

CHALMERS



Analysis of EEM project handbook

Standardize project investment process to minimize risk for exceeding project budget and schedule

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

ERIK AXELSSON

Department of Civil and Environmental Engineering

Construction Management

CHALMERS UNIVERSITY OF TECHNOLOGY

Göteborg, Sweden 2011

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ABSTRACT

Standardisation is yet an undiscovered area when it comes to project management. Early equipment management (EEM) which is meant to under ease the work before its even begun, has developed a project handbook that will help to standardize the process of investment projects for the project manager at SKF Sverige AB. By analysing the project handbook and do research regarding the handbook interests, further standardizations will be discovered to simplify the process even more. The handbook is functioning as a standardized shell for the project process. All sources for input of data and information needed for an investment process are available and shown in a methodical pattern. In the research study a stakeholder analysis was created and several thoroughgoing interviews conducted for vital information that was collected and analysed for the research of how investment projects are managed and controlled. The interviews was divided into three parts were each part was specified to recover specific information regarding how projects are managed at SKF, how they can be managed and last but not least how they should be handled at SKF. The latter interview stage mainly researched for possible improvements that could become standardized. By analysing the recovered data more parts surrounding the project handbook could become standardised and even further insure project success with minimized risk for exceeding the projects scheduled time and budged. Even the smallest parts of standardized improvements contribute to the larger picture with smoother project processes.

Key words: Project management, standardisation, project process, project efficiency

SAMMANFATTNING

Standardisering är ännu ett okänt område när det gäller projektledning. Early equipment management (EEM) som är till för att förenkla ett arbete innan det ens har börjat, har utvecklat en projekthandbok som hjälper till att standardisera processen för projektinvesteringar för projektledare på SKF Sverige AB. Genom att analysera projekthandboken och utföra en undersökning angående handbokens intressen kommer ytterligare standardiseringar upptäckas för att förenkla processen något ytterligare. Handboken fungerar som ett standardiserat skal för projektprocessen. Alla källor för inmatning av data och information som behövs för en investeringsprocess är tillgängliga och visas i ett metodiskt mönster. En intressentanalys skapades och flera grundliga intervjuer för viktig information samlades in och analyserades för undersökningen om hur investeringsprojekt hanteras och kontrolleras. Intervjuerna delades upp i tre delar där varje del hade som avsikt att inhämta specifik information om hur projekten genomförs på SKF, hur de kan hanteras och sist men inte minst hur de bör hanteras på SKF. Det senare intervjuskedet forskade främst för möjliga förbättringar som kan bli standardiserade. Genom att analysera den insamlade data kring projekthandboken kunde fler standardiseringar skapas och ytterligare försäkra en lyckad projektprocess med minimerad risk för överskridande av projektets schemalagda tid och budget. Även de minsta standardiserade förbättringar bidrar till en förfining av den större bilden med mer lätthanterliga projektprocesser.

Nyckelord: Projektledning, standardisering, projektprocess, projekteffektivisering

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Preface

In this study, the process of investment projects is investigated in search for parts to standardise. A collaboration has been set with a Swedish company called SKF Sverige AB where a project handbook that is meant to standardise the project process has been in focus. The research has been carried out from the start of February 2011 to July the same year. The main research have been carried out at facilities on SKF's ground, but also at the Department of Civil and Environmental Engineering, International Project Management, Chalmers University of Technology, Sweden and with input from the School of the Built Environment, Northumbria University, Newcastle.

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List of Abbreviations

EEM = Early Equipment Management

MHS = Environment, Health and Security

FSM = Facility Service Management

FAT = Factory Acceptance Test

SAT = Site Acceptance Test

TS = Technical Specification

PRINCE2 = Projects in a controlled environment

GPM2 = Group project management

KPI = Key performance indicators

1 Introduction

In today's society project management is used and seen in almost all organisations. Each project is always individual but can be controlled if a proper project plan is constructed and followed. The process is however not that easy. But there are factors that can simplify the workload and understanding of a proper project plan. Standardising the process is one of them and this will be in focus for this report. By standardising the process of projects the efficiency will raise and risk will be minimized due to the fact that all areas of interest will be covered and analysed. But what parts of a project process can be standardised? This is a question this research report will be answering with investment projects for SKF Sverige AB in focus. For this an early equipment management project handbook has been developed to simplify the project process and show what phases that are included. The project handbook will be used as a main resource in this study.

1.1 Scope

This study will be about finding a standardized way to handle investment projects and how to further improve the project process. SKF Sverige AB is a major Swedish company and will be in focus during this study and collaborated with. One of the main information collectors was done through interviews in three different stages. First stage discovered what SKF truly want out of this research. Second one enlightened how the process of project management truly works at SKF and how it should work. The third interview stage determined what improvements that can be accomplished to maximize project efficiency and ease the workload with the project management toll "EEM project handbook". The project handbook will be mandatory to use when dealing with investment projects and is therefore in focus to improve. To get the vital input and information regarding the project process, a stakeholder analysis is created and the primary stakeholders are selected for interviews. The collected data is then analysed for improvements and possible changes. Even though the project handbook is in focus there are several changes outside its content that are highlighted. This is to improve the whole and overview of the project process. By doing a hierarchy evaluation of the improvements in form of "estimated implementation time" and "importance of implementation" the top improvement

examples could be located and information given about what was most vital. This shows what has been missing in the project process or needs to be improved and will be shown through examples for improved understanding.

1.2 SKF Sverige AB today and its project process

First an introduction of SKF is described to interpret its extent. Secondary their project management knowledge is described to comprehend their project management skills. History and background for SKF are described later in the report.

1.2.1 SKF extent today

For more than 100 years, SKF have been applying engineering expertise to the challenge of reducing friction to make machinery run more efficiently. Specifying in products like SKF ExplorerTM rolling bearings, which not only minimises the friction but also helps increasing reliability and extend service life. SKF has a unique ability to leverage their customer experience in every major industry with a wide portfolio of products such as lubrication systems, seals, mechatronics, services to improve energy efficiency and many others. With manufacturing and operational sites in over 140 places in 32 countries it is safe to say that SKF truly is a global company.

1.2.2 Project management background:

The process of project management has always been a part of SKF since the early beginning. While all aspects of the manufacturing process of SKF bearings became better, so does also the process of project management. PRINCE, which will be described under chapter 2.2, is the foundation for GPM that is SKF own structured project management methods and mandatory to follow during project management. As PRINCE evolved so has also GPM and recently GPM2 was released. It is important to emphasize that GPM2 is not a duplicate of PRINCE2. Instead, it defines how PRINCE2 is used within SKF project management structures, and makes sure that the requirements for project delivery are met. To clarify and simplify the project process a project handbook is now developed out of the project managers' perspective as a tool of EEM.

1.3 Objective

By standardizing the project process of investments the efficiency will be increased in terms of clarity of the project process and minimize risk for budget and time schedule overdue. Whilst this is the core objective of this paper, to find how and what parts of a investment projects process that can be standardised, to locate the core objective there will be several sub objectives that will be researched at SKF Sverige AB. Through interviews knowledge will be obtained of how projects are handled and how they should be handled in different areas of SKF Sverige AB. With another interview stage, data will be collected for how the process can become more efficient regarding time, personal, cost and critical errors.

Main objective:

Discover how and what parts that can be standardised of a process for an investment project at SKF Sverige AB.

Sub-objectives:

- Find how project management is handled at SKF Sverige AB
- Discover how the process can be further improved

1.3.1 Thesis constraints

Constrains of this master thesis will reflect the width and general knowledge of project management within SKF Sverige AB and the fact that the research will be based upon only one major organisation. The following constrains have been made for this master thesis:

- Only SKF Sverige AB is in the research
- The research of project management will be based upon investment projects such as new machines and factories and such
- A time limit of 20 weeks has been set from SKF
- The researched will be done by one person

1.4 Problem discussion

The process of project management is very individual depending on the kind of project. But there are always some areas of expertise or phases regarding the project process that is standard for how a project should be run. For example there must always be a project manager in control of the process and a project receiver to take over the responsibility after the project is finished. Needed personal, data input and the project layout should all be planned before which also is a important part of project management, the project planning. Problems that must be researched to comprehend the process of investment projects at SKF Sverige AB will be firstly to find out how project management is handled. Secondly how it should be handled, both out of theory and how the project managers, receivers, sponsors and supporters want it to be handled. Thirdly and last is how the identified changes can be implemented.

1.4.1 Purpose

The planning is usually the most important part of a project and sets the standard for how the project will be handled. Even so, this can often be set aside and become forgotten to speed up the actual process where implementation begins. This phenomenon results in inaccurate conjectures that can usually require change that affects a projects budget and estimated time schedule. This can also bear weight to the actual project existence by termination due to lack of funds or project not reaching its destined goals. To ensure that every step of a project process is thought over and processed SKF Sverige AB is now developing a project handbook under EEM. The handbook will mainly work as an aid to the project manager and give guidance to what order the project process will be in. The first phase for example is where a need is obtained and resource addition is handled for the making of a pre-project study (planning of the entire project).

1.4.2 Research questions

There are several research questions that need to be answered and analysed to find how the process of investment projects at SKF Sverige AB can be standardised in such an efficiently way as possible. The following will be part of this research:

- How is project management handled at SKF Sverige AB?
- What specific front edge competence is required for different investment projects at SKF Sverige AB?
- What parts of the investment projects process can be standardised?
- How can the different parts be standardised?
- What should change and what should remain to increase project efficiency?

2 Theoretical framework

By doing a theoretical framework, data and knowledge are obtained from previous experiences and will work as an input to this papers research. This is to maximize the knowledge and thus work with such a broad foundation of information input as possible. Then no parts of the process of a investment project will be missed to be looked upon and the process of standardisation will be well known.

2.1 Effects of standardizing project process

By making the process of projects standardised, the process will become similar for all kinds of projects. This means that project managers can proceed with projects in the same way and create a similar thinking. Projects are very individual in general however. There are some factors that all project consist of, like a project's bone structure. For example all projects need planning, a start and an implementation phase. A project needs these stages to even become a project and will be defined by them. It is fairly accepted that the planning stage of a project sets the projects standard. According to Halback, M (2000) "Who fails to plan, plans to fail" is nowhere more true than within development projects of a complex kind. A lack of planning usually have its reasons such as scarce resources, missing project management skills and the belief that with good people in a project everything will somehow go right. Knowledge of clear and defined project goals, project phases and how to keep project members motivated and which skills and tools that may help a project to finish in scheduled time with the set amount of resources and functionality wanted, seems to be crucial for a successful project work. Since there are factors here that are more or less mandatory for a project's future success there should be possibilities for further improvements regarding standardising the process. It has become more accepted that standardization of some factors within projects can enhance the projects rate of success (Toney F. & Powers R., 1997, Sobek D., Liker J., Ward., 1998). But there is a big gap of knowledge in the specific area, only pieces can be found through case studies and literature reviews (Milosevic D., Patanakul P., 2005). The width of projects are enormous since they are individual, but as mentioned before there are certain parts of the process that are standard and thus can be even further standardised to improve the process of project management. Through research

(Milosevic D. & Patanakul P., 2005) three factors of standardisation have been pointed out as critical for a project's success:

- 1) Standardized project management process
- 2) Standardized project management tools
- 3) Standardized project leadership

Everything involved within a project, such as input, members etc. have some sort of impact on the process in one way or another. This gives reason to believe that all types of standardisation that are positive, even the minor ones, also affects the actual project process in a positive way which is one of the main factors for project success. The thoughts can be compared to KPI that sort of helps to set the standard of a project. KPI use factors to judge a project's success. One cannot standardize KPI, but instead standardize the thought of using KPI. By making KPI a standard to project management, progress towards achieving success criteria's are increased, enabling corrective action to be taken (APM 2006). According to APM the presence of these factors will not guarantee project success, but their absence may contribute to failure. This thought can be generalized to all kind of standardization, 5S, six sigma, ISO and so on. Some are required to insure that a certain standard is met, others are implemented to reduce chance of negative aspects.

2.2 What is PRINCE2 and what does it do?

PRINCE is a non-proprietary structured project management method based on experience drawn from thousands of projects and from the contributions of countless sponsors, project managers, project teams, academics, trainers and consultants (Bentley C., 2009). PRINCE has emerged worldwide as one of the most widely accepted methods for managing projects and has now a new version, PRINCE2, which is generic due to it can be applied to any project regardless of project scale, type, organisation, geography and culture. PRINCE2 achieves this by isolating the management aspects of project work from the specialist contributions, such as design, construction etc. The specialist aspects of any type of project are easily integrated with the PRINCE2 method and, used alongside PRINCE2, provide a secure overall framework for the project work. Because PRINCE2 is generic and based on proven principles, organizations adopting the method as a standard can substantially improve

their organizational capability and maturity across multiple areas of business activity; business change, construction, IT, mergers and acquisitions, research, product development and so on. The principles PRINCE2 are build upon are unique to this method (Bently C., 2009) and can be seen in figure 2.1. PRINCE2 breaks the process down in steps with stage plans in a methodical manner, which makes the process easier to follow and implement. Eight key processes are identified for PRINCE2, for which it lays down standards as to how they should be carried out. These are as follows (Maylor H. 2005):

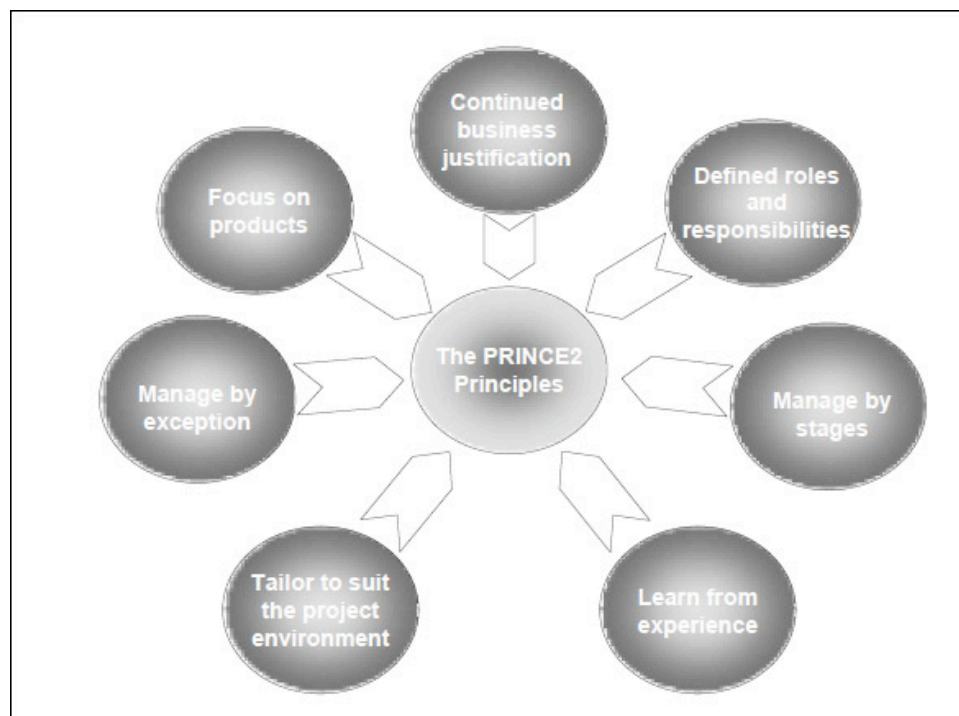


Figure 2.1: Principles of PRINCE2

- 1) **Directing the project** – Carried out by the senior management team. These are the high-level decision-makers who define the need for the project, the resources to be allocated to it and whether it should continue.
- 2) **Planning a project** – An ongoing activity that, using specified methods provides a model of activities, their sequence, duration and resource requirements and associated risks.
- 3) **Starting up a project** – Once the project has received approval, the project resources need to be organised. This starts with the appointment of the management team and assigning their individual objectives. A plan of work needs to be drawn up leading to the terms of the contract between the project organisation and its customer.

- 4) **Initiating a project** – This part of the process results in the overall project strategy and sets the criteria against which it will eventually be judged.
- 5) **Controlling a stage** – Once the project activities have started in earnest, this activity includes those aspects of control and problem solving required to ensure that the project meets the original objectives.
- 6) **Managing product delivery** – Where there are multiple teams working on different aspects of the project, this process is vital to ensure that each knows their responsibilities and their interfaces with other parts of the project, and that activities are not omitted because they were not properly allocated.
- 7) **Managing the stage boundaries** – At the end of each stage, to report on the progress and problems encountered in that stage and their implications, and following this the plans for the next stage.
- 8) **Closing a project** – Shut down the project systems, provide reports and feedback for future process improvement and establish the performance of the project relative to the original objectives.

All steps and rolls within a project are well defined with PRINCE2 and the module provides bureaucratic controls on the planning and execution of the projects (Maylor H. 2005). With this monitoring control potential problems that may arise in the project are identified in an early stage and stresses a preventive conflict resolution. PRINCE2 can however not provide any guarantees of project success. The module is a standard for how the project process should be carried out and there is little chance of specifying the precise processes that needs to take place to ensure complete success. Even then there is the human factor to consider.

2.3 How to verify that the project process is executed good enough

Although projects have been under way since the time of the pyramids, and project management emerged as a profession in the late 1950s and early 1960s (Levin G. & Green A., 2008), the profession is still not fully understood. In today's society there are tons of books explaining project management in various ways with expert opinions. There are several self-help books that claim to “make you an expert on project management in one week” (Maylor H. 2005). It is interesting that we insist

that other management professions such as accountants and lawyers takes years of practice to comprehend its profession, but when it comes to project management, people are handed projects and put into that situation often with little or no experience and education at all. Projects have specified budget and time limits that the project manager are expected to follow and maintain. For this the project manager will need to work with other people, and influence them to work in a particular way (Boddy D. 2002). This brings in the human factor that is unclear at best. People can be led by guidelines and routines and still perform badly. To insure that a project process is executed well, there are many minor parts and factors that need to be just right. The collaboration and communication between involved co-workers must function and then there is a whole set of techniques that will help as well (Boddy D. 2002). Such as work breakdown structures, process mapping, planning, scheduling and estimating are valuable. The techniques however do not function well enough, or at all, if the involved people don't make it so. So it is evident that the people involved has a big impact factor for the success of a project, and project managers need to influence them. All roles within a project are important, but there are some that are more vital for its success. Projects sponsors for example are crucial to the projects success (Dinsmore P. & Cooke T. 2006). During a project the progress needs to be monitored to insure the status of the project. There are several methods to monitor a project, KPI as mentioned under 2.1 can for example be of help here. The definition if a project process is executed well enough can be seen from different perspectives. A project's success may for example be the project having achieved stated benefits as defined in the business case. Or from the project manager's perspective success may mean meeting agreed scope, time, cost and quality objectives as defined in the project management plan (APM 2006). However, people will have different views if the project process is executed well enough depending on their perspective.

Visible control, which is an area in which there has been many developments in recent years (Maylor H. 2005), Is showing the process of the project and surfaces various problems that occur. The principle of visible control was evident in the world-class Japanese manufacturing systems and was found to be a key factor in their success. If you can see what is happening you can control it, runs the theory (Maylor H. 2005). By the use of Gantt chart the progress of a project is visualised, monitored and controlled. Here the path of the project is seen and what tasks that are most critical for

the moment. By constantly receiving the information of what part of the project that is critical for the moment and what the next step is, the project progress is controlled so that focus is on the most important task. This does not mean that other tasks are forgotten, simply that the tasks in hand that are critical and are getting maximized work ethic. With a controlled overview of the project all different tasks can be monitored and planned to increase efficiency. In projects however there is always some sort of change that needs to be included. When stakeholders change their views about their requirements of the project outcomes for example. The change needs to be passed through a system for evaluating the new situation. According to Maylor (2005) there are four parts that needs to be thought over regarding such a change;

- Cost and benefits
- The priority attached to the change (whether it is cosmetic or fundamental)
- The effects of the change on the processes
- The effects on other assumptions – particularly cost

By being prepared for changes, in mind and how to tackle it, the project manager can control and push the project towards successfully reaching its project goals. It is important to remember that this simply helps to monitor and control the project process. There are several more aspects of a project that are important to be monitored and controlled such as costs and quality. According to APM (2005) change control will ensure that all changes made to a project's baseline scope, time, cost and quality objectives or agreed benefits are identified, evaluated, approved or deferred. If the change is approved it should be fully documented and efficiently communicated. When approved the change will need to be fed back into the project's configuration as the new standard. During some circumstances, it is appropriate to introduce change freeze on a project so that no further changes will be considered as to do so would jeopardise the achievement of project objectives (APM 2005).

Since information is the one key factor as to knowledge if the project process is executed good enough, it is obvious that communication is a big part of its welfare. A common technique for communications management centres on the use of a table to identify the nature of the communication (what will be told to whom and in what format), the timing and who is responsible for doing it (Maylor h. 2005). By performing a communication plan, as can be seen in table 2.1, the distribution of

information can become more efficient and standardized. This helps to provide clarity of the projects progress and plans to the people involved. The primary objective for communication in project management is to gain a common understanding according to APM (2005). Effective communication is fundamental to project management and the project manager can choose to share, mask or promote certain information that

Table 2.1: Communication plan

<i>Stakeholder</i>	<i>Communication</i>	<i>Timing</i>	<i>Format</i>	<i>Distributor</i>	<i>Person responsible</i>
Project sponsor	Monthly	Week 1 each month	Short report	E-mail	Project manager
Accounts department	Monthly spend schedule	2 weeks before start of month	Short budget	E-mail	Administrator
Client department	Monthly	Week 1 each month	1-page report	E-mail and notice board	Liason officer

will affect the project in different ways. Teamwork and leadership also has a great effect on the projects status. The project manager needs to build and maintain a positive and effective team that encourages involvement, flexibility, efficiency, innovation and productivity to contribute to project success. As mentioned earlier the knowledge and skills of the project manager can be vital for the project. It is not uncommon that someone is chosen to be a project manager but lack previous project management experience. This of course has some effect on the project outcome, or at least on the project process. With a good and experienced project manager who possesses and is able to use the vital and required tools in a correct way, the project are in good hands. But as also mentioned earlier there are several parts to a project's success and ensurance that the process is executed good enough. There are many surrounding factors that effect the project state and are dependent on one another. The one true factor that can bring them all together and secure a great project foundation is a proper project plan, which also requires a well experienced and skilled project manager. By constant monitoring and controlling of the project plan the execution of project process is then ensured as long as the progress is going according to plan.

3 Detailed description of project research interests

For this study SKF will as mentioned be in focus and the research will be based upon their project handbook that is under development. To comprehend the experience within SKF, its history will be described more thoroughly here and also the development of the project handbook and its content.

3.1 SKF history

SKF was founded 1907 by Sven Wingquist in Sweden when the world's first self-aligning ball bearing became a commercial reality. Right from the beginning, SKF has pursued research and started testing greases and analysing how lubricants deteriorate during the bearing service life. As early as 1910 SKF had 325 employees of whom 15% worked outside Sweden and quickly SKF grew to a global company that was well established in Europe, North- and South America, Asia and Africa. SKF technical Customer Service was established in 1914 and within the next couple of years single row deep groove ball bearing with filling slot (the so-called Volvo bearing) and the spherical roller bearing were invented and SKF now had twelve factories, sales representatives in 100 countries and 12 000 employees. By year 1929 manufacturing of centralized lubrication systems for passenger vehicles was obtained and a subsidiary of SKF, AB Volvo, started production of experimental cars (AB Volvo became independent of SKF at 1935). At the year 1950 manufacturing of centralized lubrication systems was intensified for the machine sector and the SKF theory for calculating the life of a bearing was published by ISO and adopted as world standard a couple of years earlier. SKF now had 18 factories, 31 000 employees and of whom 66% worked outside Sweden. Within the next 25 years SKF grew to several new countries and researched and developed its own testing equipment and test programmes to become world leading in lubricant performance as well as bearing knowledge. Meanwhile SKF was investing and expanding more than ever and at 1970 SKF mastered 68 factories and 67 000 employees of whom 78% worked outside of Sweden. At 1986 SKF introduced maintenance products offering with a comprehensive range of bearing mounting and dismounting tools and lubricants for bearing users. SKF had then also discovered the CC design for spherical roller bearings that has self-guiding rollers and up to 20% lower friction than the previous

spherical roller bearings. Also in the late 1980s SKF service introduced the new concept “Trouble-Free Operation” and established an environmental policy. The two most recent researched and developed roller bearings are – the toroidal roller bearing CARB that was launched at 1995 and the spherical roller bearing, the SKF Explorer Series that was launched in 1999. This was the same year Endorsia.com was launched, an Internet based marketplace. Now SKF had over 90 factories and 44 000 employees of whom 84% were working outside of Sweden. SKF always improve all aspects of bearing expertise and in 2001 SKF introduced SensorMount system that ensures correct mounting of bearings, LubeSelect a new method for selecting the correct greases and at the same time SKF Manufacturing Development Centre was established in Göteborg, Sweden. Just between 2002 and 2008 SKF expanded with new factories which were mainly in Asia and Europe, but also investing in other companies such as; Magnetic Group, a leading manufacturer of electromechanical actuators; Aerospace Bearings UK who manufacture shafts and gearboxes for jet engines; SBB in Bulgaria who own four bearing factories; The Twentieth Century Machine CO., a US manufacturer of ground ball screws; Rolling Stock Supply & Service Pty Ltd, one of the leading railway bearing service companies in Australia; Willy Vogel AG, one of the world leaders in lubrication systems; Jaeger Industrial Ltd in Taiwan, a leading manufacturer of electromechanical actuators; Sommers Indusritechnik AB, a distributor of Vogel lubrication systems; Precision Balancing & Analyzing in the US, specialist in repair and upgrading of machine tool spindle mechanisms; Monitek, a leading Australian predictive maintenance services company; The industrial seals company, Economos Austria GmbH; SNFA SAS, a leading French manufacturer of bearings for aerospace and machine tool applications; ABBA, a manufacturer of linear guides; S2M, a leading French magnetic bearing company; Baker Instruments, a leading manufacturer of testing and diagnostic instruments in the US; Automatic Lubrication Systems, a service company for Canadian mobile transportation equipment and US-based Preventive Maintenance Company Inc, a market leader in predictive maintenance services. SKF keeps on growing even though, due to the light of a weakening demand, capacity and costs were reduced in 2008. The year after SKF won the Swedish Innovation Award due to the new SKF energy efficient bearings and the Folksam Corporate Responsibility Index for 2009 gave SKF top score for its environmental and human rights work. In the end of 2009 and up to this date further restructuring and cost reduction activities have been announced.

Today SKF is represented in more than 130 countries, has more than 100 manufacturing sites and supported by about 15 000 distributor locations in the help of a efficient global distribution system. The SKF Group also has global certification to ISO 14001 (environmental management systems) and OHSAS 18001 (health and safety) standards.

3.2 EEM project handbook

EEM, factory executives, project developers and other parts of SKF have longed for the process of investment projects to become more efficient with special guidelines and routines. Thus started the work of developing the project handbook that would help standardising the work process. People working with the project process and that was interested in a common solution got involved to provide their insight and expertise. The foundation for the process is from GPM2, which describes SKF's approach to managing projects. It is written to help anyone who is asked to manage projects at SKF, regardless of their experience of managing projects or their job function. The method is based upon PRINCE2 and is tailored to work within the SKF environment. It is not a duplicate of PRINCE2, instead it defines how PRINCE2 is used within SKF's project management structures and makes sure that the requirements for project delivery are met. After a need has been developed and a project is started the lifecycle of a project follows this process according to GPM2:

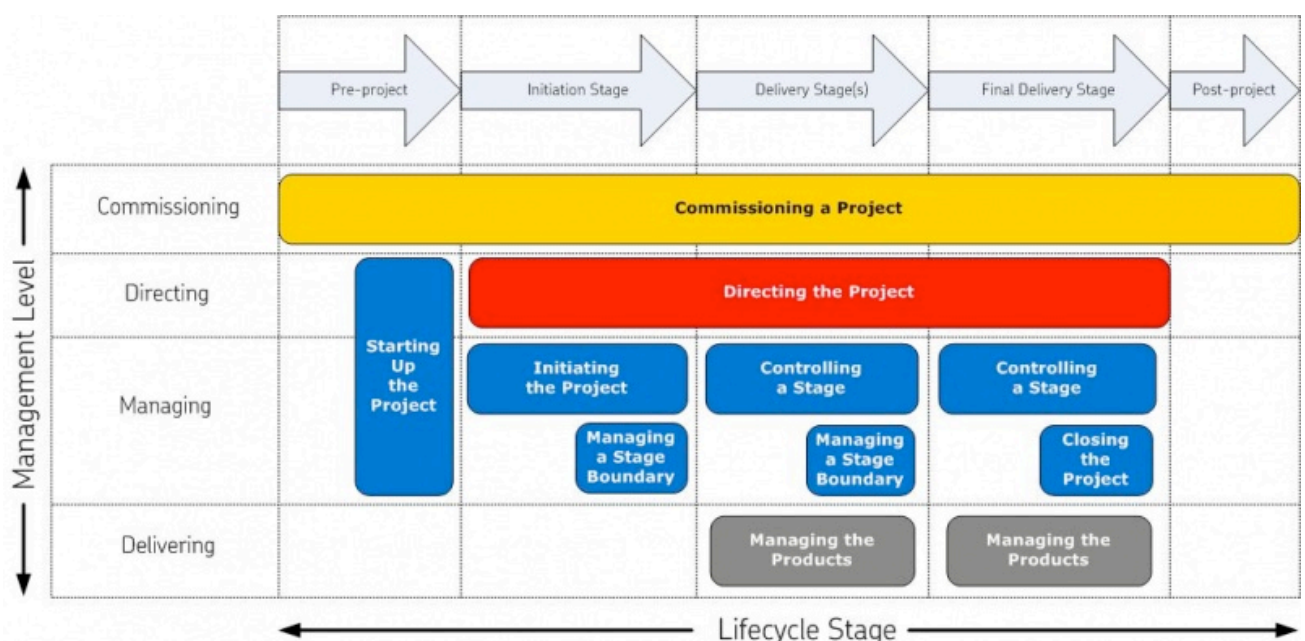


Figure 3.1: Lifecycle and management of a project according to GPM2

Since GPM2 is based on PRINCE2 the process of how projects are run are very similar. The process of PRINCE2 can be seen under chapter 2.2 and the differences are that the project handbook has downsized the process into five major phases after a need is developed, as seen in figure 2. The phases can be described as:

Pre-project – Here a pre-study is composed for the project with resources provided by the steering committee. Through research concepts are presented and evaluated. A cost- and profitability-estimation is researched and a rough project plan is constructed.

Initiation Stage - Once there is a decision to go ahead with the project, it needs to be planned in detail. Project funding needs to be obtained and controls should be defined.

Delivery Stages – Startup of the project where effective project groups, a steering committee, a thoroughgoing project structure, defined project goals and time schedule are created, using input collected during the pre-project and initiation stage. Implementation of the whole project plan and all its activities. Prepare and finalize the delivery of the project to the line organization.

Final delivery stage – Close all orders and ingoing activities, write a close out report and perform an experience meeting for lessons learned.

Post-project – Make sure that the efficiency goals are meet and that assurance matters are performed. After monthly monitoring of the efficiency level the project is closed towards the project supplier and the project is fully closed.

Since all project managers have different knowledge and management skills, they now have a standardized project process to work against. For people with great project management experience the project handbook will work more as a tool of guidance. But for project managers who are less experienced this tool will ensure that all steps of the process of investment projects are included and thought of. The required steps will not only be a part of the process, there is also guidance of how to execute them to the fullest with important aspects, templates and stakeholders of interests.

4 Methodology

SKF Sverige AB is using a project model called GPM2 that is based on the project model PRINCE2. By this project model a project handbook is under development for standardizing the process of all investment projects. This was a main resource for this paper and research are based upon knowledge and experience of people related to SKF Sverige AB who works within this area of expertise.

4.1 Research approach

Here the sources where information was retrieved will be described and how the research was approached.

4.1.1 Literature research

As a foundation of information a literature research has been made to cover the areas of standardising a project process at SKF and understand the consequences of it. This has been a width of information before it gets narrowed down and used as background information to comprehend the project process.

4.1.2 Approach SKF Sverige AB

SKF Sverige AB has worked as a research candidate and is in focus during the information gathering outside the literature research. How SKF work with project management and its process are the main areas of interest to see how it could be standardised and more efficient. The collaboration was with the whole of SKF Sverige AB, so there have been several sectors of factories and other vital sources to comprehend.

4.1.3 Continuous meetings and feedback

During the research the owners of the project handbook have helped to guide the work towards the right direction and expertise. Meetings were set up every second week where questions, progress and general information were provided and run through. They also worked a big part of helping finding the right vital experience and knowledge to aid the research in form of information.

4.1.4 Interviews

Interviews were chosen as the form to retrieve information and knowledge at SKF. Even though it was bound to be many people to interview, a sent out questionnaire or Internet survey would not provide the answers that this research was looking for. Some of the questions had to be very general and open minded to retrieve the essence of information and experience that the respondent could provide. With this in mind the interviews were divided into three stages that will be described more thoroughly under chapter 4.2.

4.2 Research procedure

The research information was obtained by different sources and also in a variant of ways. Here the procedure will be described of how the information was retrieved from each source.

4.2.1 Read and analyse literature content

By using books, articles and general knowledge information was researched regarding what effects standardising a project process gets, how to verify that the project process was executed good enough and how PRINCE2 was used. Databases at Chalmers University of Technology, Sweden and Northumbria University, England was the main source used to retrieve the information using keywords such as; standardise, project process, PRINCE2 etc. Subscribed tutors from respective University gave a helping hand in names of recommended articles and books as well. The retrieved information was then analysed and used to the research as a foundation of information.

4.2.2 Read and analyse the project handbook

To understand how project management and the process of investment projects worked at SKF a closer look at the project handbook was made. Its steps and process are based upon GPM2, which is a modified version of PRINCE2 out of SKF's perspective. To better understand the layout of the project handbook an overview reading, analyse and conclusion of GPM2 and its content were made, with the literature research as a foundation. Then a comprehensive study of the actual

handbook was done to comprehend its different steps and phases. This was the foundation for the first questionnaire.

4.2.3 First interview stage

To begin this study a section of start up interviews was constructed for the research and to get knowledge what SKF Sverige AB really wanted out of this paper and how GPM2 was involved. This was comprehended by interviewing seven chosen people deeply involved within the area of expertise. The project handbook owners helped to decide who were of best interest and had the best experience of project management and the project handbook. Seven people of different experience, mostly executives of various factories, were chosen and got invited by means of SKF's internal meeting decision program where one can see date and time when the chosen person is free and don't have anything planned. This of course only works if the person updates ones calendar and even then some meetings have to be postponed. All seven interviews were held at each individual's office and with the help of a basic constructed questionnaire where knowledge and experience were transformed into paper and ideas. The questionnaire worked more as guidelines so the interview didn't leave track to an irrelevant topic. During all the interviews notes were taken regarding what went wrong or particularly good in terms of project management and the project handbook. Ideas and thoughts were also noted but they mainly came in the later interview stages when that topic was in focus. After analysing the retrieved data a more comprehensive picture were obtained of what was needed out of this research and what it would bring. To proceed more interviews were needed and a stakeholder analysis to make sure all aspects and perspectives were included.

4.2.4 Primary stakeholder analysis

For the stakeholder analysis the project handbook owners were of great help due to their great insight within the organisation. With their help four people from different areas of expertise related to the project handbook were invited to a meeting where the stakeholder analyse took form. At the meeting a program called "Mind Manager" was used which is the same program the project handbook is using. All areas that had anything to do with the process of investment projects were first brainstormed so that no input of experience and knowledge were missed. People from each sector who were thought of having best knowledge or interest of the whole process was then

selected to be involved and give their input to the handbook. All in all 55 names were brainstormed, the previous seven that already had been interviewed were included. There are two major reasons why it became so many. One is because there are a lot of areas that gets involved in the process for a investment project. Secondly because in each area there are more than one important instance, for example factories who produce different sizes of bearings (middle, large and extra large). These are the people who know how project management is at SKF, how it can be and more importantly how it should be.

4.2.5 Interview stage two

For the second interview stage a new enlarged questionnaire was crafted to better suit the respondent and the interviews purpose, to receive thoroughgoing information regarding project management at SKF and its consequences. 20+ people was called and mailed regarding interview invitation and all but two gladly accepted. The interviews were held almost in the same way as the first stage with the only difference that the questionnaire was followed a lot more. During the interviews the questionnaire got updated due to the new input that was received. All vital data got continuously noted and analysed.

4.2.6 Interview stage three

With a structured questionnaire that was formed and upgraded during the second interview stage more refined questions were asked during the third. The latest version of the questionnaire was mainly formed to receive answers regarding how project management and the process of investment projects should be handled comparing to how it is done today. Even though the questionnaire covered a large area and many questions were general and all interviews were open, the interviewee was rather asked to speak open minded than to just give a specific straight answer. As the previous interviews, important or interesting matters were noted and filed. The major difference was that now they surfaced a lot more and new involving factors as well, some that SKF never thought of before and was thereby new experience. There are many areas of expertise that give input or somehow get affected by the project process. The stakeholder analysis showed that 53 people were primary stakeholders to the project process. This is also the reason why 53 people have been interviewed in

this research and given input to how the process of investment projects are today, should be today and can be tomorrow.

4.2.7 Collective information analyse

Information that was received during the three interview stages was as mentioned noted. Parallel to the interviews, previous notes got analysed for possible improvement changes and important factors for the project handbook's success. These were filed in a collective document and after all interviews were done a list of improvements, thoughts and ideas had been developed. By analysing the list in terms of area of modification, type of change and resemblance the list were modified from 53 types of change to 23 individual. These will be discussed more under result.

4.2.8 Improvements hierarchy

A meeting was set with the project handbook owners to make a prioritization list of the discovered standardised improvements. The listed improvements were prioritised based upon:

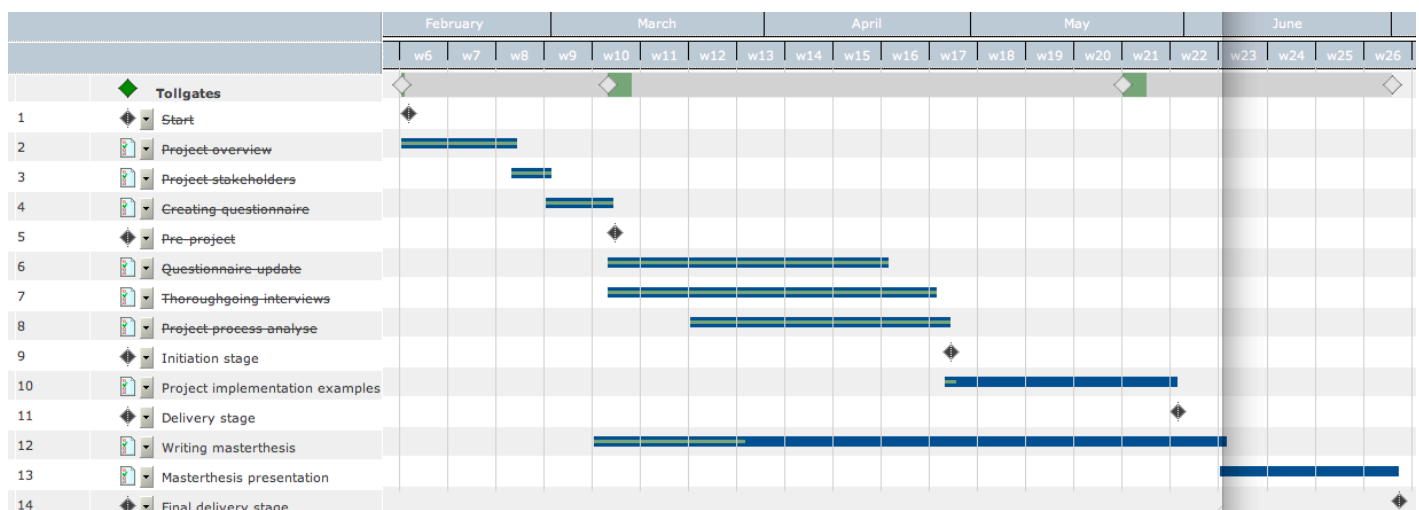
- Estimated implementation time
- Importance of implementation

With a scale from 1-5 were

1 = very bad, 2 = bad, 3 = middle, 4 = good and 5 = very good

4.3 Gantt schedule

Here the WBS is shown for this report with workload exceeding 1000 working-hours.



5 Data presentation

All data and knowledge that has been collected will be presented here and be analysed afterwards.

5.1 Interview stage one – start up

Even though a questionnaire was made the interviews remained open due to the vast experience and knowledge of the chosen people and also to the fact that they knew exactly what they wanted and how they wanted it. These strong minds did however not desire the same things nor in the same ways. But one thing that was concluded was that the efficiency of project management could become a lot better, in a numerous of ways. Among this fact a wider general knowledge of how SKF work with GPM2 was obtained and also some flaws with it.

5.2 Stakeholder analysis

The various areas that the invited people for the stakeholder analysis was working within was:

- 1) Production Engineering Manager
- 2) Project Portfolio Manager
- 3) Manager of EEM
- 4) Maintenance Manager
- 5) Project Manager in Process Development

The variance of expertise was a great help to the insight of needed people to the stakeholder analysis. To cover all areas of interest that can give input to the project handbook, 53 people were presented as primary stakeholders. This is due to the vast amount of information and steps that the process of investment projects need. The stakeholders was divided into four different groups with the project handbook in focus:

Table 2: Primary stakeholders to the project handbook

Primary stakeholders				
		Project handbook accessariness		
Position	Name	User	sponsor and steering committee	Support function Receiver
Executive of production			0	0
				0
Executive of manufacturing			0	
			0	
Controller			0	0
			0	0
Executive of process development			0	
			0	
			0	
Executive project management ID support			0	0
Project leader		0		
Project manager		0		
		0		
Process developers		0		
		0		
		0		
		0		
		0		
Product technology				0
Industrial engineer				0
				0

			0	0
Facility & Service Management				
Operator driven reliability			0	
Maintenance engineer			0	0
			0	
Maintenance manager			0	
			0	
API			0	
Construction			0	
Industrial division			0	
Spare parts			0	
Machine safety			0	
			0	
Technique of measurement			0	
Supply chain			0	
			0	
MHS				
Internal environment coordinator			0	
External environment			0	
Safety representative			0	
			0	
Safety executive			0	
Development centre			0	
Purchase			0	
Early equipment managment	0		0	
Kraft			0	
Human resource			0	
			0	
Manufacturing excellence			0	
			0	
			0	

5.3 Interview stage two – thoroughgoing information gathering

During second interview stage information was gathered about how project management is handled at different parts of SKF and consequences it brings. Another research topic was how project management and the process should be handled. Here a new enlarged questionnaire was created and divided over the four different project handbook accessoriness (can be seen under appendix 1). The data collected during second interview stage showed how diverse project management were conducted within SKF. Through the different factories and also among the individual project leaders there were clear differences. Efficiency of course and project planning as well, but that the content of input for several projects that are of same type it makes one wonder if the project process can become more standardized and in that case raise the efficiency and minimise chances of risk. From the project leaders perspectives it was common that they had a hard time receiving the required resources for the planned process. But if they did, it usually wasn't the correct amount and needed refunds and delays of the planned project time. It was clear for them that the input for each project usually was too simple and not analysed enough. The process of all projects at SKF are meant to be done in five major stages:

- 1) A need is developed
- 2) Pre-project – a pre-study is made
- 3) Initiation stage – start of the project
- 4) Delivery stage – the project is implemented
- 5) Final delivery stage – closure of the project

One common factor that most projects had was that they were rushed into the initiation stage too early without a proper pre-study. Sometimes even the definition of what was needed was diffuse and thereby lead to confusion and misunderstandings among project members during the process.

5.4 Interview stage three – future improvements

To generalise the research data that was extracted it has been divided into the four aspects of a project, from the project handbooks perspective.

The **Users** usually felt that the resources were not enough and that the process was stressed to start too early without proper background information. Another common factor that put setbacks from the users' perspective was that the roles of the people involved within the project were not clear and defined enough. The sponsor in particular did often not know one's role and thereby what was desired out of oneself. This usually affected decision-making in the project and also made goals unclear and misunderstood which provided uncertainty into the project.

From the **Sponsors** perspective the project plan and goals were not always clear and well defined. Although there always was a communication plan for each project, misunderstandings were quite common, in particular when the sponsor was unclear of its role. It was also shown that the sponsor for a project sometimes was the project receiver, which caused problems with the definitions of projects goals vs. project efficiency goals. More about this will be discussed later in the report.

The **Supporters** to investment projects are from areas such as spare parts to supply chain and they all have the same problem. They want to be included in the project process in such an early stage as possible. This walks hand in hand with project managers jumping into the initiation stage or even delivery stage much too soon, without considering the supporters' perspective and how their knowledge and experience would help the actual implementation of the project plan. Their expertise is usually forgotten until it is needed, and then it could already be too late in the process to make the required changes that was recommended. Another thing that gets neglected from the supporters' perspective is when they actually are involved and their expertise come to use. Then the communication in form of feedback is not done well enough. This phenomenon had numerous of reasons to why it occurred, such as with project managers as a middle hand for the information flow, then it sometimes get lost. But the most co-occurrence one was that the supplier missed the information, or at least did not send any back. According to the supporters this could be because of the time pressure and the scheduled time the project manager had planned the investment unit to be delivered by the supplier. The purchased unit was accepted far too quickly without any real certification and tests of fulfilled delivery goals.

Project receivers stated that the cost and time plan never were as planned. As mentioned before because of the scheduled time and production demands a delivery often got accepted with faults, even though they could be major ones. This delayed

the whole process due to reconstructions and with that changes the project budget. But the production demands put pressure and because of that force the project receiver to accept the responsibility for the project before changes are made and long before the project is rightfully closed. This results in that the project manager no longer has responsibility and with it the system of a project collapses.

All four perspectives knew what went wrong, how they would like to have it and sometimes also what should be changed to retrieve it. The data collected here was about changes that would have an impact and also possible to implement, both as change in the organisation but mainly as a standard for the project handbook. To see data that was drafted out of the interviews see appendix 2, this datasheet is the collective data from all interviews.

6 Results and reflections

The results that this paper will be presenting are based upon the literature research, interviews and general knowledge. As seen under previous chapters, project management for investment projects at SKF are well diverse and handled in different ways. The one connecting part is the project handbook that helps to give each project a certain standard of process extent. Main problem for the process presently is the flow of information that does not reach all involved members in time and the content of information can become more vital if not generalized. This affects all other steps in the process. The handbook system shows when each input to the project should be contacted and consulted. A co-occurring problem is the overall understanding and knowledge of the project managers who are supposed to control the project environment and anticipate possible problematic scenarios. Here are not only the skills of the project managers involved but also the sponsors and their participation. It is vital that the project managers are driven, flexible and possesses leadership skills when dealing with major investment projects due to the requirement of several inputs of information that are needed to collaborate. Possible parts for standardization for the process of investment projects are usually the fundamental ones that form the process. This can be everything from the layout for the project management plan to use standard templates when performing certain steps. Since EEM's project handbook is meant to standardize all these, it will be in focus and the improvements or possible changes are concentrated towards it. There are several aspects of the process for investment projects that can be improved and / or standardised to minimise risk and raise efficiency. Even minor changes can tribute in major differences.

Below solutions to the 23 most discussed and common issues at SKF that were identified in this study will be presented in terms of what it would do and what difference it would bring.

6.1 Highlight mandatory process steps

All steps and phases in the project handbook must be looked up if needed, but it is not mandatory to use them all. There are however some steps that are mandatory to do and they should therefore be highlighted to simplify the project process for smaller projects, such as c-class (smallest investments projects at SKF). They usually don't need too many steps involved and by highlighting the mandatory steps the work can

be progressed a lot faster and make it easier for the project manager to see what must be done for the layout of the project plan. The project handbook is as mentioned presented in the program Mind Manager where each step under the headline phases are presented as bubbles. The mandatory steps could be of a different colour and would thereby easily be seen by the project manager. The other steps that are not mandatory should remain neutral in colour but must also be progressed by the project manager to insure that no important steps are missed. The reason why its important to highlight the mandatory steps is simply because then they cant be missed and the project manager then know how important the certain step is for the project success.

6.2 Move out hidden activities to new underlining steps

The project handbook is built so that input to all different kind of investment projects can be found if the process if followed. This is the best way to standardise the process of investment projects. But under some steps there are hidden activities in form of things that must be done to accomplish the step. These activities should be moved out as underlying steps so the whole process can be seen outside the actual step in the project handbook (see figure 6.1). By moving out new activities so that each step is only one activity the whole of the process is better shown and thereby can be easier to follow and plan. A negative aspect to this is that the handbook will be enlarged and because of it looks like even more things are to be done. The truth is that the amount of work for the project manager is still the same. If the headline to the activity is still nothing the project manager must consider, then the underlying steps doesn't have to be looked over and can instead be ignored.

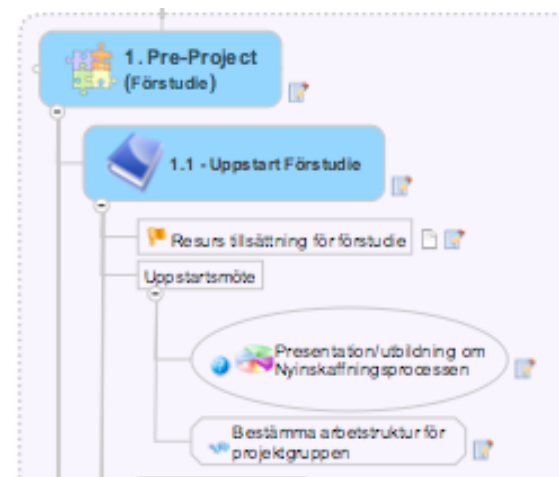


Figure 6.1: Activities underneath a phase are shown

6.3 Checklist of project steps (shown at gates with attached information)

At the handbooks gates there are a go / no go – meeting with the steering committee of the project. There the previous steps are shown how they were executed and what the results are. The handbook can be used as a checklist because all the previous steps to the gate are shown. But by printing out the handbook and use it as a checklist the

steps neither process will not be defined for the steering committee and thereby hard to follow. GPM2 also has checklists to each gate. The problem is that they are rarely used. To implement a real and simplified checklist for each individual process can be easy. For each step there is an input, definition of what to do and an output. By choosing what steps that are included in the specific project these three should be shown for each involved step at the gate and then the progress and process will be much easier to follow for the steering committee and to explain for the project manager. Since all steps already have an input, definition of what to do and an output a macro would easily combine the steps by choosing which one that is needed for the required gate.

6.4 Enlighten the importance of “pre-project” phase

All projects need a proper project plan so that important input will be thought of and implemented. A project’s time schedule and budget are of course important aspects as well that is more likely to be accurate if the project plan is well constructed. During the project handbook’s pre-project phase all the planning for the project is done. It is a pre-study for what to include in the project and sources that can be used to get the accurate input information. This phase can be said to set the project’s standard and is seen as the most important phase. SKF however have commonly forgotten or rushed through the pre-project phase, which have given devastating consequences. Its importance must therefore be enlightened to insure that all projects take the necessary time and resources to accomplish a proper pre-project study. With a thorough pre-study the whole project process would become different. A more accurate time and budget schedule could be presented and followed and sources of input could be involved a lot sooner to give vital information regarding demands, quality and other factors.

6.5 Define clear roles of project members

All members of a project must know their role to be able to perform their job to the fullest. Too often have people directly involved in projects at SKF had no idea what their precise role was in their projects. This usually occurred for project sponsors that funded the project and are to maintain the investment after delivery. Each project role is defined at GPM2, but project members don’t enter that site and check the information available. What can be done is that in the beginning of each project, when

the project members are chosen (project manager, receiver and sponsor) then the defined roles from GPM2 are sent out and discussed in beforehand so each member know exactly what is required out of oneself. This for example can be done during the start-up meeting, which is mandatory, where all project members meet for the first time.

6.6 Show what the different project activities will be input to

Due to the vastness of the project handbook many project managers feel that it can be hard to follow. When working with a certain step the information regarding what must be done is well defined. Sometimes the work requires input from previous steps, which then already is done and can be used. The wanted output from each step is usually clear also but not always to what purpose. Many interviewed project managers felt that they sometimes didn't really understand why certain steps were needed or what the output would bring to the project success. By defining or showing what each step's output would bring, for example be the input for a source in a later part of the project handbook process, the activity's purpose would be much more clear for and understood by the project manager. The efficiency is probably not to the max if the purpose with the activity is somewhat diffuse so this would hopefully help to clear misunderstandings and raise work motivation.

6.7 Guidance of how to use EEM project handbook

Due to that the project handbook is a new tool for project management it is not common for all the users to fully know all the aspects of the handbook and its purpose. Lectures have been given in GPM and some have also received the upgraded version of GPM2. For the EEM project handbook however there has only been individual teaching and on a one-to-one level. To comprehend the handbook as a tool there should be written guidance for how to use it. This of course would also standardise the teaching process of how the tool is used and why it is preferred. By making a tutorial guide the user can follow it and get instructions of how the handbook are supposed to be used and why it is needed for project management. There are several small details such as icons showing the handbooks version and files that can be downloaded and used which ought to be described but hard to be remembered if only heard once during an handbook intro. With a tutorial guidance the user can look it through several times and pause during usage experimentation.

6.8 Updates of EEM project handbook

A project process can always be improved in forms of finding new standard ways of work or enhance the already existing one. Therefore updates are necessary for the project handbook, specially now when it is in such an early stage. Problems have however occurred due to the fact that the handbook have been irregularly updated and therefore the users have been lost in their work to find what version that they should use and what it brought that might require change in the project. The updates must therefore be in a systemised way. Maximum two updates a year with specific dates and a log of all changes that are made. Previous versions of the handbook can still be used after the upgrade by choosing so in the program. This is since many projects can last several years and if the whole project process must be looked after from step one each time it will be too time consuming and restrain the project progress.

6.9 Enlarge the help text in EEM project handbook

The helping text that is available on the right side of the handbook for each activity is quite small on Mac computers. By being able to enlarge the text after ones own wanting the text will be easier to read and the process will be easier to follow. This problem is mainly due to that all project managers don't have the full version of the program Mind Manager but a free "Viewer"-version installed instead. So the real problem can be in buying the actual program instead of using a free version.

6.10 Clarify mandatory demands of MHS

To all investment projects the MHS process gives input regarding environmental, health and safety issues. Even though all projects are individual with different needs of input, MHS have issues and demands that are mandatory for everyone. These mandatory steps are not clarified today and the project managers find the whole MHS process very confusing and misleading. To simplify the process, members of each part of MHS with the required competence should standardise their mandatory questions and thought to be considered. The various parts can be assembled to a mandatory checklist, even for different sizes or types of projects. This will make the process of MHS more efficient and a lot easier to follow. Each project manager must contact MHS regarding every project for further input since they possess the vital experience and knowledge that are needed. The mandatory steps will be there to

simplify the work for the MHS staff and let the project managers know what can be done before all information is received.

6.11 Create layout for consequence analysis

A few projects have lately implemented a new unit called consequence analysis. It is meant to be revealed at gates where go / no-go decisions are made and show what the consequences are to terminate the project. So far there is no real layout or parameters chosen for the consequence analysis, or even decision that it will be used. But according to the project managers who did use it, the steering committee appreciated it and it helped the insight of the decision process. It is always better to see right in front of oneself what the consequences would be of the decisions made.

6.12 Implement examples of project templates

There exists many templates in the project handbook regarding stakeholder analysis, lessons learned, risk analysis and many more. The interviews showed that it was common of the project manager to modify the templates. This was mainly due to lack of understanding how the template worked or what the related units that the template used meant. By implementing examples of how each template ought to be used and define the unsure parts within, the foundation of all templates would be standardised for every project and easier to follow for all members who take part of them.

6.13 Send in templates with positive feedback

As mentioned above, examples would be of great help to simplify and standardise the work with project handbook templates. The whole process of using the handbook as a tool is still new and few have used the existing templates. Before there have been many versions of all kind of templates. But now that there are going to be one standard foundation for each template and it is important to receive information regarding what content it should have and how it is favourable used. By sending in used templates that had positive feedback to the support, examples are then had for others to follow. If an example already exists, which it should, it can be upgraded if some factors are clearer than the existing ones. The updates will still only be done maximum twice a year, as mentioned under 5.8.

6.14 Show hidden costs by choosing a none standard supplier

When choosing a new supplier for a investment project there are several things that must be thought of which have been forgotten at several occasions at SKF. New spare parts are needed and the new suppliers are probably not familiar to the standards and methods used at SKF. The latter have brought many problems due to that SKF commonly have to reconstruct the machine that has been ordered and delivered. These costs are however not in the budged plan for choosing a none standard supplier. Budget for reconstruction plans have instead been moved from the project's budget to the factory departments budget, which is still the same but can affect the choice of supplier and thereby enhance risk. By adding costs for spare parts, reconstructions and man-hours to learn a new machine the choice to accept a new supplier can be changed. These are all standard things that are to be included in the choosing of a supplier.

6.15 Define investment cost vs. reconstruction cost

As mentioned above there are uncertainties at SKF regarding what investment costs are and what is included. To be able to standardise the investment process with a budget plan clear definitions must be made regarding cost for investment and reconstruction. When a machine is to be moved for example, it does not go under investment cost, but under reconstruction cost. This changes the budget for the project and the clearer it gets the lower the risk.

6.16 Clear demands of supplier

Due to the fact that projects have rushed into the initiation stage or even delivery stage before making a valid pre-study, demands of the supplier have sometimes been rather diffuse. For all investments there have been a need for changes before delivery by the supplier, especially when using new suppliers. It can be regarding design, MHS, tolerances, output or other aspects. The mistake that has been made is that SKF lets the supplier lose far to early before all the demands have been reached. This is due to a numerous of reasons. The change that needs to be implemented is a better feedback system from SKF to the supplier as well as communication within sectors of SKF to enlighten what need to be improved or modified to fit the sent out supplier demands. Feedback for the supplier must be calculated into the projects time schedule and demands kept tight so the supplier delivers what is ordered or pays a fine if

unsuccessful. If this can be implemented the project would have a more accurate time schedule, lower the risk and hopefully avoid unnecessary reconstructions once delivered.

6.17 Send maintenance tools in early stage with demands of feedback

SKF have certain tools for maintenance. With new investments these tools must be kept in mind to implement the right data in the correct way. The breakdown structure for an invested machine for example, here all parts are going to be implemented into a program called VIMS with dimensions and design. This is the standard way at SKF. But it has been common for suppliers to send data in their own programs were everything has to be reprogrammed once delivered. This basically is because the project manager doesn't inform and involve maintenance in such an early stage that is necessary. If it would be so and the improvements of 6.16 would work together then the communication between supplier and buyer would reach a new level with enhanced chances of reaching the set goals. Once the maintenance are involved with the investment process it is important that the required tools are sent in time with clear instructions and an operating feedback system. This would not only simplify the workload for SKF staff but also keep costs down and efficiency up.

6.18 Standardise FSM work regarding guidelines and routines

When dealing with investment projects the project manager has to include FSM to get their expert input. At FSM there are two people who work as a second link project manager and divide the work within FSM to each project. Their way of working has not been similar however and brought misunderstandings and confusion to the project managers. People have individual styles of work. But the guidelines and routines can still be standardised regarding layout and type of content of weekly update mails for example. This would simplify the communication between project managers and FSM while misunderstandings and time consumed by confusion would be reduced.

6.19 Involvement of FSM as early as possible

As mentioned before, each source that has input to the project process ought be involved in such an early stage as possible. FSM is such a large part of the required input and since they have internal middle hands it is vital that they get involved

quickly in the process. By getting an early notice more thorough calculations and research can be done by FSM in planned time so that communication and feedback can be used as fundamental tools for improvement.

6.20 Service technicians should be part of TS development

A TS is sent to the supplier to show required demands for the purchased unit that will be developed. Expert's opinions are heard from each area concerning the investment and implemented into the TS so that the ordered product will meet all of SKF's requirements. It has been understood that service technicians, who maintain and perform service on the unit once delivered, have not always been a part of the TS development. This usually results in many extra changes once the product is delivered, which easily can be avoided by involving them earlier in the process and include their requirements. With a TS that all surrounding parts have given input to and agreed on, the process will go smoother and the demands and goals will be set to follow.

6.21 Enlighten SKF Sverige AB of EEM project handbooks importance

Due to that the project handbook is such a new tool not everyone involved with the process of investment projects have used it or even seen it. But since it has become mandatory to use for investment projects, the people of SKF should be enlighten what the handbook really is, what it is meant to do and why it is needed. Since the handbook involves all aspects of the project process all sources that give input to a investment project are part of the actual handbook. This fact should make the involved persons embrace the handbook and give feedback on how their involvement can become even more efficient. Sort of what this research has been doing, but this time it was asked rather than coming directly from the source. When all sources of input are involved and understand the handbook, the projects process is clearer for everyone, which makes the workload more standard and collaboration a lot smoother.

6.22 Project sponsor must not be project receiver

When project members have been chosen in the past it has been unclear for the project manager that the projects receiver can't also be the sponsor. This led to huge consequences for the project. As the project's receiver there are certain efficiency goal

that are set to achieve. The definition of these goals however is what the investment's output should be with surrounding impacts, such as the human aspect for example. A project's goals show what the investments output can be, when driven to a maximum. Sadly these goals are rarely the same due to random interferences. Even though the different goals have clear definitions of what to aspect, when the projects receiver is chosen as the projects sponsor they get clouded since the efficiency goal is all that truly matters for the receiver. An investment project should instead have technicians as sponsor who will be the ones maintaining the investment when received. They are deeply involved and really want the investment to be functional in a top manner right from start since they will have responsibility once delivered.

6.23 Constant coaching of project managers

There are as many types of project leaders at SKF as there are projects. Some major projects have educated and skilled project managers who are excellent at what they do. Other minor projects, but also larger, receive a project manager who is selected randomly from the staff, even though the person has no previous experience or knowledge of project management. These people need to be educated in the art of managing projects since it is a great responsibility and it helps to understand vital parts of the project handbook that now is mandatory. SKF is constantly evolving and project management as well, so it is important that the project managers get educated parallel to this process. By keeping the project managers up to date and informed regarding aspects of management, risk will be reduced, project process more efficient and the overall picture clearer.

7 Conclusion

To be able to standardise the process of investment projects all aspects of the process must be considered, during all of its lifecycle. By developing the project handbook to include all aspects for all input during a investment projects lifecycle, the process can be followed so that nothing will be missed. This of course does not include every detail but tells the project manager what to think of during a specific time in the project process. By being able to see what must be done and how to retrieve it the process are standardised in a way that all projects can follow this structure and in such way not miss any vital steps. This however is up to the project manager and the sponsor due to the fact that just some steps are mandatory and others are to be considered and progressed if needed.

At SKF projects are classified regarding their size, risk, costs and importance and are divided into three major investment types; A simple project, A typical Project and A complex project. A simple project, which naturally is the smallest and simplest one, sets the standard for what project steps that are mandatory. These steps are thereby also mandatory for the largest type of projects, the complex ones. For these types of projects however all steps are usually carried through and it is here the true force of the project handbook come to use. By having a standardised process no steps will be overlooked and forgotten which will minimise misunderstandings, risk, cost and raise the efficiency in general. It is important to realize that not only all the steps are standardised, but also the way in how they should be solved. All details can of course not be included as mentioned before, since all projects are individual. But through guidelines and examples the project can follow a correct way in its progression where vital parts will be thought of. The downside to this is that the project handbook will become a massive manual with too much information to comprehend. By seeing the whole picture of the content that are to be in the process, the project manager can get an overwhelming feeling. The handbook that is meant to help the project manager with guidance and understanding is then doing the opposite; it becomes ignored and confusing. Best way to prevent this is for the project manager to concentrate on one phase at a time. The project handbook is like a standardised shell of project management and GPM2 are its guidelines. It is there and contains all sorts of data and information inside but it is not defined down to detail level. Different factors,

techniques and suggestions that are seen under results have given some details of what further can be done to help the standardised process and build a thicker shell.

Due to that the process have been standardised through the handbook, all aspects that give input to the project are linked together in a more open-minded manner. This improves the calibre of collaboration and communication between different instances and by helping the project manager in leading the project. Next step to do in this process would be to implement the new researched improvements. To constantly evolve the standardisation and improve the standards it is vital to use the concept of lessons learned. By saving data of successful closed projects that have used the project handbook as a main tool, the database of lesson learned will work as a foundation of information and sets the standard of future projects as well.

8 References

- APM (2005) Body of knowledge, *Association for Project Management; fifth edition*, pp. 18-19, 24-25, 42-43, 102-103
- Bentley, C. (2009): The Essence of the PRINCE2: Project Management Method, *Hampshire Training Consultants; Fifth Revised edition*
- Boddy, D. (2002): Managing Projects, *Building and leading the team, Pearson Education Limited; First edition*, pp. 4-5
- Dinsmore, P., Cooke, T. (2006): The Right Project done Right, *From business strategy to successful project implementation, Jossey-Bass; First edition*, pp. 123
- Halbach, M. (2000): Standard of Project Management & Manual Development at Danzas Germany, *Department of Industrial Dynamics*, pp. 31
- Jackson, C., & Johnson, K. (2000, September 18): Planning large projects: Innovative solutions, *Space World*, pp. 25 & 99–109.
- Johnson, C. (1996): Quality management: The way to success, *International Projects*, 10(2), pp. 13–17.
- Levin, G., Green, A. (2008): Implementing Program Management: Templates and Forms Aligned with the Standard for Program Management, *CRC Press; 1 Har/Com; Second edition*
- Maylor, H. (2005): Project Management, *Pearson Education Limited; Third media edition with MS Project CD*, pp. 13, 172, 274, 281-282, 288-289, 399-402
- Milosevic, D., Patanakul, P. (2005): Standardized project management may increase development project success, *published in International journal of Project Management* 23, pp. 181-192
- Sobek, D., Liker, J. & Ward, A. (1998): Another look at how Toyota integrates product development, *Harvard Business Rev*, 76(4), pp. 36–49.
- Toney, F. & Powers, R. (1997): Best practices of project management groups in large functional organizations, *Drexel Hill: Project Management Institute*

Appendix

1) A constructed questionnaire that was updated parallel to the interviews.

Användare

Användandet av projekthandboken

- 1) Till vilken mån används projekthandboken i dagsläget?
- 2) Hur används projekthandboken?
- 3) Används någon avcheckningsmetod då ni avslutat ett stycke?
- 4) Hur används gaterna i dagsläget?
- 5) Hur används Lessons Learned i dagsläget?
- 6) Hur används tillgängliga mallar?
- 7) Har projektledaren gått en utbildning för att använda HB?
- 8) Hur delegeras arbetet så att all tillgänglig expertise utnyttjas?
- 9) Hur sköts kontakten med sponsorn/stödpersonerna/mottagaren?
- 10) Använder du filtrerings systemet i HB något?
- 11) Tvingas du modifiera mallarna innan användning?
- 12) Har du någon idé på hur vissa viktiga delar av processen kunde vara highligad?
- 13) Hur delas projektmål samt effektmål upp? Fungerar det bra?
- 14) Hur presenteras arbetet på bästa sätt?
- 15) Saknas information/erfarenhet hur datan skall analyseras i dagsläget?
- 16) Finns det något intressenterna bör tänka på utifrån ditt perspektiv?

Projekthandbokens innehåll

- 1) Tycker du alla delar av projekthandboken är relevanta?
- 2) Täcker projekthandbokens innehåll alla delar av projekthantering i dagsläget?
- 3) Om nej, vad saknar du?
- 4) Finns det något stycke du inte är nöjd med, skulle vilja modifiera?
- 5) Vilket stycke i HB är viktigast enligt dig?

- 6) är strukturen av HB lätt att följa?
- 7) Är rubrikerna i HB tillräckligt förståliga?
- 8) Finns det tillräckligt med exempel hur de olika delarna skall gå till / mallarna användas?
- 9) Bör det finnas med en konsekvens analys?

Sponsorer & styrgrupp

- 1) Har projektledaren gått en utbildning för att använda HB?
- 2) Hur används gaterna i HB?
 - 2.1) Behovs beskrivning
 - 2.2) Godkänna koncept
 - 2.3) Godkänna IRE förslag
 - 2.4) Godkänna måluppföllnad
 - 2.5) Godkänna projektavslut
 - 2.6) Godkänna effektmål
- 3) Finns det något i processen du inte är nöjd med?
- 4) Hur sköts kontakten med projektledaren i dagsläget? (Utöver vid gaterna)
- 5) Hur tycker du kontakten borde skötas med projektledaren?
- 6) Hur fungerar processen då ett behov skall framtagas? Fungerar den bra?
- 7) Tycker du att det finns något som projektledaren bör tänka på utifrån ditt perspektiv?
- 8) Vad får ditt arbete för framförhållning till själva projektet
- 9) Används någon sorts avcheckning vid BG att stegen innan blivit gjorda?
- 10) Är informationen given från projektledaren tillräckligt tydlig?

Stödperoner

- 1) Hur sköts kontakten med projektledaren?
- 2) Hur hanteras informationen som skall in i projektet? Så som TS/MHS (lagar & krav)
- 3) Hur uppdateras informationen och sedan överförs in i HB? 3 års projekt exempelvis
- 4) Skulle du säga att tillvägagångssättet är standardiserat för kontakten/arbetet med projektledaren?
- 5) Används lesson learned något?
- 6) Skulle det vara möjligt att dela upp UH analysen i mer specifika och vitala delar?
- 7) Tycker du att det finns något som projektledaren bör tänka på utifrån ditt perspektiv?

Mottagargrupp

- 1) Hur fungerar kontakten med projektledaren under projektprocessens gång?
- 2) Hur tas behovet fram? Går det via HB också?
- 3) Hur används gaterna? -Hur skall de användas?
- 4) Vid överlämnande av projektet, hur avslutas det? Rutiner?
- 5) För ni Lesson learned av projekten?
- 6) Jobbar mottagaren av projektet även som sponsor i vissa fall? Intressekonflikt? Speciellt för effektmål och projektavslut..?
- 7) Bör det finnas en konsekvensanalys i HB?
- 8) Tycker du att det finns något som projektledaren bör tänka på utifrån ditt perspektiv?
- 9) Hur delas projektmål samt effektmål upp? Fungerar det bra?

2) Thoughts and ideas that was collected during the interview stages

Ideer och funderingar:

1) **Highlighta obligatoriska moment, resten valfria/valbara**

2) **SE 11)** Projektledare måste delegera ut ansvar (vara fritänkande och inte styra åt visst håll)

3) **SE 4)** Sponsor måste få och ställa krav

4) **Tydliga roller inom projektet (Projektledare, sponsor samt mottagare)**

5) **Checklista för projektmomenten, skall visas upp vid gaterna där beslut tas**

6) **Förundersökningen är och A & O, sätter projektets standard**

7) **Behov framtagning lika viktig, skall finnas klar innan förstudien startas**

8) **Avslutning av projekt måste bli bättre**

9) **Mottagaren skall aldrig vara projektets sponsor**

10) **Tydliga projektmål vs effektmål måste tas fram och hållas tydliga**

11) **Projektledaren måste använda sig utav expertisen inom SKF, exempelvis för TS**

12) **Lyfta fram krav på miljö och säkerhet**

13) **Använd LL via personal med tidigare erfarenhet, annars databas?**

14) **Handledning måste finnas för hur handboken skall användas/skötas**

15) **SE 4)** Viktigt att tänka på innan start av projekt (Roller, ledarskap, vikt av förstudie etc)

16) **SE 11)** Måste få med alla delar i starten av projektet (supply chain, TS, Controler, ME etc)

17) **Föra in tänket av standard leverantörer, se "gömda" utlägg för omkonstruktion, pesonal etc**

18) **Mall för konsekvensanalys? (Vid behov / rekommendation?)**

19) **Måste finnas exempel på hur olika delar av processen skall gå till, speciellt mallar**

20) **Handledning istället för utbildning av handbok? Tutorial film?**

21) **Visa tydligt vad delarna i förstudien skall vara input till?**

22) **Mer reklam för handboken, vad gör den, vad blir bättre och varför!**

23) **Gaterna måste vara klara beslutsmöten iställen för endast informationsmöten**

24) **Viktigt att inte koncentrera sig på slutmålet hela tiden utan att se närmaste målet**

25) **Levererade maskiner måste ha manualer, toleranser samt mätutrustning!**

26) **SE 4, 5 & 12)** Vad som måste vara tydligt: Roller, Krav, Arbetssätt

27) **Om projekten ej är högrisk projekt bör de gå snabbare att avsluta/genomföra**

28) **Kickoff (uppstartsmöte) för större projekt med flera delaktiga intressenter skall vara obligat**

29) **Definiera investeringskostnad med omkonstruktions kostnad(ex flytta maskin 200k)**

30) **SE 14)** Ef har utbildning över hur deras process skall gå till (kostnad etc), införa?

31) **Aktiviteterna i MM måste ut ur texten och hamna som synliga aktiviteter under! (Eller döpa o**

32) **Bra mallar skall skickas in som exempel till supporten för granskning och möjlig användning**

33) **Projekt presentation skall ske i PowerPoint eller liknande program (Se även punkt 5)**

34) **Kontakt med leverantören bör ske öga-mot-öga (obligatoriskt) så missförstånd minimeras (S**

35) **MHS ansvariga att skapa standardiserad checklista till handboken, avsätta resurser så varje**

36) **MHS skall skötas via checklista samt dialog från förstudien**

37) **Miljösamordnare skall vara mer delaktiga vid MHS för projekten, resursfråga?**

38) **Uppdatering av handboken vid utvalda datum!?**

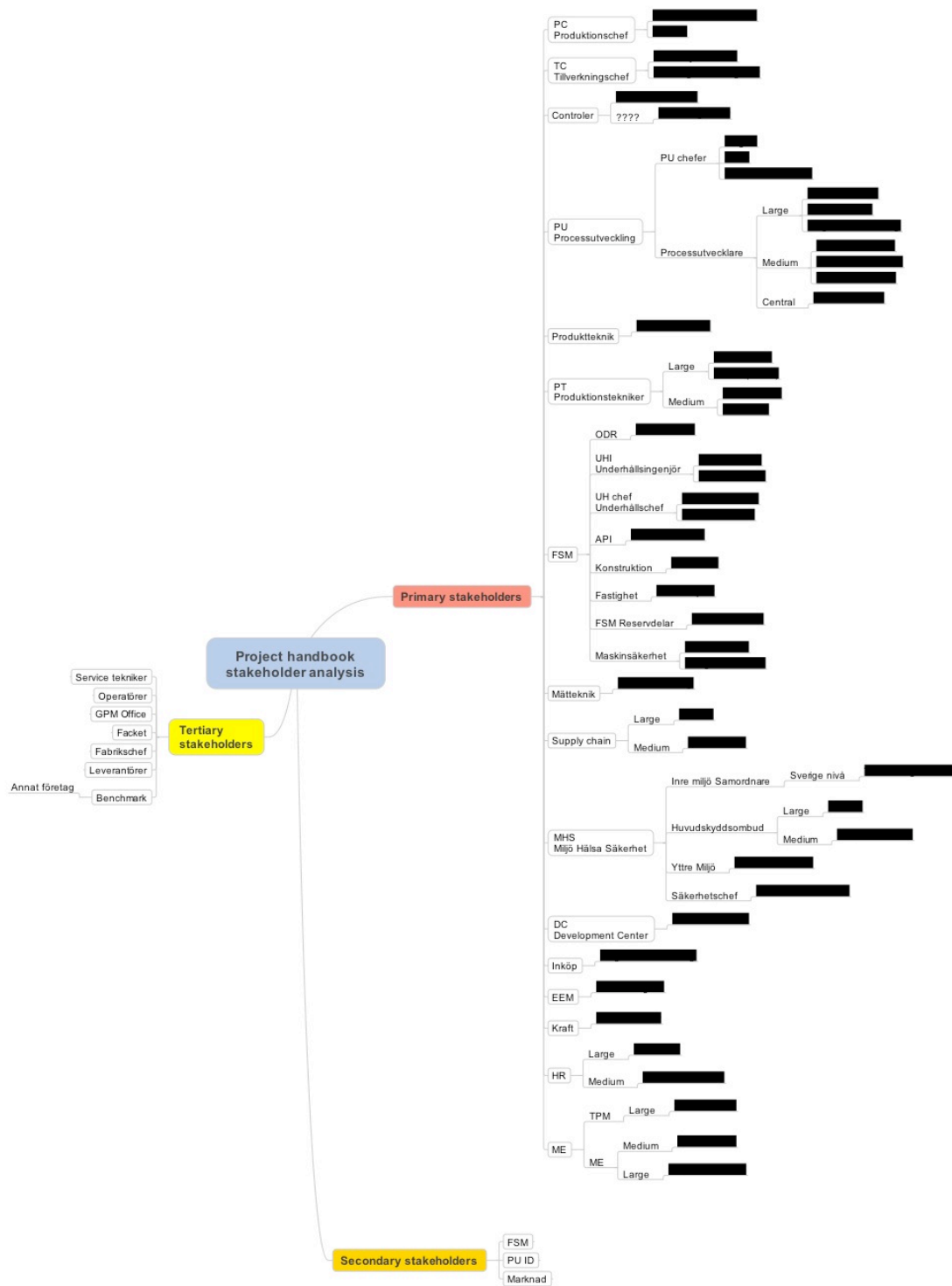
39) **Bör Sponsorn skriva under uppdateringar etc under projektets gång som försäkran!?** (Bör f

- 40) Storleken på texten i hjälprutorna bör vara större och lättlästa
- 41) Krav måste finnas på leverantören ang. VIMS nedbrytning (från API) med språk, tid för återkoppling
- 42) Verktyg för FU skall skickas med till leverantör i tidigt skede och med krav om återkoppling
- 43) Arbetssätt för FSM bör vara standardiserat. Tydligare riktlinjer och rutiner ex: struktur/innehåll
- 44) Föra kommunikationen inom FSM i så tidigt skede som möjligt, förenklar för resurskrav av leverantör
- 45) Trycka på att det skall finnas en ansvarig för maskinsäkerhet inom varje processutvecklingsområde
- 46) Under designreview skall maskinsäkerhet, UH samt andra påverkade vara med
- 47) Sponsorn bör skriva ut checklista från GPM2 för projektledaren inför BG, checka av att allt är klart
- 48) Vid leverantörsval, räknas reservdelar med som kostnad?
- 49) reservdelar vill vara med under VIMS framtagning
- 50) Projektledare måste kontakta rätt personer för ED i tidigt skede - får därmed ledning under framtagning
- 51) Införa tänket "Vid förändring --> Vad påverkas? --> Ta in rätt personer för granskning" (Förändring)
- 52) Projektledaren tar kontakt med fastighet men måste vara säker på vad som söks!?
- 53) Serviceteknikerna skall vara med under framtagning av TS

3) Startup of the master thesis



4) First stage of stakeholder analysis



5) Improvement hierarchy

Nr	Type	Estimated implementation time	Required resources
1	Enlight the importance of "pre-project" phase (sets the standard of the project)		
2	- Send in templates with positive feedback as examples to support		
3	Clear demands of supplier (manuals, tolerances etc)		
4	- VIMS breakdown structure with focus on language, feedback and education of maintenance		
5	- Send FU tools in early stage with demands of feedback		
6	- Begin communication within FSM as early as possible to simplify the resource requirements (UH, spare parts etc)		
7	Service technicians should be part of TS development		
8	Enlight that the project sponsor never should be the project receiver		
9	Project leader must understand the meaning of "change -> what gets affected"		
10	Show "hidden" costs of reconstruction and personal by choosing a none standard supplier	3	
11	- Define investment cost vs reconstruction cost in resource needs	3	
12	Checklist of project steps (shown at gates with attached information)	2	
13	Enlarge the helptext in EEM project handbook	5	
14	Clarify mandatory demands of MHS (standardised checklist manufactured by people with specific competence of expertise)	1	
15	Create layout for consequence analysis	2	
16	Move out hidden activities to new underlining steps	3	
17	Show what the different project activities will be input to	3	
18	Updates of EEM project handbook should be at specific dates (2 times/year?)	5	
19	Implement examples of project templates	3	
20	Guidance of how to use EEM project handbook (video/education/etc)	4	
21	Highlight mandatory process phases	4	
22	Regelverk för rubriker i olika nivåer	4	
23	Define clear roles of project members	5	
24	Standardize FSM work regarding guidelines and routines (structure/content of weekly mail and how work is done)	5	
25	Enlight SKF Sverige AB of EEM project handbooks importance, what it does, what becomes better and why	5	