

**BEST PRACTICES FOR PROJECT HANDOVER IN MIDDLE-SIZE  
ORGANIZATIONS**

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<b>The title of thesis</b> Best Practices for Project Handover in Middle Size Organizations	<b>Number of pages and appendices</b> <b>67 + 1</b>
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<p>It is challenging to run a project and hand it over into daily processes. This thesis examines Nord Pool Spot AS' (later NPS) issues in current project and operational processes. It has been a common problem in NPS that the project team has had the best knowledge of new systems. This has led to a situation where the daily operation team depends on the project team and/or persons who have worked for the project.</p> <p>The thesis is based on a research problem to define an optimal project handover model for small or medium size organizations. It intends to describe a model which ensures the end user's sufficient knowledge of the project. In other words, the goal is to define how to ensure thorough knowledge of new systems for the end-users.</p> <p>The research methodology in this thesis is the case study method. With the help of semi standardized interviews, the plan was to organize the theory to present best practice. The data was collected by interviewing employees, employers, and suppliers. Also, an external project manager's project diary was studied.</p> <p>The most common issue in project handover in NPS is to define the end user's roles and responsibilities. The reason for this, and similar issues in all these projects (Enex, Sets and Sesam) is the need for the organizational maturity to run projects according to standards. Other issues included the motivation of end users. Among project members, the motivation is good but since the end users are not committed to the new product in the early phase, their motivation is lacking.</p> <p>The model that this organization is missing is clear responsibilities for each process; clear phases for the project; validating and verifying project results; and commitment of the operational team.</p>	
<b>Key words</b> Case Study, handover, project closing, organization's readiness, end user motivation	

<b>Tekijä</b> Markus Laine	<b>Ryhmä</b> YTI09K
<b>Opinnäytetyön nimi</b> Parhaat tekijät projektin luovutuksen kannalta pienessä tai keskisuuressa yrityksessä.	<b>Sivu- ja liitesivumäärä</b> <b>67 + 1</b>
<b>Ohjaaja</b> Jarmo Sarkkinen <p>Projektien tekeminen on haastavaa, mutta erityisen haastavaa on luovuttaa projekti loppukäyttäjälle. Tutkimuksen taustana ovat Nord Pool Spot AS –nimisen (myöhemmin NPS) organisaation projektien luovutuksessa havaitut ongelmat. Hyvin usein keskeinen tietämys tuotteesta on vain projektiin osallistuneilla henkilöillä. Tämä on johtanut usein myös siihen, että myös operatiiviset tehtävät kaatuvat projektihenkilöiden niskaan. Pienessä yrityksessä, jonka resurssit ovat muutenkin rajalliset, tämä ei ole tehokasta voimavarojen käyttöä. Resurssiongelmat eivät häiritse ainoastaan operatiivista liiketoimintaa, vaan myös uusien hankkeiden suunnittelu ja läpivienti kärsivät.</p> <p>Teoriaosuuden pohjalta laadittu teemahaastattelu konkretisoi tutkimusongelman. Tutkimusta varten haastateltiin NPS:n projektien työntekijöitä, projektipäälliköitä, projektien omistajia ja toimittajan edustajaa. Myös ulkoisen projektipäällikön päiväkirjaa käytettiin tutkimuksessa apuna projektin yksityiskohtien selvittämiseksi.</p> <p>Tutkimuksen perusteella ongelmakohtia olivat vastuunjako, loppukäyttäjän sitoutuminen uuteen tuotteeseen, kommunikaatio ja tietämyksen siirto projektilta operatiiviselle organisaatiolle.</p> <p>Ratkaisuehdotuksena on vastuualueiden määrittely prosessikohtaisesti, selkeät vaiheistukset projekteihin, tulosten validointi ja verifiointi sekä operatiivisen henkilöstön sitouttaminen projektiin jo projektin alkuvaiheessa.</p>	
<b>Avainsanat</b> Toimintatutkimus, luovutus, projektin päättäminen, organisaation valmius, loppukäyttäjän motivaatio	

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# **1 Introduction**

## **1.1 Background**

It is quite challenging to define when a project is finished and when that project is not any more a *project*, but is a part of the daily process. Quite often the project just continues with the same team and resources, although the product itself has been delivered for production. Especially in small or medium size organizations, it is difficult to draw the line between when the project has ended and when the production phase has started. In general it is interesting to find out what the consequences of lacking a project handover process are in small and multinational organizations.

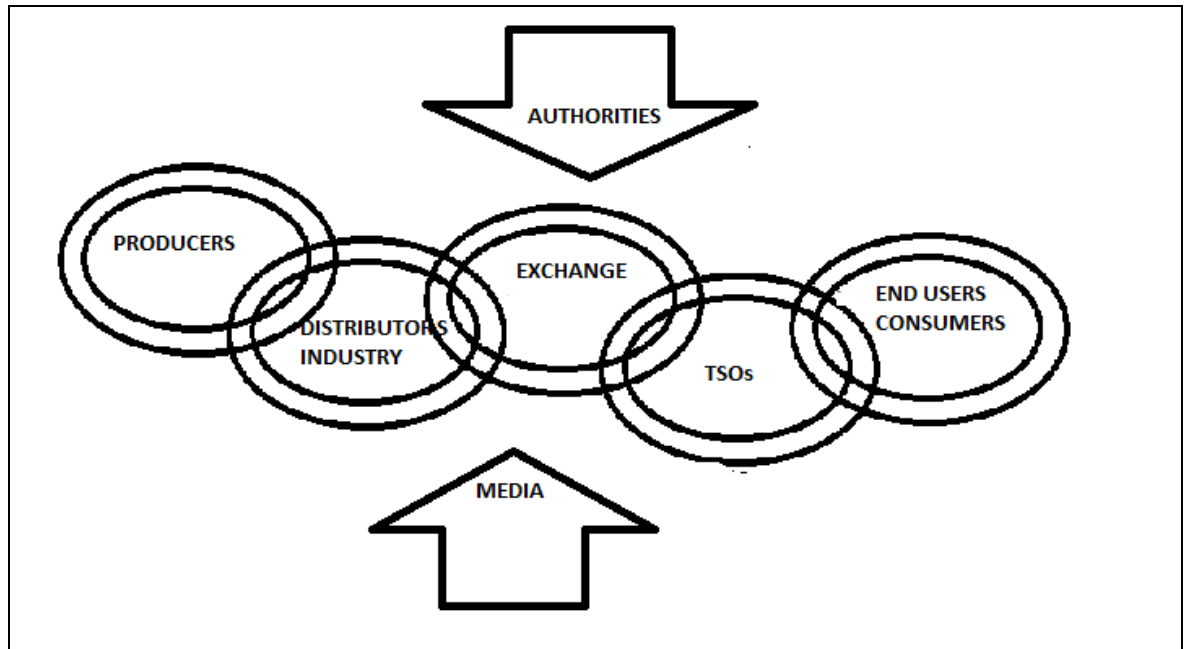
The purpose of this thesis is to study project handovers made at Nordic Power Exchange; in other words Nord Pool Spot. The challenge in the organization has been the lack of project methodology and project management standards. This has led to a situation where the project handover process has failed in many cases. The problem with lacking a handover process has been that the project owner does not have control over the new system. In other words, the project team also runs daily business cases because the project owner does not know or does not have enough motivation to learn how the new system works. Also, the quality of project work has been lacking.

The goal is to find out how project handovers should be managed in middle sized companies and the tools for project handover: in other words, how to transfer the knowledge of an improved process to the operational team, so the project team can concentrate on running the next project. With an efficient process management system in place, the organization can also save time and money.

## **1.2 Nord Pool Spot**

Nord Pool Spot AS is one of the leading power exchanges in the world. Trading volume in 2010 was about 310 TWh, which is equivalent to about 74% of electricity consumption in the Nordic countries. Its trading value in Euros was around 16.5 billion Euros. The staff of NPS number around 50. The headquarters is located in Oslo, Norway and there are branches in Fredericia (Denmark), Stockholm, Helsinki, Tallinn, and London.

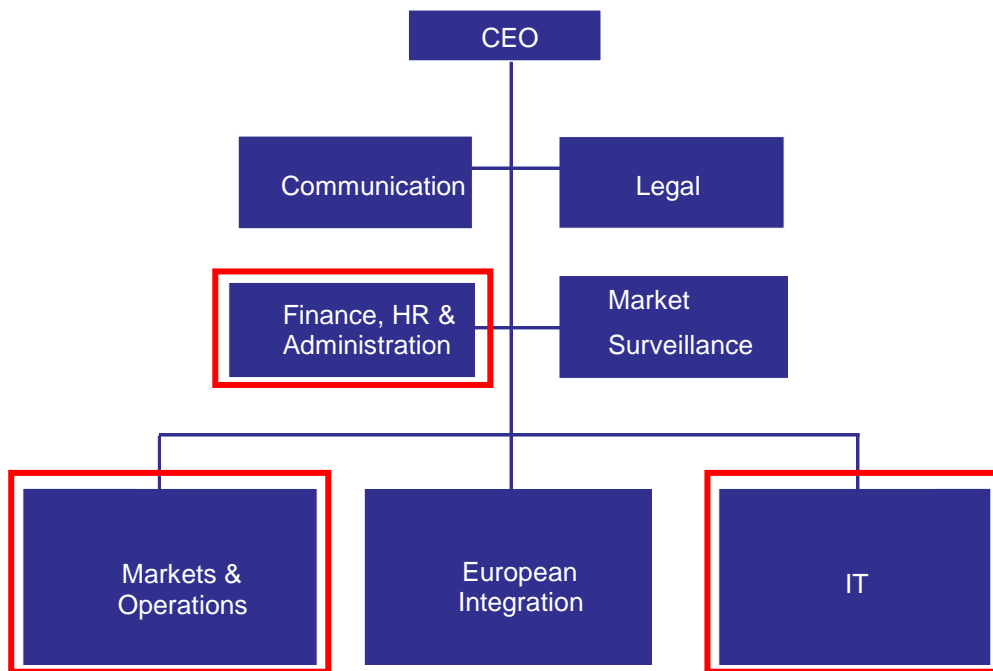
NPS has many stakeholders, like the owners, four Nordic Transmission Operators (later TSO), the Nordic authorities, electricity market members, institutions and market researchers. One critical issue for the company is also the public opinion of the market model, as well as giving equal and transparent information on electricity prices (see Figure 1).



**Figure 1. Value Chain of the Electricity Market**

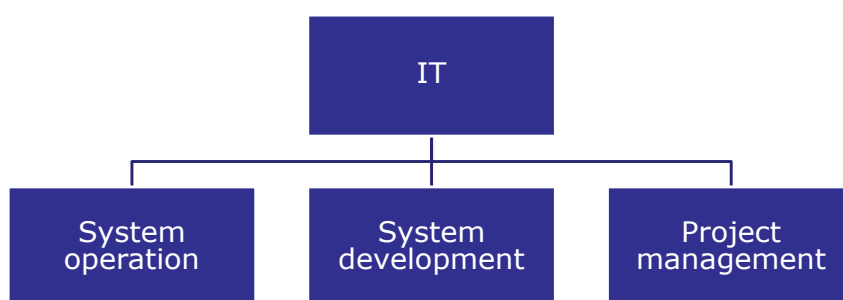
The organizational model is based on a weak matrix form of organization where all employees have some daily routines to undertake, and possibly also some project responsibilities. The project owner can be any management team member representing any department. The resources, as well as the project manager, can represent any department, such as Market and Operations, European Integration, Communication, Market Surveillance or IT. The prioritization of projects is the management team's responsibility and the ultimate decision making in the organization rests with the CEO. The most critical connections from the daily business point of view are between the Market and Operations, IT and Finance, HR and Administration departments (see Figure 2).





**Figure 2. NPS organization – IT projects are run in the IT department but the CEO has decision-making power**

NPS' IT organization is divided into three sections: Systems operation, Systems development and Project management (see Figure 3). Altogether 10 people work for the IT department. IT projects as a general rule are managed in the Helsinki office. NPS also uses some external consultants and suppliers such as software development companies.



**Figure 3. IT Department**

Nord Pool Spot is quite young as an organization. Responsibilities, delegation and the use of resources are not always crystal clear, especially not for all employees. This has led to situations where it is difficult to define a person's exact role, project or daily tasks. Also, in many cases, the management expects a named employee to run the project without man-

date, resources or a plan. However, every project does not as a rule fail because of the lack of project standards: in fact many projects have been carried through successfully, but the time and money used is not always in balance with the business plan. Many improvements have been commenced in the organization.

### 1.2.1 The Core Process of NPS

Most of NPS' revenue comes from the Elspot market, which is a marketplace for electricity market members, in other words for producers and suppliers. These market players define the electricity price once per day and that price is the reference price for the whole Nordic market. Over 99% of NPS' turnover originates from the main process described in Figure 4. The whole economy of the company depends on how this process is maintained and developed.

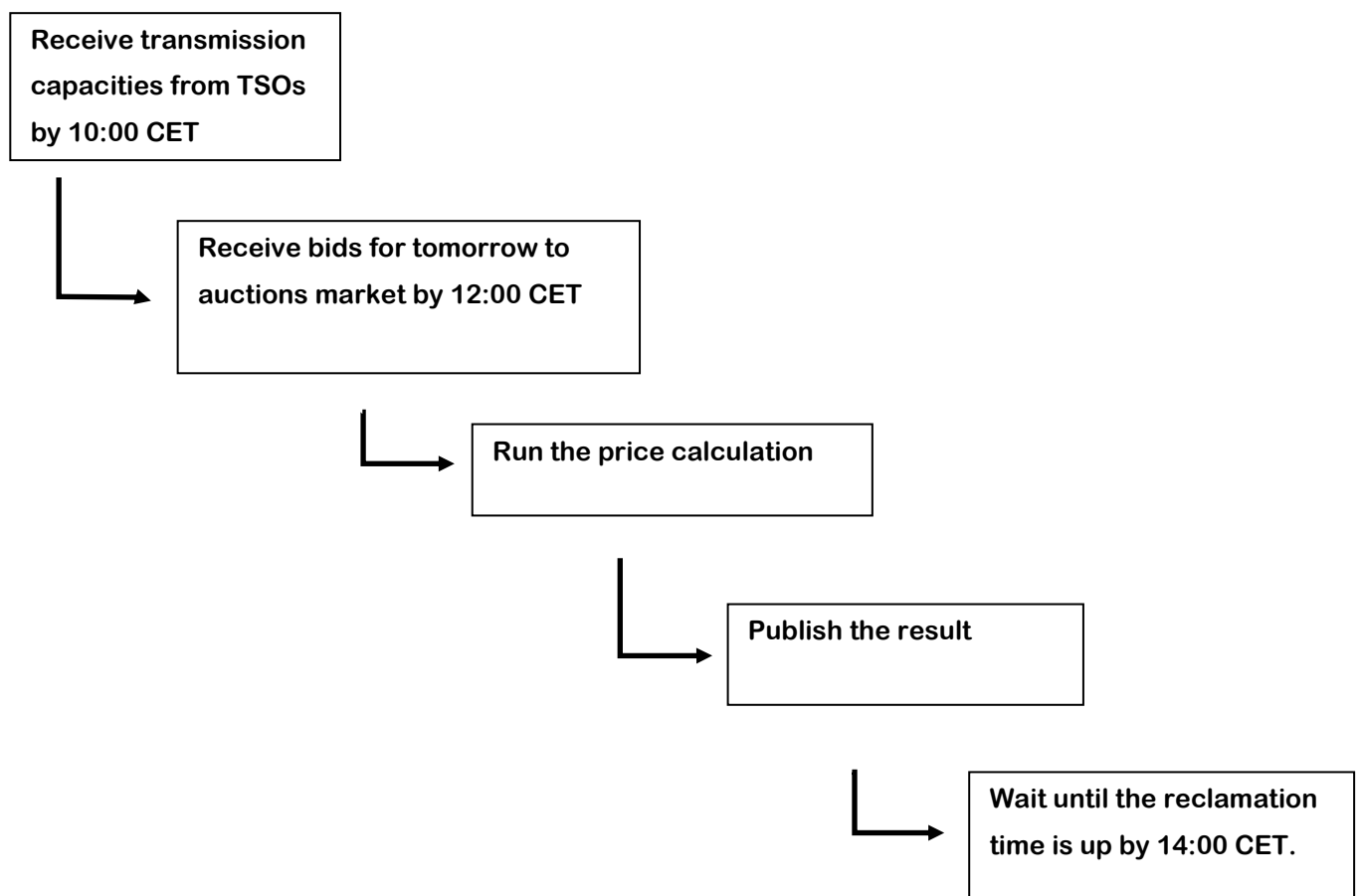


Figure 4. Auction process

It is important to realize that Figure 4 only shows the very core of the most important process of the organization. Without sub-processes such as financial administration or market surveillance, the core process could not survive.

### 1.2.2 Project Management processes in NPS

Project management in NPS is not based on any known project management standard but more likely ad hoc knowledge and requests from owners or other stakeholders such as the authorities. This thesis focuses on the challenges located between boxes 3 and 4 and also between 4 and 5 (in Figure 5). The question is why the project manager is still tied up with the release after the project has been brought out into production and why knowledge of the project results is not reaching the end users.

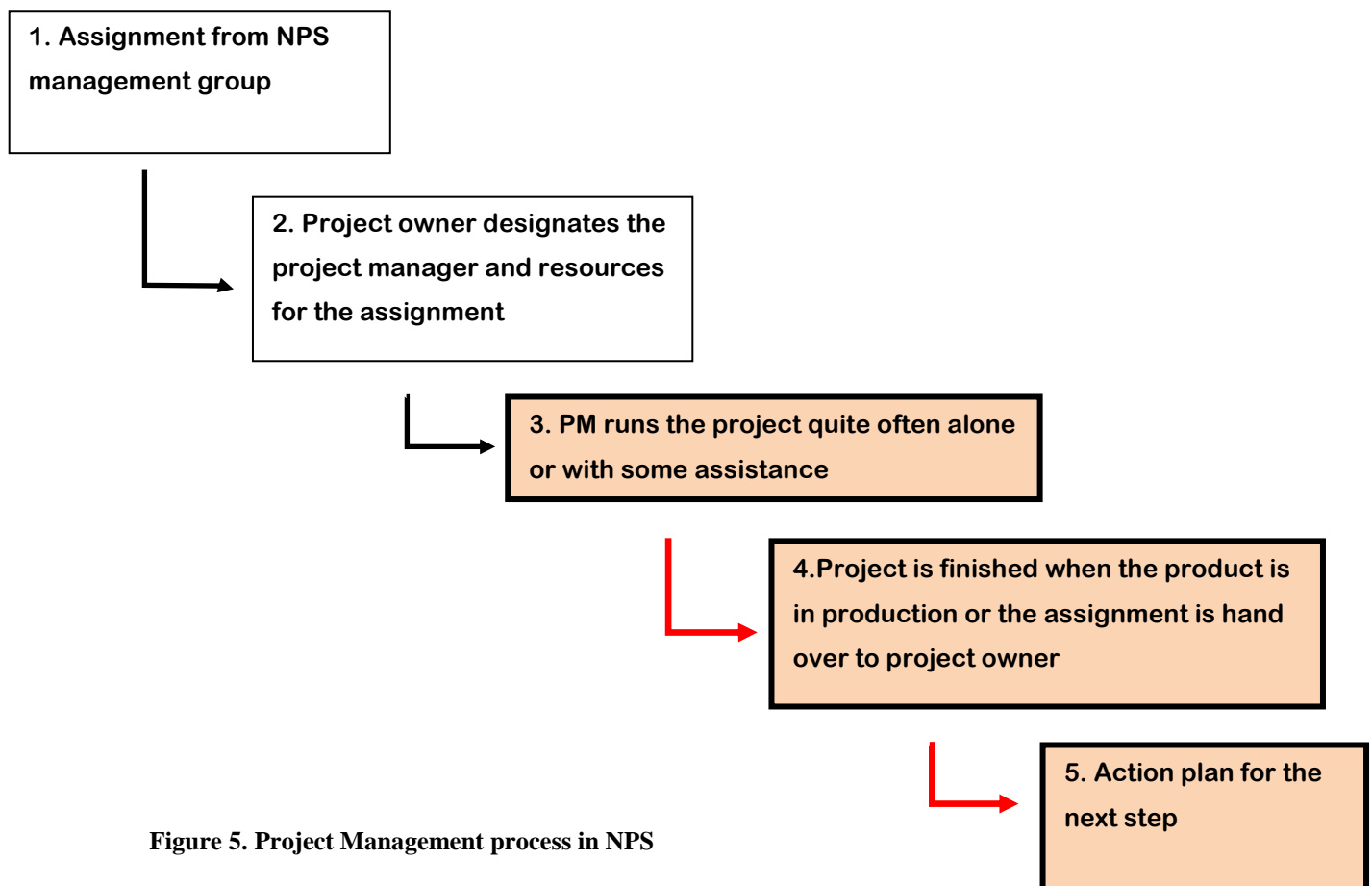


Figure 5. Project Management process in NPS

### 1.3 Research problem

The research problem is:

“To develop a proposal for a project handover model which ensures the end user’s sufficient knowledge of the product.”

The following questions have been defined for the study in order to solve the research problem. Questions:

1. What are the problems in the project handover process in Nord Pool Spot?
2. How can a midsize company control these problems?

#### 1.3.1 Problems caused by flawed handover process

Figure 6 describes at an overall level the daily market maintenance process. Quite often the project manager or the system developer must take an action in order to solve quite common issues that are related to daily process management. In the worst cases, the customer will be ignored because of a lack of knowledge of who should solve the issue. It would be interesting to find out where this kind of behavior goes wrong. Is it management, project management, overall knowledge of standards or just challenges that any small or middle size organization must face?

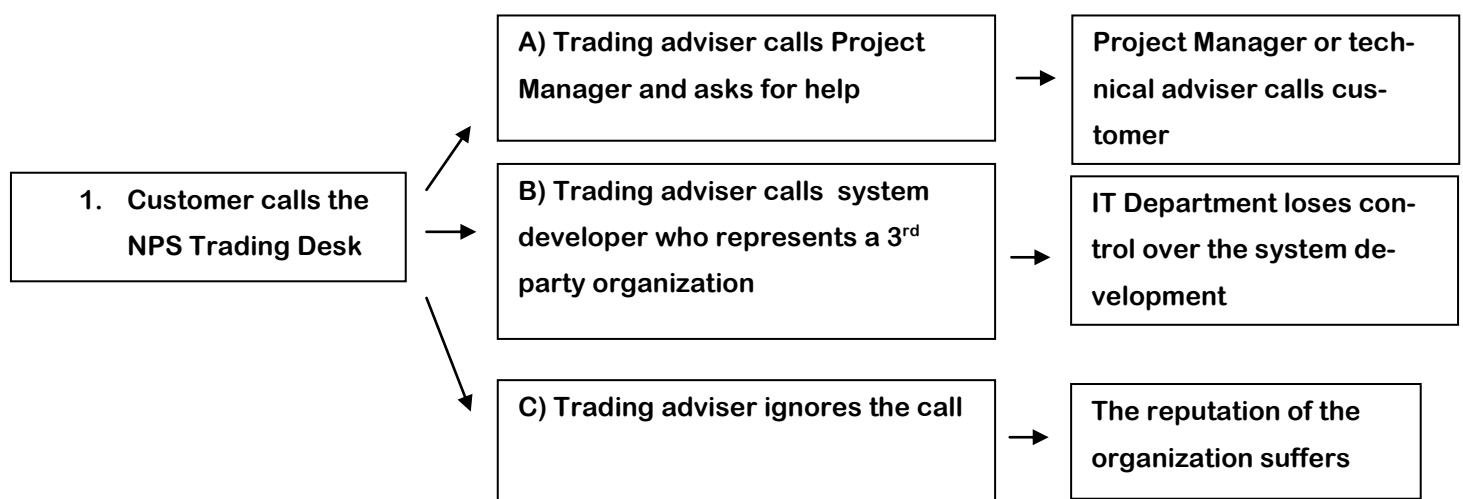


Figure 6. Daily market maintenance process in NPS

Figure 6 brings in to question problems also in communications, education and management. In other words, there is not just one clear issue in the organization, but there are several challenges that the organization must solve.

#### **1.4 Research Approach**

The research approach for this study is based on a case study model. The case study is a typical strategy, for example in economical science. The starting point for this strategy is based on the tradition of scientific study. The case study is ideal in a situation where the goal is to renew an organization's processes. The "case" can be an organization or a part of it, a product, service or process. The case study gives valuable information about the current state of an organization, its environment and problems. In other words, with the help of the case study it is possible to understand the organization in its real environment (Yin, 2009, 4).

*The current phenomenon of time-event in terms of its real context, namely the environment in which the phenomenon occurs. (Yin, 1994, 13)*

The case study gives an answer to the questions "How?" and "Why?" The goal will be to expand and generalize theories and not to enumerate frequencies or statistical generalization. The case study takes in to account environmental, temporal and social situations and connections (Yin, 2009. 4, 15).

The analysis method for this thesis will be qualitative case study research. The research methods are a manual walkthrough of project documentation from the past three projects interviewing corresponding people. Information on the corresponding organization of the project handover processes are collected in non-electronic form in the interview.

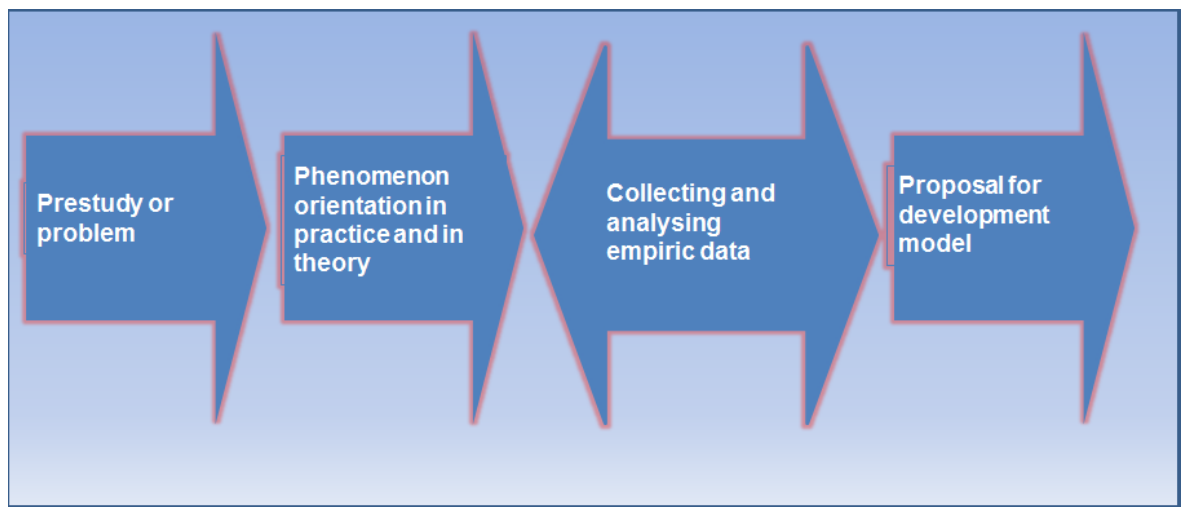
*In the classic case study, a 'case' may be an individual. (Yin, 2009, 29)*

The phases of the research process are based on theories, methodologies and previous research. Three case projects examine a sample of past NPS IT projects. The system involved for this study represents the main operational functionalities of NPS, for example trading in the main market, trading in the aftermarket and settlement services. The first

phase of the case study is a preliminary development task or problem: the second phase is orientation to the phenomenon in practice in theory and study specification.

The third phase concentrates on collecting and analyzing empirical data using different methods such as interviews, queries and observation. The last phase creates the proposed development model (see Figure 7).

*The case study examined the discussion between the client and the vendor or discussions in the staff meetings, examined documents produced by the organization or the researcher recorded observations of the organization's operational practices (Yin, 1994, 13)*



**Figure 7. Phases of Case Study (Ojasalo, Moilanen, Ritalahti, 2009, 54)**

In the case of NPS, the recognized problem is identified but the suitable solution is missing. Data collection is quite easy, mainly because the people involved in these projects are still working for NPS and also because there are documents available in both paper and electronic formats.

### **1.5 Quality of research design**

Four tests have been used to establish the quality of empirical social research. Because case studies are one form of such research, the four tests also are relevant to case studies. The identification of several tactics for dealing with these four tests when undertaking case studies is shown in Figure 8. The figure lists the four used tests, recommended case study tactics and when the tactics are to be used (Yin. 2009, 40).

TEST	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	<ul style="list-style-type: none"> <li>- Use multiple sources of evidence</li> <li>- Establish chain of evidence</li> <li>- Have key information review draft case study report</li> </ul>	Data collection Data collection Composition
Internal validity	<ul style="list-style-type: none"> <li>- Do pattern matching</li> <li>- Do explanation building</li> <li>- Address rival explanation</li> <li>- Use logic models</li> </ul>	Data analysis Data analysis Data analysis Data analysis
External validity	<ul style="list-style-type: none"> <li>- Use theory in single-case studies</li> <li>- Use replication logic in multiple-case studies</li> </ul>	Research design Research design
Reliability	<ul style="list-style-type: none"> <li>- Use case study protocol</li> <li>- Develop case study database</li> </ul>	Data collection Data collection

Figure 8. Case study tactics for four design tests (Yin, 2009, 41)

Each item on this figure deserves special attention. For case studies, an important finding is that many tactics for dealing with these tests should be applied throughout the subsequent conduct of the case study (Yin, 2009, 40- 41).

## 1.6 Reliability problems

The goal of reliability is to minimize the biases and errors in a study. One way of approaching the reliability issue is to make many operational steps and to conduct research as if someone were always looking over your shoulder. A good guideline for doing case studies is to conduct the research so that an auditor could repeat the procedures and arrive at the same results (Yin, 2009, 45).

The measures used in the selection of the themes under examination, namely project hand-over, seem to be fairly easy: problems arise if budgets or schedules overrun, and this is quite easy to measure. Also it is quite clear to verify the model of handover process, seeing if it includes all necessary instruction and documentation, so with the help of that infor-

mation it is possible to hand the project results over to the system's owner. However the challenge is how to measure successful methods of management of the handover process.

### 1.7 Construct validity

To meet the test of construct validity, an investigator must be sure to cover operational measures that match the concept, which is preferably accomplished by citing published studies that make the same matches.

Because of the examined industry, the research may have related to the theoretical - i.e. construct validity problems. Electricity, and especially the electricity exchange business, is a challenging topic for many people. In this sector, systems are rather complex and closer to the engineering than the financial world. It is therefore crucial to use clear terms. Also the problems of observation are particularly important. Although the research target is to be generalized to some extent, to the handover process, the issues, however, require a strong industry expertise.

### 1.8 Internal validity

Internal validity concerns explanatory case studies, when an investigator explains how and why event x led to event y. If the investigator incorrectly concludes that there is a causal relationship between x and y without knowing that some third factor z may actually have caused y, the research design has failed to deal with some threat to internal validity. Basically, a case study involves an inference every time an event cannot be directly observed (Yin, 2009, 42-43).

### 1.9 External validity

This test deals with the problem of knowing whether a study's findings are generalizable beyond the immediate case study. The following example describes the topic:

*If a study of neighbourhood change focused on one neighbourhood, are the results applicable to another neighbourhood? (Yin, 2009, 43)*



This example is relevant also to this case study. The aim is that the NPS project handover model can also be applied more broadly to other organizations. The generalization is not automatic, but a theory should be tested by replicating the findings in second or even a third case, where the theory has specified that the same results should occur (Yin, 2009, 44).

### **1.10 Ethical guidelines for research**

My goal is to find a method to assess the efficiency of the handover processes so it will also help other organizations.

### **1.11 Terminology**

PML – Process Management Lifestyle

Six Sigma - Product Life Cycle – model

COPQ - Cost of Poor Quality

DPU – Defects per Unit

Lean Six Sigma – Product Development Process - model

PMBOK - Project Management Body of Knowledge

CMMI - Capability Maturity Model Integration

CRMP - Center for Research in the Management of Projects

TAM - Technology Acceptance Model

IIS - Model of Information System Success

DMAIC – Define, Measure, Analyze, Improve, Control Improvement

The Deming Cycle, PDCA – Plan, Do, Check, Act

### **1.12 Scope of the thesis**

This study examines only the project handover process. It is not intended to examine project management methods such as light business planning or project design.

The research is to be carried out alongside standard daily tasks and duties and the plan is not to interfere with other projects, or to interfere with projects only in moderation.

The objective of the study is not to find a universal project delivery model, but a model that suits this organization. One goal for this study is to clarify the line between projects and daily processes. Another goal is to clarify the roles of project organization and process ownership.

If the thesis includes classified information about NPS, that kind of data will be presented in separate attachment which will be available only for NPS or the relevant authorities. Otherwise the thesis is public.

### **1.13 Structure of the thesis**

The first section describes the research problem and the target organization, Nord Pool Spot As. This section also describes in short how the project management process works at NPS. It also describes the research approach, which will be based on the case study methodology.

After the introduction, the study will analyze related theories. The initial objectives are organizing the work and finding in the literature theories and models on project handover. The goal is to create a crystal clear description of what the project handover process means, how it can be described and the theories and standards that describe *project handover*. Many standards describe the project handover process point of view, like PML, Six Sigma and the Deming cycle. There are also some standards which describe the project handover *project point of view*, like CMMI and PMBOK. This thesis clarifies the project phases and especially what happens at the end of a project: how and when the project is in the state of being ready for closing. In this second section it is interesting also to find out

what kind of influences organizational structure have on projects and especially project handover.

In Chapter Three I study the operational process handover point of view. I will clarify the stage between the completion stage and the operational stage. I will also find out the differences between project management and operational management and what the methodologies and models say about project handover.

The fourth chapter is dedicated to analyzing past projects at NPS and again how projects were handed over to production in the organization. The data is collected by interviewing project participants and members of the NPS organization. The objective for this chapter is to find and identify problem areas in past project handover processes. For this study three projects will be chosen that are related to NPS' core business and are highly critical for the organization.

Chapter Five presents the new project handover model. The idea is to describe a mechanism for the project handover process that works in this organization.

An important part of the study is to evaluate the whole work. This chapter helps to understand the whole picture of this thesis and by self-reflection to give valuable information on the upcoming challenges. In this section I will also summarize best practices for the project handover process.

## **2 Project Management**

### **2.1 Definition of Project**

PMBOK is an American National Standard which collects good project management practices together. PMBOK was created by the Project Management Institute. Every project creates a unique service, product, or result. An ongoing work is generally a repetitive process because it follows an organization's existing procedures. In contrast, because of the unique nature of projects, there may be uncertainties about the service, product, or results that the project creates. Project tasks can be new to a project team, which expect more dedicated planning than other routine work (Project Management Institute, 2008, 4-5). The PMBOK Guide defines projects thus:

*A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. (Project Management Institute, 2008, 5)*

Projects are often utilized as a means of achieving an organization's strategic plan. Projects are typically authorized as a result of one or more of the following strategic considerations: market demand, strategic opportunity or business need, customer request, technological advance, and legal requirements (Project Management Institute, 2008, 10).

### **2.2 Definition of Project Management**

According to PMBOK, project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is divided into five process groups: initiating, planning, executing, monitoring and controlling, and closing the project. Managing a project includes identifying the requirements, addressing the needs, concerns, and expectations of the stakeholders. The project also includes the scope, quality, schedule, budget, resources and risk. The relationship among these factors is such that if any of the factors changes, at least one other factor is likely to be affected. For example, if the schedule of a project changes the project closing will be

delayed. The project team must be able to assess the situation and balance the demands in order to deliver a successful project (Project Management Institute, 2008, 6-7).

A project management office (PMO) is an organizational body or entity assigned various responsibilities related to the centralized coordination of those projects under its domain. The responsibilities of a PMO can range from providing project management support functions to actually being responsible for the direct management of a project. A primary function of a PMO is to support project managers in a variety of ways, which may include managing shared resources; identifying and developing project management methodology, best practices and standards; coaching, mentoring, training and oversight; monitoring compliance with project management standards, policies, procedures, templates and other shared documentations; coordinating communication across projects (Project Management Institute, 2008, 11).

### **2.3 Role of the Project Manager**

The Project Manager is the person who is assigned by the performing organization to reach the project objectives. The role of a project manager is different from that of a functional manager or operations manager:

*Typically the functional manager is focused on providing management oversight for an administrative area, and operations managers are responsible for a facet of the core business.* (Project Management Institute. 2008, 13).

Depending on the structure of the organization, the Project Manager reports to a functional manager. The Project Manager may also report to a Portfolio or Program Manager who is ultimately responsible for enterprise-wide projects. The Project Manager should maintain the following characteristics: good knowledge of project management; performance that refers to what the project manager is able to accomplish while applying project management knowledge; and personal skills such as attitudes and leadership. It is important to guide the project team while achieving the project objectives (Project Management Institute, 2008, 13).

## 2.4 Knowledge of the Project Manager

In 1997 CRMP<sup>1</sup> (the Center for Research in the Management of Projects) conducted research which aimed to provide empirical data to update BoK<sup>2</sup> (Project Management Body of Knowledge). The aim of the CRPM work was to identify the topics of a competent project manager's knowledge and understanding of project management. The research was based on data collection in over 117 companies and on interviews. The findings gave valuable information about what practitioners and academics believe project management professionals ought to be knowledgeable in.

The results showed that the most important features of project manager are leadership, legal awareness and procurement. What is remarkable is 89% of respondents said business case, project organization, testing, commissioning and *handover* are important to manage. In other words, project handover is more important than, for example, program and quality management, project planning, contract planning and administration (Morris, 2000, 7).

Only 28% agreed on goals, objectives and strategies and only 33% of respondents found system management important. Also performance measurement (44%) and information management (46%) were at low priority (Morris, 2000, 8).

## 2.5 Project lifecycle and organization

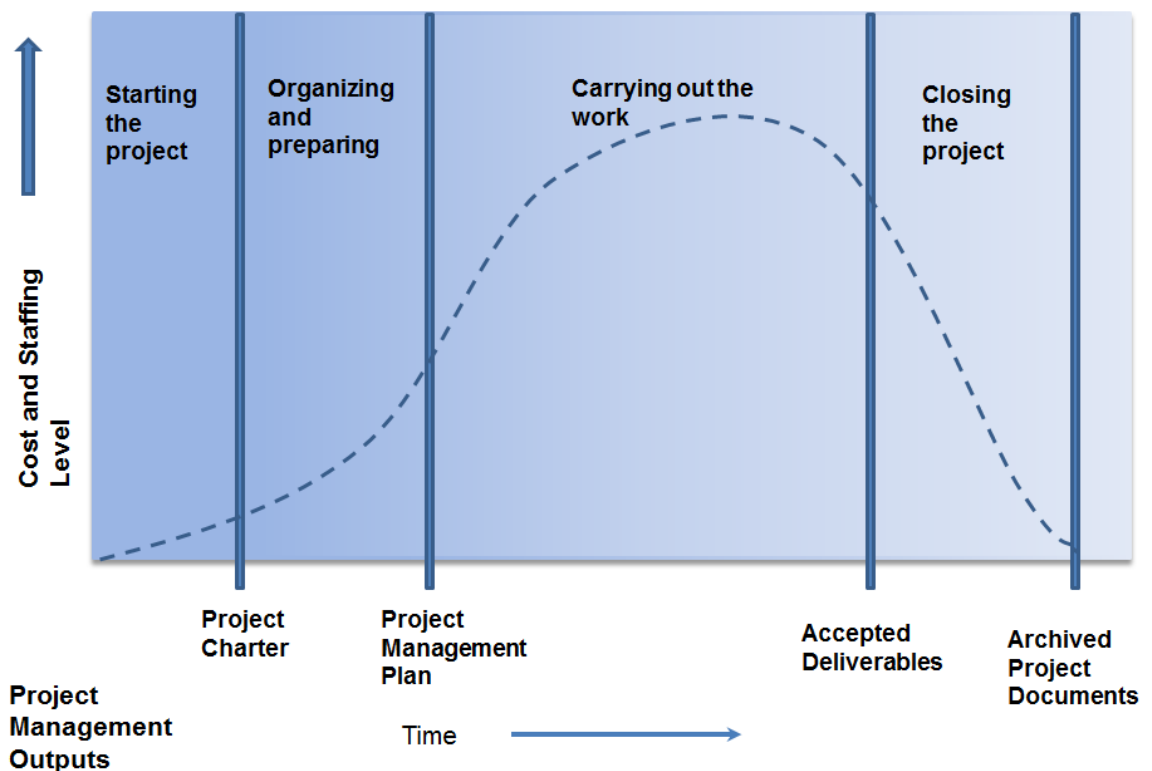
Project management is broader than the project itself. Understanding this broader context helps to ensure that work is carried out in alignment with the goals of enterprise. A project lifecycle is a collection of project phases. Every project has a definite start and a definite end. The specific deliverables and activities take place in between the start and end. The lifecycle provides the basic framework for the management of the project.

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<sup>1</sup> CRMP is a leading academic group in project management (see: <http://www.mbs.ac.uk/research/managementprojects/index.aspx>).

<sup>2</sup> Project Management Institute (PMI) established the first Project Management BoK in 1976. The idea was to establish one common practice for all projects (Morris, 2000, 3).

No matter what the project's size or complexity, the characteristics of the project lifecycle structure will be the same (see Figure 8). First comes starting the project, then organizing and preparing, third carrying out the project work, and last closing the project (Project Management Institute, 2008, 15-16).



**Figure 9. Typical Cost and Staffing Levels Across the Project Lifecycle (Project Management Institute, 2008, 16)**

Figure 8 shows from the budget point of view that the cost level dramatically drops in the Project Closing phase. This might lead to a situation where the project is not closed by the book. For example the documentation and end user education might be lacking. In the worst case, that might cause problems at the operational stage.

## 2.6 Project Phases

The project is segmented into logical subsets, in other words, the project is based on a phase structure. This helps to manage, plan and control the project. The need for phases, the number of phases, and the degree of control applied depends on the complexity, size, and potential impact of the project. No matter the number of phases, they all have similar characteristics.

*When phases are sequential, the close of phase ends with some form of transfer or handoff of the work product produced as the phase deliverable. (Project Management Institute, 2008, 19)*

There is no single way to define the ideal structure for a project. Some organizations have established policies that standardize all projects, while others allow the project management team to choose the most appropriate structure for their individual project. For instance, a feasibility study can be routine pre-project work for some organizations while others may treat it as a separate, stand-alone project (Project Management Institute, 2008, 19).

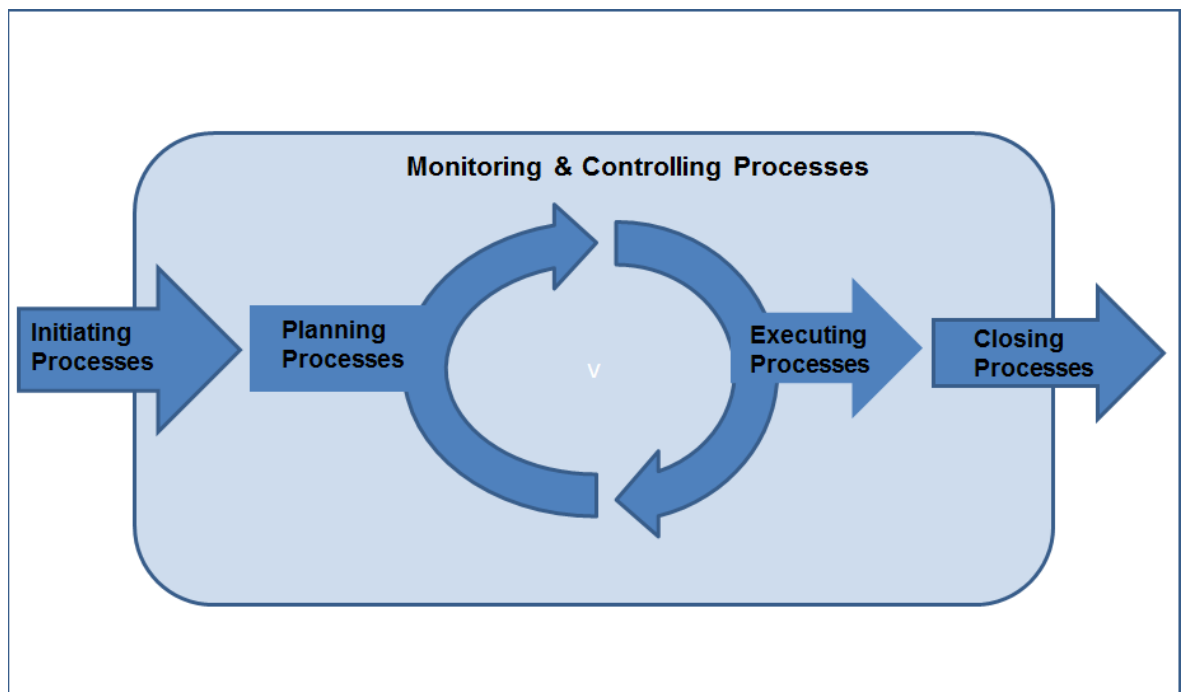


Figure 10. Example of a Single-Phase Project (Project Management Institute, 2008, 19)



Figure 10 shows an example of a single-phase project. Although PMI is talking about project phases, the project consists of several processes: initiating, planning, executing, and closing process. The project is part of business processes, it just has a clear start and end point.

## 2.7 Organizational Influences on Project Management

The organizational structure, style and culture influence how projects are performed. The degree of project management maturity also influences the project. When a project involves external entities as part of a joint venture or partnering, the project will be affected by more than one enterprise. Because of the different organizational styles and cultures, the project manager should understand that this might have an effect on the project's success. An organization has structural ranges from functional to projectized. Figure 11 shows, for example, that a functional organization has little or no power to make decisions on resources, a while projectized organization has almost total power over resources and budget.

<div>Organizational Structure</div> <div>Project Characteristics</div>	Functional	Matrix			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Resource Availability	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Who controls the project budget	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

Figure 11. Organizational effect on Projects (Project Management Institute, 2008, 28)

Compared to Figure 11, the NPS IT department is organized as strong matrix organization which consists of a chief executive, several functional managers and one manager of pro-

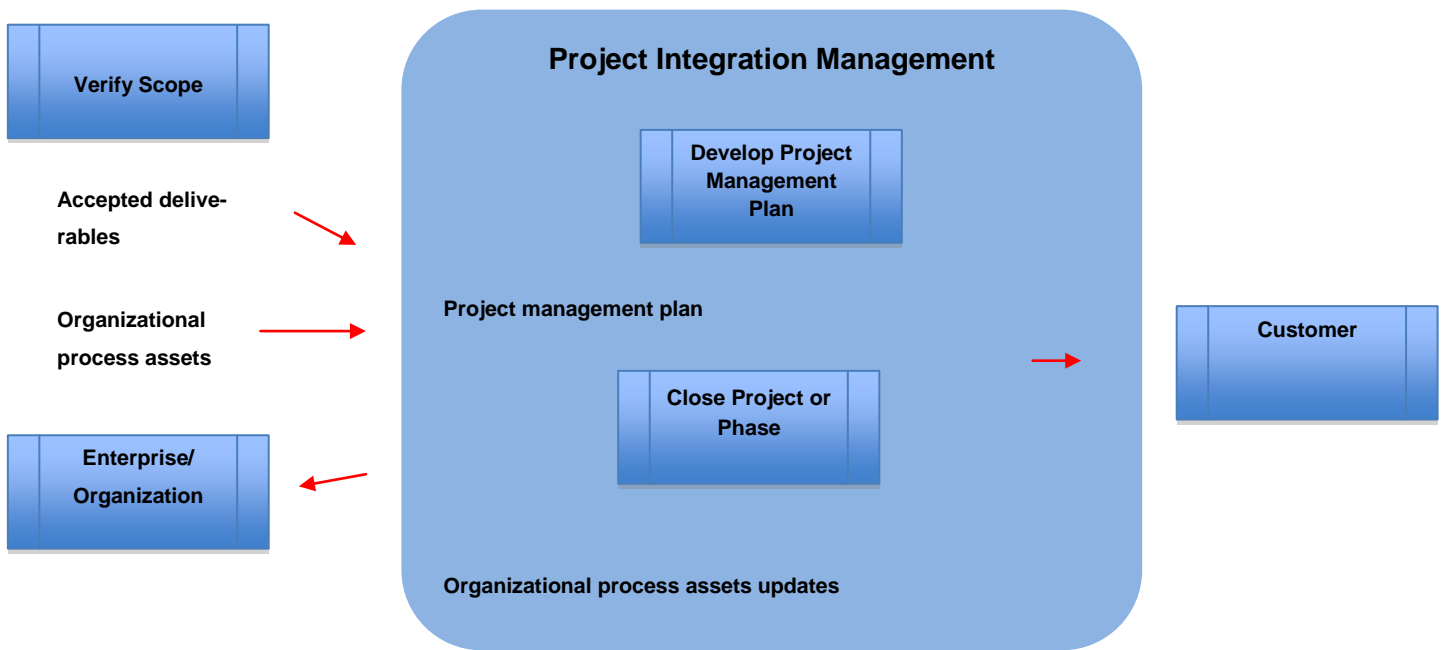
ject managers. Still, at the moment most of a project manager's duties involve, for example, supporting other departments and administrative work.

## **2.8 Definition of Project Closing**

The project's results cannot be transferred into daily processes without proper closing. A common problem with projects is that organizations spend too much time initiating projects but only a little time closing them. The situation might arise that the application has been installed for several years, but the initial production and on-going enhancement releases have not been differentiated from each other. This leads to a situation where customers have a sense of endless "projects." Often lack of time at the end of a project causes a situation where project handover is easy to skip. However, there are some simple and clear signs for the whole project team that show a project is over and finalized and it is time to move on. Tasks for project closing include cleaning up open items, finalizing documentation and production support material (user guide), preparing end-of-project administrative reports, release notes, and financial reports. One minor sign of project closing is celebration. All those who have worked hard know that there is a special happening that means one phase is about to end and the other phase is going to begin. It is difficult to hand over the product for the client if the project has not been closed properly (Highsmith, 2009, 268-269).

## **2.9 Documentation of project closing**

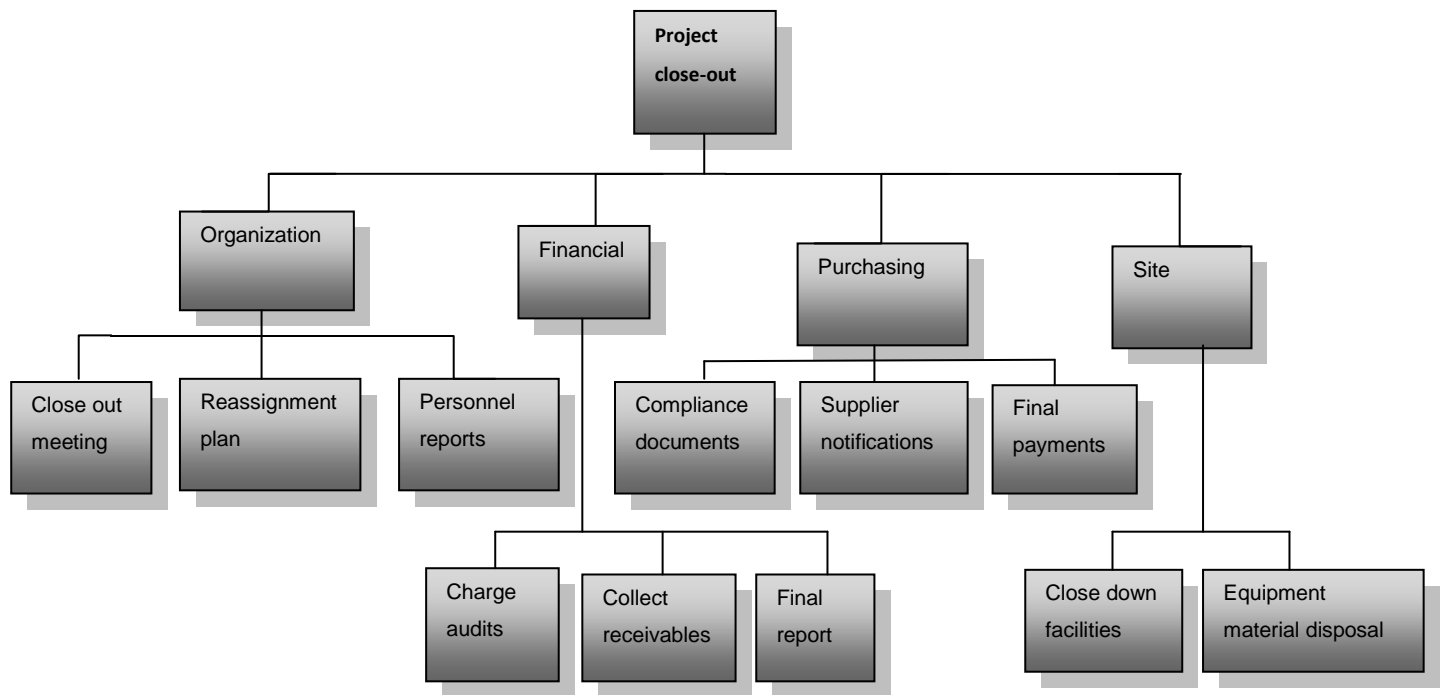
The PMBOK model states the importance of project closing. PMBOK says that project or phase closure documents consist of formal documentation that indicates completion of the project or phase and transfer of the completed project or phase deliverables to the next phase. The project manager reviews the customer acceptance documentation and the contract to ensure that all project requirements have been completed (Project Management Institute, 2008, 102). Figure 12 describes the data flow of project closing.



**Figure 12. Phase data flow diagram of project closing (PMI, 2008, 102).**

Figure 12 does not show directly what happens between the customer box and the closed project or Phase, but it shows elements, like the project management plan, that need to be in order before the customer receives the project result.

The book, *Project Management in Practice*, presents several ways to terminate the project: extinction, addition, integration, and starvation. In this case *extinction* means when project activity suddenly stops, although there is still property, equipment, materials, and personnel to disburse or reassign (Mantel, Meredith, Shafer, Sutton, 2001, 248). When it is impolitic to terminate the project but its budget can be squeezed until it is a project in name only, then we are talking about the term *Termination-by-starvation*. The project may have been suggested by a special client, or a senior executive or the project would be an otherwise embarrassing acknowledgement of managerial failure. A few project members' task is to issue a "no-progress" report once each quarter. In this kind of situation it is considered bad manners for anyone to inquire about such projects (Mantel, Meredith, Shafer, Sutton, 2001, 247-248). Most of the projects in NPS are terminated by integration but the problem in this case is that the end users of the new system cannot survive without the help of project team members. Figure 13 describes in detail the hierarchy of Project close-out.



**Figure 13. Termination of project (Mantel, Meredith, Shafer, Sutton, 2001, 248)**

The Termination figure shows in practice the elements of project close-out. This is not an ideal model for all sizes of projects, but it clearly shows the complexity of a simple task like project closing.

### 3 Operational service management in the middle size organization

#### 3.1 Stage between Completion stage and Operational stage

The process model shows the project is divided into a number of stages (see Figure 14) that are followed in sequence from start to finish of the project. This model consists of six steps: pre-project work, start-up or initiation stage, development stage, completion stage, operational stage, and last post-project review stage. In this thesis I am interested in what happens between the completion stage and the operational stage (Cadle & Yeates, 2008, 92).

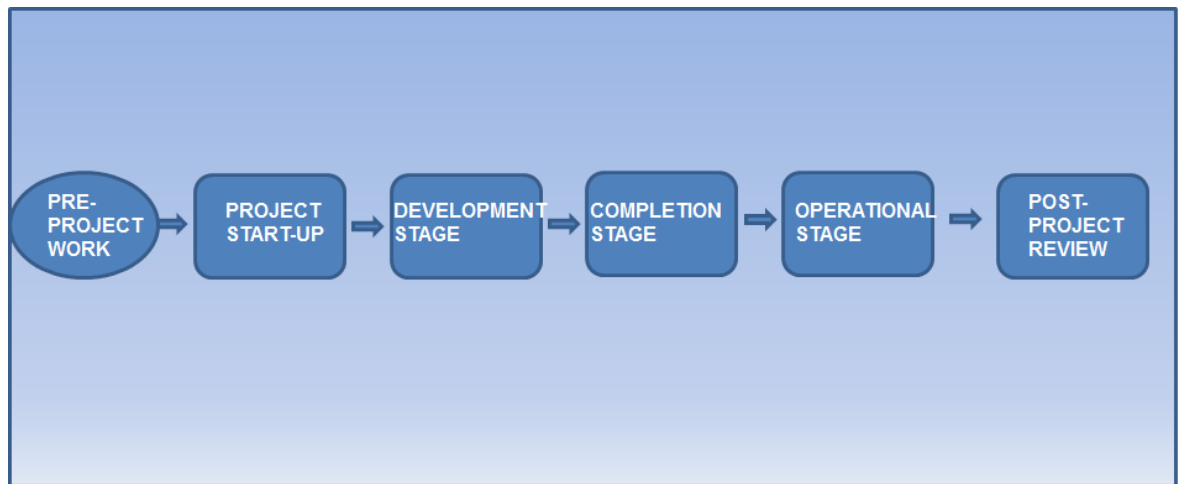


Figure 14. Stages of a software development project (Cadle & Yeates, 2008, 93).

When the project result has been completed by the supplier and has been subjected to the full rigors of a system test and every error and problem eradicated, the *Completion stage begins*. This stage means that the associated technical documentation, user manuals, operating instructions and any other documentation should be finished at this point. This stage is where the customer receives the finished product and carries out a number of examinations and tests in order to confirm that the system meets the specification which was agreed between end-user and supplier. The acceptance of the completed system by the end-user culminates this stage. The steps of this stage are delivery to the end-user of all the elements of the system, like software and documentation; training end-users, system administrators and operators; carrying out of acceptance tests by the end-user; acceptance by subscriber; and system commissioning, which means go-live procedures. Delivery to the end-user should be handled by a formal handover with all the deliverables being held under configu-

ration management. Software should be available in an appropriate electronic form with documentation of source code included, or whatever was agreed in the project plan.

The final end-user takeover means the point where subscriber formally accepts the system and the project comes to an end. There might be some minor faults in the system and it is agreed that the supplier will correct these deficiencies within a specified time frame. The project manager should prepare an end-of-project report for the project board or steering committee which is responsible for officially accepting the result of the project. Also, the project manager should create the project evaluation report which gives useful information for coming projects. The idea of project evaluation is to pinpoint the common pitfalls of projects (Cadle & Yeates, 2008, 113-115).

### **3.2 Project Management, Operations Management and Service Management**

It is important to realize the differences between project and process. We will now examine the characteristics of these two types of work.

Operations are an organizational function performing the on-going execution of activities that produce the same product or provide a repetitive service. PMBOK gives as an example accounting operations, for example charging the customer. Though temporary in nature, projects can help to achieve organizational goals when they are aligned with the organization's strategy. Organizations sometimes change their operations, products, or systems by creating strategic business initiatives. Projects require project management, while operations require business process management or operations management. Projects can intersect with operations at various points during the product lifecycle, for example at each closeout phase, when developing or upgrading a product, improvement of operations or at the divestment of the operations at the end of the product lifecycle. At each point, deliverables and knowledge are transferred between the project and operations, for implementation of the delivered work. This occurs through a transfer of project resources to operations toward the end of the project, or through a transfer of operational resources to the project at the start.

Operations are permanent endeavors that produce repetitive outputs, with resources assigned to do basically the same set of tasks according to the standards institutionalized in a

product lifecycle. Unlike the on-going nature of operations, projects are temporary endeavors (Project Management Institute, 2008, 12).

Project work differs from operational work in a number of characteristics like being performed by individuals; limited by constraints (including resource constraints); planned, executed, monitored and controlled; performed to achieve organizational objectives or a strategic plan. Operations work does not terminate when its current objectives are met but instead follows new directions to support the organization's strategic plans (Project Management Institute, 2008, 22).

A project's deliverables may modify or contribute to the existing operations work. In this case, the operations department will integrate the deliverables into future business practices. As a result of such a project, a new product or service may arise. Installation of a product or service that requires on-going support may affect the structure, staffing levels or culture of an organization. Based on these characteristics it is quite easy to set a higher level goal for the project when the operational target for the whole project is defined (Project Management Institute, 2008, 23).

Comparing PMBOK to the ICT standard for management organization brings up that the five streams of ICT do not talk about operational management but service management. The ICT standard for management organization has published comprehensive and easy to apply standards and models that can be used while defining the right project or process management model for the functional organization, especially for large or small organizations (see [www.ictstandard.org/about](http://www.ictstandard.org/about)). The ICT standard is based on best practices like PMBOK, CMMI and ITIL, and it creates a clear structure for managing ICT. The standard is a guide for the daily work of those responsible for the management of Information and Communications Technology (ICT). ICT management consists of five management streams, described in Figure 15: Business Alignment (overarching stream), Strategy and Governance, Sourcing and Vendor Management, Project Management and lastly Service Management (see [www.ictstandard.org/ict-standard -management-](http://www.ictstandard.org/ict-standard-management-)).

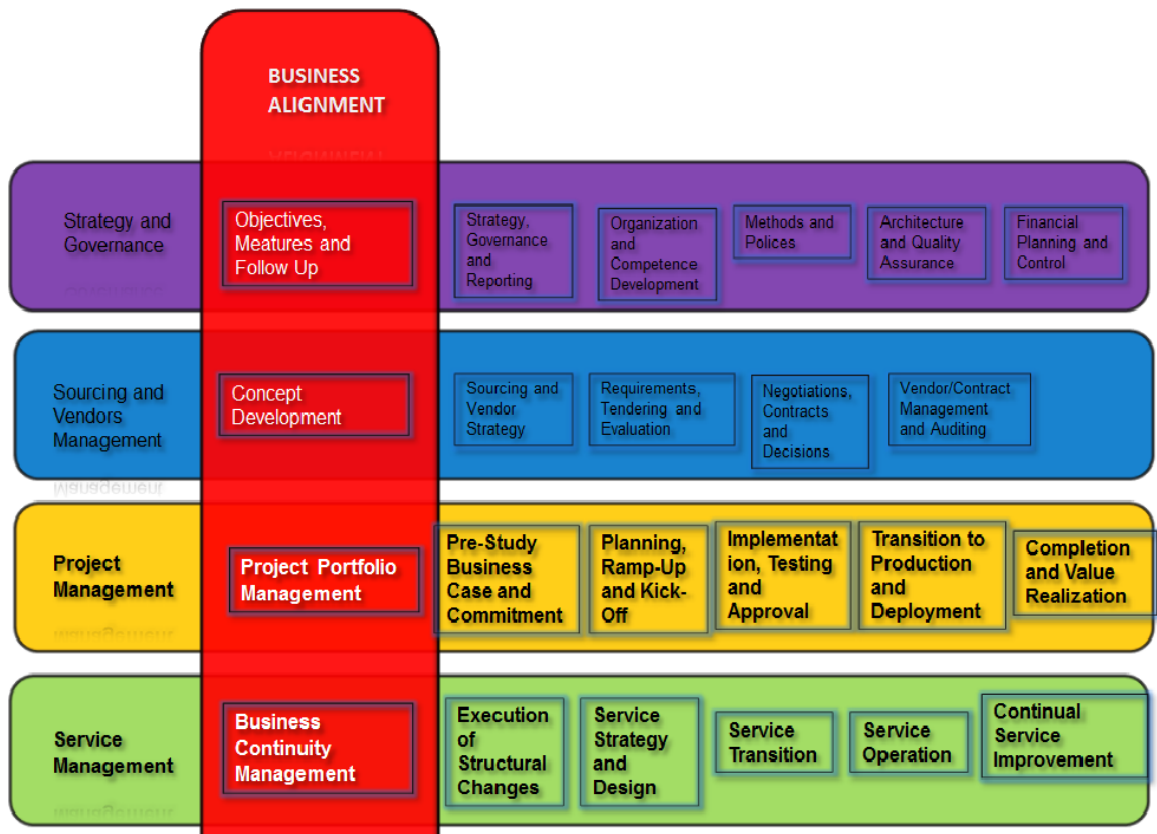


Figure 15. Five streams of ICT Standard for Management ([www.ictstandard.org/ict-standard - management](http://www.ictstandard.org/ict-standard-management))

The five streams of ICT standard for Management bind together an organization's strategies plans and governances, sourcing and vendor management, project management and service management.

In figure 15 the horizontal axis represents streams from strategic long-term planning towards daily operational activities, as in project management the stream starts from pre-study, business case and commitment and ends to project completion and value realization. The vertical axis (business alignment stream) connects the four streams together by showing cooperation between business and ICT management. Business alignment steers the goals and operations of the other streams (<http://www.ictstandard.org/ict-standard-management>).

I have focused on project management (transition to production and deployment, completion and value realization) and service management (service transition, service operation) streams (see [www.ictstandard.org/streams](http://www.ictstandard.org/streams)). The goal for the project management stream is producing results on schedule, within budget and with agreed resources. The service man-



agement goal is simply ensuring business continuity (see <http://www.ictstandard.org/ict-standard-management>).

In the Project Management (PM) stream, my focus is in the transition to the Production and Deployment box. This phase is part of the roll-out phase, after which the actual benefits from the project begin to take shape. In other words, project deliverables are transferred to the line organization by integrating them into continual operations. Preparation for this phase should be started in early to ensure the commitment of all parties (see: <http://www.ictstandard.org/book/project-management/transition-to-production-and-deployment>).

The second phase in the PM stream is Completion and Value Realization. This phase is focused on the project ending. Project completion includes the evaluation of target points, approval of project deliverables, and documentation of further development goals and unfinished tasks. Deliverables and post-project maintenance responsibilities and warranty periods are documented in the transition memorandum (see: <http://www.ictstandard.org/book/project-management/completion-and-value-realization>).

The Service Management stream (SM) has a phase known as Service Transition. This phase includes the roll-out of systems, services and project deliverables. The checklist includes management of communication, management of training, change management, phasing and automation of roll-out, and lastly, resuming As-Is (roll-back) in the event of crisis (see: <http://www.ictstandard.org/book/service-management/service-transition>).

The second phase to focus on in the SM stream is Service Operation (SO). It is interesting to notice that the majority of ICT costs are generated by SO. The responsibility of an organization's ICT and cooperation with vendors as well as service contracts lies in the SO department (see: <http://www.ictstandard.org/book/service-management/service-operation>).

The last phase to focus on in the SM stream is Continual Service Improvement. This phase ensures that the service level and competencies of ICT conform to the requirements of the business. This is not possible without transparent service measurement, service processes, analysis of measurement results and *further development in cooperation with the Business*

(see: <http://www.ictstandard.org/book/service-management/continual-service-improvement>).

### 3.3 Product or service readiness

It is not enough to define how to close a project or the difference between operations and projects. It is also important to define *when* the product or service is ready for production.

One model to define product or service readiness is CMMI. CMMI comes from the words Capability Maturity Model Integration. It is a process improvement maturity model for the development of products and services. CMMI consists of development and maintenance activities that cover the product lifecycle from conception to delivery and maintenance. The purpose of CMMI is to help organizations improve their development and maintenance process for both product and services (CMMI Product Team, 2006, 1).

According to CMMI, the last phase of a project is acceptance reviews and tests. The focus in CMMI is more the quantitative project management process area, which applies quantitative and statistical techniques to manage process performance and product quality. The model does not describe in detail how the handover process works (CMMI Product Team, 2006, 56-58).

CMMI describes how the process lifecycle works and how the process will be run through the improvement process and after that will *transfer* back to daily process.

The whole idea of CMMI is to reduce the cost of process improvement across enterprises that depend on multiple functions or groups to produce products and services. In other words, as soon as a fixed process is transferred back into operation, the organization can save a great deal of money. The most important issue is to have an integrated view, which means that the CMMI Framework describes common terminology, common model components, common appraisal methods, and common training materials (CMMI Product Team, 2006, 65).

The technical solutions chapter describes CMMI based on a product-related lifecycle process. Such a cycle may include selecting and adapting existing processes for *use* as well as developing new processes.

CMMI says that the product is ready for production when software is coded, data is documented, services are documented, electrical and mechanical parts are fabricated, product-unique manufacturing process are put into operation, processes area documented, facilities are constructed, and materials are produced (CMMI Product Team, 2006, 473).

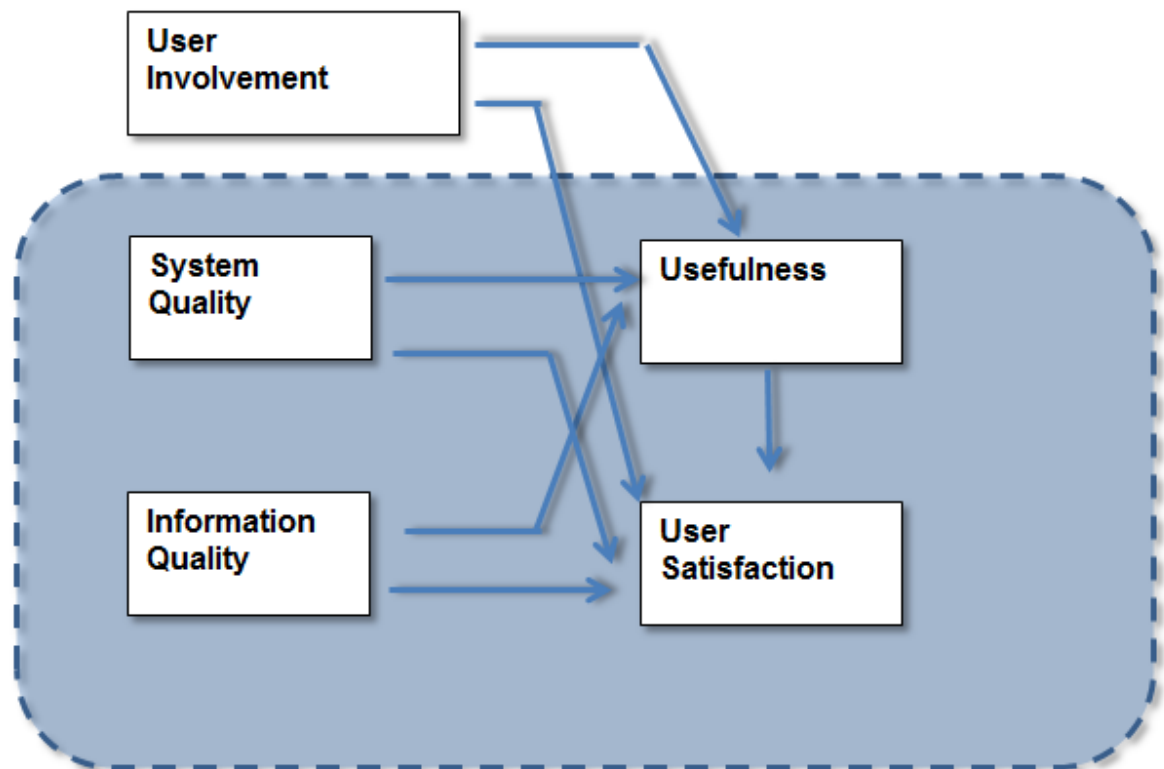
The model also points out the importance of documentation. Development and maintaining documentation will be used to install, operate, and maintain the product. Typical work products are end-user training materials, user manuals, operator's manuals, and maintenance manuals and online help. As a secondary practice, the model advises reviewing the requirements, design, product, and test results to ensure that issues affecting the installation, operation, and maintenance documentation are identified and resolved. The second issue is to use effective methods to develop the installation, operation, and maintenance documentation. The third issue is to adhere to the applicable documentation standards, which means, for example, use of abbreviations and internationalization requirements. The fourth issue is to develop a preliminary version of the installation, operation, and maintenance documentation in early phases of the project lifecycle for review by the relevant stakeholders (CMMI Product Team, 2006, 476).

### **3.4 Comparison of the CMMI, IIS, and TAM models**

The IIS (Information System Success) and TAM (Technology Acceptance Model) differ from CMMI by underlining the importance of end user commitment to the product, while CMMI concentrates on more practical measurement methods such as the quality of project documentation. Without commitment, the implementation and use of the product fails. Also it is interesting to see that both the IIS and TAM models state that system usefulness is a critical factor, even more critical than system easiness.

One way to measure the success of a project handover is to find out how much system users have been involved in the project phases. DeLone and McLean's model of IS Success

describes the relationship between user involvement, system quality, usefulness, information quality and user satisfaction (see Figure 16) (Seddon, 2001, 241).



**Figure 16. User Involvement in the IS success model (Seddon, 2001, 241)**

TAM presents the following factors that affect information system satisfaction: top management involvement, technical competence, and feeling of participation (Legris, Ingham, Colletette, 2003, 203).

The second generation of technology acceptance model (TAM2) describes the relationship of information and management in Figure 17.

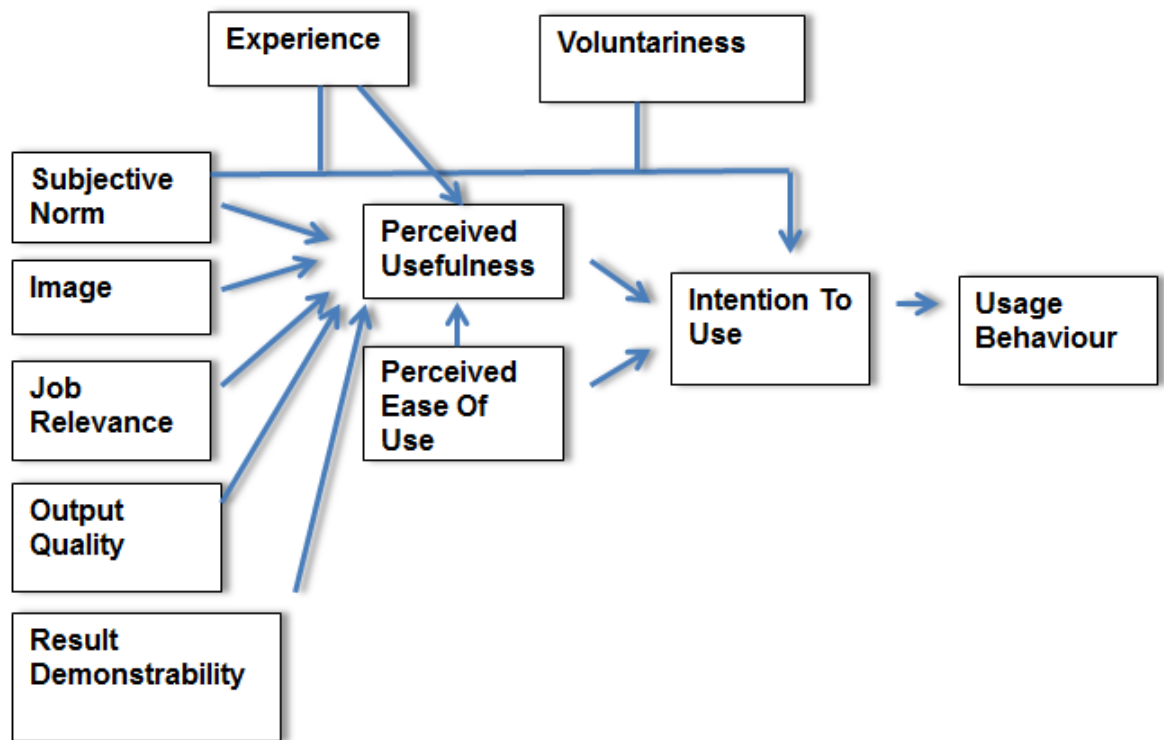


Figure 17. Relationships in TAM2 model (Legris, Ingham, Colletette, 2003, 200)

Based on these models (IIS and TAM), it is possible to see similar issues in NPS. Without top management commitment and end user participation, projects as well as the production phase fails.

In small or medium size companies, practical issues are important in the project handover process. Firstly, the handover process is a final part of the project. In other words, it is not a separate phase *after the project*. The first phase of the handover is to test the system in practice. Secondly it is important to educate the product user about the new product. It is crucial to realize that the handover will be the end of the project. After the handover is complete, the project will be transferred into the process phase, which means, for example, product fixes based on the quarantine agreement. It is important that after the product handover the supplier does not leave the customer, but helps the customer to make a profit out of the new product. This can be lead to a win-win situation for both parties. The supplier gets experimental user data and can improve the product or processes in the next project, and the customer gets an economical profit because of a new and better process or product (Erma, 2005, 68).

### 3.5 Summary

First there is a project which has a clear start and end. Then there is a process which is on-going, or a product which is the result of a project. Somewhere between the project and process there is a project handover phase. If this phase is handled wrongly or using incompetent knowledge, the process might be a fail or the product might be incomplete. The goal for this thesis is to find out how the project should be closed and *handed over to* the end user.

The following issues should be in order for the project handover phase. The first and most important issue is the project closing. Without a proper close, it is impossible to hand over the project results to the customer. The next issue is to check and verify the agreement, in other words, does the final package meet all the requirements, including testing that the product works as planned. The third issue is to create proper guidance for the end user. Without guides and education, the end user depends on the project team. The fourth issue is to plan the production phase: “who will do and what and when and how.” Who is the person responsible for maintaining the process and do they have proper resources for success in that job?

Figure 18 shows the handover process in time.

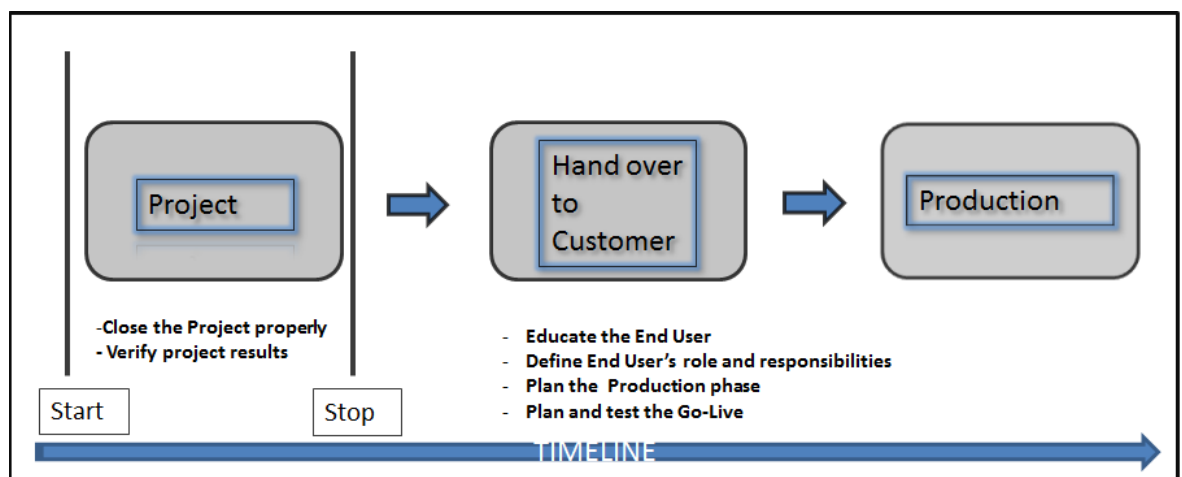


Figure 18. Stage between Project and Production

## **4 Handover process analysis in Nord Pool Spot**

### **4.1 Past projects**

I have chosen three past projects which cover three critical processes in the organization. Trading in the main market, trading in the after-market and financial processes are the heart of the company.

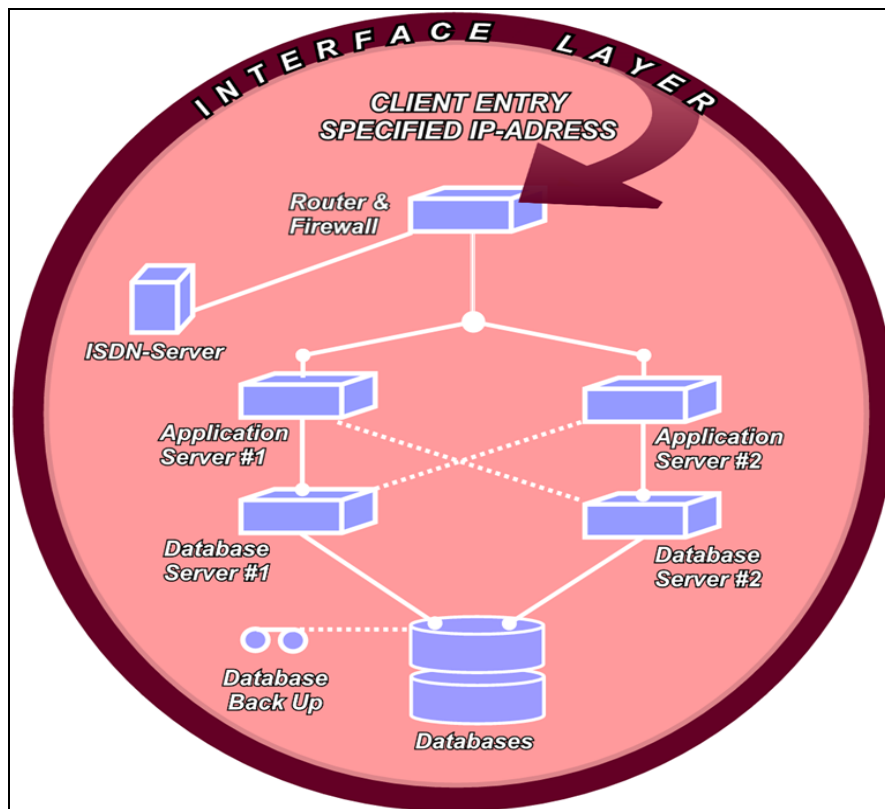
The goal is to collect information by interviewing regarding project management and how projects were handed over to production.

The interview structure was based on six themes and the structure was the same in all interviews:

- Background of project
- Project organization
- Project closing
- Handover material
- Project budget
- Motivation

#### **4.1.1 Case Enex 2.0**

The Enex 2.0 project was established because of the need for an upgrade to the existing version of the continuous electricity market called Elbas, in other words the Electricity Balance Adjustment System. The original version of Enex was created in 2001 and was based on Java technology. A new version was also needed because of the old hardware solution. Also there were performance issues, support for the hardware had expired and the old solution did not support new features. The lifecycle for Enex 1.0 was quite long, over 9 years.



**Figure 19. Enex 1.0 hardware solution.**

The hardware solution shown in Figure 19 demonstrates that Enex 2.0 was not a huge project from an investment point of view. Still, it was quite a typically sized project for NPS.

Timing for this project was not optimal: at the same time the Elspot project for the main market was on-going. Resources were occupied with the Elspot project and the daily processes. Also there were organizational changes on-going, so responsibilities were unclear.

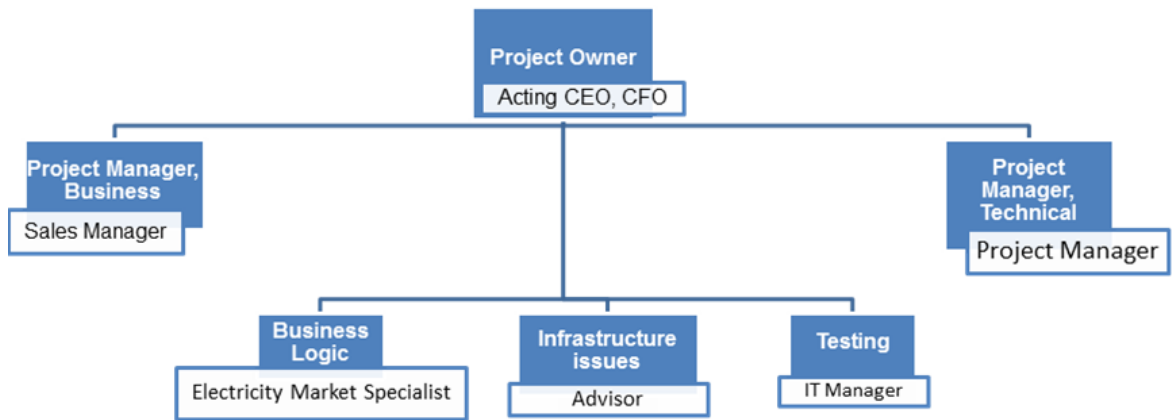
Despite all of the challenges, the project was successfully finished. However, the handover of the project partially failed and the idea of this thesis is to clarify in more detail why this happened. The idea is to clarify the project organization, management, observer, mandate, budget, resource management, communication and finally to find out the factors that influenced the project handover process.

#### **Project organization for the Enex project**

The project was initially organized by the acting CEO (chief financial officer). The project had a steering group with three internal members and three members representing the system provider. The project team had four members: project manager, infrastructure profes-



sional, business advisor and one tester (see Figure 20: Internal Project Organization). The system provider had eight persons on duty. Covering other duties were a number of consultants and hardware professionals.



**Figure 20. Internal Project Organization**

#### **Project Owner Interview**

In order to get more information about the project and how it was delivered into production I conducted a semi-standardized interview (Hirsjärvi & Hurme, 1995, 35) with the second owner of the project. The last project owner gave a different angle for the project.

The first theme, the background of the project, gave me new information regarding issues why this project was launched in the first place.

*Interviewer: "What was the launch for the project?"*

*Interviewee: "The ground work for the project was started many years ago. The main reason was to expand the Elbas market to Norway. The so-called main driver for the project was Norway's authorities and regulators like Norges vassdrags- og energidirektorat (NVE). The Elbas market was already part of other Nordic areas and it was decided that Norway would join this common continuous trading market area. This was also the main driver for the NPS management to launch the project."*

As the project owner says, the motivation for the project was clear, mainly because the main driver was the representing authorities.

The second theme was to find out how the project organization was created.

*Interviewer: "How was the project organized?"*

*Interviewee: "The starting point for this project was not ideal. Another critical project was in final phase, the CEO had resigned and the CFO had to take over the CEO's tasks, all the projects and market development. The first Project Manager was too busy with the other project so the second person got the responsibilities but without any knowledge of the system itself. The project was handed over to a third person, who didn't have technical understanding of the system. So, it was decided that the project would be divided into a technical project, covering renewing of infrastructure and software, and business and legislation issues regarding the new market area."*

Although the motivation for the project was good, the first pitfall was resources for the project. NPS is a quite a small organization and that is why running many critical projects in parallel is not an optimal starting point.

The fourth theme was Project Closing.

*Interviewer: "How was the project closed? What was the plan for the project closing phase?"*

*Interviewee: "Despite the fact that the project was over half a year behind schedule, the timetable was not in the critical path. The reason for this was the Norwegian regulators who were not ready for the project launch because of the slow legislation process. The project team had good time to finish the development process and what was remarkable, from this point of view, the project closing and handover phases were defined in the project plan."*

Because of external factors, the project launch was delayed. This helped to finalize, for example, the documentation of the new system and also there was enough time to plan the next step, in other words, the production phase.

The fifth phase of the interview was the project handover material.

*Interviewer: "Was handover material made in this project like a User Guide?"*

*Interviewee: "Although the project plan covered, for example, the User Guide, Go Live plan and the plan for the production phase, the real issue was the business organization. NPS' organization did not have enough resources to take over the new system. In other words, the organization was not ready for the system delivery. That was the most critical reason, why the project team continued with daily tasks although the project itself was closed."*

It was interesting to find out that good documentation does not ensure a successful production phase if the end user is not well motivated to take the system over.

The next question regarded the project budget.

*Interviewer: "Can you say something regarding the project budget? Was it according to the estimation?"*

*Interviewee: "Although the budget was exceeded for the project, this was not a big issue. The project was quite massive, the development team was new, resources for this project were very limited, and still the project managed to cover the goals. Motivation was high through the whole project. And the fact that the system was old and vulnerable gave extra motivation for the management. Also, maybe because of the fresh development team, the motivation was also high among the employees."*

From a project handover point of view, the budget was not an issue in this specific project. The extra money would not solve the issue if knowledge is lacking.

The last question was in regard to organizational motivation.

*Interviewer: “What was the organization’s motivation for the project?”*

*Interviewee: “The motivation was high through the whole project. The fact that the system was old and vulnerable gave extra motivation for the management. Also, maybe because of the fresh development team, motivation was also high among the employees.”*

The project team’s motivation is a critical success factor for the project but it does not necessarily help the situation if end-users are not involved in the project.

#### **4.1.2 Case SETS**

SETS is the system for financial clearing: in other words, trades that have been made in the primary market and aftermarket are cleared via the SETS system. I interviewed the end user of the SETS system, in other words, the Risk Manager.

*Interviewer: “Why was the SETS project launched?”*

*Interviewee: “There were three reasons for the SETS project. The first was an old and inflexible system that was used for many years. The second reason was the ownership of the old system. Nord Pool ASA, which was partial owner of Nord Pool Spot AS, kept too high a price for the settlement service. The third reason was the knowledge of the settlement process. NPS wanted to control the process, so the only way to manage that was to build up our own system.*

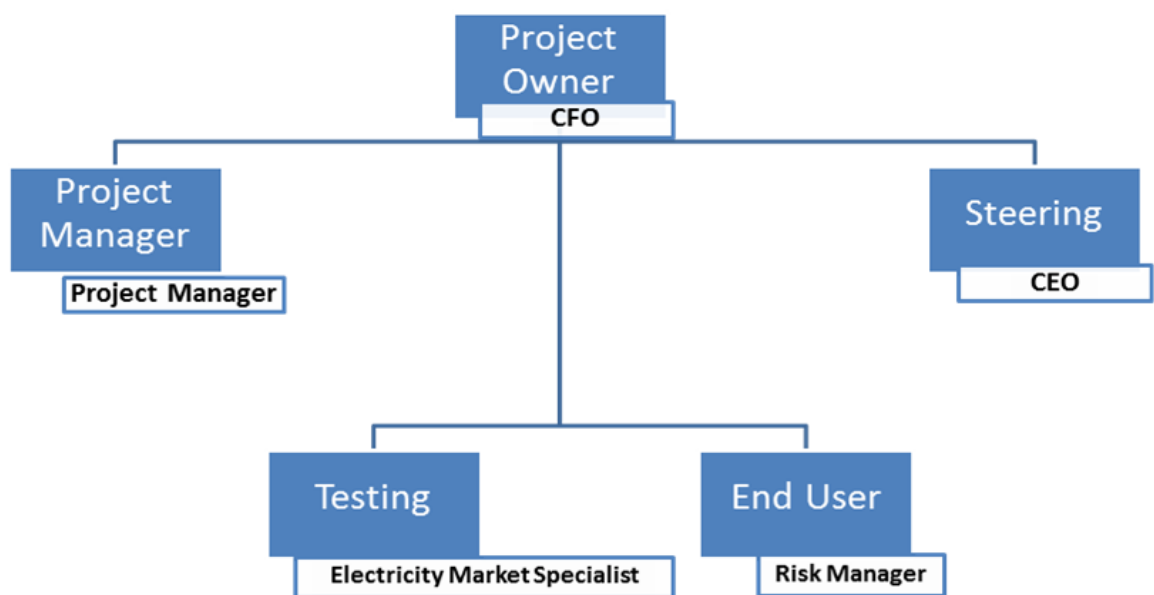
The starting point for this project was clear and top management’s motivation for the project was high.

The second question was regarding project organization (see Figure 20).

*Interviewer: “How was the project organized?”*

*Interviewee: “The project was organized at the beginning of 2003. It was launched quite soon after NPS got a new CEO, Mr Jörn Limann. The project group was quite small, only the owner, project manager, tester, steering and end user. The project did not follow any standard or project process model. It was a so-called ad hoc project, which means that in this case the project was launched without any knowledge of project standards but only based on the need to have a new system for production as soon as possible.”*

It seems that in this specific project, although the project knowledge was poor, it would not fail the project if the commitment is high. However, even in this phase it is easy to see that there are many risks for this project, and especially from a handover point of view the circumstances are not optimum.



**Figure 21. Internal Project Organization of SETS**

The third question was regarding the success factors for the project and for the delivery.

*Interviewer: “What do you think was the success factor for this project? The project was delivered on time. What do you think was the reason for this, even though the circumstances for the project were challenging?”*

*Interviewee: “Although the starting point for this project was challenging the project itself was quite successful. The new system was launched and all goals for the project were met. I would state following success factors for this project: The first was a well-motivated and flexible project team including the mature supplier which had very good knowledge of this kind of financial system project. In other words, the supplier’s strong knowledge of the business process saved it from many mistakes. The second important factor was the communication and understanding between NPS’ project team and the supplier. The supplier used a prototyping method in this project and that strategy helped NPS to verify and test the system in practice at an early phase. There were no so-called hiccups in communication among the project team. Also the project team was small and decision makers, like the CEO and CFO, were strongly involved in this project. All these factors ensured a secure handover for the project result. Despite the fact that the documentation of this project was poor, the project delivery was a success. Although the project was successful in the end, the system included a lot of moderate solutions and that is why the problems of the system can be major. One great risk is the knowledge of system. There is no proper documentation of the system and almost the whole project group has been changed. Also the product lifecycle is about to end. Although the project delivery was successful, the project knowledge handover was poor.*

Although the project organization was small, the team’s commitment and control over the project was high. It was quite easy to get permission for purchases because the company’s top management was involved with the project. Also the experienced supplier probably prevented total disaster. The project was successful, but it seemed that the focus was too much on the project finalization and that was why, for example, system documentation, user guides, and end-users commitment were poor.

*Interviewer: “Referring to project handover, what is your opinion of that phase?”*

*Interviewee: “Although the End-User guidance was poor, the go-live day was smooth, mainly because there was a long parallel phase with the old sys-*

*tem. The system's end users had enough time to verify the system's reliable functionality."*

In this project there were many salvation factors and one critical feature was the old system. There were no big risks of system failure because the old system was available during and for some time after product launch.

I also managed to interview the project member. The project member was in charge of testing the system and project coordination.

*Interviewer: "Regarding the project handover, did you verify the system deliverables?"*

*Interviewee: "The acceptance test phase was not fully finalized. The project team trusted that the system would be finalized during the parallel phase. The idea was if there were any major issues there is always the old system standing by."*

It was amazing to hear that critical system acceptance testing was partially missed just because the old system was available. In other words, there was no guarantee of reliable system operation.

*Interviewer: "How was the project handed over into production?"*

*Interviewee: "Although there was no project plan for this project, the go-live plan and responsibilities for different phases was made. However I was quite involved with the system also after the go-live date. I gave online help to the end users for some time."*

Although knowledge of the project standards was poor, some basic factors were in place like a go-live plan and responsibilities. In this case it was like a natural progress that the project team member was also very actively involved with system after the project handover.

*Interviewer: "What is your overall feeling about the project?"*

*Interviewee: "The project was clearly under-resourced and one consequence was a great amount of change requests. In other words, some assumptions about the system's functionalities were wrong or misleading. Also, because of the lack of a proper plan, there were a lot of ad hoc features used in the system development phase. All these issues caused problems or challenges for the production phase. This was a very typical project for NPS."*

Because of the issue with this project, the organization now has major problems and challenges when the system's lifecycle is about to end. There is no proper documentation of the system, parts of the source code are missing and neither NPS's or the supplier's project team are available.

#### **4.1.3 Case SESAM**

SESAM is a trading system for the Elspot market. Over 99% of the company's turnover comes via the Elspot market, so that makes SESAM the most important system for this organization.

I conducted an interview with the system specialist who was working for the supplier, a privately owned company (POC) at that time.

*Interviewer: "Could you please describe the background to the Sesam project?"*

*Interviewee: "The SESAM project was launched because NPS needed a new and better way to calculate the system price. The old system, called SAPRI, was inflexible and was owned by Nord Pool ASA."*

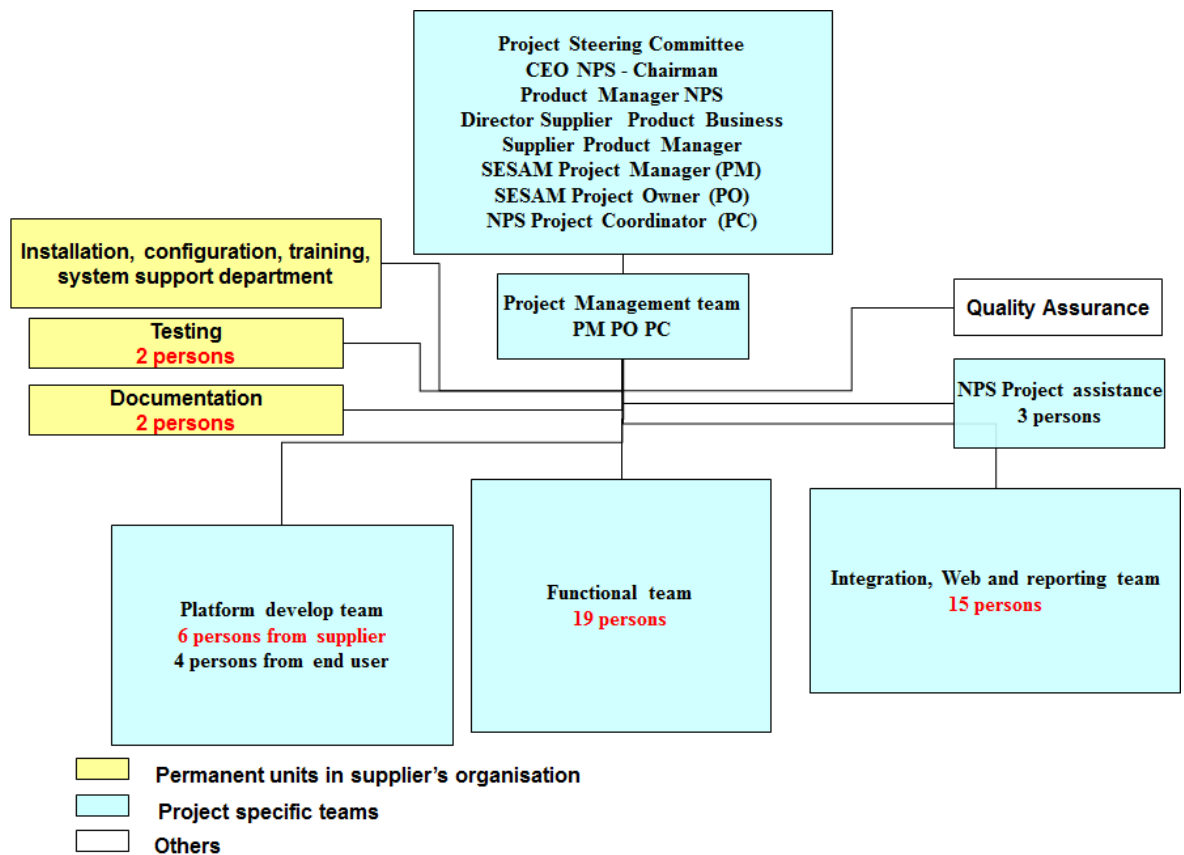
Motivation for this project was clear: the old system's lifecycle was about to end and it did not meet the new requirements.

*Interviewer: "How was the project organized?"*



*Interviewee: “The owner of the SESAM project was the head of the IT department. The rest of NPS’ project team represented the IT and Trading departments. Since the supplier for the SESAM system was from Finland, the Finnish office was closely involved in the project launch. The Project Manager was chosen from a company which was dedicated to challenging IT projects. From Nord Pool Spot and POC’s point of view, the project was quite huge. Most of the POC’s resources were involved with this project, so you could say that this was the most important project so far for POC.”*

In this project it is interesting to see how the localization and cultures affect the project and results.



**Figure 22. Sesam project organization**

The project organization was multinational organization. People involved were of different cultures and represented several nationalities (see Figure 22: Sesam project organization).

The system supplier was chosen for this project after long search. The POC is a privately owned Finnish IT company with hundreds of employees. POC is dedicated to power market systems.

*Interviewer: "What is your opinion of POC's commitment to this project?"*

*Interviewee: "The SESAM project was the biggest project ever for the POC and that is why key persons were strongly involved in the project. For example, two of the company's partners were working on this project. Altogether more than 50 persons were involved in this project. The SESAM project was the biggest project in POC's history. One of the key terms for the NPS was the size of the supplier. NPS has no power against too big a supplier. Vice versa: too small a supplier did not have enough resources for this size of project."*

*"The supplier's team was well motivated. Also the offer request was quite well defined and there was a lot of documentation of the present system. However, although the start of the project was felt to be in order, quite soon POC's project team realized that the documentation was not that accurate and POC's business knowledge of the Elspot market was quite weak. There were a lot of change requests in this project and the plan changed many times. In the end project lasted for almost three years (2004-2007) and it did not meet all the business or financial goals."*

I also wanted to know how the project result was handed over to the subscriber (NPS) from the supplier point of view.

*Interviewer: "How was the project closed and handed over to NPS?"*

*Interviewee: "Although the project was over time and budget the launch went as planned. There was a Go-Live plan but no plan for the production phase. In fact, the project was so much over time that it was decided to launch the*

*production phase even though there were some unfinished parts of the system. So, the launch was divided into three phases. That was probably the most important reason for sharing the lack of knowledge: end users depended on the project team's knowledge because the project team was too busy and overloaded and they did not have time to transfer the knowhow and train the trading desk. End users were not involved in the project but they were occupied with running the daily routines. There were no well-defined user roles in the production phase. In theory there was quite good documentation for the system, but since the system was originally based on different uses, there was a lot of material that did not help the end-users".*

The motivation, knowledge and commitment were in order for this project, but one quite simple thing was missing: documentation and knowledge sharing. Maybe the topic of the project was too complex and the project team was too big, so that caused serious problems in communication. People did not have a full understanding of what they were doing.

Although many of the supplier's key people left the project, the salvation for the project was that NPS managed to hire a key person from the supplier. In other words, NPS bought the system knowledge. From the production phase point of view, it was challenging for the supplier's support desk to adopt the system because of the weak business knowledge and limited orientation for the hosting process. A major part of the knowledge just disappears with key persons. There was no risk management, or it was not followed properly.

*Interviewer: "What is your opinion about the project? Was it successful despite the difficulties during the project?"*

*Interviewee: "The system was launched after the difficulties mainly because the project team on both sides was working hard and flexibly to reach the goal."*

#### 4.1.4 The Project Manager's logbook for the Sesam project

Thanks to the Sesam project team member I had an excellent opportunity to study the project manager's logbook regarding the Sesam project phases and progress of the project (see Figure 23: Project Manager's logbook).

It is interesting to read Project Manager's logbook afterwards. The logbook shows quite clearly the pitfalls that the project was facing already at the start of the project.

General			
Title	Project Management Team status report	Project	SESAM [1]
Type	Project Status	Created by	22-08-2005 09:14 / BBE
Week	33-2005	Status overall	Critical
Status project plan	Critical	Status Deliverables	Critical
Status scope	Observed	Status Organisation	According to plan
Status Risks	Observed	Status	Approved All
Responsible	[BBE]	Accept assign.	Yes

Figure 23. Project Manager's logbook

Below are short quotations from the Project Manager's logbook during the design study phase of the project:

*[BBE] 22-08-2005 09:14*

*Progress for planned tasks and deliverables:*

- Planned tasks: We are getting more and more behind schedule mainly because time for documentation by critical resources as well providing answers to questions is limited due to the number of workshops that also should be covered.*
- Deliverables: Situation for deliverables is the same as for planned tasks.*

*As you will see when reading this status report, there is a clear indication that we are on critical path and in some areas actually may have passed the critical point. Because of this the project management team are now considering what to do to get back on track. It seems that planned time for doing the design documentation is not sufficient to finish the design with proper quality. Technical PP and POC team leads will early next week initially come up*

*with suggestions/proposals for getting back in shape. The Project Management Team will then judge which alternative to recommend for the steering committee.*

*Status for the different teams (and work streams) are:*

*General: All workshops are kept and no unplanned delays (sick etc.). There has been good effort from both sides in every meeting.*

*Team platform & technology:*

*First part of the platform and technology design document ready to be approved. Still many open questions in second part of platform and technology and Adm., user roles and Author and design documents for both of those a little bit delayed.*

*Team function:*

*Understanding of requirements/functionalities is good and there is much detailed information on functionalities and use cases, but design documentation slightly delayed and quite a lot of information not written. Some open questions to be answered.*

*Team Integration:*

*Some design documents not created yet because of tight workshop schedule but in coming week most documents will be created and also completed. Still old workshop open questions to be answered.*

*UMM functionality and scope:*

*There has been some discussion in different workshops about UMM functionality – what is in scope and what is not. Just to make it completely clear for everybody, it is stressed that the complete package regarding UMM is in the scope of the SESAM project. Contract wise the option is bought and planned to be delivered after the acceptance date of the system. This can be seen in contract appendix 13 for options originally in scope.*

The project was facing classic issues like delays in the timetable, lack of documentation and resources. One interesting issue was the comment regarding *unwritten information of requirements and functionalities*. In the interview, the supplier's project member said that one of the supplier's specialties is to ignore everything that is not mentioned clearly in the documentation. In other words, if the supplier does not understand the requirements because of the lack of documentation, the supplier will ignore the requirement. This was one of the reasons why so many requirements were dropped from the final version.

## Resource issues

According to the logbook and from a handover point of view one of the critical issues was supplier's resources (see Figure 24). Based on the project member's interview, the problem was the training of new project members: the senior project member did not have the time, motivation or even skills to educate the new project member. Also, when the documentation was lacking, there was no orientation material for use.


11-06-2007 16:03	XSBK	Probability	50-75%	25-50%
Read by: PP, NPS				
05-06-2007 11:08	XSBK	-	-	-
Read by: PP				
25-02-2007 19:25	 XSBK	Title	-	A-06 Lack of skilled resources from supplier
		Responsible	-	[XTPE]
		Accepted	-	No
		Type	-	Risks
		Project	-	SESAM
		Milestone	-	No
		Number	-	1965
		Risk Type	-	Acceptance Test
		Status risk	-	Observed
		Impact rating	-	High
		Main Impact	-	Time Schedule
		Probability	-	50-75%
		Team	-	Cross
		Initiator	-	[XSBK]
		Read by:		

Figure 24. Logbook: Lack of skilled resources from supplier

Sentences from the Project Manager's logbook from the implementation phase of project:

[XSBK] 25-02-2007 19:25

*Close follow up on POC milestone progress. Steering committee to initiate actions if progress is too bad.*

[XSBK] 25-02-2007 19:25

*POC has been requested to describe the outstanding deliverables and the resources allocated for the work in order to clarify the coverage.*

*The problem has been raised many times, but POC has not been able to mitigate the problem*

[XSBK] 05-06-2007 11:08

*This is raised since we must expect that POC resources are transferred to other projects and the support team is taking over.*

*[XSBK] 25-02-2007 19:25*

*POC has few resources for the core areas, and has not been able to add extra resources with the skill level required for finalization of the deliverables.*

*This is a risk to the progress of the project both in relation to the current outstanding tasks, handling of bugs from test activities and in order to adjust in case of sick leave etc.*

*[XSBK] 05-06-2007 11:18*

*Training of trading desk resources may be challenging.*

*The system is complicated to use, and there are areas where you need an in-depth understanding of the system to use it correctly.*

The tiredness in the final phase of project was high. The project teams in both sides were just concentrating on finalizing the project's delivery. There was no energy or resources to plan or write a user guide that would meet the needs of end users. The guide was too complex to use because it was based on the original system and not dedicated just to NPS. The end user team was depending on the project team's knowledge in order to run daily processes.

## **4.2 Issues and success factors of current handover process**

The most common issue in project handover in NPS is to define the End User's roles and responsibilities. The reason for this and similar issues for all these projects (Enex, Sets and Sesam) are the need for the organizational maturity to run projects according to standards. In other words, it has been clearly shown that if a business organization is not well-organized, this has an influence on projects and especially the organization's capability to maintain daily processes.

All these projects have been launched more or less according to plan, but the timetable, budget and use of resources have been lacking. One critical factor for the success has been the flexibility and motivation of the project members. Without these factors all these projects would have failed. The project team's motivation was good because the goal was clear and everybody knew that there were no other possibilities than finishing these tasks. However, from the handover point of view, these projects have failed because of the motivation and knowledge of the end users. The reasons for end users' poor motivation are un-

clear responsibilities, lack of documentation, and lack of communication between management, project team and end users. It is quite a challenge to start to run a new system if you are already strictly involved with other tasks. In the case of Elbas market system, the issue from the end user's point of view is also that the market itself is quite self-steered: many of the tasks have been automated. There are seldom issues in the Elbas market, but when there are, it is easier to call a project team member than try to solve the issue by themselves.

The second issue from a project handover point of view in the organization is suppliers. Many times the supplier had a good knowledge of how to run the project but whenever the product is ready, the supplier's obligations run out. The supplier might have good documentation about the project delivery, but in practice the implementation of the theory has been lacking. It is as if NPS loses the capability to proceed with the product after the supplier has left the building. This was the case especially with the Sesam project. NPS was forced to hire a person with knowledge from the supplier's organization because of the missing knowledge in-house.

Poor handover is not just a problem for the first time when the project is finished. In fact, it has long term influences, as we can see with the Sets project. The project was finished in 2004 but now the supplier of the original system has been changed and NPS' key person is going to change job. So, NPS has trouble, because there are still no documents or the documentation is poor.

These interviews showed that many of the projects have survived mainly because of the high motivation of the project participants or NPS employees. Vice versa, the project handover has failed in many places due to lack of motivation. It is just too easy to pick up the phone and ask for help than to try to solve issues by yourself. Of course, when there is a lack of documentation, communication or organizational pressure, it is more likely to be the rule that the operational tasks fails.

It is important to realize that the handover has started already at the beginning of the project. It must be clear for the organization what happens after the project is closed and the production starts. Process tasks before the project, during the project and after the project



must be defined. Also the process must be transparent for the whole organization. It is not enough if just a few people know what is happening in the organization.

In case where the ownership of the organization is spread out for the daily operational management it is crucial to know the main flow of projects and operations. In particular, external stakeholders are not necessarily aware of the challenges the organization must face. However, if all responsibilities, phases of project and operation, and internal communication and knowledge sharing are in order, it is much easier to meet the stakeholders' requests. The handover phase itself is not very transparent for stakeholders but the issues and the consequences if the handover process is not in order might be devastating for the whole organization.

NPS has three major issues when it comes to project handover: unclear system responsibilities, end user documentation and use of existing documents or handbooks, and controlling the phase after the project.

Based on the interviews it was quite easy to define the pitfalls of the project handover. In the Enex 2.0 project, there were not enough resources to run the project according to commonly approved standards. Plans for the next phase were missing. During the whole project, responsibilities were unclear. For example, from time to time it was unclear who the project manager was, and even the goal setting was poor. The most important part from the handover point of view was the end users' motivation and involvement in the project. I can only guess the reason for the poor attitude, but maybe one thing is the fact that Enex 2.0 is not a system for the main market. From the business point of view, Enex 2.0 is not the most critical system. However it supports the most critical system and that is why it is an important part of the whole picture.

The Sets project was different in many ways. The project team was small, even from the NPS point of view. Maybe the biggest issue was that the resources were clearly underestimated. There were not enough people or even knowledge to manage the project. The goal was just to build up a new system as soon as possible. The focus was more on the implementation of the product than on long term system planning. Because of these issues, the testing failed. The focus was more on system testing than verifying that the system worked

as planned. In fact, that led to a situation where project members were strongly involved with the system after the system was already in production.

Compared to Enex and Sets, in the Sesam project, resources were not the issue. The most critical system's title ensured enough both financial and human resources for this project. However, the Sesam project was also the biggest project for the organization so far. Also, the problems were different than in previous projects. Maybe because of the fact that the main system was quite complex and project team big and multi-cultural, the biggest issue were communication. Communication failed in both ways, vertical and horizontal. It was almost felt that people were too afraid to ask questions because they thought others would think that they were incompetent to understand business logic or technical specifications. I think this was also the issue during the production phase. The documentation was incomplete, and, for example, the system administrators are the same people who were strongly involved during the project phase. Maybe there is some sort of protection also involved: "If you know something, keep it secret." This has led to a situation in which the project was not actually ever handed over to the end users, but project members continued to run operational matters instead of concentrating on the next project.

## 5 Proposal for handover process

### 5.1 Mechanism of the project handover process

Overall, the mechanism of the project handover process means that there are named persons to continue with the product after the project has been finished. Also it is important to use the knowledge and resources of supplier (see interview in Chapter 4.1.3 Case Sesam). The supplier has worked with the new product or process for many months, so it is important from the project handover point of view to ensure that knowledge will be transferred to the end user or the process owner. Chapter 2.3 (role of project manager) clarifies the responsibilities and roles of the project manager and operational manager. Knowledge of project management, business, processes and transferring of knowledge has been one of the key terms in this thesis (see Chapters 2.2, definition of project management; 2.3 role of the project manager; 2.4, knowledge of the project manager; 3.2 project manager, operation manager and service manager).

#### 5.1.1 Clarifying the organization model and responsibilities

The first task is to define and create an appropriate organization model that suits the company's size and business. Referring to Chapter 2.7, Organizational influences on project management, because of the size of NPS the most suitable organizational structure would be the functional organization. NPS is a small company and every employee has many tasks, and quite often many roles as well. In short, a functional team is about people who have different functional tasks and expertise but *work for the same goal*. It also includes employees from all levels of an organization or even outside an organization. Functional teams are quite often self-directed, responding to broad but not specific directives. A team may depend on consensus when doing decisions but normally a team is led by a manager, coach or team leader (Di Benedetto, 2010).

#### The Ambidextrous Organization

*The Roman god Janus had two sets of eyes—one pair focusing on what lay behind, the other on what lay ahead.*

An organization which can learn from the past and prepare for the future is *ambidextrous*. An organization's top management must constantly look backward, attending to the products and processes of the past, while also planning the future by preparing for the innovations that will define the coming success. This kind of mental balance is very tough to achieve. It requires executives to explore new opportunities even as they work intensively to exploit existing capabilities (The Ambidextrous Organization - Harvard Business Review <http://hbr.org/2004/04/the-ambidextrous-organization/ar/pr>).

## 5.2 Implementing the handover model

It is a fact that at some level the organization under discussion managed to achieve quite good results while running the daily processes, but it can do better. Although the products are quite sophisticated, the maintenance of operational systems suffers. One way to improve the present situation is to combine the best part of the theories of cross-functional teams and ambidextrous organization. It needs a flat organization with named persons for predefined functionalities, such as development, testing, and operation. It also needs clear responsibilities. It must improve its internal communication. Half-truths and hidden knowledge harm the whole organization and build up internal barriers. Continuous evaluation of the processes, direct feedback, and positive motivation are features that are missing. Especially when the ownership of the market system is going to spread out, it is important to have control over business critical development and process maintenance. No matter who is the end user, internal processes must be crystal clear for everyone.

The handover process is clarified in Figure 25: Model of Handover. There are three main functionalities: Project, Handover and Production.

The Project Manager is responsible for running the development project for a new product or improvement to a fixed budget and timeframe. The Project Manager is also responsible for closing the project when the goal has been met. In this model, work on the next phases has already started at an early phase of the project. The most important reason for this is sharing knowledge. This means that the test manager and operational manager participate in project planning and working. Time and budget for validation, acceptance testing, and product and knowledge handover to the end user are already defined in the project plan. Also the communication plan is made during this phase. It is important to define when,

how and what will be communicated internally and externally, not just during the project but also before and during the operational phase. The Project Manager receives the assignment and the mandate from the Management Group.

The Test Manager is responsible for validating, together with Management Group, that the system meets predefined and agreed requirements. This model is based on the idea that the next person in charge always verifies that the quality of work remains high. After the validation, the Test Manager is responsible for running the User Acceptance Testing.

The Operational Manager is responsible for verifying that User Acceptance Testing has been passed. The Operational Manager is also responsible for Operational Acceptance Testing. This means that the Operational Manager verifies that the product or improvement is completed based on standards and with good quality. This also means for example, that the supplier's version management is in order, the source code is clear and commented, the system documentation and user guide is done, the escrow package is done and will be updated on a regular basis, the system follows regulations, end-users are trained for the new system or functionality, and maintenance agreements are completed, responsibilities defined and operational functionalities are tested. All these factors need to be in order for the proper project handover.

All in all, project handover is a cooperation between the Project Manager, Test Manager and Operational Manager. These are the people who make sure that the product or service is handed over in a good manner by sharing knowledge, validating and verifying results, and last but not least, by communicating internally and externally.

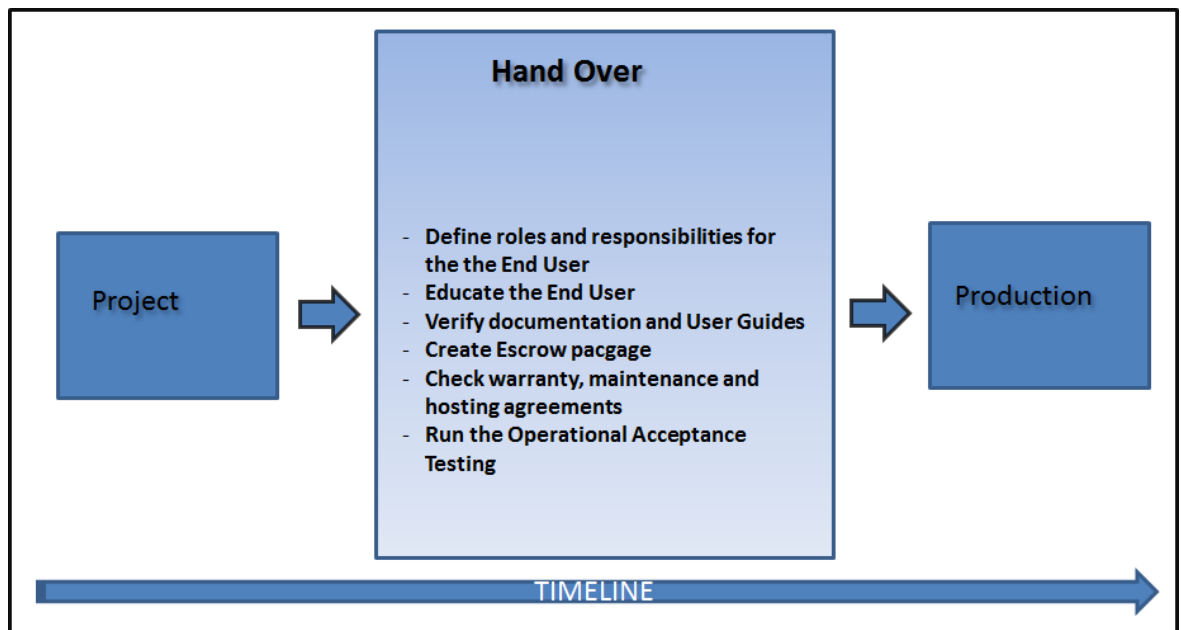


Figure 25. The Model of Project Handover

In this model, the system has many owners. That is why it is highly critical to define and use a clear communication procedure. The most challenging phase is to define the priority list. After the decision on the new feature or improvement is made, the procedure for the next phases is clear and straightforward. Each manager is responsible for communicating internally and externally about status, issues, and milestones. Also communication between other stakeholders must be well planned.

This model does not take a stand on what system or product is being developed. It can be the main market, financial system, or a documentation management system, but the most critical matter is to define the team with clear responsibilities and support activities like communication, marketing, financial administration and decision making.

## 6 Assessment of the study

The study was quite a long process, but the journey was exciting and motivating. A challenging part of this study was to find useful and reliable source material. The electronic library seems to be a very useful tool and place to find qualified source material, but quite often a book or article was only partially available or there was a lack of authenticity.

It was quite challenging to focus just on project handover while there was a great deal of interesting material available regarding project management. Of course, this was also the main reason why it was exciting and challenging to find out what the literature says about what happens after the project itself is finished. The project is quite clear to define: there is a clear starting and ending point, but how do we set frames for the so-called abstract phase? However, answers for the research questions were found and a new missing phase called “project handover” was defined.

Table 1 gives a comparison of the research questions and findings of study.

Questions	Answers
<b>1. What are the problems in the project handover process in Nord Pool Spot?</b>	<p>4.1.1 Case Enex 2.0</p> <ol style="list-style-type: none"><li>1. Resources occupied on another project.</li><li>2. Unclear responsibilities</li><li>3. End user motivation and involvement in the project was poor</li></ol> <p>4.1.2 Case SETS</p> <ol style="list-style-type: none"><li>1. Communication</li><li>2. End-user involvement in the project</li><li>3. Risk management</li></ol> <p>4.1.2 Case SESAM</p>

	<ol style="list-style-type: none"> <li>1. Knowledge of project standards, like documentation</li> <li>2. End-user involvement in the project</li> <li>3. Acceptance testing</li> </ol>
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**Table 1. Questions and Answers**

Longer period measurements for the results are not easy to define or follow, but despite that, the feedback and ideas I was able to collect from employees may help the management to improve the organization's motivation, level of efficiency and the commitment to reach the common goal.

At the end the feeling was that there is a clear iterative approach for the research problem. After the theory phase, I felt confused about the standards and models I had read about but when the interviews started it was easy to combine the theory and practice.

Somehow the feeling was that the challenge of the final study was much higher than that of studying at school. Maybe the reasons for this feeling are also personal issues. For example, do not buy and renovate a house, take care of three children and undertake other duties while trying to finalize your studies.



## 7 Summary

Project handover is not just one phase between *project and process*, but it is a part of the whole framework that consists of project management, acceptance testing and preparations for operational system maintenance.

It is quite clear that an organization will have problems if responsibilities are not well defined or one person is in charge of the most critical functionalities while the rest of the resources are running daily processes with insufficient targets and goals. In short, the success factors for well-motivated and efficient work are reliability, confidence and challenge.

Handover without these aspects does not work.

When there is a lack of communication, information does not pass on. Single tasks or projects may be successful, but when the project is over and the knowledge of the new product or system does not reach the end user or process owner, the handover fails.

The organization may have high and unique business knowledge and the organization may be successful with projects but if the evaluation and verification are missing, the handover suffers and serious mistakes can take place.

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## Appendix 1

BoK survey results by CRPM (Morris, P. 2000. 7-8)

100% agreed on the need for Leadership, Legal Awareness, Procurement to be included
99% on Safety Health and Environment
98% on Life Cycles
96% on Purchasing
95% on Risk Management
94% on Financial Management
93% on Industrial Relations and on Scheduling
89% on the Business Case, Project Organisation, and on Testing, Commissioning & Hand-over
87% on the Project Context
86% on Close-out
85% on Programme Management
84% on Quality Management and on Teamwork
81% on Project Management Plan
80% on (Post-) Project Evaluation Review
79% on Contract Planning and Administration and on Project Management as a general topic
78% on Monitoring & Control
77% on Resources Management and on Project Launch
75% on Configuration Management and Change Control
46% on Information Management
44% on Performance Measurement – i.e. Earned Value (this is very interesting considering how central to project management theory and “Best Practice” it is)
42% on Success Criteria (relatively surprising)
36% on Systems Management (not surprising: this has long caused difficulty)
33% on Integrative Management (not surprising: it is covered by Project Management)
32% on Requirements Management (ditto)
28% only agreed on Goals, Objectives and Strategies (surprising considering how important these are)