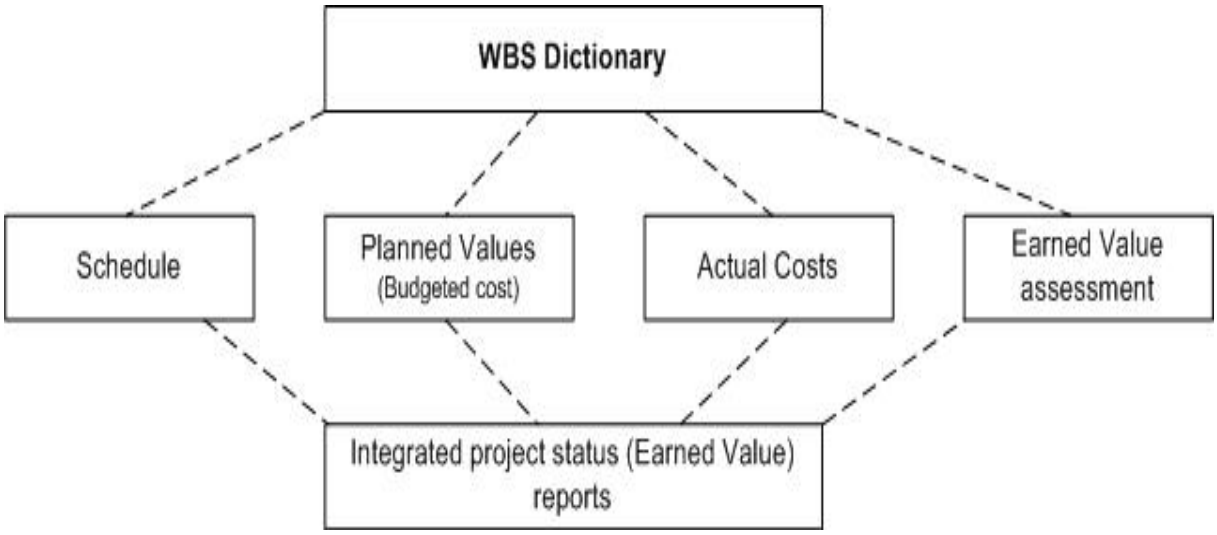

Figure 2-3 – Earned Value Management diagram (from PMIBOK, 2011, p. 12)

Figure 2-3 describes an alignment of the project activities in a WBS (Work Breakdown Structure), a project cost and scheduling subsystem. This concept is to align project activities, defined in the WBS, into both a schedule and financial accounting of a time recording system (PMBOK, 2011, p. 12).

Earned Value methods are generally applied to work packages, where each work package has its own unique characteristics. Therefore, there is no single best way to measure the work progress. According to PMI (2011) there are several accepted methods (discrete effort, apportioned effort and level of effort) to measure work performance. In this study it is focused upon discrete effort which contains:

- Fixed formula
- Weighted milestone
- Percentage complete
- Physical measurement

Fixed formula

This method assigns a specified percentage of the budget value of the work package to the start milestone of the work package. The remaining budget value percentage is assigned when the work package is completed. The 50/50 method and the 25/75 method are typical. The work is credited for Earned Value (EV) as soon as it starts. However, the real progress is invisible and can give a false sense of accomplishment. This measurement method should only be used for work which spans less than two reporting period.

The 0/100 method does not incrementally credit EV for partial work. This measurement method should only be used for work which is scheduled to start and complete within one reporting period.

Weighted milestone

This method is suitable for longer (two or more time periods) duration work packages which has intermediate and tangible results/milestones. In this method, the work package is divided into measureable segments, each ending with an observable milestone. It also assigns a weighted value to the achievement of each milestone.

The milestones are weighted to reflect the relative accomplishment against the whole milestone.

Percentage complete

This method shows an estimate of the percentage of the work that is complete at the end of each measurement period. It is also based on objective and quantifiable work completion. The Planned Value (PV) is determined by the time-phased resources required to accomplish the work package. The EV is determined by multiplying the work package Budget at Completion (BAC) by the percentage complete.

Physical measurement

The evaluation of work progress in the project work packages is related to the physical nature. This physical measurement, unlike the weighted milestone and the percentage complete, can be related more explicitly to the completion of the work. More precisely, a specific measurement with the cost or efforts spent should be defined and agreed upon in advance (Project Management Institute 2011) .To understand better how EVM works, a calculation example is put into Appendix C.

2.4.2 Risk Management in Projects

In 2006, APM defined risk management as “an organized process that allows individual risk events and overall project risk to be understood and managed proactively, optimizing the project success by minimizing threats and maximizing the opportunities” (APM, 2006, p. 26) (APM 2006).

ISO 2009 defines risk management as “a set of coordinated activities implemented in order to direct and control an organization with regard to risk” (Guide 2009)

Risk is always related to what can happen in the future. Risk analysis is always a proactive attitude in the sense that it contracts exclusively with potential accidents (Rausand, 2011). There are three main steps to analyze the risk: *Hazard identification, frequency and consequences analysis* (figure 2-4)

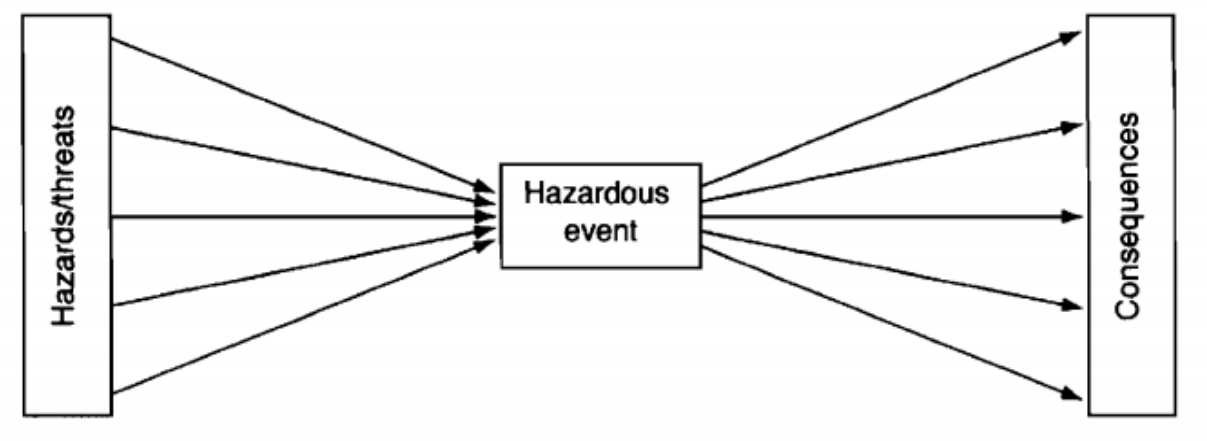

Figure 2-4 – Bow-Tie Model (from Rausand, 2011, p. 6)

Risk analysis is used to find the causes of destructive events to determine the possible consequences of those destructive events. The bow-tie model is useful for illustrating both the conception and analysis of the risk matters in the products or in the projects; each threat or destructive event has a specific influence on the consequences (Kaplan and Garrick 1981)

Massingham (2010) has defined risk management as a continuous management process with the objective of revealing, analyzing and assessing potential hazardous events in a system, as well as identifying and introducing efficient risk control measures to eliminate or reduce possible harm to people, the environment or other assets. It is an integrated part of all good management and contains three main elements: risk analysis, risk evaluation and risk control and reduction (Massingham 2010).

Risk analysis: The objective of risk analysis is to identify harmful threats related to the projects, and to identify the potential cause of each hazardous event.

- Identify barriers and safeguards that can prevent or reduce the hazardous events as well as reducing their impact on the project outcome.
- Determine the consequences and frequencies (establish the risk picture).

Risk evaluation: Assessing the risk picture that was established and comparing the risk with the established risk acceptance criteria.

- Consider an alternative system or optional solutions.

- Propose risk-reducing measures and assess the effect of the risk reduction provided by each of them in relation to the cost of measures.
- Provide input to decision-making related to risk.

Risk control and risk reduction: Making decisions regarding the introduction of new risk reducing measures or the modification of existing measures, and implementing risk reducing measures (Rausand 2013).

- Monitor the risk and propose and evaluate changes when appropriate. Communicate the risk issues to relevant stakeholders and the general public.
- As an example: make other decisions related to the risk (the proposed risk reducing measures; is it appropriate? Or which will be appropriate within the several proposals?).
- How much must be invested to reduce the risk?

According to PMI (2013), a designed review could be the performing of project documentation to identify the risk (including plans, assumptions, previous project files, contracts etc.). PMBOK has defined documentation reviews, information gathering techniques, check list analysis and assumption analysis.

Every project's risk is considered and developed based on a set of hypotheses, scenarios or assumptions. Assumption analysis explores the validity of assumptions as they apply to the project. It identifies risks to the project from inaccuracy, instability, inconsistency or incompleteness of assumptions (PMBOK, 2013).

2.4.2.1 Project Outlook of Risks

In a project, risk may have one or more causes and, if it occurs, it may have one or more influences. Risk is an uncertain incident or condition that, if it occurs, it has an effect on the project objectives (scope, schedule, cost and quality). The objectives of project risk direction are to increase the probability and impact of positive events, and decrease the probability and impact of negative events in the project (PMBOK, 2013).

From an information perspective, Dey (2010) states that risks are a cluster of factors formed by the different viewpoints of the various stakeholders. From a project perspective, the risks can arise from the business or operational aspects; in the initial stages the business risks are mostly highlighted while the operational risks primarily considered. However, there should be an ideal balance between those two aspects without ignoring any feature on any stage within

the project execution time. Whereas the operational risks affect specific work activities, does the business risks affect the project as a whole (Dey 2010).

Known risks are those that have been identified and analyzed, making it possible to plan responses for further direction. Unknown risks, on the other hand, cannot be coped with proactively, which makes it recommendable that the project crew should create a contingency plan.

2.4.2.2 Risk Analysis Techniques

Risk analysis techniques are segmented into two parts: quantitative and qualitative. These are described below.

Quantitative Techniques

Quantitative risk analysis uses numerical values for frequencies, consequences and brutalities. The numerical value may come from many different sources (such as technical data, operational data, reliability data, stakeholder's data, maintenance data etc.) (Rausand, 2011). One of the most complex parts accompanying projects risk management is the quantification of risk (Rebiasz 2007). The industry's wide used key techniques include:

- Sensitivity analysis
- Expected value analysis
- Monte Carlo analysis
- Scenario planning, Fuzzy set analysis
- PERT (program evaluation and review technique)
- Risk data quality assessment
- Decision tree analysis and Probability distribution

Some of these techniques are less applicable as they necessitate the need for detailed information. This is generally not available at the planning stage, and thus there is a struggle in making accurate decisions (Dey, 2010).

Qualitative Techniques

In qualitative risk analysis, words or descriptive scales are used to describe the frequency of the identified harmful events and the brutality of the potential consequences that might result from these events. Qualitative risk analysis may be used as an initial screening activity to identify accidental scenarios that require more detailed analyses. When the data availability is

inadequate for a quantitative analysis, qualitative techniques can be appropriate (Rausand, 2011). The qualitative risks include risks regarding contractual obligations, variations by the client, design variations and incomplete or inaccurate cost estimate (Rebiasz, 2007). The industry's wide used key techniques for these risks include:

- Risk probability and impact assessment (probability and impact matrix)
- FMEA (failure mode and effects analysis)
- Fault tree analysis, Event tree analysis
- Cause-consequence analysis
- Risk data quality assessment
- Risk categorization
- Risk Urgency Assessment
- Delphi Technique, Brainstorming
- Assumption and checklist analysis
- Expert Judgement

To follow these techniques, various tools are used according to organizational projects demand. Mostly used tools are: risk register, risk catalogue, spread sheets, focus group discussions etc.

2.4.3 Communication and Conflicts in Project Management

As is common knowledge, communication between two parties can solve any conflict between them if done properly. Good communication leads to trust and confidence between two parties, and in a working project team, how the communication between the team members and the Project Manager works, can be a determinant on if the project fails or succeed. But what is actually communication? Some might think that if someone talks to a person, and the other person listens, and afterwards they turn it the other way around this is communication. And to some extent this might be communication. However, communication is not as much about talking and listening as it is about actually understanding the other party's intention behind the conversation. Jacobsen and Thorsvik (2002, in Langlo, 2013) have made a model which shows how the communication between two parties works (figure 2-5).

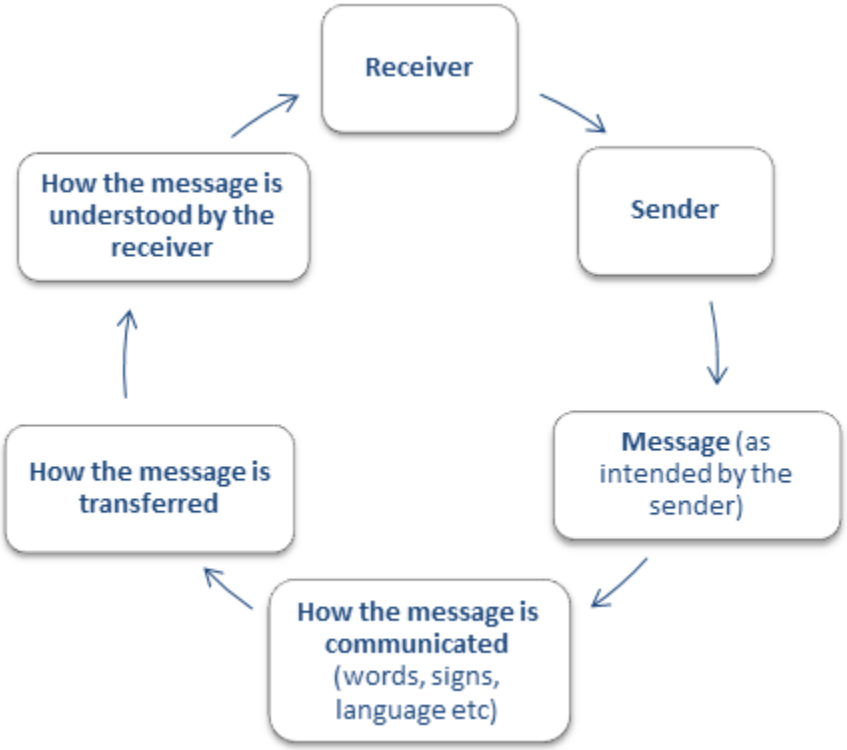

Figure 2-5 – Communication circle (from Jacobsen and Thorsvik, 2002, in Langlo, 2013, p. 7)

In the perspective of project management, Langlo (2013) identifies that communication is the processes that is required to ensure the correct information flow of within the project. At the same time the author pinpoints that communication is the most time consuming part of a Project Manager during a project. Communication between the Project Manager and its team can go, as suggested by Langlo (2013), like this:

1. Defining who needs to know this information, finding the stakeholders
2. Planning how the information should be communicated
3. Actually communicate the information
4. Taking care of misunderstandings
5. Making sure everyone has understood and taken the information into consideration

2.4.3.1 The Importance of Communication

Langlo (2013) also explains some of the reasons why communication is so important for an effective project management. Communication can serve as a great part for the project team to carry out the mission that they are set to do during the project as well as creating motivation for the team members. It also creates predictability to some extent, and knowledge and skills can be shared between the team members. All of these important communicational effects

lead to the conclusion on effective leadership being dependent on effective communication. Communication is also effectively used to reduce the risk of conflicts during the project. Conflicts often happen because the team members and/or the Project Manager do not understand each other's reasons for their opinions and they misunderstand each other's intentions (Langlo 2013).

2.4.3.2 Conflict Management

To project task accomplishment, the Project Manager often specifies that one of the requirements for effective performance is the ability to attain various conflicts and disagreements. If the Project Manager is aware of some of the major cases of disagreements in the various steps of projects, there is a greater likelihood that the detrimental aspects of these potential conflict situations can be avoided or minimized (Thamhaim and Wilemon 1975). Their research investigates the seven potential conflict determinants to be the prime cause of conflict in project management.

1) **Project priorities:** The views of the project participants often differ over the sequence of activities which should be undertaken to achieve successful project completion. Conflicts over the project priorities can have an impact on the project team and other support groups who belongs to the project execution time.
2) **Schedule:** In a project, disagreements may develop around the timing, sequencing and scheduling of project-related tasks between different team members in different departments.
3) **Administrative procedure:** Administrative procedure-conflict means a number of managerial- and administrative-oriented problem that can arise over how the projects will be managed; the definition of the Project Managers reporting relationship, the definition of responsibilities, the interface relationship, the project opportunity, the operational necessities, the plan of accomplishment, the work agreements with other groups, and the procedure for admin support.
4) **Technical:** Technical issues can arise over technology-oriented projects, agreement conflicts, technical tradeoffs and the way on how to achieve performance.
5) **Manpower:** Staffing of the project team is a big challenge for the Project Manager; finding the proper person for a specific task can raise conflicts. Project personnel management conflicts can accordingly have an effect to project activity.

6) **Personality:** Project team member's personal characteristics, their interpersonal differences rather than technical issues can affect the project outcome.
7) **Cost:** Conflicts can develop over cost-estimates from support areas regarding various project work-breakdown or task-breakdown packages. As an example can the Project Manager's allocating of the funds for a functional support group, be perceived as insufficient for the support requested.

Conflict Handling Modes

According to Blake and Mouton (1964) can the manager approach and resolve conflicts by using various conflict resolution modes (Blake and Mouton, 1964, in Thamhain and Wilemon, 1975). Five of them are very useful for resolving conflict, such as:

1) ***Withdrawing:*** Retreating or withdrawing from an actual or potential disagreement, used when you cannot win, when the stakes are low, or when you win by delay.
2) ***Smoothing:*** Deemphasizing or avoiding areas of differences and emphasizing upon the areas of business agreement.
3) ***Negotiating/Bargaining:*** This can be used when both parties need to win, when others are as strong as you, or to maintain your relationship with your business partner or the opponent. It can also be applied when you are not sure that you are right, or when you cannot achieve anything if you do not make a deal. Bargaining and searching for a solution brings some degree of satisfaction to the parties despite of their differences.
4) ***Collaborating:*** This is used to make both of the parties achieve at least what they want and maybe more, on a common power base, and when knowledge or skills are complementary, where there is enough time and trust. More precisely is this a "give and take"-attitude.
5) ***Forcing:*** When "do or die"-situations arise, when you are strong enough to gain the status and when one part demonstrates that the relationship is not such an important factor for the dominant part to achieve their goal.

2.5 Project Teams

In every project there is a defined Project Manager, but there are also a number of people with different backgrounds, skills and knowledge available for the Project Manager to use for the project to go forward. These people form a team which is organized by the Project Manager and used in order to achieve the expected project goal and reach project success. The team is

one of the respective project management tools. A team can be structured and organized in many different ways, but the four most common types are functional teams, cross-functional teams, problem-solving teams and self-managed teams (Hellriegel et al., 1998).

2.5.1 Functional Teams

A functional team usually consists of people that work together on a daily basis with interdependent and continuously running tasks. Functional teams often exist within functional departments and sometimes there also exists more than one functional team within the departments. For example can it within the human resources department be a functional team of recruiting, safety as well as training and development (Hellriegel et al., 1998).

2.5.2 Cross-functional Teams

Two definitions of cross-functional teams is from Wilemon (1998) which have found that a cross-functional team can be defined as "a group of people with a clear purpose representing a variety of functions or disciplines in the organization whose combined efforts are necessary for achieving the team's purposes. …" (Wilemon, 1998, p. 281) and "cross-functional teams have considerable currency now as a logical means to generate more creative, less problem-riddled solutions, faster…," (Wilemon, 1998, p. 281).

Another, similar, definition of a cross-functional team is from Hellriegel et al., 1998 which states that a cross-functional team consists of people that have different skills and knowledge and that comes from various backgrounds so that all these different competencies can be used in order to solve a common problem. In cross-functional teams members from different departments and functions join together to deal with problems existing across departments. The cross-functional team are mostly efficient when the team is supposed to reach a goal that requires adaptation, speed and a focus on the end-customers' demands (Hellriegel et al., 1998).

Parker (1994, in Wilemon, 1998) also found that there are several benefits to working in a cross-functional team. For starters, the cross-functional team helps the organization in doing things faster, which is particularly important in projects where time is one of the major success factors. Secondly, it can join team members with different skills, capabilities, and knowledge, into one team to solve highly complex problems. Thirdly, the customer demands will be in focus because the team members work together to solve important problems. Fourthly, it will create further creativity since it is a heterogeneous group with diverse

thoughts and ideas which they will share with each other. This can create new common ideas. Fifthly, the team members, the project team as well as the organization will learn from shared knowledge, and lastly, the cross-functional team can be the only point of contact for information about the project (Parker, 1994, in Wilemon, 1998).

Although there are several advantages to a cross-functional team, it requires lots of thought, work and planning to make it effective, according to Wilemon (1998). A cross-functional teamwork can be of a huge challenge if the members think they know it all by themselves and refuse to listen to what others have to say. Another challenge may be that information is not sufficiently shared between the team members, and that they might not understand what their responsibilities are, which leads to a missing focus on the project. Lack of communication between the team members, resistance to change and technical performance problems due to a rush with fixing important problems may also be challenging with the cross-functional team (Wilemon 1998).

2.5.3 Problem-solving Teams

A problem-solving team is a temporary team put up to find different solutions to a problem and to analyze the solutions against different criteria to find the best one. This team consists usually of people from one specific department which meet regularly every week for a shorter period of time. Problem-solving teams have the authority to make smaller changes to how the department is working as long as the decisions they make do not affect other departments or functions and requires an extensive amount of new resources. They do not change or reorganize the work of a manager or a department to a great extent, but rather delegating tasks and authority to entities (Hellriegel et al., 1998).

2.5.4 Self-managed Teams

A self-managed team usually consists of employees who have to work together on a daily basis and is a team that can organize the work by themselves and can make their own decisions without talking to a manager first. It often raises both productivity and quality in a company, mainly because they are allowed to do things as they think is best suited. The self-managed team often removes the need of one or several managerial levels, which makes the organizational structure more horizontal and in line than other organizations (Hellriegel et al., 1998).

2.5.5 Virtual Teams

A virtual team is a team where the team members as well as the Project Manager work distantly from each other (Cascio, 2000). There are many advantages to working in a virtual team, but also many disadvantages. The most important advantages may be that it is easier to access global markets since the team can have members working all over the world, it gives environmental benefits since one can work from home instead of having to travel to work, reduced real estate expenses, and improved customer service, since they have more time to meet the customers face-to-face when they do not have an office to attend to. The main disadvantages may be that the Project Manager has to change its focus from time to results as well as recognizing that the need for management is decreasing. It also will affect negatively because of the setup and maintenance cost of the computerized tools that is needed, cultural clashes between the team members, the feeling of isolation, because one do not really socialize in that matter, and the lack of trust, because one will not be able to get to know the people in the team outside of the project hours (Cascio 2000).

2.6 Organizing and Managing a Project Team

To organize and manage a team is not always an easy task. To make the team as effective as needed is even more difficult. A failure may occur in any stage of the team development, from the forming of the team to the team termination (Hellriegel et al., 1998). According to Frame (1987) the team is the basic work unit in a project. Because of this it is important to understand in what way the team is contributing to the success or failure of the project. When the team fails to realize its potential, the team outcome will not be a success. The outcome of the team is dependent on several factors, and these factors are all interdependent of each other. Hellriegel et al. (1998) defines some of the internal factors of the team as the group size, the roles and diversities of the team members, the norms and rules that are set, the cohesiveness of the team and the Project Manager's way of leading. All these factors collected, together with external factors as the external environment and the set goal, affect how the team behaves and work together, and in the end it has a great influence on the performance and satisfaction of the team members (Hellriegel et al., 1998).

2.6.1 Team Performance

According to a study done by Thamhain (2004), where the leadership effectiveness in technology-based project environments were to be examined, the influences to team performance were also implicated and discussed upon. His findings too showed that the team performance is influenced by five main internal factors, but the factors described by him are somewhat different from the ones described by Hellriegel et al. (1998).

The factors mentioned by Thamhain (2014) are people, work, organizational process, tools and techniques as well as leadership. He also mentioned four external factors as the business environment, managerial support, organizational support and project complexity. How these internal and external factors are connected with the team performance and can influence it is shown in figure 2-6.

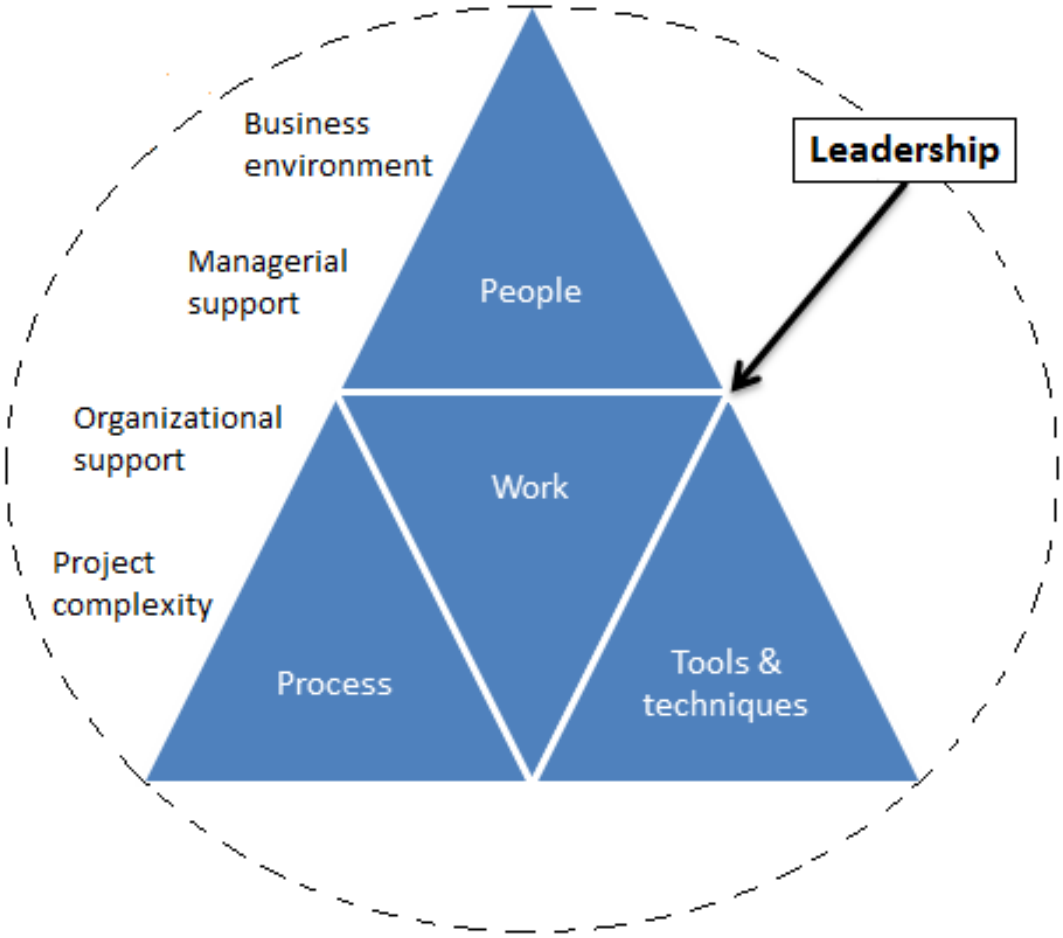

Figure 2-6 – Influences to team performance (from Thamhain, 2004, p. 40)

2.6.1.1 Affecting the Team Performance

The factors discovered by Hellriegel et al. (1998) and Thamhain (2004), mentioned in the previous part, will to a smaller or larger extent have an effect on the overall team performance and furthermore the result. How the factors can affect the performance, and in what way, will be further examined in this part. In this study it is only focused upon the internal factors and not the external factors. The external factors are found not to be as relevant for this study since the research is about improving project control in the team and not outside of the team. The external factors cannot as easily be altered with by the Project Manager as the internal factors can.

Influence of Work and Task

One work-related variable, such as the size of the group, is argued upon having any significant influence upon the team performance. Hellriegel et al. (1998), states that size may affect how much control the leader should have; a smaller group needs only a low amount of direction from the leader while a bigger group needs more. Also, the larger the group, the longer time is needed for reaching decisions as well as making use of written rules and procedures. It is also easier for members to speak their mind if the group consists of only a few people, than if the team exists of more than 10 members (Hellriegel et al., 1998). Furthermore, communication, as stated by Frame (1987), is much more essential with more people than with smaller groups, because there are more people to deal with.

However, Thamhain (2004) found that project size, as well as other structural variables, had little statistical impact on the team performance. The reason for this is because of the Project Manager's ability to find the necessary people that are needed to do the project. Another reason is the Project Manager's ability to effectively assign the work to control work allocation and project outcome. When the Project Manager is capable of this, the size or structure of the team does not matter. He found that the personal aspects of the work, as interests, ability to solve problems, job skills and experience were more influencing as long as the necessary competence and skills of the team members are to be found in the team and that they are distributed in an essential order to fulfill the project tasks (Thamhain, 2004).

Influence of the Team Members

When it comes to how the team members influence on the group outcome, it is important for the team to have members that are both focusing on the tasks that needs to be done and on the members' well-being for the project to be as efficient as possible. If the group members are all

self-centered and only focus upon their own needs, the teamwork would not go forward. It is at the same time necessary for all the people in the team to have an open mind when it comes to cultural differences in the group, only that way a member can learn from others backgrounds as well as the other way around (Hellriegel et al., 1998).

Hellriegel et al. (1998) suggests that in a team it is much more important to have a collectivistic view on the project tasks and be an integral part of the group than being individualistic and think only about your own personal goals and interests. It is important to find a common team goal and to show a greater sense of involvement when you are a part of a team. According to Frame (1987), the team goal should be transferred from everyone's personal and individual goals for a simpler coordination of the different individuals in the team.

The team members' role can also to some extent be compared to the people-oriented factor found by Thamhain (2004). This factor seems to have, as discovered by Thamhain (2004), the most significant influence upon the team performance. This factor is stated to include, amongst other, personal interest from the project, pride and satisfaction as well as project challenges, accomplishments and recognition. The people-oriented factor is shown to be affecting the team performance by building a joint project team that can effectively influence the strengths and competencies of the team as well as effectively have an impact on the produced result of the project (Thamhain 2004).

Influence of the Organizational Process

Thamhain (2004) also found that the organizational structure and processes were important to an effective team performance. Under here the most important factors seems to be cross-functional cooperation, effective communication and effective project planning. Frame (1987) agrees that structure is very important, and states that if the team is not structured properly, it can cause inefficiency. Bad structure can include members that do not communicate well, poorly integrated tasks and conflicts in knowing who does what. Also, the team members may not always realize that they are part of team, which can make the Project Manager's work more difficult. The Project Manager has to be the one to develop the sense of team feeling and spirit amongst the project team (Frame 1987).

Influence of Norms and Rules

When it comes to the unwritten norms of the group, if the members are not aware of the expectations on their behavior, there might upraise some embarrassing situations and

awkwardness amongst the team members when they do certain things together. The teams could be chaotic and tasks rarely completed. Norms can help avoiding these situations and rather express how the members are anticipated to act towards each other and how personal and close the team members are allowed to be (Hellriegel et al., 1998).

Influence of Cohesiveness

The cohesiveness of the team members are important for the members to wanting to stay in the group and showing commitment to finishing the work together with the others (Hellriegel et al., 1998). However, it is important to remember that being too committed to the group and always agree with any kind of decisions that is made can lead to inefficiency and wasted work hours. Some conflict and disagreement is actually healthy for the team to reach better and more efficient decisions together. If a group is too similar in its mindset, the teamwork would not go forward, but stagger and stay at the same, blank page. The important thing is to knowing how a conflict best could be solved when it occurs.

Influence of Tools and Techniques

Thamhain (2004) discovered that even though team members do not show great interest in tools and techniques, they seem to have an eager effect on the team performance. By using the correct tools and techniques properly they can help a Project Manager with problem solving, communication and information transfer amongst other tasks of the Project Manager. The methods which a Project Manager uses can affect the atmosphere as well as the work process of the team. These same methods can be used to support organizational processes like budgeting, scheduling and reviewing.

Influence of the Leadership

The last factor mentioned by Hellriegel et al. (1998) is the leadership. The leadership is shown by many studies, for example by the study from Thamhain (2004) as well, to be truly significant when it comes to team management. The leader will accompany and help the team with reaching the goals, and are influential on how the team is structured and managed. They are also the most important part between the team and the organization or higher management. The leader has certain responsibilities that are assigned to the leadership role, and if these tasks are not carried out correctly the team will be influenced in a negative way (Hellriegel et al., 2004). Thamhain (2004) also suggests that some of, if not all, the previous

mentioned influencing internal factors are all controlled by leadership, which makes the overall leadership or management a truly essential component of the project team.

One task that is important for a Project Manager is, mentioned by Frame (1987), to create the team feeling within the team. One way of doing that is to have regular meetings with the team members, and using them effectively. When used effectively, the members of the team will get important information and also earn a better sense of identification within the team. If not used effectively, the meetings will be looked upon as time killers and interrupters of useful work. Another method is to engage quality circles where the team can meet to discuss ways on how to improve the performance of their work. Through these meetings problems can be identified and solutions can be discussed. This way people who actually work in the field can see how things can be done even better and it also creates a certain commitment and team feeling amongst the team members. A third method could be to engaging task forces that meet to together solve a certain problem that have arisen. This method could lead to a better understanding amongst the team members of what is required and needed to accomplish the project goals as well as creating a better sense of being an important part of the team (Frame, 1987).

2.6.2 Rules of Team-building

Dinsmore (1993) described ten principles of team-building, where each principle helps to create the spirit that make people work together cooperatively to meet goals:

1) *Identify what drives is vital in the team:* What is the driving force that makes your work necessary? Is it an external force or is it internal like organizational demands? Or is it the needs of the group itself?
2) *Get your own act together:* Are you a bright and shining example of team work? Can it shine even brighter? Do refinement on interpersonal skills and show teamwork talents.
3) *Understand the game:* Each game in a business is different and rules need to be reconsidered. Do you know the business game and how much you can bend the rules?
4) *Evaluate the competition.*
5) *Pick your players and adjust the team:* Choose qualified players who know the basics and teach them those skills that they do not have, but are necessary to achieve the organizational project goal.

6) *Identify and develop inner group leaders*: If there is a need to develop a team with full capacity, then delegate, mentor and coach them in a daily habit.
7) *Get the team in shape* with proper training.
8) *Motivate the players* with work challenges such as successful task completion, a possibility to lead, and an opportunity to learn new things.
9) *Develop plans.*
10) *Control, evaluate and improve* (Dinsmore 1993).

Team-building Stages

Hellriegel (1998), Tuckman (1977) and Dinsmore (1993) consider a basic five stage of team-building. Those stages are forming, storming, norming, performing and adjourning, and it shows how teams develop over time. The competences in a team process that members bring to the team could speed up or change its evolution.

1) ***Forming:*** At this stage, different members will focus on defining or understanding the goals, and follow developing procedures for performing the tasks. Team development in this stage involves getting acquainted and to understand leadership and the other members' roles. They also develop an overall vision of the team's purpose and clarify the object values and goals. The Project Manager's role is to direct this effort and to encourage group members to reach consensus and to achieve a feeling of commitment.
2) ***Storming:*** At this stage, the Project Manager's broaden the focus to include both accomplishing tasks and building relationships. They also emphasizes on interpersonal interactions as active listening, assertiveness, conflict management, flexibility and creative thinking. The group completes the tasks with a sense of understanding, clarification and belonging. Some of the members may withdraw or try to isolate themselves from the emotional tension. If the team cannot effectively evolve, then it may not turn to third stage. Here the Project Manager relies not only on actual authority, but also on leadership skills, such as encouragement.
3) ***Norming:*** At this stage, the team-building process is more relationship-based than the task-based, and recognition and admiration are important for the group members. Here, cooperation and a sense of shared responsibility are developed among the team members. The Project Manager relies on communication, feedback, affirmation, humor and networking to motivate the team.
4) ***Performing*****:** At this stage, the team starts to operate very much by its own, and shows how effectively it can achieve results. The team members have learned when they

should work independently and when to help each other. The role of individual members are accepted and understood. The Project Manager's role is to serve as a mentor or coach and to take a long-range view of future needs.

5) ***Adjourning:*** At this stage, the termination of work behaviors and disagreement from social behavior occurs. Team members continue to motivate by the feeling of achievement and self-actualization. **T**he Project Manager focuses on evaluation, reviewing and closure.

2.6.3 Team Motivation

Even though organizing the team is a great part of the Project Manager's role, this work has, according to Gray et al. (1990), little to none effect if the Project Manager fails to motivate the team members into performing as effective and efficient as possible. Motivation is important because people need not only want to join the team, but also stay in the team until the project is finished. Motivation is also needed for the team members to perform the tasks they are meant to do in a respectable way. Furthermore, the team members have to not only be dependable, but actually contribute with new and innovative ideas and solutions (Gray and Smeltzer 1990).

Grazier (2006) has listed six factors that to some extent may influence the team motivation. The first factor that is mentioned is the purpose. Unless the team members feel that they have a purpose in the project team, the motivation to continue working inside of the team may disappear. If the mission is clear and aligns with the members' personal goals it is much easier for the team member to find its individual place in the united team hence be motivated to continue the work.

Another factor is challenge, the human being performs better and is easier motivated when the work is stimulating and challenging. However, if the work is presented as too difficult for the person to fulfill, it may have the opposite effect on the team motivation, causing the team members to give up before they have even started. The same would happen if the challenge is perceived as too easy, which would cause the team members to put less effort in doing a good job because it is so easy to accomplish a decent result (Grazier 2006).

A third factor is personal relationships within the team. If the team members like each other and can create some sort of friendship with each other, it is easier for them to wanting to maintain that bond by performing as good as they can regarding to the project. A good relationship amongst the team members will lead to open and straightforward communication,

giving positive and relevant feedback to the others contributions, and mutual support all through the project. Nevertheless, there exists people in a group that does not like each other, and often the reason for this is because they do not understand each other's way of thinking or acting well enough. The solution to this is then to make the team member's understand better the behavior of the other people in the team (Grazier, 2006).

The fourth factor mentioned by Grazier (2006) is responsibility. People in teams are more motivated when they are given some sort of responsibility because this leads to a stronger feeling of ownership to the project. On the other hand, if the responsibility comes with a too huge amount of consequences if a mistake is made, the responsibility can be discouraging. It is important to find a balance between the amount of responsibility given and consequences if failure occurs.

Fifthly, there has to be some sort of personal and group growth in the team. When the team members feel like the project is moving forward and that they gain new knowledge, motivation tends to stay high. The feeling of growth will boost the individual self-esteem. Both team members and the Project Manager should discover new opportunities for enhancing the knowledge and skill base of the team members by asking them what they expect to gain and learn from the teamwork and actively looking for chances to achieve this (Grazier, 2006).

Lastly, but not least, comes the factor of leadership. The leadership is, assumed according to all the previous mentioned authors as well as other not-mentioned authors, the most important factor for everything that has to do with a team. Without an effective, good and motivating leadership, the project can kiss its success goodbye. Anyhow, according to Grazier (2006), the best leaders find ways for team members to motivate themselves, while they can be of help with motivational problems when it is necessary. A great leader understands the importance of all the factors above, and also its own responsibility in it all.

2.7 Project Management Success Factors

Different research on project success shows that it is difficult to create a universal checklist of project success criteria which is suitable for all type of projects. According to Waterridge (1998) will success criteria in diverse projects differ from project to project depending on a number of issues, for example on size, uniqueness and complexity (Wateridge 1998). Pinto and Covin (1989) commented that, to explain the cause of project success, many project management researchers have generated sets of success factors which are assumed to account

for much of the variance in project performance. Morris & Hough (1987) suggest that projects are influenced by seven forces which help to construct successful project, such as:

1) What the project will accomplish and an approach to design activity and technology implementation to achieve this.
2) An attitude that reflect the importance attached to the project and deliver support to all through the management level.
3) Employees and their management, project leadership and team work.
4) A system related to planning, reporting and control.
5) An external context of the project that encompasses project sponsorship.
6) External influences such as political, social, technical, legal, environmental and economic.
7) Organizational roles, responsibilities and contractual relationship.

They developed a comprehensive framework depicting the elements of project success, such as attitude, project definition, contract strategy schedule, external factors, financing, the organization's communication as well as resource management and human qualities control. In their book it was addressed that the concept of success is both subjective and objective, and that success varies across the project as well as the product life cycle where various stakeholders are involved (Morris and Hough 1987).

2.7.1 Critical Project Success Factors

In between 1987-1990, Pinto published a number of articles regarding critical success factor in projects. Pinto and Covin (1989) had 408 responses to an extensive questionnaire which discovered managerial insights about project success features. Two types of projects (construction and R&D) was chosen, where the factors considered crucial to successful project executions varied over the life cycles of projects. According to their research they prepared a table about project critical success factor and identified 14 factors. Table 2-2 elaborates a project's critical success factors.

Success Factors:

1) **Mission of the projects:** Initial clarity of goals and general direction.
2) **Support from top management:** Willingness of top management to provide the necessary resources and authority for project success.
3) **Project schedule/plan:** A detailed specification of the individual action process for project implementation.
4) **Client consultation:** Communication, consultation and active listening to all parties of concern.
5) **Personnel/team members:** Selection, recruitment and training of the necessary personnel for the project team.
6) **Technical tasks:** Availability of the required technology, tools and expertise to accomplish the specific technical action steps.
7) **Client acceptance:** The act of selling the final project to its ultimate intended users.
8) **Monitoring & feedback:** Timely provision of comprehensive control information at each stage in the implementation process.
9) **Communication:** The provision of an appropriate network and necessary data to all key actors in the project implementation.
10) **Trouble shooting:** The capability to handle unexpected crises and deviations from plan.
11) **Characteristics of the project leader:** Competence of the project leader such as administratively, interpersonally and technical knowledge, as well as the scale of authority available to perform his/her duties.
12) **Power and policies:** The degree of political activity within the organization and the perception of the project as furthering an organizational member's self-interests.
13) **Environmental effects:** The likelihood of external organizational or environmental factors impacting on the operation of the project team either positively or negatively.
14) **Urgency:** The perception of the project or the need to implement the project as soon as possible.

Table 2-2 – Project Critical Success Factors (from Pinto and Covin, 1989, p. 52)

The first ten of the factors in table 2-2 are within the control of the project team, and the last four factors also have a significant impact on ultimate project success or failure, but might not

be within the control of the project team. As an example may external events (environmental effects) have important allegation for the project operation (Pinto and Covin 1989).

According to Belassi and Tukel (1996) most of the factors in table 2-2 are related to the Project Manager and to the organization where the projects belongs to, but it seems to ignore project charecteristics and the charecteristics of team members. It was also mentioned as an example whether condition can be considered as a critical factor for the construction projects to completion on time. On the other hand, product development projects, the project life span and its costs are critical factor for the immediate release of a product to fill the market demand and gain business profit. These two factors are neither controlled by the Project Manager nor by the business organization. However, both of them are critical for a successful accomplishment of the project (Bellasi and Tukel, 1996).

The Hyväri (2006) research addresses different organizational conditions, and the success of projects includes 1) the organizational context in project management, 2) critical success factors in project management, and 3) dependencies between organizational context and success factors. The purpose of the study of Hyväri was to evaluate the critical success factors in project management and to find out their relationships with organizational background variables, and critical success factors are prioritized with different success factors in different project phases (Hyväri 2006).

Bellasi and Tukel (1996) considered four areas; 1) factors related to the project, 2) factors related to the Project Manager and the team members, 3) factors related to the organization and 4) factors related to the external environment. Their frame work, described in figure 2-7, helps the Project Manager to understand the interrelationship between the factors in different groups and also in helping the Project Manager to evaluate and monitor the project's progress more accurately. They mentioned that a combination of several factors from four different factor groups might lead the project to failure or success (Bellasi & Tukel, 1996).

Their frame work, described in figure 2-7, has considered four major areas, but the researchers in this study have considered only three of these. The external factors group was chosen not to be considered. This is because the researchers has analyzed that the external factor does not relate much to this exact study.

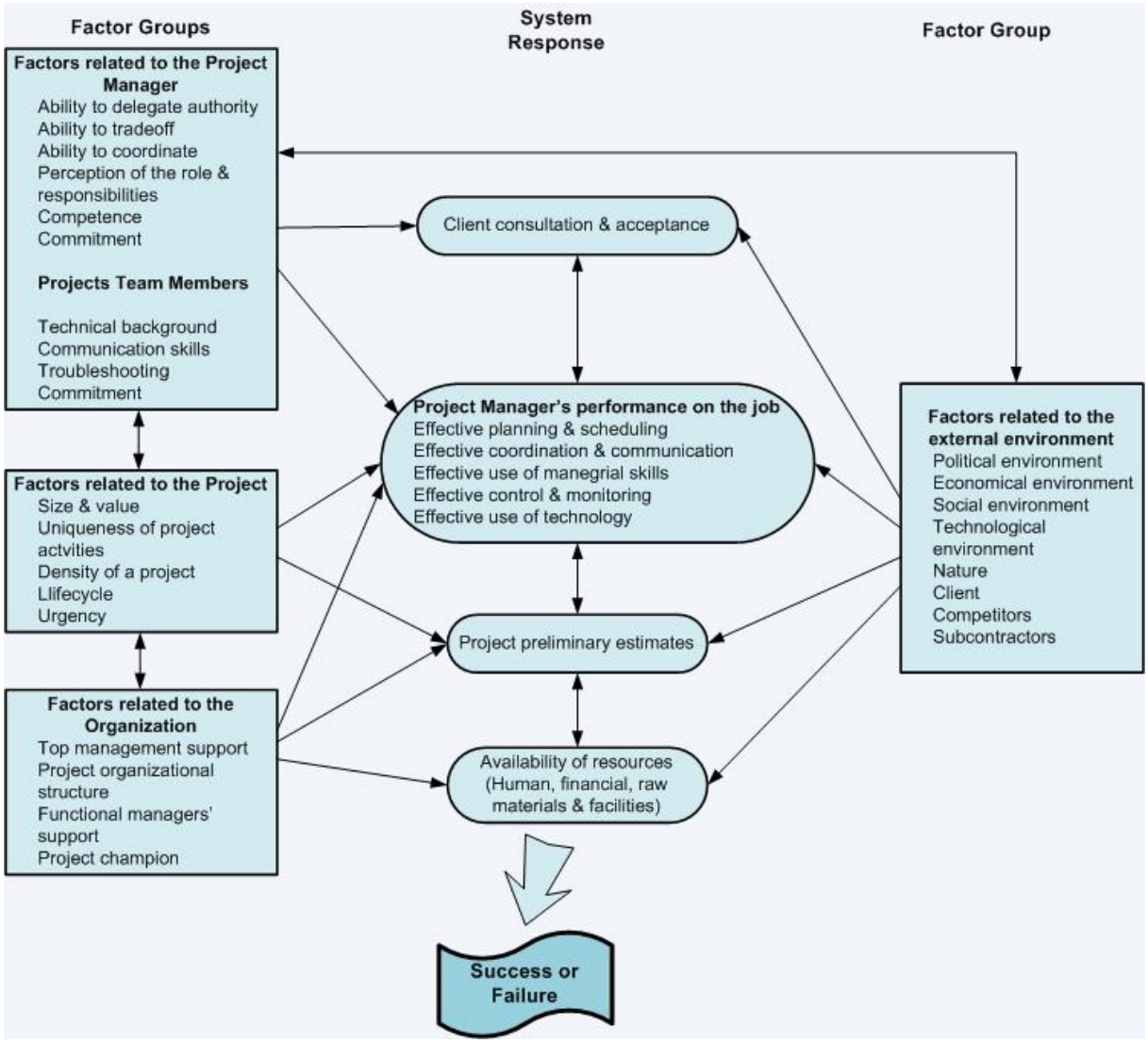

Figure 2-7 – Different groups of factors related to the project success or failure (from Bellasi & Tukel, 1996).

Factors Related to the Project

According to figure 2-7, there are five characteristics related to the project; size and the value of the project, the uniqueness of the project activities, density of the project network, project lifecycle and the urgency of the project outcome. In 1998, Tukel also mentioned in another one of his article that, if the project life span is being used as a measure to evaluate project performance, then the size of a project must be overlooked. When not only the number of activities is considered, but also the familiarity of the organization with the type of project, it raises an issue (Tukel and Rom 1998). Hyväri (2006) also considered all of those five characteristics, and her findings add more objectives like clear project goals/objectives, end-user commitment and the adequate funds/resources that might have a significant impact to the project outcome.

The performance of the Project Manager on his task could be heavily influenced by the project activity uniqueness. If a project has more standard activities, it is easier for the Project Manager to plan, schedule as well as to monitor the projects.

The project density is defined as the ratio of the total numbers of precedence relationship to the total number of activities. Some of the objects are affected by the density which is the allocation of the project resources (man-hours is the most effective project resource). The project performance criteria do not, in many cases, meet the urgency of a project. If it considers the projects which start after a natural disaster, there is not enough time to allocate for planning and scheduling the projects. Most likely will the budget in projects without proper planning exceed and may lead the project outcome to failure (Belassi and Tukel 1996).

Factors Related to the Project Manager

According to Bellasi and Tukel (1996), were the factors related to the skills and the characteristics of the Project Manager and team members proposed for a successful completion of the project. Pinto and Slevin (1988) mentioned that, although the Project Manager's commitment and competence are the most critical during the planning and termination stages, the team members' competences is also a critical factor during the project implementation phase (Pinto and Slevin 1988). Hyväri (2006) mentioned that, the Project Managers with longer work experience has a stronger commitment with the end-user. The ability of task coordination and effective leadership, effective monitoring and giving feedback to the project team members as well as trusting these members is also potential issues (Hyväri 2006).

Factors Related to Organization

A complete support from the organization to the projects helps to facilitate and implement strategies for the projects to be successful. Bellasi & Tukel (1996) mentioned that the top management support, the project organizational structure, the functional manager support and the project champion factors are mostly related to the organization. Mostly top management controls a Project Manager's access to resources. These are then supervised by the functional managers. Hyvari (2006) also considered top management support, clear organization/job description and project organization structure as important organizational factors. The projects with matrix organization and projects with pure project forms to acquire necessary resources or resource allocation to accomplish the project could be difficult. It might require negotiation skills and positional power to solve problems in matrix or projectized organizational projects.

Table 2-3 shows the success factors related to project management and the factors are arranged with a priority list (1-9) according to the research findings of Hyväri (2006, p. 36).

The project	The project team members	The Project Manager
1) Clear goals /objectives 2) End user commitment 3) Adequeate funds/resources 4) Realistic schedule 5) Having a clear boundray 6) Dependencies between activities of the project network 7) Project life cycle 8) Urgency	1) Committment 2) Communication 3) Technical background 4) Effective monitoring & giving feedback 5) Trouble shooting 6) Others scope known by members	1) Commitment 2) Ability to coordinate 3) Effective leadership 4) Competence 5) Situational management 6) Ability to delegate authority 7) Management of changes 8) Having relevant past experience 9) Effective conflict resolution

Table 2-3 – Success factors in project management (from Hyväri, 2006, p. 36)

Hyväri (2006) also considered the factors related to the organization and the factors related to the environment like Bellasi & Tukel (1996). The factors such as political, economic, social, and technical as well as factors related to the nature affect the project performance either positively or negatively. Bellasi & Tukel (1996) also considered the clients from outside/inside of the organization, competitors and subcontractors in an external environment. Here the researcher highlighted only three factors related to the project management, and the reasons are described earlier.

2.8 Summary of the Literature Review

In this part a summary of the reviewed concepts covered in the literature review is shown. The most important concepts were found to be project management, the responsibilities and competences of an effective Project Manager as well as different management tools and techniques, team management and project leadership as well as various success factors covering the entire field of project management. These concepts are also covered in figure 2-8.

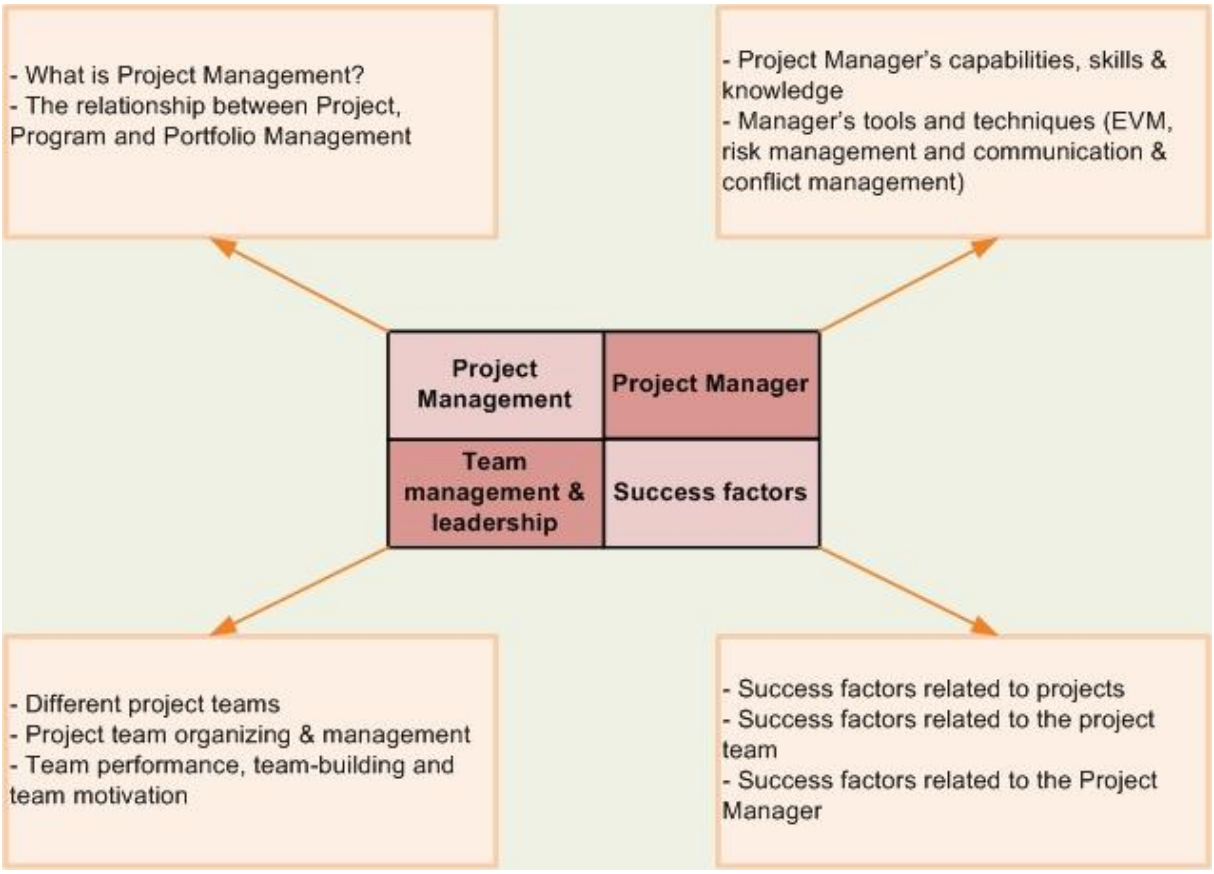

Figure 2-8 – Theoretical concepts used by the researchers

3 RESEARCH METHODOLOGY

3.1 Scope of the Study and the Research Goals

As a reminder, the purpose of the study to find out the value of effective project management, Project Manager's characteristics and competences, team formulation and their leadership consequence on organizational projects. Three research questions were formulated in order to achieve the results for this study:

1. What responsibilities and competence should the Project Manager have in order to achieve an operative and successful project execution?
2. To what extent can team management and project leadership styles affect the outcome of the projects in a portfolio?
3. How do success factors have the influence on the potential project outcome?

Figure 3-1 – A conceptual framework of the research study

The conceptual framework from figure 3-1 has been built by the researchers to help finding solutions to the research questions as well as to discover how the organizational project management can be effective through Project Manager's competences on team organizing and leadership, which can help to achieve efficiency in projects. It also considers what project management success factors are related to the potential project outcome.

In order to identify the project management efficiency and effectiveness to improve project control following steps are proposed to be followed:

- Discover the current best qualifications and activities in being a good Project Manager, according to the Project management theory and through the survey, interview result analysis to organize and lead the project team.
- Analyzing how real Project Managers actually works and what are the major success factors they consider for the effective project management outcome in a project.
- Analyzing how project control can be improved by the Project Manager.

3.2 Research Tools

This research has employed different research tools in order to collect as exact and important data as possible. In this regard the research will employ structured interviews as well as a survey focusing on four different themes that all relates to the research questions. These two tools were very important to the research because they help the research with getting a deeper, broader understanding of how the organizations relate to the field of project management as well as giving a more general idea about the topic, both from certified Project Managers and people that have joined in their respective teams.

The semi-structured interview was directed in order to help the researchers get important quality data as well as discovering how much the respective Project Managers actually know about being what theory refers to as great Project Managers. The survey helped the research in either confirming the knowledge that was gained from the interviews or in showing differentiations between the Project Manager's and the team members' perception of project management. The survey was also made out of the interview questions, only simpler and more understandable, since the people responding to the survey cannot ask questions back to things that are unclear. It will give supplementing data to what the researchers through the interviews have found to be the similarities and differences between the three organizations.

3.2.1 Making Use of the Research Tools

When making use of the research tools, the process was made as flexible as possible in order to make the progress as efficient as possible. The top level management of the organizations often had very busy schedules and might not respond to the survey as the researchers hope

for. However, the data that was collected, analyzed and used to its fullest. Both the interviews and the survey were managed by both of the researchers to that extent that it is practical.

Data was collected over a period of two months. First the researchers were seeking for relevant persons to perform the qualitative interviews with within a period of one month. Once the researchers had found the qualified Project Managers, the next step was to find the time for when the interviews could be held. The interview questions were formed in the first month together with finding the correct people to talk to. The survey was also formed in the beginning of the two months of data collection, because relevant people were found through talking with the already existing interview objects.

3.3 Research Method

This research employs a qualitative study with the use of a survey and interviews collected from Project Managers and other employees. The qualitative study is best suited to collect the data needed for this report since it will give the researchers primary information straight from the organizations itself. By doing it this way the researchers is able to interact with the staff and management in the organizations which makes it possible to understand the different perspectives of the research by gaining direct knowledge.

For achieving deep understanding of the problems related to the research subjects, particularly the Project Manager's skills and competences to develop the effective team for project procurement, the qualitative approach was chosen for the research. The reason for this was because of flexibility, an opportunity to reflect upon and focus on the subject's reality as well as comprehensiveness.

According to Yin (2013), analysis of multiple cases allows replication of logic and increases external validity of the findings. In this research, three interconnected business units that are focused upon a similar goal were studied. The business units (further referred to as BU1, BU2 and BU3) are rather independent and separate, so in the given study they were considered as three different cases. Documents revised showed various content and thought of different Project Managers for different business units. For instance does, besides the common strategy, mission and vision, management processes also differ in the three business units. The research design was developed according to Yin (2013). Six stages were identified to carry out the case study, as illustrated in figure 3-2.

Figure 3-2 – The flow of the case study research

Step 1: **Plan** – In the planning stage, a foundation for the case study was provided. The advantages and limitation of the method were considered, and an application of the research study were described and explored.

Step 2**: Design –** In the design stage, the case study questions were specified. Yin (2013) recommended developing theoretical proposals for the study. However, for the given research being rather investigative, no plans were suggested before the data gathering. Instead, the researchers specified what should be explored, the purpose of exploration, and the expected outcomes of the research, described in section 3.1, figure 3-1. The literature on the subject was reviewed in order to decide what kinds of data were necessary to collect. It was decided by the researchers to include interviews and survey data to prepare this report.

Step 3**: Prepare –** In the preparation stage, key information sources and participants were identified to give information for the case companies' organizational projects and their management. Further, a set of preliminary questions for the interviews was developed and reviewed by the research supervisor. Later on, the researchers modified the interview and survey questions according to their demand. The potential interviewees were requested to take part in the research, and the interviews were scheduled.

Step 4: **Collect –** In this stage the researchers made the data was collected through interviews and a survey. For more detailed information on the data collection process, see section 3.4.

Step 5: **Analysis and presentation of data –** The collected data was analyzed in order to do an evaluation. To do this, simple data analysis tools, like Microsoft Excel and Microsoft Word, was used. The interviews were transcribed, and essential words and expressions within the different themes counted. The surveys were analyzed using percentages separated into the different important subjects. The three business units were also analyzed by comparing them towards each other. The collected data was then analyzed and compared to the secondary data from theory in order to assess a reasonable discussion for answering the research questions.

Afterwards, the analyzed data from the research were used to find a conclusion and a recommendation for the three organizations on how to be more efficient during their next projects.

Step 6: **Share –** The researchers will send a copy of the report to the people they have interviewed. If the organization wishes to have a presentation of the data, this will be done about two-three weeks before delivery of the report. The given report was accomplished and prepared for publication. The study findings might be, if desired, presented to the case company and to concerned persons from the Norwegian University of Science and Technology (NTNU) in Trondheim.

3.4 Data Collection

In this research, data were collected from both team members of earlier projects and Project Managers of these projects from the three considered business units, and not from external staff that knows little about project management, but more about the project results. This was because the research was supposed to compare and discover variances in how project management is perceived amongst different Project Managers, their team members and regarding to which organization they work for. This helped to collect more reliable and accurate data. The use of multiple data sources mitigates the probable problem of construct validity (Yin 2013). Four types of data sources were used in this research project:

1) **Documentation:** Individual document sources such as organizational charts, organizational culture survey results, company project management methodology, and the company general management methodology were accessed via the organizational website of the companies (Helsebygg Midt-Norge 2015) (St. Olavs driftsservice 2015, St. Olavs Hospital 2015). Some information was also accessed through the book "Prosjektet" (Hellerud 2011).
2) **Direct observation:** Updated news published on the internet as well as press releases was viewed to understand clearly the strategic visions and goals of the three business units. The researchers also kept their eyes on organizational changes, and new directives and initiatives related to project management.
3) **Interviews:** The business unit's potential stakeholders of project management were identified and the subject area was discussed with them.

4) **Survey:** The data collected via survey questionnaire were used descriptively, and no relevant statistically significant correlations were found. The reason for this might be the small sum of survey respondents.

3.4.1 Interview

The researchers issued the interview objects by finding the Project Managers in the three organizations that could help the researchers with finding a result to the research questions. Yin (2013) recommends using unstructured or semi-structured interviews in case studies, that must be more "guided conversations rather than structured queries" (Yin, 2013, p. 106). The questions in such type of interviews will be better suited to the interviewees and make it easier to identify the important areas that require deeper inquiry.

In this research a sample list of Project Managers were selected for a qualitative interview. All together six face-to-face interviews were conducted, and their responsible project departments are showed in figure 4-1, section 4. There were three Project Managers from St. Olav's Hospital (BU1), two Project Managers from Helsebygg (BU2) and one Project Manager from the Faculty of Medicine at NTNU (BU3). All the interviews were audio taped and took approximately 60 – 90 minutes. All the interviews were conducted on confidential basis; no names or personal details are mentioned in this report.

In this research case study semi-structured interviews were conducted between January and March 2015. A semi-structured interview guide was developed before the interviews, which can be seen in Appendix A.

Some general questions were asked in the beginning to smooth the conversations. Some of the questions from the list were not applicable for particular interviews, hence they were skipped; vice versa, some issues popped up during the interviews and were discussed in a more detailed matter. This technique validated the use of a more flexible approach and helped understanding the advantage of the case study for collecting deeper data. In order to reduce preconceptions about gender, three out of six interview objects were females while three interview objects were males. The survey, on the other hand, does not distinguish between male and female, only between organization and level of experience.

List of question included the following area:

1) The organizational environment and general projects
2) The Project Manager's competences

3) The project team organizing and leadership
4) The project management success factors

Some interview objects preferred to speak in the Norwegian language, which only one of the researchers speaks fluently. To not waste precious time, only this researcher will participate in the Norwegian interviews, while the other one, who does not speak Norwegian, will do other useful and valuable work for the report. Three interviews were held in English and the other three in Norwegian. Later on all the interviews were transcribed in English and the data were analyzed by the researchers.

3.4.2 Survey

The main purpose of the survey was to enhance data collection from the Project Managers, resource owners and project sponsors who works with different project related department within BU1, BU2 and BU3, which can share their valuable experience. The survey questions were grouped in four areas and can be found in the Appendix B.

The respondents for the survey were selected by the interview objects, who passed the survey forward to those people they found most qualified to answer it. Some of the respondents were also selected by the researchers according to the organizational map of the three respective business units. These respondents were chosen because it seems as one of the best ways to gain quality information directly from experienced people and to collect the most accurate and relevant data as possible to support the theory for the research.

The survey was deployed for one month period from 12th of March to 11th of April 2015. The respondents received the invitation through e-mail, and two reminders were sent within the period to increase the response rate. The data collected from the survey response was analyzed by the two researchers together to make a valuable discussion and critique of the empirical data.

In the survey, the researchers asked more specifically about success criteria regarding each of the three elements; the projects, the project team members, and the Project Manager to find the answer of project management success factors. Table 3-1 describes the various factors which are related to the project management success.

The project	The project team members	The Project Manager
1) Uniqueness of project activities 2) Commitment to the end user 3) Clear defined goal /objectives 4) Dependencies between activities of the project network 5) Availability of funds and resources 6) Project life cycle 7) Project integration & procurement management	1) Technical background 2) Communication skills 3) Earlier, similar work experience 4) Effective monitoring & giving feedback 5) Being motivated 6) Being committed	1) Effective leadership 2) Having earlier, similar work experience 3) Frequent change in management team 4) Perception of the management role and responsibilities 5) Ability to co-ordinate different task 6) Competence 7) Commitment 8) Trust 9) Ability to delegate

Table 3-1 – Factors considered for the project management success

3.5 Data Analysis

There is no standardized procedure to analyze qualitative data due to their diverse nature (Mark, Philip et al. 2009). Still, usually three processes are applied: *summarizing*, *categorization*, and *structuring* of meanings. Typically, the quantitative data helped for producing expressive statistics.

The amount of the data which were collected through the survey and interview might be considered too small for making solid statistical generalizations. This report prepared with five interview subjects and seven survey respondents. A small population size makes the statistical test insensitive. Data display and data analysis was chosen as an analytical procedure. In 2009, Mark, Philip et al. (p. 450, 503), three steps were identified: data reduction (with the purpose to transform and reduce the data), data display, and drawing and verifying the conclusions.

At the end of the data reduction step, the combined data from the company documentation, interview transcripts and descriptive survey data were summarized, partly coded and divided into categories following the conceptual framework of the study (figure 3-1).

3.6 Assumptions and Limitations

There are various assumptions that will be made during the research progress. It is assumed that the selected sample of people represent the characteristic of the actual organizational Project Managers and team members. The selected people are assumed to be giving data that can be acknowledged by all Project Managers and team members in the three business units BU1, BU2, and BU3 organizations. At the same time it is expected that the people chosen to response the survey will fill them out in time for the researchers to analyze the data. It is also assumed that the sample of people chosen for both the interview and for filling out the survey is to answer truthfully to the questions asked.

To make sure that the participants would answer honestly, their anonymity and confidentiality is preserved, and they know that they are volunteers that could withdraw from answering the survey or participate in the interview at any time, with no questions asked. The interview objects were also allowed to speak in their native language if they wanted to, instead of English. A pilot survey was also conducted for the researchers to know that the questions asked would give significant information to answer the research questions.

There were a number of limitations that have to be counted for. Finding enough relevant people to talk to within the boundaries of time that is set for this task was one of them. Sometimes people did not have sufficient time or there were other reasons for them not being able or willing to join the researchers for an interview session. It could also be that they were unavailable, and the researchers could have a hard time in communicating with them.

At the same time there were limitations in finding enough relevant people to respond the survey in time. The reason for this could be that the people that were asked to respond to the survey felt that they did not have the time to fill out the survey questions. It could also be that they felt they had little or no relation to the problem statement, and they were therefore not interested in answering or felt that their responses were inadequate for the thesis.

Another limitation was the boundaries of time to fulfil this report to its necessary extent. The report was supposed to be written in 21 weeks, and in this time the researchers had to make a decision of what they wanted to study, what kind of research questions and problem statement

they would have for their thesis, find the relevant people to talk to, conduct a literature review and find the most useful for this report, conduct the survey and interviews with the relevant people and write the report with introduction, literature review, methodology, empirical data, discussion and analysis as well as finding a conclusion to the research questions. The project is huge, and several more aspects could have been counted for within the thesis, but the earlier mentioned concepts were the one chosen because of the constraint of time.

The information received from the conducted survey and interviews are only as good as the asked questions, since the questions may not have covered everything that it should have covered, and there might have been sub-items that the researchers have not thought of pre-hand. Even though a pilot survey was conducted, this does not by all means mean that the ones receiving the pilot survey were able to find items that were missing and that could have been thought of. It could also be that the receivers of the pilot survey did not have sufficient time to go through it thoroughly, and therefore only replied to the researchers that it looked okay without really getting that much into the content of the survey.

Another limitation is that the responses received, both from the survey and the interviews, may not cover the entire aspect of the different business units. For example did only one person from the Faculty of Medicine answer the survey, and only one joined in on an interview. The organization consists of 1200 employees, and two respondents are not merely enough to cover the entire business unit's view on the different subjects, with only 0.2 % answering rate from the organization. The researchers can only assume that these two respondents can answer for the whole organization's opinion and understanding, even though this is very unlikely. This also counts for St. Olav's Hospital, with only four respondents for the survey, and three interview objects, which makes a sample of less than 0.1 % of the entire organization. The responses from Helsebygg will then give more correct data and information, since there were two respondents in the survey and two objects for interviews. The organization of Helsebygg only consists of 17 employees, which gives an answering rate of 23.5 % of the organization.

4 EMPIRICAL DATA

The empirical data following in this part of the study is based on interviews held with people from different parts of the three business units (BU) St. Olav's Hospital, which will be referred to as BU1, Helsebygg, which will be referred to as BU2, and the Faculty of Medicine at NTNU, which will be referred to as BU3. It is also based on a survey questionnaire sent out to several people from the three BU's. The interview included data from responses to 20 questions with altogether 14 sub-questions, while the survey contained responses to 18 questions including about 100 sub-items. The questions were parted into four main themes; general projects and organization, team organizing and management, Project Manager's characteristics and style of leadership and success factors for an efficient and effective project performance. The people asked to answer the survey were either Project Managers or people that had been involved in a project team. The questions were formulated so that the questions could be answered in a general way, where every project they had been involved in or managing regarding the new hospital would be considered.

In order to test the validity of the survey it was firstly sent out to the six interview objects so that they could check how the survey looked, and help us find the relevant people needed for answering the survey. After this an e-mail was sent out from the researchers to a number of overall eighteen people where twelve of them were from St. Olav's, four people from Helsebygg and two people from the Faculty of Medicine. This e-mail included an invite to participate in the survey about their project management efficiency containing a link to the survey.

There was also sent out a request to them on helping the researchers passing the survey forward to other relevant people. Seven responses were received from the three different BU's. The level of experience in projects were also quite different, two respondents had 4-8 years of experience, three respondents had 9-12 years, one had 13-16 years and one had more than 17 years of experience. This can also be seen in figure 4-1.

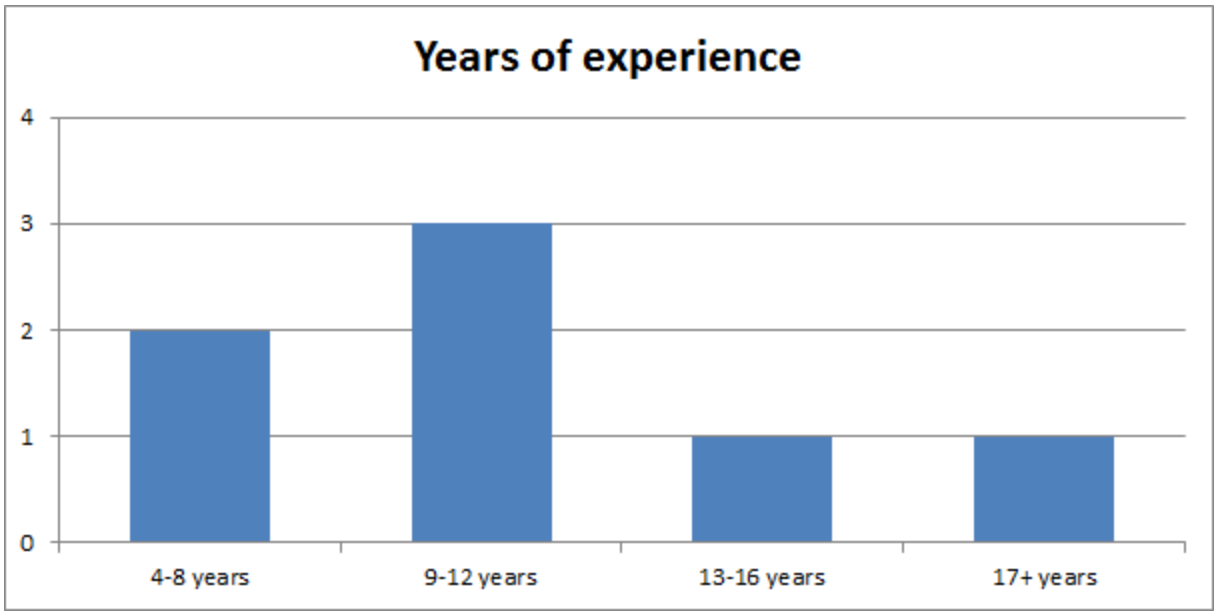

Figure 4-1 – The survey participants Project Manager's level of experience in Projects Management

Table 4-1 shows the information on where the responds came from and which role they have in a team.

Survey	BU1, St. Olav's	BU2, Helsebygg	BU3, the Faculty of Medicine
Number of responses	4	2	1
Project Manager	4	2	0
Team member	0	0	1

Table 4-1 – Survey respondents and roles

All questions had to be answered in order for the survey to be valid for this study. The researchers had found that the survey had been opened and closed without complete response a number of eleven times in addition to the seven times the survey had complete responses. If these incomplete responses had counted and could be investigated further, the research may have been more valid, and the researchers would have more information than they otherwise had at this point.

The results of the survey were statistically analysed against the interviews for parallels and reliability, with an aim for getting insights from a number of relevant factors. Even though the final sample size of the survey were very small, it could still be compared towards the answers from the more qualitative interviews to give them a stronger foundation for this

research and to help the researchers find a possible solution to the problem statement and research questions.

4.1 Survey and Interview Findings

The findings from the quantitative survey and the relevant factors from the qualitative interviews are further presented throughout this next chapter with a focus on the four essential subjects; organization and general projects, team organizing and management, Project Manager's characteristics and style of leadership and success factors for an efficient and effective project performance. The findings are presented in a sequential order.

4.1.1 Organizational Environment

The three BU's have somewhat different values and ways of how they run their business. The most common similarities between them are that they all are placed in the same area in Øya in Trondheim and that they all are utilizing services for the health care sector. The organizational project structure of the entire project "the new university hospital" was received from one of the BU's, the organizational project structure can be seen in figure 4-2.

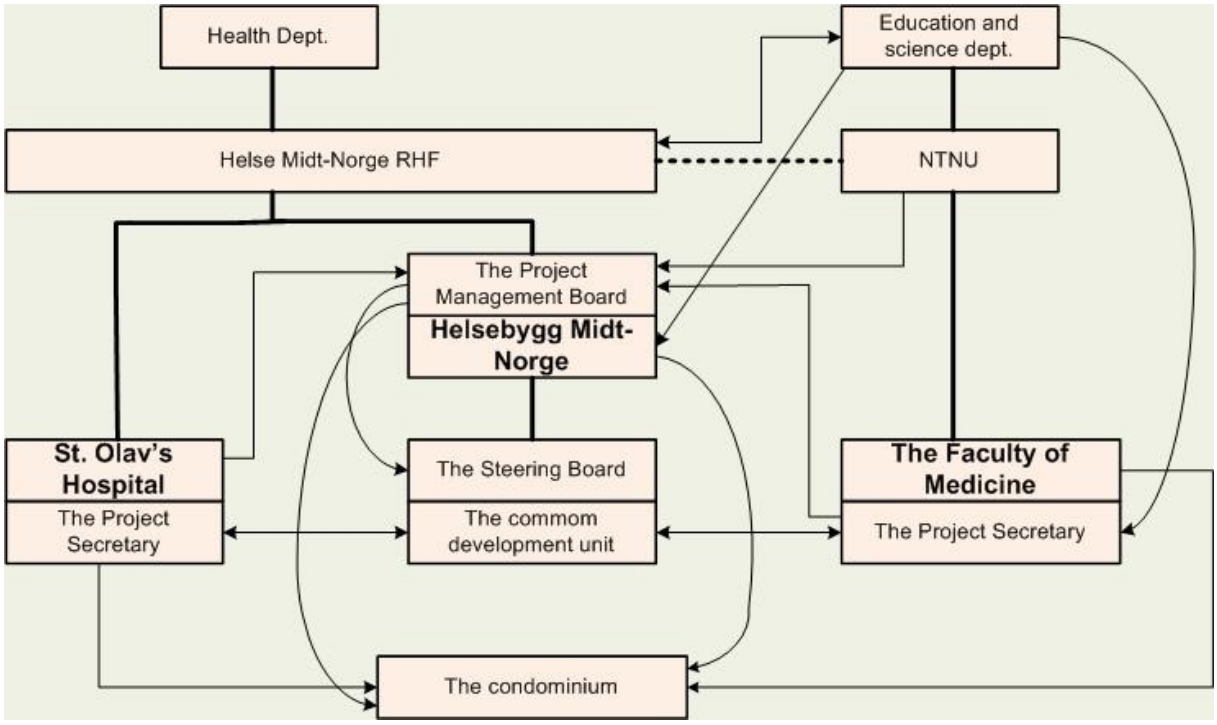

Figure 4-2 – Organizational structure and the cooperation between the three business units (St. Olav's Hospital, Helsebygg and the Faculty of Medicine at NTNU)

The three BU's organizational environment is further presented in table 4-2.

	BU1	BU2	BU3
Service type	Providers of specialist health care services	Responsible for engineering, construction and completion of "the new university hospital"	An educational and research institute within medicine and health
Number of employees	Employees 9000+	Employees ca. 17	Employees ca. 1200

Table 4-2 – Organizational environment of the case study

The researchers have made their own organizational map for the BU's so that it is easier to present the data coming from the people that have been joining a qualitative interview. The ones attending a qualitative interview have shown with bold text and it is in figure 4-3.

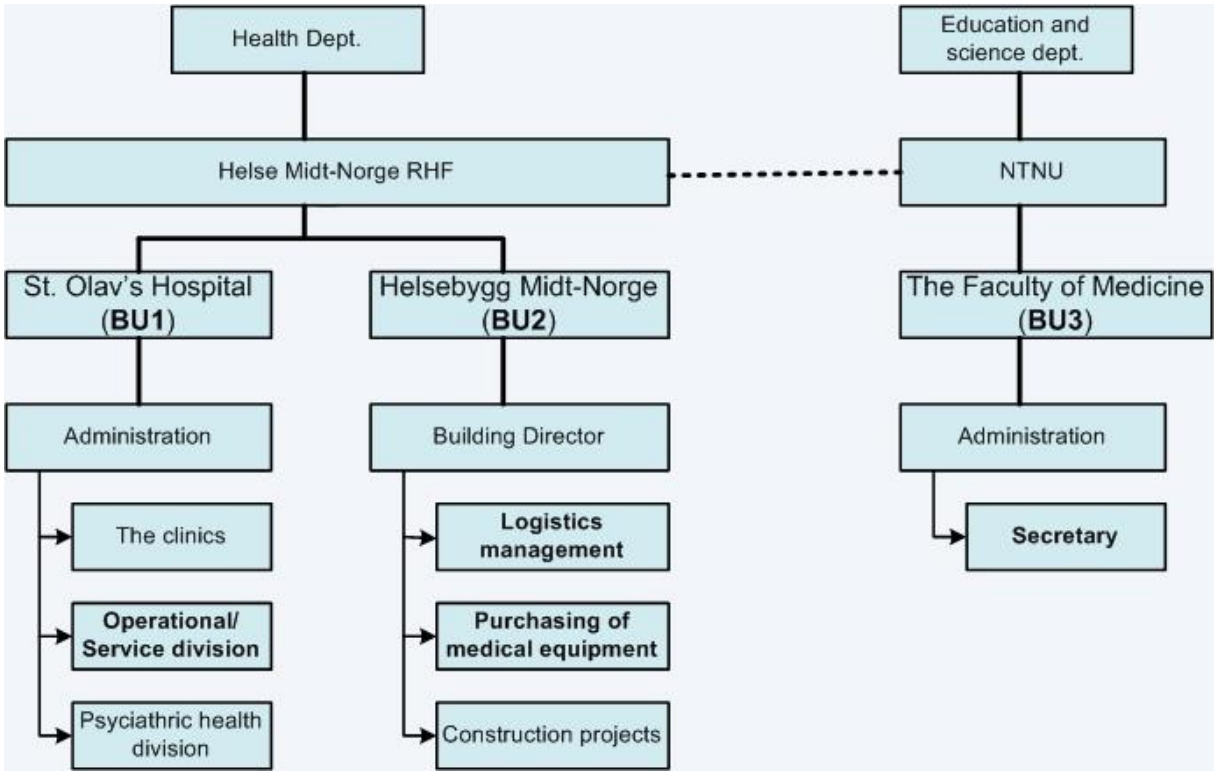

Figure 4-3 – Organizational map made by the researchers to show where information is obtained, based on the interviews

4.1.1.1 Project Structure

During the entire project of the new hospital there have been a number of different projects going on at the same time with different sizes, budgets, time plan and type of team. In each of the BU's there are different types of projects involving a different number of team members.

Sometimes the projects involved only one team member, the Project Manager, and sometimes there were teams with more than 20 people involved. The general team member's involvement in projects is further presented in the figures 4-4.

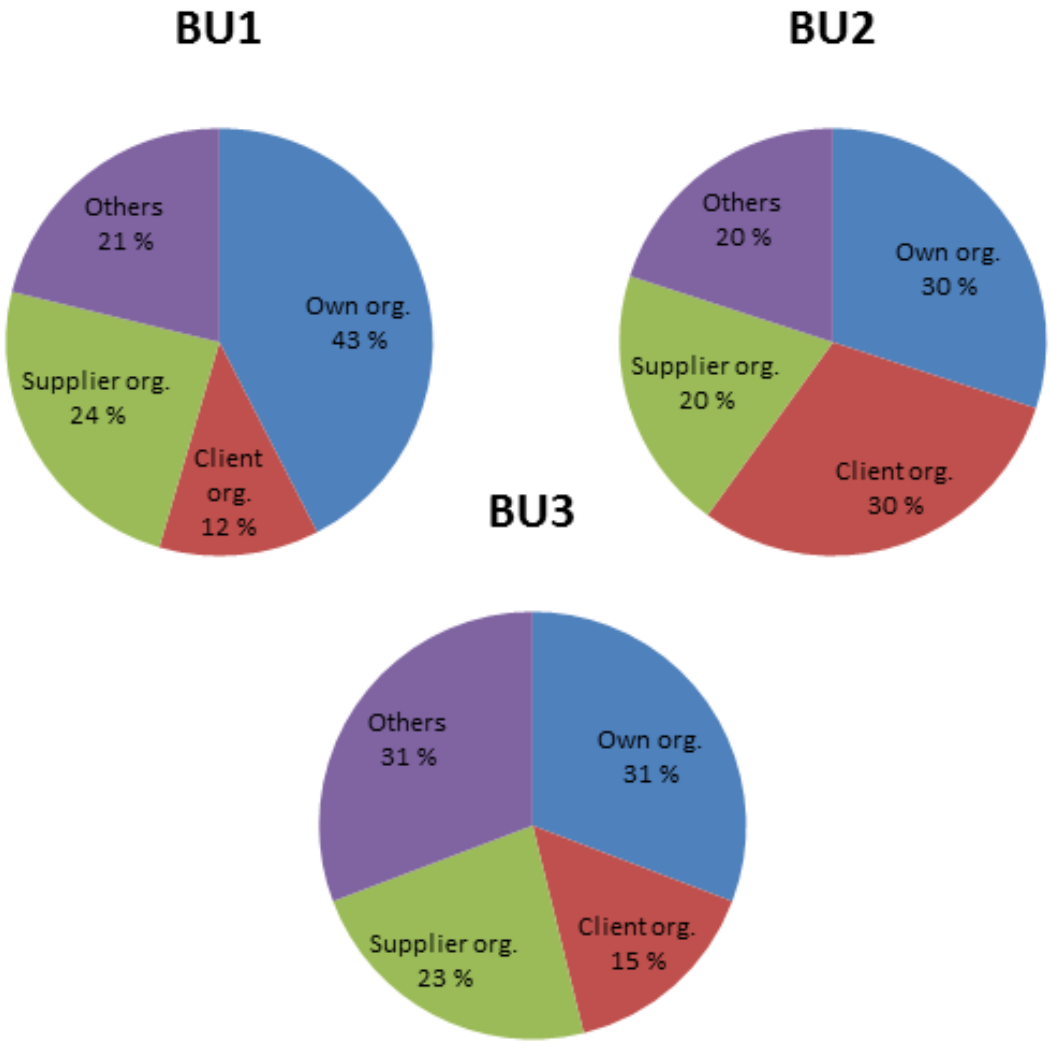

Figure 4-4 – The participants from different organizations for projects in the BU's

According to the interviews, the administration department of BU1 did projects with mostly around a number of 10 people, but had at top projects with 19 team members plus the Project Manager. The operation service division did projects with a number of people ranging from one to ten where the Project Manager itself was the only team member sometimes. In BU2 there were approximately 120 people working in the logistics project, but this project also were divided into smaller parts working at each St. Olav's buildings. In for example the Knowledge Centre at St. Olav's Hospital there were around 20 people in the team. According to the person representing BU3 in this project, there were also about 20 people in the team.

The entire project “new hospital” was a project that lasted for 17 years, but it was divided into smaller projects that lasted for a shorter period of time. In BU1 there were people that had been working with the overall project for over ten years, but there were also people from the underlying division that had worked with smaller maintenance projects which lasted from one month to a year. In BU2 there had been people working on logistics projects since 2008, but these were still ongoing. BU3 actually had people that had worked with the entire project since the very first day in 1998.

The budget for the entire project was approximately 10 billion NOK. BU2 were the ones that had access to this money, and were also the ones deciding who could spend how much on what. They also worked as a project management Office (PMO) for the other BU's. In BU2 the logistics management did projects for the new hospital with around 35 to 40 million NOK in budgets. Both during and after project execution, the operation/service division in BU1 get a yearly budget of 50 million NOK where they have to report back to the building owners of St. Olav’s (St. Olav Eiendom) what kind of maintenance project they are going to spend the money on. The projects they use their money on vary from 70.000 NOK to 5 million NOK projects, and they have 10-12 projects going on at the same time.

4.1.2 The Project Manager’s Competences

The average level of experience for being in a project varied from, as can be seen in the introduction of this part, 4 to over 17 years. For Project Manager’s the expected level of experience was around 9 to 12 years, according to each response in the survey. In BU1 the level of experience varied from 4 to 16 years, in BU2 it varied from 4 to 12 years of experience, while in BU3 the average level were above 17, which also were confirmed by the interviews.

In figure 4-5 the most important characteristics of the Project Manager are mentioned according to the survey results, where 5 is the most important.

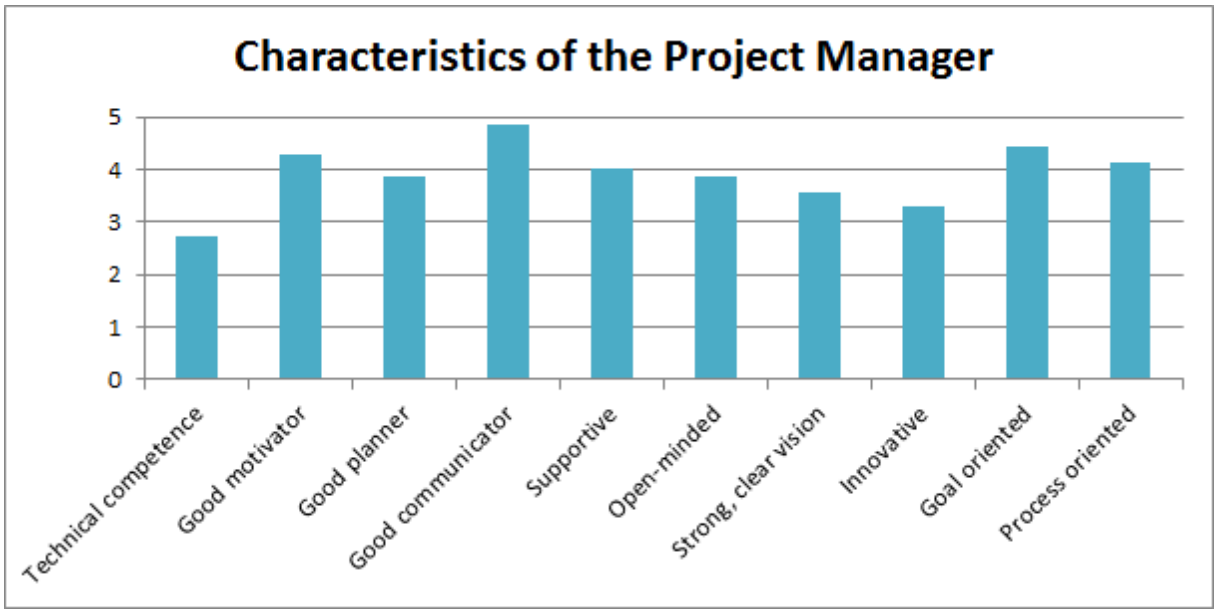

Figure 4-5 – Important characteristics of the Project Manager

As one can see from figure 4-5 the most important characteristics for a Project Manager are to be a good communicator (ranked 4.86) closely followed by goal oriented (4.43) and good motivator (4.29). Process oriented is also very important, having a ranking at 4.14. The least important characteristic is technical competence (2.71).

According to the interviews BU1 thinks that the most important characteristic of a Project Manager is to be a good planner. BU2 focuses also at being a good planner, but they also think that good communication and being goal oriented is very important as well. BU3, on the other hand, thinks that the technical competence is the most important thing, and that being a good motivator is the least important skill for a Project Manager to have.

In the service/operation division in BU1 they think that the most difficult part of being a Project Manager is to know that all risk factors are considered and that everything is coordinated and communicated with the relevant people. In the administration it has been the organizational structure and the close cooperation between the three BU's, and the disagreements arising from this cooperation. In BU2 they think that the most difficult part is the rules and regulations from the government and the time planning, as well as communicating to the suppliers how important it is that deliveries are done in time. In the logistics department the combination of time, quality and budget is the biggest challenge. In BU3 there were no specific challenges for the Project Manager.

4.1.2.1 Tools and Techniques Used by the Project Manager

In all of the BU's they used different computerized project management programs to keep control of the project. They all used Microsoft programs as Excel, Word and Project, but also some special programs designed for their use. BU1 used state analysing and mapping of the project, as well as a main registration system where all projects are registered and cost estimated. They also use a project management system where all chosen projects are put in before implementation. In BU2 they use Building Information Modelling (BIM) as well as risk analysis tools. In BU3 they also used some special programs, but these were not specified. According to the survey, 85.71 % of the respondents used computerized tools, while 57.14 % also used manual tools in their projects.

On how they measured maturity in the projects their answers can be seen in figure 4-6 where 5 is the one that is mostly used in projects.

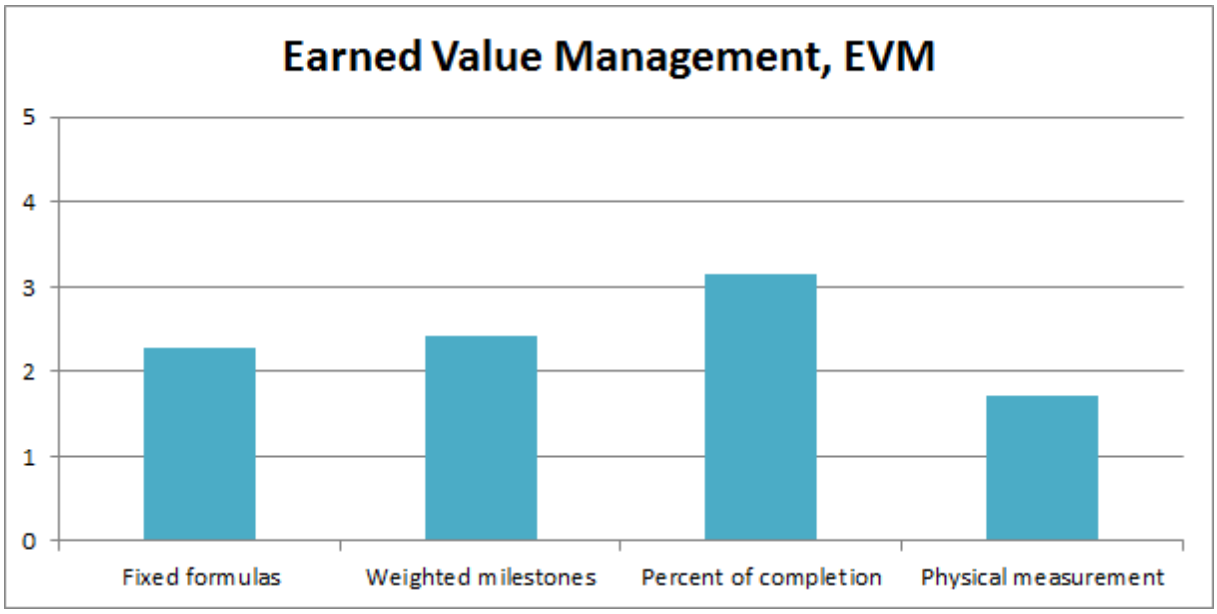

Figure 4-6 – The use of EVM in projects

From figure 4-6 one can see that the most used Earned Value Management method is percent of completion (3.14), while the one least used is physical measurement (1.71).

A clear overview of the responses from the survey can be seen in figure 4-7 for risk management.

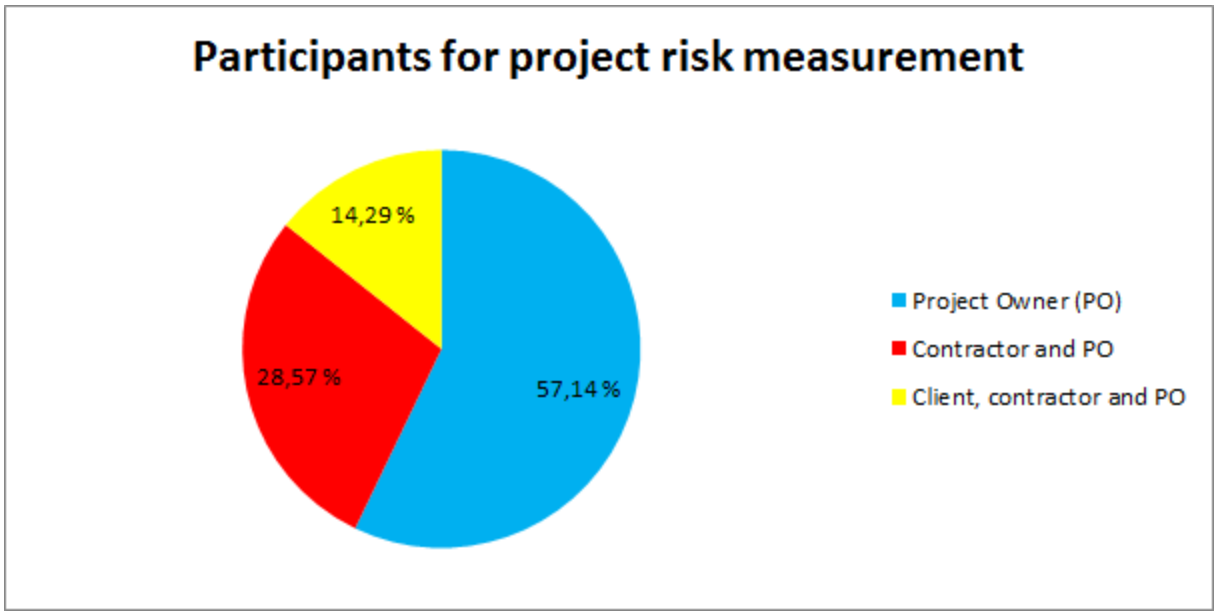

Figure 4-7 – Participants for project risk measurement

According to figure 4-7 it is clear that the project owner was a part of every risk analysis of the different projects. 57.14 % of the risk they analysed and measured on their own, 29 % together with the contractor and 14.29 % together with both the client and the contractor. The most common risk factors in the administration site of BU1 were delivery on time and with quality. In the service/operations division the most common risk factors are technology and lack of planning before implementation. In BU2 the most common risk factors are flexibility in specification and delivery on time, while in BU3 the most common risk factors are security and safety to the end-user.

When it comes to conflict management, the respondents answered accordingly to figure 4-8, where 5 is the most used conflict management style of the Project Manager.

Figure 4-8 – Conflict management styles in projects

As it can be seen from the figure collaboration and cooperation are the two most common conflict management styles, with 4.14 and 4.00 in ranking. The least used conflict management style is domination (1.43). This was also confirmed by the interviews; however BU3 explained that they sometimes use domination, but never withdrawing.

4.1.3 Project Teams, Team Organizing and Leadership

According to both the survey and the interviews, the people from the three BU's have all worked in cross-functional teams, but neither have taken any participation in virtual teams. The results from the survey on project teams the different BU's have participated in are shown in table 4-3.

Types of project team	BU1	BU2	BU3
Cross-functional	Yes	Yes	Yes
Self-managed	No	Yes	Yes
Problem-solving	Yes	No	Yes
Virtual	No	No	No

Table 4-3 – Types of project teams used by the BU's

Table 4-3 also shows that BU3 have been participating in self-managed and problem-solving teams as well, while BU1 have never participated in self-managed teams and BU2 have never participated in problem-solving teams. The percentage of people that responded to the survey that had been working in the different types of project teams can be seen in figure 4-9.

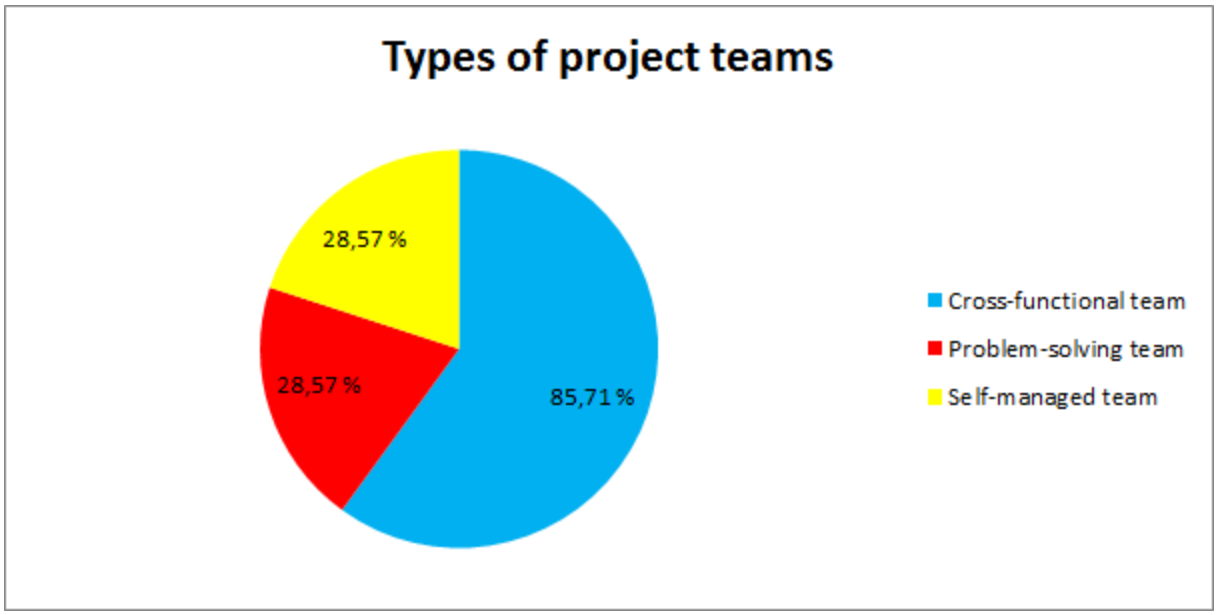

Figure 4-9 – Types of project teams used by the BU's

From figure 4-9 one can see that 85.71 % of the respondents had worked in cross-functional teams before, while only 28.57 % had been a part of problem-solving and self-managed teams.

According to the interviews there are always clearly written procedures and practices for the exact work the teams in BU1 and BU2 is going to do, and it is also very easy to get access to the information from the Project Manager that is necessary for the project execution. In BU3, on the other hand, it is not always clear what the team member's responsibilities are in a project, and they sometimes have to decide for themselves what is necessary and what they can do. However, also in BU3 it is easy to get access to the needed information from the Project Manager. According to the survey, when it comes to having written and clear procedures for the project, the answers varied from "never" to "always". The Project Managers' answers varied from "sometimes" to "always", while the only one that was not a Project Manager answered "never". On the responsiveness from the top management on how easy it is to access the information needed, the answers can be seen in figure 4-10.

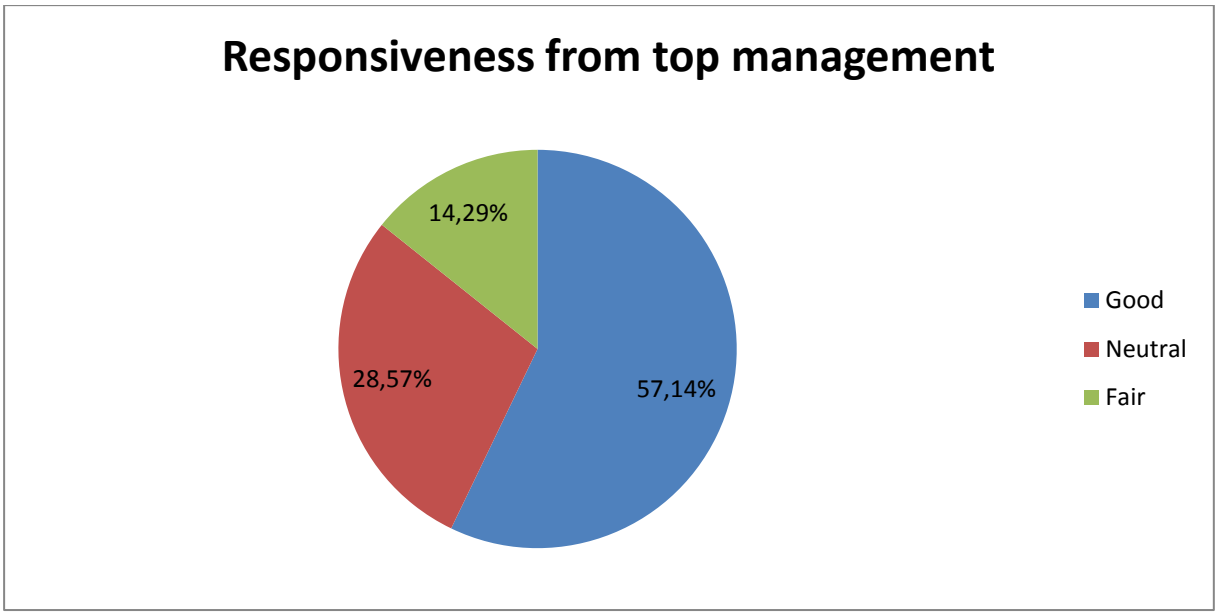

Figure 4-10 – Responsiveness from the top management

Here one can see that most of the respondents thinks that the responsiveness is good (57.14 %), but the answers varied from "fair" to "good". None of the respondents answered "poor" or "excellent".

The survey respondents were also mostly satisfied (71.43 %) with how well their roles are clarified in a project, as can be seen in figure 4-11. None of the respondents answered "very dissatisfied", "dissatisfied" or "very satisfied".

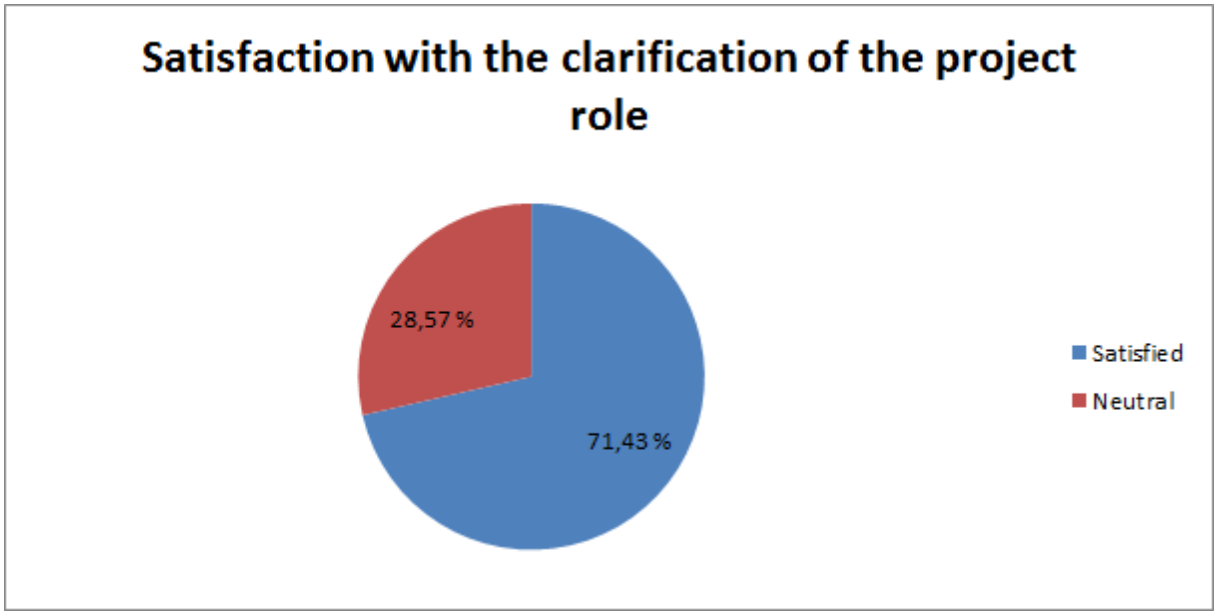

Figure 4-11 – Satisfaction with the clarification of the project role

A problem between the team members and the Project Manager in BU1 is most likely to arise when the team members accepts attendance to meetings, but do not show up, because they do not understand the importance of their attendance, which leads to the meeting not taking place. In BU3 it also adds up to appreciation and knowing the importance of their role. In BU2 it seems as conflicts are not likely to occur, since they know their roles and importance to the project.

When it comes to motivation, the operation/service division in BU1 do not engage in any motivational activities, while the administration has close follow-ups of the team members. In the logistics department of BU2 each team member are responsible for their own motivation, but in the purchasing department they are closely cooperating with the team members, and uses some time to find the right people for the team. In BU3 they arrange regular meetings, but the team members are set to motivate themselves. Reasons for demotivation could, according to the interviews, be misunderstandings and confusion in what the team member's roles are and too many meetings instead of progression in the project. Demotivation could also come from disengagement to the project goals. Even though none of the BU's participate in any team-building activities, the responds in the survey shows that 71,43 % of the respondents thinks that this could be effective and that it could affect the project outcome positively. None of the respondents answered "very ineffective", "ineffective" or "very effective". This can be seen in figure 4-12.

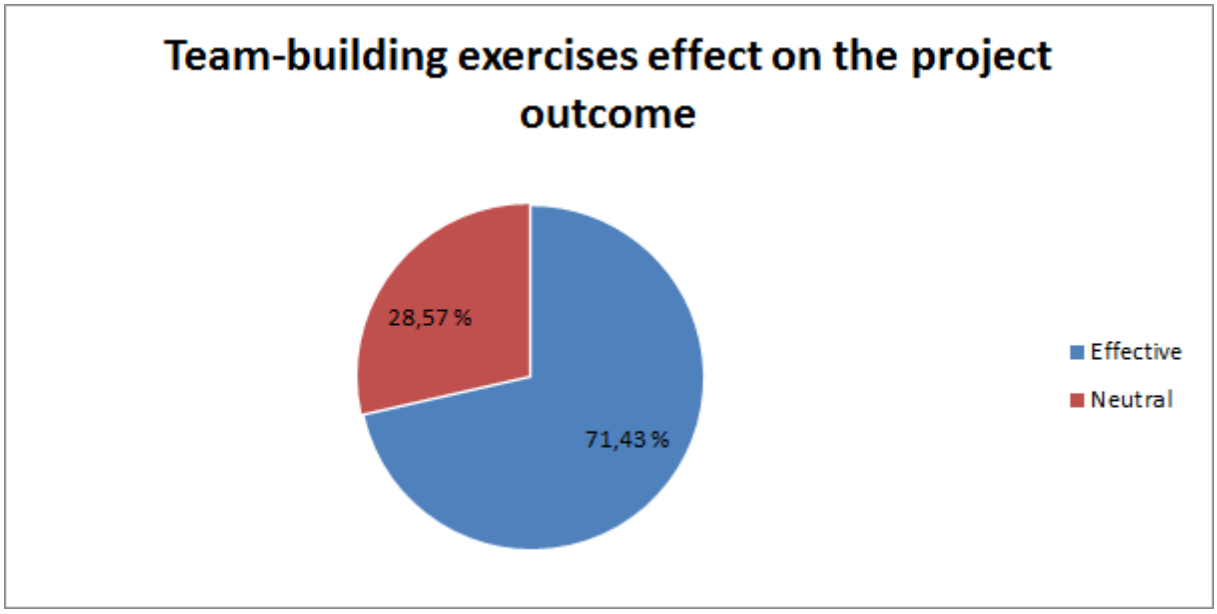

Figure 4-12 – Team-building exercises effect on the project outcome

4.1.4 Project Management Success Factors

According to the interviews the most important success factors in projects, project management and for team members was for the administration in BU1 the cooperation between the three BU's. In the operation/service division the most important criteria was quality and functionality, then budget and thirdly, the implementation. In BU2 the three most important criteria was delivery within time, budget and quality. According to BU3 the quality is all that matters. In the survey, the researchers asked more specifically about success criteria regarding each of the three elements; the project, team organizing & leadership, and the Project Manager. The results can be seen in figure 4-13 – 15, where 5 mean the most important.

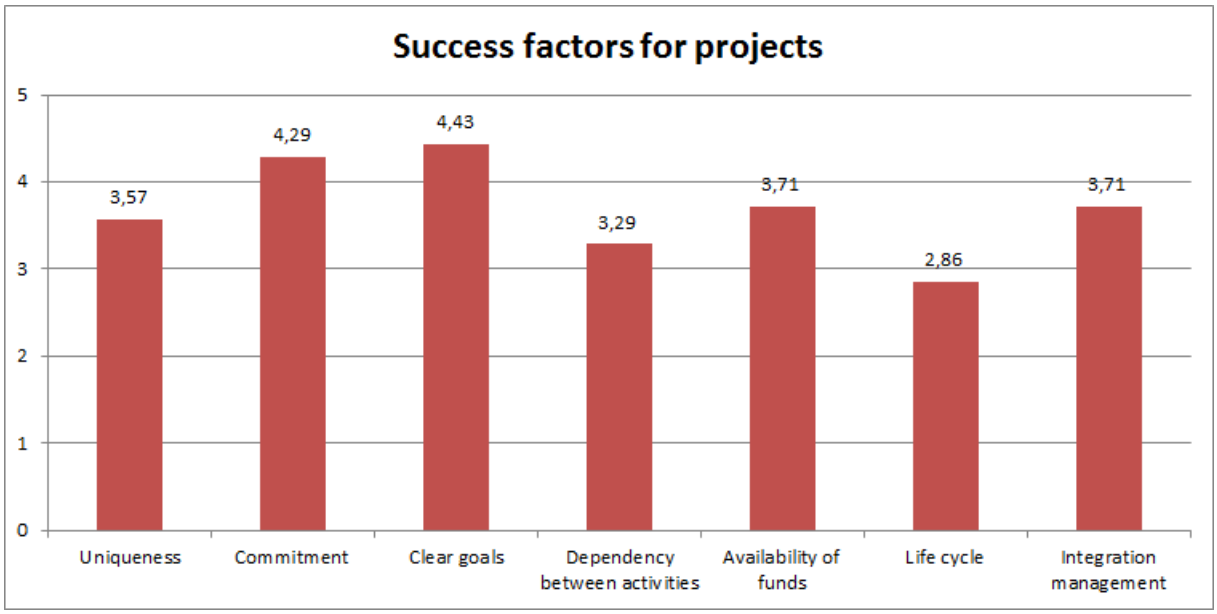

Figure 4-13 – Success factors for projects

Figure 4-13 explains that the most important success factor for projects is clear goals (4.43), closely followed by commitment (4.29). The least important is the project life cycle (2.86).

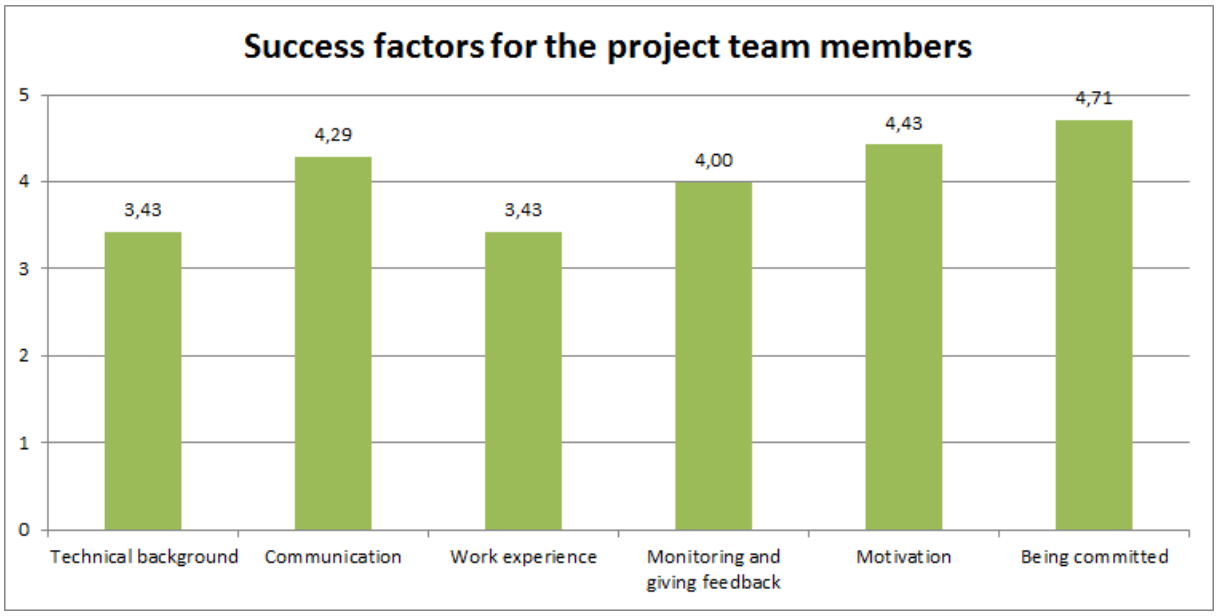

Figure 4-14 – Success factors for the project team members

From figure 4-14 one can see that the most important success factor for the project team members are being committed (4.71), closely followed by motivation (4.43) and communication (4.29). The least important criteria are here both technical background and work experience (both ranking 3.43).

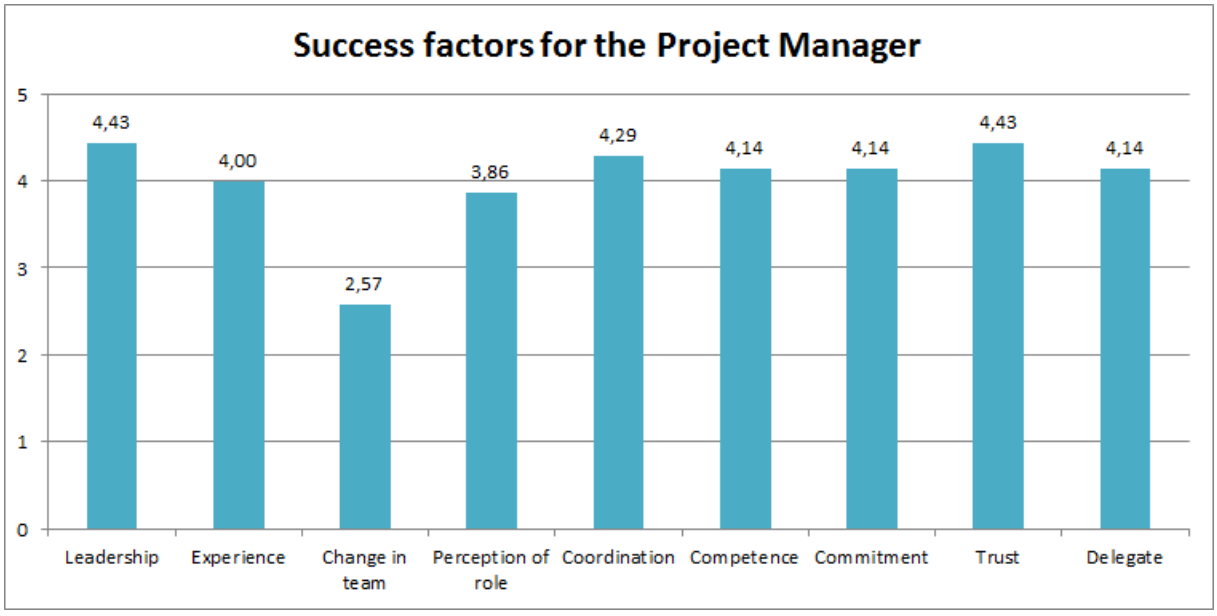

Figure 4-15 – Success factors for the Project Manager

According to figure 4-15 the most important success factors for Project Manager is leadership and trust (both rated 4.43), closely followed by coordination (4.29) and competence, delegating and commitment (4.14). The least important success factor is a frequent change of

team (2.57). As one also can see, the range between eight of the success factors is quite low (only 0.57 between the next to lowest and the highest), while change in team is separating itself extensively (with 1.86 from the highest ranked).

When the projects are finished, BU1 measured and performed end-user satisfaction by final inspections and reviews with all the involved parties, but not all projects are evaluated unless there is a certain need for evaluation. However, they have yearly customer surveys as well, where the customers can mark their complaints. Maintenance projects are though not a part of this survey. In BU2 they do evaluation for all of the larger projects, but only with small projects if they have failed or they have received many complaints regarding the projects. In BU3 this was not answered.

5 DATA ANALYSIS AND DISCUSSION

This chapter presents an accurate examination of the essential information shown in the empirical data in chapter 4. A general description of the results is presented in part 5.1. Further explanation and discussion on these results are given in part 5.1.1 to 5.1.4. Part 5.2 will display a summary of the findings and a general discussion of these findings.

5.1 Challenges for Effective Project Management

Various meanings and conceptions of the importance of project management are observed in the collected data, also within the three BU's. The difference in how the subject is perceived, displayed in the empirical data collection, will be further analyzed and discussed through this part. First of all the data will be analyzed due to the differentiations in organizational environment and what effects this may have on the projects. Further will the discussion be around the project team structure and the competences and characteristics of the Project Manager, with the usage of different tools and techniques. The discussion will then proceed to the benefits and disadvantages between the different types of teams and the management style of the Project Manager. Lastly, the variations in the different success criteria for projects, project management and the team members will be analyzed and discussed further.

5.1.1 Organizational Environment

There are clear differences in the organizational size and type of service they provide for their end-users between the three BU's. While BU1 provides medical and health care services to patients and customers, BU2 utilizes services to the health sector with constructional and engineering services and BU3 is a research and educational institution. The focus of their work will therefore be somewhat different. BU1 may focus on health and convenience for the patients. BU2 may focus more upon completing a construction of a building according to buyer’s criteria. BU3 may focus upon the convenience for the students. These three different goals may be of a challenge between them, but can also be of advantage when providing better project management quality into the project.

The challenging part may be to understand how these goals can be integrated and unified to provide a successful project outcome which all parties are satisfied with. If each BU is looked upon as a team member, this can be looked upon as a cross-functional team. The important

part here is therefore communication; all the three parties have to communicate what their goal is in an understandable matter that will be of concern to the other parties. Since the three parties are quite different regarding skills, capabilities and knowledge, they can all learn from each other as well, and create new, innovative ideas together. However, as also in a cross-functional team, this requires lots of work, time and planning for creating effectiveness. If the BU's refuses to listen to each other and at all times considers their own goal as the only one of important value, this might cause inefficiency. This can also happen if the information is not sufficiently shared between them and they lose track of the project. The team has to realize what potential it has with all the different competencies to provide project success.

5.1.1.1 Organizational Size

Regarding the differentiations in size of the organizations, where BU2 only have around 17 employees, BU3 around 1200 and BU1 over 9000, it can be argued upon that in smaller organizations (as well as for smaller teams) there is a larger amount of free speaking than for the larger organizations, thus coming through with more of individual ideas. Nevertheless, in a project like this, not all employees can be considered as project team members. The essential is to understand how many from each of the BU's were involved in the overall project organizing. It is also important to know if the Project Manager's for each separate project were able to find the necessary resources that was needed for the projects, as Thamhain (from 2.6) states that this is much more important than the size. As stated in the interviews, the project team size varied from around 10 to 20 people working in a team at the same time, and it can be argued upon the effect this had on the project outcome. However, as is important is that all the three BU's had mostly people from their own organization working in the different teams (part 4.1.1.1), which can seem as important when casting a vote that there are mainly people that share the same vision and goal as you around you.

However, it looks as BU1 prefers to be in charge of the projects mainly by themselves, with little impact from the clients, suppliers or other companies (like consultants for example). BU2 have more even projects with more impact from clients, suppliers and others. This may have something to do with the size of the organization. While BU1 is a very large organization, BU2 has only a few employees, which might make them require more help from the outside because they might not have the overall competence that is needed for the project within their own company. BU3 uses more other companies and less their client organization during projects. This might be because they feel that competence and experience lies within

consultant companies, because this is what they are used to work with, and not with their client which is the one that requires this project to be done, because they do not have the same amount of experience. Of course they let them be a part of the project, but the outside companies are more used for decision making and consultation. However, it could be useful to use the client organization more effectively, and this regards all BU's, because the client knows more how they want it and have more inside information of what is going on in the organization than outside companies do. In this case the project model of BU2 would be more effective than the other two, because it flattens the project impact so that everyone that is a part of the project has an equal vote in decision making.

5.1.2 The Project Manager's Competences

As can be seen from the empirical data in part 4.1.2, BU3 is the ones with the most experienced Project Managers, while BU2 has the least experienced ones in average. There can be both advantages and disadvantages for experienced Project Managers, those who have long experience have inside knowledge from similar projects, but may also have difficulties in realizing that time and technology is changing constantly, and that things that worked for one project earlier, may not work for this project, even though they are quite the same in size and goal. The more inexperienced Project Managers may not be able to see every risk factor that comes up and therefore makes several more mistakes, but on the other hand they can be more adaptable to new projects and innovation.

5.1.2.1 The Project Manager's Personality Characteristics

From the empirical data in part 4.1.2 the three BU's feels that the most important characteristic of the Project Manager seems to be a good communicator, be goal oriented and be a good motivator. These are also highly rated by the theory from Crawford, stated in part 2.3.2. The least important factor seems to be the technical competence, but from theory this also seems to be one of the most important factors. According to the interview results in part 4.1.2 there are some quite different suggestions between the three BU's, where it seems as BU1 and BU2 are agreeing with the survey results, while BU3 has a completely different idea of a great Project Manager. BU3 seems to think that motivation is something that the team members are responsible for themselves, but the technical competence has to be in place in order to make the project go forward and knowing what you are doing. The reason for these differentiations in answers may be seen in regard of the average experience of the Project

Managers, those who have had longer experience is more concerned by getting things done by themselves than motivating the team into doing these things in a project, while those with minor experience may see the benefits of communication and motivation to achieve a higher success rate of the project. This can also be confirmed by looking at the different challenges for the Project Manager in the different BU's, where BU1 and BU2 may constantly search for challenges, BU3 see none specific.

This might be related to the types of projects going on in the different BU's as well as the level of experience. When the team exists of people with a higher level of experience it knows how to motivate itself, and the Project Manager does not have to be included as much as in teams with a lower level of experience. It might also have to do with the cultural aspects within the BU, if the people from BU3 are more used to a certain type of projects, and these projects are similar to the ones they have been involved with during the project "new hospital", the project teams can find it easier to work more effectively individually and with less guidance from the Project Manager. BU1 and BU2 might, however, be used to different types of projects which may, through the new hospital project, challenge them to find new ways for how to do the project and the Project Manager have to be more involved. There is certainly not any correct ways to do this, but according to theory, a Project Manager is a better leader if he/she can find ways to motivate the team into self-motivation, and not just being a general manager for the project team.

5.1.2.2 EVM and Risk Management in Projects

According to the interviews, listed in part 4.1.2.1, Project Managers mostly used Earned Value Management to identify the maturity of the ongoing project. They also mentioned that the main criteria of evaluating EVM were by fixed formulas, weighted milestone, percentage of work completion and physical measurement. How to work with EVM is more described in the theory chapter (2.6.1). Figure 4-6 in the survey findings of part 4.1.2.1 shows that the mostly used criteria of EVM is the percentage of total task completion (3.14), and the one least used are physical measurement (1.71). The Project Manager from BU1 mentioned that EVM method selection depends on the project; if it is a construction project physical measurement criteria are mostly used.

In this research study, the project owners participate in every risk analysis of the different projects. According to figure 4-7, 57.14 % of the risk is analysed and measured by the project owner, 29 % together with the contractor and 14.29 % together with both the client and the

contractor. It is clear from the interview that most risk analysis were done by BU2 as the responsible part for the construction site, but some were done by BU1 as well and that BU3 did not participate in any of the risk management. According to the interviews with BU1, the Project Manager thinks that the most difficult part of being a manager is to have enough knowledge of the risk factors, coordination of the different activities and communication with the relevant people.

The most common risk factors in the administration site of BU1 were delivery on time and with the agreed quality. At BU1 the most common risk factors are technology and lack of planning before implementation. In BU2 the most common risk factors are flexibility in specification and delivery on time, while in BU3 the most common risk factors are security and safety to the employees and for the patients.

There is a restriction to risk management techniques; the wrong use of tools and techniques can lead to negative result, which can be destructive in nature. In different projects individuals vary in their perception of reality, and knowledge by training through tools for comprehending the nature of risk can enhance objectivity of individuals to process risk in the same way. This can be seen in the theory of Massingham in chapter 2.4.2. Risk has a negative effect on the project objective (scope, schedule, cost, and quality). Some of the Project Managers from BU2 also mentioned about those project objectives and stated that if any of these project objectives face risk, difficulties or lack of control it is very hard to accomplish the project on time. According to the theory in this study (2.4.2), there are several techniques to handle the risk and to mitigate effect of risk from uncertainty. Consequently, the qualitative risk techniques can be made more precise by reducing the vulnerability of subjectivity as a result of the human factor. That vulnerability can be internally create and might affect to the organizational, social or economic factors.

5.1.3 Project Teams and Leadership

From the survey results in part 4.1.3 the three BU's have all participated in cross-functional teams, and as this project can be seen as a cross-functional team (as stated in part 5.1.1), this seems highly reasonable. The effectiveness of a cross-functional team, as explained in the theory part of 2.5.2, is clear if the team can make use of their diverse knowledge into working as a joint project team for the same project goals. The advantages from working in a cross-functional team can be clearer if the team members have worked in other sorts of projects before where their skills have been highly appreciated, and at the same time have learned to

reap the benefits from others competencies and knowledge. Only then they may understand that working together and not against each other is the correct way to do it. Sometimes there might be indifferences between the members or even between the team and the Project Manager, but it is important to acknowledge why these people are chosen to work together in the team and also communicate the problems they have towards each other. As is stated in the theory in part 2.6.1.1, people in the team may have personal issues towards each other, but this only comes from problems of understanding.

It seems as the Project Managers in BU1 never have participated in a self-managed team, which may not give them the opportunity of knowing how it feels to make the team responsible for their own actions. While only the Project Managers being the ones managing the team, the team members may feel that they have nothing to say regarding the decisions and that they have no control of the project outcome, which may lead to lacked motivation which again may cause inefficiency. The Project Managers in BU2 seems to have never experienced the use of a problem-solving team which, according to the theory in part 2.5.3, is a team that is highly qualified find the best solution amongst different possible solutions to a problem. Without this experience the Project Managers may lack the ability of understanding that there may be more than just one solution to a problem, and that the important thing is to find the best one that fits for all the parties involved, and not just go with the easiest one and the one that acquires least resources. The Project Managers in BU3 however, seems to have joined in all these types of projects, and may be more certified to understand everyone's point of views and find the most reasonable way to resolve a problem. None of the Project Managers from any of the three BU's have participated in a virtual project, and it does not seem necessary to have been involved in one either since everything in this project is going on at the same place and every BU are located in the same area. However, having the experience from a virtual team project is never a bad idea for the future, as the technology and times are changing constantly.

5.1.3.1 Communication

While it seems as the Project Managers from all the BU's have reasonably control over the procedures and practices during a project, it may look as if the team members do not feel like the procedures are very clearly written, due to the responses of the survey stated in part 4.1.3. This may suggest that the communication between the Project Manager and the team members is not as good as it is perceived. Since the ones involved in this study seems to think

that communication is the most important characteristic for the Project Manager, the Project Managers may have to think through how their messages are received. Even though the Project Managers might understand the procedures pretty clear, their team members may not necessarily think the same. Both experienced and new team members to the project may have problems letting the Project Manager know if there is something not satisfactory with the written procedures, which makes the Project Manager responsible for their understanding. It seems as the Project Managers are good at answering to questions or concerns the team members may have, according to the result of responsiveness from Project Manager in 4.1.3, and if the Project Managers are a bit more proactive, they might also pick up on things that might concern the team members and take action before it becomes a bigger problem that may affect the entire project. As theory in part 2.4.3 so clearly states; communication is one of the most important factors for achieving an effective project management control.

5.1.3.2 Conflict Management

According to figure 4-11 collaboration and cooperation are the two most common conflict management styles, with 4.14 and 4.00 in ranking. Project Managers from BU1 and BU2 have mentioned that they use lots of cooperation and collaboration with different departments for managing conflicts so that it might not turn into a big obstacle which the projects different task processes need to wait for. Some Project Managers from BU2 thinks that compromising and group table discussion is the easiest way to go to solve a problem, and all the co-workers are so friendly and easy to communicate with. The Project Manager from BU3 also uses collaboration at an early stage of the conflicts, and it was also clarified that they sometimes use domination when collaboration or cooperation does not work, but never use withdrawing to mitigate the conflicts in project. In projects all the Project Managers from the three business units very rarely used the domination conflict management style. The theory part 2.4.3 clearly describes a potential conflict determinant which helps to identify the prime cause of conflicts in project management, as well as different conflict handling modes.

5.1.3.3 Motivation

It looks like motivational activities is not very common in the three BU's, as can be understood from the empirical data in part 4.1.3, and it seems as the team members are more responsible for their own motivation. It also seems, from the Project Managers points of view, that the team members are not welcome in the team without having a deep, initial motivation for the project team work in the first place. Though it can be agreed upon that initial

motivation is important, keeping up this motivation is not only the job of the team members themselves, but also the Project Manager's. According to the theory in part 2.6.1.1 it is clearly stated that the Project Manager is the one that has to develop the team feeling and the team spirit amongst the team members. Of course it is important that the members are open and willing to get to know each other better, but the Project Manager has to be in charge of any social activities that include the whole group, at least in the beginning when people do not know each other and they might have a harder time communicating. As the sixth factor, the factor of leadership, of what affects team motivation by Grazier in part 2.6.3 clearly states, is that a good leader finds ways for the team members to motivate themselves during the project execution.

The Project Managers of BU3 uses regular meetings in order to help the team members find their inner motivation for the projects. Close follow-ups and close cooperation is also used to some extent within BU1 and BU2, and this, as stated by Frame in the theory part 2.6.1.1, is important for a Project Manager, but only when used effectively. Too many meetings and too much focus on communication can mean loss of motivation amongst the team members during the project life cycle due to lack of understanding the importance of their participation in the meetings and why the meeting is important. For the team members meetings may mainly mean reduced time for actual project work, especially for those who are more used to work through problems than to talk them through. This seems as a problem according to the empirical data of 4.1.3 when team members say that they will attend a meeting, but do not show up. Shorter meetings with only those of concern can be a solution to this. Instead of having a two hour meeting with everyone altogether every week, where there are only ten minutes that concerns each of the attendants, a shorter meeting with only a few people for 10-15 minutes each week will not only keep up the motivation, but also avoids using time unnecessarily. This way the team members will feel that they have something relevant to come up with during these meetings, which can increase their feeling of importance and commitment to the group and they can also do useful work while the others attends meetings, which will lead to a more efficient and valuable use of the time available for the project work.

The researchers also chose to ask a question about how the respondents viewed team-building exercises, although there was next to nothing to find in theory about team-building effectivity. The discovery was that, even though none of the BU's participates in any team-building activities, it seems as the Project Managers and the team members think that it would to some extent be effective before working in a project together. According to the empirical data of

part 4.1.3 over 70 % of the respondents thinks that it might be effective to use team-building exercises to maximize the outcome of the project. Although team-building exercises are mainly used in the private sector, it does not hurt to put some of this into public projects as well. This way the team members can both get to know each other in a different way than just at the work place and have fun by challenging each other and have fun together in another way than they are used to. This can participate in bonding the team members together, finding out what qualities that exists within the team and making use of these qualities in a more efficient way.

5.1.4 Success Factors for Project Management

In this study research, the researchers asked the Project Managers from the three different BU's to answer which of the listed success factors that are most related with the success of the projects, the project team members and the Project Manager. The factors was grouped into three areas; factors related to the *project*, *project team members* and the *Project Manager*. Here, the researchers mainly kept their focus upon these three major factors to meet their research result.

The project	The project team members	The Project Manager
1) Clear defined goals /objectives 2) Commitment to the end user 3) Availability of funds and resources 4) Project integration & procurement management 5) Uniqueness of project activities 6) Dependencies between activities of the project network 7) Project life cycle	1) Being committed 2) Being motivated 3) Communication skills 4) Effective monitoring & giving feedback 5) Technical background 6) Previous similar work experience	1) Effective leadership 2) Trust 3) Ability to delegate 4) Co-ordination of different task 5) Competence 6) Commitment 7) Previous experience 8) Perception of the management role and responsibilities 9) Frequent change in management team

Table 5-1 – Factors related to the project, the project team members and the Project Manager entitled with a priority list (1-9) by the responds from the survey

According to the survey result mentioned in part 4.1.4, shows table 5-1 the arrangement of different success factors with a priority list. The priority list has been made up according to the interviews and survey response from the three different BU's Project Managers and project team members.

Factors Related to the Project: A project, no matter the size, is easier if there is a defined goal. In this research, seven important factors were considered. Figure 4-13 shows that the most important success factor for projects is 1) clear defined goals, 2) commitment to the end user, 3) availability of funds and resources and 4) project integration management. The less important factor was dependencies between activities in project network and the project life cycle. According to the survey findings regarding project success factors of Hyväri, mentioned in chapter 2, table 2-3, were 1) clear goal/objectives, 2) end-user commitment, 3) adequate project funds and resources, and 4) a realistic schedule. The less important factors were project size and value as well as the project lifecycle. According to Pinto & Covin, mentioned in theory part 2.7, initial clarity of goals and general direction, support from the top management, a detailed specification of the plan and the client consultation are the most important factors for projects. This can be seen in section 2.7, table 2-2.

The Project Managers from BU1 wants to deliver the project within the specific schedule, targeted budget and with a good quality. The Project Manager from BU3 clarifies that "the budget is very wide" for their projects, so they expect to deliver a good quality product or service for their end user. In a project, resources have to be utilized in an effective and efficient manner in order to achieve maximum benefit. According to the interviews and survey responses, when the question of "what aspects and factors does the client value when judging the success of the project?" arises, the three business units' mentions that the end users are the main concern, with an overall influence in the project and the functionality of the end product.

Factors Related to the Project Team Members: The survey findings in figure 4-14 statistically shows that the most important success factor for team members are 1) being committed, 2) being motivated and 3) communication skills, while the least important criteria are here both technical background and work experience. According to the survey findings regarding project team members by Hyväri, mentioned in theory part 2.7, table 3-3, are the most important factors 1) commitment, 2) communication, 3) technical background and 4) effective monitoring and feedback. The less important factors are here troubleshooting and other scope known by members. The Project Managers from BU2 think that all the employees

are responsible for their own work that motivate them and that it is an important issue for the team members. The Project Manager of BU3 assumed that all of their team members are goal oriented, which motivates them to work actively for the project.

In this research, the interview objects from BU1, BU2 and BU3 also mentioned that they are mostly satisfied with their project task clarification from the upper level; sometimes if the task is not clear they can easily find support from the upper level or from their management team.

Factors Related to the Project Manager: It represents the Project Managers important success factors for the projects. According to figure 4-15, the most important success factors for Project Managers are 1) leadership, 2) trust, 3) various task coordination, 4) competence and 5) delegating and commitment. The least important factor is a frequent change within team members. This is more clearly shown in table 5-1. According to the survey findings regarding success factors of the Project Manager by Hyväri, mentioned in theory part 2.7, table 2-3, the most important factors was 1) commitment, 2) ability to coordinate, 3) effective leadership and 4) competence, whereas the less important factors are trust and other communication. One Project Manager from BU2 indicated that the Project Manager needs to take a decision to solve all the difficulties in a project. The combination and adjustment of time, quality and budget is a big challenge for the Project Manager, if any of them mismanages, the Project Manager and the whole project would be in trouble. Another Project Manager from BU2 talked about the changes of rules and regulation from the government. For medical equipment purchasing and product quality management issues, the delivery on time are a big challenge. The Project Manager also mentioned that it sometimes is difficult to make the supplier understand that the products should be delivered on time, and that the installation and other activities (such as patient treatment) are badly affected when there is a late delivery. So, product delivery on time is their first priority. The Project Manager from BU3 said that they are working in a project to deliver the final result with a good quality and functionality.

Figure 5-1 illustrates the success factors related to the project, project team organizing and leadership and the Project Managers to improve project control. It also suggests that the Project Managers from BU1, BU2 and BU3 could improve project control in their business project environment.

It is a comprehensive representation which demonstrates the interaction between the three factor groups. All of these three factors are interconnected and each factor can influence other group’s factors. It is emphasized that the Project Manager’s competences, leadership and team

management effectiveness is connected with the organizational project's lifecycle, resources, and project personnel to have a strong focus to improve project control for the business units.

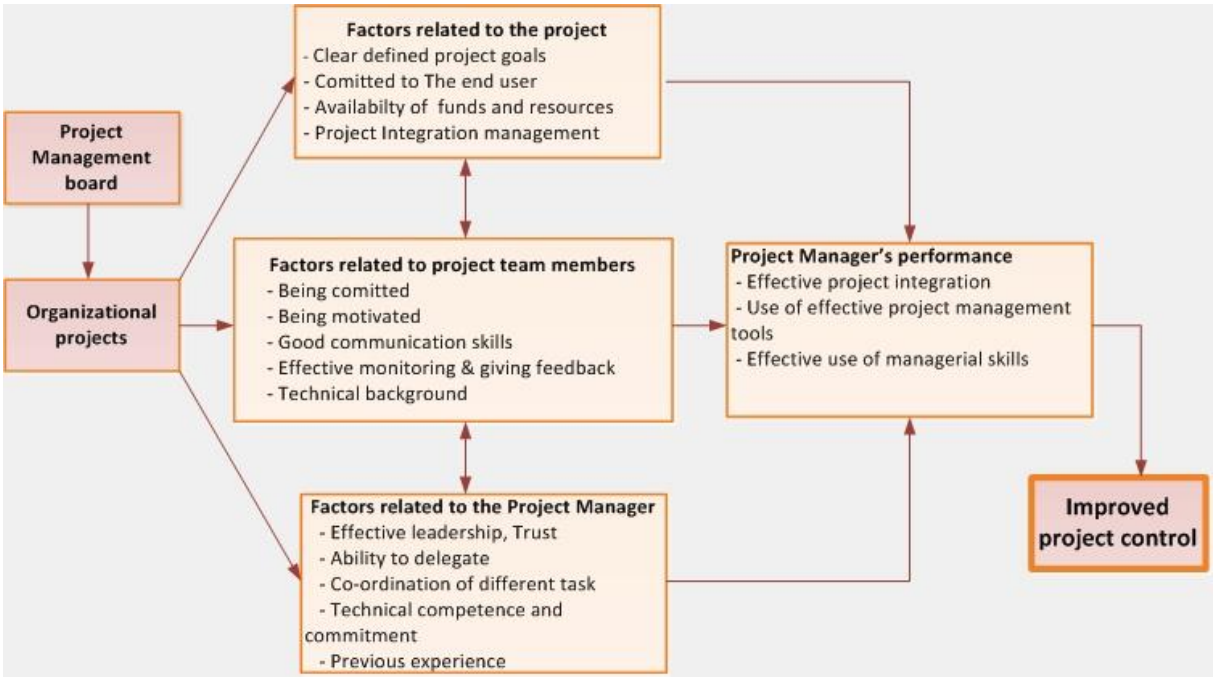

Figure 5-1 – Factors related the project, project team organizing and leadership and the Project Manager (developed from Belassi and Tukel, 1996, p. 144)

According to figure 5-1, those factors are interconnected and their successful execution will turn to Project Manager's performance where an effective use of management tools, managerial skills and successful project integration are playing an important role. The performance of the Project Manager is dependent on whether he/she can implement the managerial practices effectively. There was not such remarkable variance between Hyväri (2006) and this study regarding the project management success factors findings, even though Hyväri considered different types of Project Managers from public and private projects whereas this study has conducted only projects from the public sector.

According to interview and survey respondants it is clear that the success factors of highest importance in a project is defined project goals and objectives and secondly the commitment to the end-user. Interdependencies between activities of the project network and project lifecycle have a minor priority for the case organizations Project Managers. In the success factors of the project team organizing and leadership, the first priority are being comitted and motivated, while previous work experiences are less important for the business units Project Managers. In the success factors of the Project Manager, the most important factor are

effective leadership, and secondly trust and his capability to delegate with the clients, project team, contractors and the stakeholders.

5.2 Summary of the Analysis and Discussion

The analysis and discussion part includes several more or less important factors, which may or may not overlap with the chosen theory of the researched subject. The most important findings for this research were the organizational environment, the Project Manager, team management and leadership as well as the success factors for project management.

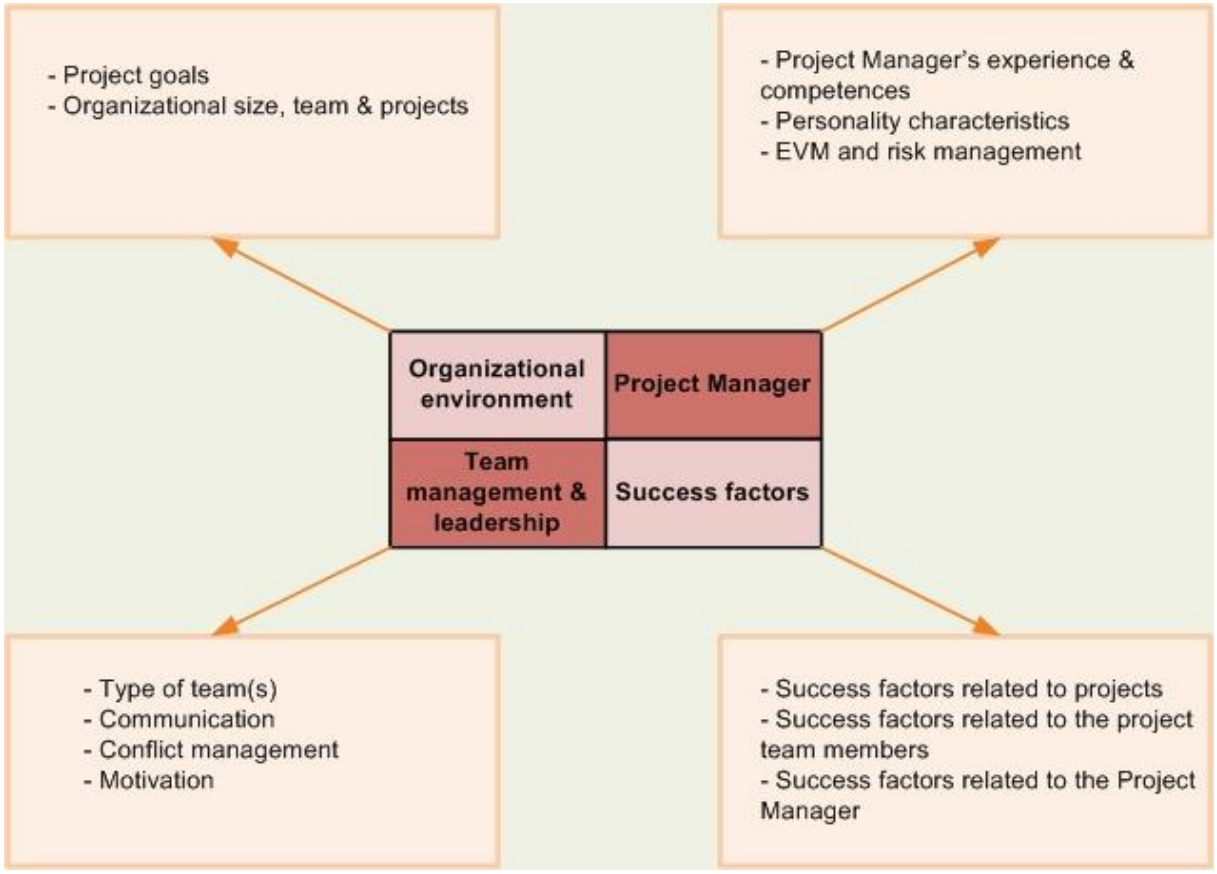

Figure 5-2 – The most important concepts found through discussion and analysis

Figure 5-2 shows the concepts found to be most important through this research, and this can be related to the figure from the literature review, in part 2.8, figure 2-8. However, there is a difference between what was thought to be more relevant in the beginning of this study and what was found to be most relevant in the end. For example was theory on project management and the relationship between project, program and portfolio closely examined and understood as of high relevance to this thesis. After the research was conducted this only seemed as a small part of the study, while organizational environment was found to be a far

more interesting subject with more impact on project outcome and success than the relationship between projects, programs and portfolios have. The three other main subjects remain more or less of the same importance as it was suggested in the literature review. The only difference is that some of the factors that were thought to be of most importance to the Project Manager him/herself were actually more relevant according to team management and leadership.

6 CONCLUSION

The goal of the study was to provide a comprehensive view on the Project Manager's competences, team management and project management success factors which have an influence on the potential project outcome in the Norwegian regional Health authority projects. This coherent view can help Project Managers to better understand the inter-relation between team management, team motivation and the performance of different teams and the members. This study may also help Project Managers to better understand the reasons behind successful project management and how the different success factors may have a magnificent impact to the overall project.

This study has provided an empirical evidence of the Project Manager's responsibilities, team organizing and performance and leadership of Project Managers in three different business units. It also gives a clear picture about the different success factors related to the different phases of a project. Finally, the study has resulted in a suggested framework to improve project control. This framework illustrates the project management's success factors by considering factors related to the project, project team organizing and leadership and the Project Manager. On the basis of the responses received from the interviews and survey, it is possible to identify the Project Manager's characteristics, team leadership and various success factors which can be related to achieving an optimistic project outcome, in the aspect of project size and organizational project management policy.

According to the analysis of the study, the Project Manager could be able to identify and eliminate the factors which may have a negative effect on the project execution performance. To improve project control it can be concluded that Project Managers are responsible for meeting the project goals and the criteria for their projects, and they play a magnificent role for effective project management and control. An explanation and conclusion to the three research questions are exemplified further through the next parts.

6.1 RQ1: Responsibilities and competences of the Project Manager in order to achieve an effective, efficient and successful project execution

The Project Manager's may have several responsibilities and competences which all have to some extent an effect on the project execution. It is very difficult to say exactly what is most important and what is less important, because of the many different types of projects as well as many different types of leadership styles of the Project Manager. Some responsibilities and competences may be more important in some projects, while not as important in others. According to the result of this thesis, however, there are some qualities of the Project Manager that are more important than others no matter which type of project it is. If the Project Manager search to be a leader type, and not only to be the boss of a certain project, it can be concluded that the Project Manager should be a good communicator towards the project team members in order to achieve an effective, efficient and successful project execution. The Project Manager should also be able to motivate the team into motivating themselves. A great Project Manager works also as a leader, not only as a manager. However, if the Project Manager only searches for control, technical competence seems to be more highly appreciated than communicational and motivational skills. Therefore this report may conclude that interactional skills and connecting and making personal bonds with the team members are absolutely in the highest interest of every person in the team for feeling appreciation and importance to the project work, while the team members can take more care of the technical competence in the team. This can help in achieving a more effective, efficient and successful project execution and project control.

In a project management environment, using project management tools is vital for a positive project outcome. By the help of EVM, Project Managers can identify the maturity of an ongoing project, by the comparison of worked performed and work planned. It is a measureable system for project scope, scheduling and cost in a single integrated system, also to provide an early warning for problems with the project performance. By implementing or following proper risk management techniques, can Project Managers save the project from uncertainty, and by maintaining effective communication in different stages of the project with the stakeholders, clients, contractor and the employees' conflicts can be mitigated and the project can turn into being rigid and stable. Project management has emerged because the characteristics of our contemporary society demand development of new methods of

management. Effective project management provides an organization with powerful tools that improve its ability to plan implement and to control its activities as well as the way in which it utilizes its people and resources.

6.2 RQ2: Team management and project leadership that can affect the outcome of the projects in a portfolio

There are many different ways to lead a team, and also here it raises a question about type of project as well as size and budget for defining the best team management and leadership style of the exact project. The most important aspect here seems to be to join in different types of project teams, as cross-functional, self-managed, problem-solving and virtual teams, to get the best idea of what type of management can be used for these certain kinds of projects. With more experience within different types of teams, the Project Manager can learn to handle different problems differently as well, and not think that every problem can be treated the same way. According to the results it also seems as frequent and simple communication and clear, written procedures is important for the team members to feel important for the project as well as giving them the feeling that the project is doable so that they do not lose motivation. It also seems as the level of experience is not a big issue because the Project Managers with less experience seems to be more adaptable to the ever-changing environment than the more experienced ones.

Team-building and motivational activities seem also to be important, and it can be suggested that the Project Managers from the three BU's starts taking more of this into use whenever starting a new project. Not only will this make sure that the team members works more effectively during the project, but it may also make them feel that they are a part of a tightly bonded group with personal connections also with the Project Manager. It can also make the team members feel that the Project Manager is not just a boss of the project, but also their friend, which will make communication go easier. Even though this might take some time in the beginning of the project, it will most certainly bring more efficiency during the rest of the project execution.

6.3 RQ3: The Success Factors' Influence on the Potential Project Outcome

It is difficult to create a universal checklist of project success criteria which is suitable for all type of projects. The organizations require a wide range of skills, expertise, resources and technology for successful project implementation. Most of the Project Managers in the research commented that their projects finished within their time limits and specified budget, and that they meet the project goals. They also commented that the project plans very rarely change during the project execution phase. The logistics & medical equipment purchasing projects (BU2) and the facility and maintenance department projects (BU1) are for example less likely to change than the technology projects. The success factors described in table 5-1 may differ upon project type, also in different stages of the project because the projects are unique in nature. In the organizational life cycle both project type and different stages of projects are important to consider the accurate success factors. Figure 5-1 is a presentation of a suggestion on how to improve project control, which demonstrate the interaction between the different success factors as described earlier. It seems useful for the Project Manager to analyze particular factors in the beginning of the project implementation stage for improving and accomplishing the project successfully. Most of the Project Managers from BU1, BU2 and BU3 think quality is their important objective, and that good quality can be ensured by recognizing and eliminating the factors among the table 5-1 that lead to poor project performance, whereas she/he needs full authority to control the project.

6.4 Summary of the Conclusions and Suggestions for the Future for Similar Projects in the Public Sector

This part gives a brief summary of the conclusion with suggestions for future projects in the public health sector or for similar projects in other sectors as well. An overall conclusion is that it seems as the Project Manager has to be responsible of providing effective communication between the members of the project team and to be a good motivator and leader as much as a manager. The Project Manager should also have the competence in using different project management tools and techniques, such as EVM, risk management, and conflict and communication tools. This is to show capability of knowing several potential outcome of the project before it starts and to understand how risk can be reduced. It also

expresses how conflicts can be managed in a better way and how to evaluate the project's progress before completion. Different factors related to the project management success are related to the project, project team organizing and leadership and the Project Managers. The main findings according to this study are summarized in table 6-1.

Findings from the study for BU1, BU2 and BU3 to improve project control
Project Manager's competences and effective use of PM tools such as EVM, risk management and communication & conflict management.
Team management and leadership; different types of team, team performance, team leadership & motivation and the rules of team-building.
Project management success factors (factors related to projects, the project team & leadership and the Project Manager)

Table 6-1 – Research findings

The stream of this study is constructed to inspire Project Managers and to help them with achieving an effective outcome in projects where essential practical information from the business environments are involved. In a daily life project, many managers make the mistake of not involving the team members of their project at the early planning stages or at conceptual meetings. However, the involvement of team members is very important at an early stage of the project. It can also be suggested that the Project Manager encourages team-building activities for their team during the preliminary stage of the project.

The Project Managers are also assigned to handle the information or solution for solving the problem of their project independently when they have direct authority from the management, whereas the organizational structure is the important factor. As an example, in organizations with a matrix structure, the Project Manager mostly gets direct authority to handle each and every issue in the project which has a great impact on the project outcome. Therefore it can be suggested that the matrix structure should be more used during projects than other organizational structures.

The research and results which are presented in this thesis clearly show that the Project Manager's competences, the team leadership and the project management success factors is very specific and this research has carefully focused upon those areas. Based on the constructed results it is possible to further develop the research, perform additional case studies and gather more statistical data. Therefore, further research efforts might continue to

focus more about the documentation and verification of the Project Manager's competences, managerial tools and techniques, team-building as well as the project management success factors that may affect the improvement of project control.

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APPENDIX A

Interview

Researcher has prepared the interview questions according to reach their findings and to meet the research questions. The research questions are following:

1. What responsibilities and competence should the Project Manager have in order to achieve an effective, efficient and successful project execution?
2. To what extent can team management and project leadership styles affect the outcome of the projects in a portfolio?
3. How do success factors have the influence on the potential project outcome?

Interview Date: 01 Feb 2015- 30 Mar 2015

Interview Object: St .Olav Hospital, Helsebygg office, Faculty of medicine, NTNU

Interview Structure: Semi-structured

Interviewers: Lutful Hassan and Mia Selnes

Interviewee's: Secret

Interview Questions

Organizational Environment

1. Information about interviews, what kind of responsibilities do you have at work?
2. Can you please describe the a) organizational structure type and b) numbers of employees?
3. What kinds of projects have you either been a manager for or involved with?
    a. Size? Budget? Team members? Length?
4. How many projects in the business unit are going on at the same time?
    a. How are these projects organized? (PMO, Portfolio management or manually?)

Project Manager Competences

5. What is the average level of experience for the project manager?
6. What do you think is the most important characteristics of a project manager? (Leadership style, technical competence, communication skills, motivation skills etc.) What characteristics can create inefficiency amongst project managers?
7. What is the most difficult part of being a project manager/team member?

Tools used by Project Manager

8. What kind of project management tools (computerized tools: MS Project, Excel, PrimaVera…, manual tools) do you use?
9. Do you use any specific models to estimate the total cost of the project? What kinds, and what is working/not working with this?
    a. At ongoing projects, how do you measure the project management maturity? (EVM)
10. Who measures the risk factors of the projects? (Project owner, project manager, contractor etc.)
    a. How do you measure the risk factors of the projects? What are the most common risk factors?
11. What do you think is the most effective way to solve a problem (as a project manager)? (Collaboration, compromising, avoiding, dominating etc.)

Project Team Organizing and Leadership

12. Have you ever been in a cross-functional department project?
    a. Who are in charge of them? (Customer, supplier, own department…)
    b. How do you deal with the several different problems arising regarding this?
13. Is it sometimes unclear what your responsibility is during a project (where you are a team member) or are there always very good written procedures/practices for the exact work you are going to do?
14. How easy is it to get the access to the information you need from the other team members/project manager?
15. Can you give an example on a project where the leadership style of the project manager was not working?
    a. What could be the reason for this?
16. In what circumstances is it most likely for a problem amongst the team members/project manager to arise? (Schedules, personality conflicts, administration, money etc.)
17. What do you do to motivate your team, and how do you measure the effectiveness of this motivation?
    a. What do you think is the most effective way to get the team members motivated? (General meeting, incentives etc.)

18. Have you ever been involved in a project where the team members are very demotivated? Please give examples.
    a. What could be the reason for this? What could have been done differently?

Project Management Success Factor

19. What are the most important criteria for judging if the projects are successful or not? (Schedule, budget, quality etc.)
20. How do you measure the end-user satisfaction after finishing a project? (Survey, interviews etc.)

APPENDIX B

Survey

The researcher has sent the survey request through following e-mail format.

Survey Deployment period: 12 March – 11 April 2015

Hei!

Er dere interesserte i hvordan prosjekter og ledelse av disse fungerer i deres organisasjon? Vi driver nemlig med en analyse av dette.

I forbindelse med vår masteroppgave i Project Management på NTNU (Fakultet for Industriell Økonomi og Teknologiledelse) har vi formulert en spørreundersøkelse for å identifisere hvordan prosjekter kan gjøres mer effektive i den offentlige sektoren. Spørreundersøkelsen er formulert slik at det skal være enkelt å besvare (med svaralternativer) og vil ta rundt 10-15 minutter. Spørreundersøkelsen er på engelsk. Din deltakelse i undersøkelsen er veldig viktig for at vi skal kunne gjøre en så nøyaktig analyse som mulig.

Vennligst svar på spørreundersøkelsen innen 6. april 2015. Spørreundersøkelsen er anonym og inneholder ingen identifiserende spørsmål. Svarene som blir sendt inn vil kun brukes i forhold til denne oppgaven, og vil slettes så snart oppgaven er ferdig.

Dersom dere kjenner noen flere som kan ha mulighet til å besvare undersøkelsen (innenfor St. Olav's, NTNU og Helsebygg), så send gjerne linken videre!

Link til undersøkelsen: https://survey.svt.ntnu.no/TakeSurvey.aspx?SurveyID=MSPROMAN

Takk for din deltakelse i undersøkelsen. Resultatet av undersøkelsen vil bli sendt ut til de som ønsker en kopi.

Med vennlig hilsen,

Mia Selnes & Lutful Hassan

Fakultet for Industriell Økonomi og Teknologiledelse

Master in Science, Project Management, NTNU, Trondheim

Survey Participants: Project Managers and project team members at St. Olav's Hospital, Helsebygg Midt-Norge and the Faculty of Medicine at NTNU

Survey questions

Organizational Environment

1. **Which business unit do you work for?**
    - BU1
    - BU2
    - BU3
    - Other? Please specify

2. **Organization size, number of employees?**
    - 1-100
    - 101-500
    - 501+

3. **Your Job tittel?**
    - Director of project management
    - Project Manager
    - Functional manager/Line manger
    - Purchasing/Logistics manager
    - Administrative Manager

4. **Number of people involved in the project?**
   (1-5), (6-10), (11-20), 20+ participants
    - Participants from your organization
    - Participants from the client organization
    - Participants from the supplier organization
    - Other participants

Project Managers Competences

5. **How many years of experience have you had as a member or leader of a project team?**
    - 1-3 years
    - 4-8 years
    - 9-12 years
    - 13-16 years
    - 17+ years

6. **What are the most important personality characteristics for a project manager?**
   Scale (1-5); 1-less important, 5 –most important
    - Technical competences
    - Good motivator
    - Good planner, with focus on budgeting and scheduling

- Good communicator
- Being supportive for the team members
- Open minded and easy to talk to
- Having strong clear vision
- Being innovative and thinking out of the box
- Goal oriented
- Process oriented

7. **In a project, do you have fully written procedures for how the project will proceed? (Project guidelines, implementation plans, resource planning etc.)**
    - Always
    - Often
    - sometimes
    - Seldom
    - Never
    - don't know

Tools used by Project Manager

8. **What kind of project management tools do you use?**
    - Computerized tools (MS Project, excel etc.)
    - Manual tools and methods
    - Other? Please specify

9. **Who controls risk in your project?**
    - Project owner
    - Client and/ or contractor
    - Contractor and project owner
    - Other? Please specify

10. **What conflict management style do you (or your project manager/line manager) mostly use?** Scale (1-5); 1-less important, 5 –most important
    - Compromising
    - Collaborating/problem solving
    - Cooperating
    - Withdrawing/avoiding
    - Dominating /forcing

11. **Do you use any methods to evaluate project performance or maturity? (Earned Value Management)** Scale (1-5); 1-less important, 5 –most important
    Fixed formulas
    Weighted milestones
    Percentage completed of total work

Physical measurements

Project Team organizing and Leadership

12. In a project, what kind of team have you worked for?

- Virtual team
- Cross-functional team
- Problem-solving team
- Self-managed team
- Other? Please specify

13. How much do you think team-building exercises in advance affect the outcome of the project?

- Very effective
- Effective
- Neutral
- Ineffective
- Other? Please specify

14. How satisfied are you with the clarification of your role in the different projects?

- Very satisfied
- Satisfied
- Neutral
- Dis-satisfied

15. How good is the responsiveness from the top management to provide the required information?

- Excellent
- Good
- Neutral
- Fair
- Poor

Project Management Success Factors

16. Success factors related to the Project

Scale (1-5); 1-less important, 5 –most important

- Uniqueness of project activities
- Commitment to the end user
- Clear defined goal /objectives

- Dependencies between activities of the project network
- Availability of funds and resources
- Project life cycle
- Project integration & procurement management

17. Success factors related to the members of the project team

Scale (1-5); 1-less important, 5 –most important

- Technical background
- Communication skills
- Earlier, similar work experience
- Effective monitoring & giving feedback
- Being motivated
- Being committed

18. Success factors related to the Project Manager

Scale (1-5); 1-less important, 5 –most important

- Effective leadership
- Having earlier, similar work experience
- Frequent change in management team
- Perception of the management role and responsibilities
- Ability to co-ordinate different task
- Competence
- Commitment
- Trust
- Ability to delegate

APPENDIX C

Calculation of Earned value Management

To have the clear concept of EVM and the formulas, let's think a project which has exactly one task and the task was base lined at 8 hours, but 11 hours have been spent and the estimate to complete is 1 additional hour. The task would have been completed already. Assume an hourly rate is $100/hour. The following is the calculation:

Hourly Rate = $100

PV or BCWS = Hourly Rate * Total Hours Planned or Scheduled

PV = $800 ($100 * 8 hours)

AC or ACWP = Hourly Rate * Total Hours Spent

AC = $1100 ($100 * 11 hours)

EV or BCWP = Base lined Cost * % Complete Actual

EV = $734 (baseline of $800 * 91.7% complete)

(NOTE % Complete Actual (below) to get the 91.7%)

BAC (Budget at completion) = Base lined Effort-hours * Hourly Rate

BAC = $800 (8 hours * $100)

EAC (Estimate at completion) = AC + ETC (Estimate to Complete)

EAC = $1200 (1100 + 100)

VAC (Variance at completion) = BAC - EAC

VAC = -$400 ($800 - $1200)

% *Completed Planned* = PV / BAC

% Complete Planned = 100% ($800 PV / $800 BAC)

% *Completed Actual* = AC / EAC

% Complete Actual = 91.7% ($1100 AC / $1200 EAC)

SV (Schedule variance) = Earned Value (EV) - Planned Value (PV)

SV = -$66 ($734 EV - $800 PV)

SPI = Earned Value (EV) /Planned Value (PV)

SPI = 0.91 ($734 EV / $800 PV)

CV (Cost Variance) = Earned Value (EV) - Actual Cost (AC)

CV = -$366 ($734 EV - $1100 AC) indicating a cost overrun

CPI = Earned Value (EV) /Actual Cost (AC)

CPI = 0.66 ($734 EV / $1100 AC) indicating over budget