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Improving Project Management in Customer Delivery Projects

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Writing this section of this Master's Thesis makes me feel relieved and cheerful, as this part of Thesis was the last part to write. Also while writing this section, it enables to me to go through the whole journey of this Thesis, and also the whole journey of this Industrial Management program. Last year has been challenging and a large part of my free has been spent with these tasks. This Thesis and courses before it has been rewarding but sometimes stressing and time consuming tasks. Last months has caused several busy weekends and long evenings but now is reward from the work is very close.

In the beginning of the studies, the topic of the Thesis seemed to be pretty clear, but due to some unexpected events, I was forced to change the topic. It was challenging to find the new topic in order to keep the original schedule. With support from the instructors I managed to find new topic without any major delays. Due to this it was possible to have fast start with the Thesis and managed to catch the schedule.

As mentioned this last year has been excellent journey. I have managed to gain more knowledge and especially I had opportunity to meet many new great persons. During this program we managed to build excellent team spirit inside the whole class. This team spirit has motivated and push me forward when the time schedules has been tight.

I would like to thank all my classmates regarding this team. The team has motivated each other's and pushed all to reach the maximum result every time. It was also nice that we could find the place for us where we could spend time together after long days at school. During these times we could change ideas and improve our thesis with valuable comments from experts from the different areas.

Biggest thanks I like give to my family. They are the reason why I even applied to this program as they have made this schedule possible. From the family I received always the support regarding the tasks and the Thesis. The family has always support my timetables and deadlines and they have made all these weekends and long evenings possible to graduate.

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This Thesis focuses on the improvement of the customer delivery projects project management in technical field at B2B context. By identifying the prevailing customer delivery projects process and addressing the most critical weaknesses of this identified process, the focus is to able to provide improvement to selected weaknesses in order to improve the project management of customer delivery projects.

The qualitative research methodology is selected as the research approach due to its possibility to detailed replies from each interviewees. This will ensure that current state analysis and its strengths and weaknesses can be identified detailed. The research design contains five steps, where best practices from the literature with findings from the interviewees. This study does not have a specific case company. This study is carried out by interviewing people who work at project management duties. This group of people is selected from different areas of business and from different companies to obtain a holistic view of the project management processes and its strengths and weaknesses.

The outcome of the study is a list of recommendations to improve the project management in customer delivery projects, built to cater to the project-based companies who would like to improve their project management. The list of recommendations is positioned to improve the most common weaknesses what companies are suffering, and to improve weaknesses which can be improved during the daily operation. This list of recommendations gives good foundation to project-based B2B companies improve their project management and its processes.

Keywords	project management, knowledge management, resource management, critical resources, process improvement, data transfer

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1 Introduction

Successful project management is in a key role if companies wish to have effective and profitable business. Successful project management is also a very important factor for customer experience and customer satisfaction. Companies that have effective project management processes and organizations can use their time to serve better the customer instead of using most of the time to deal with internal documents and actions. This study does not have a specific case company but is carried out by interviewing people who work at project management duties. This group of people is selected from different areas of business and from different companies to obtain a holistic view of the project management processes, in particular those which are currently working well and also those which need improvement.

Different companies and individual persons have separate ways to manage the project management actions. As there is not an absolute right or wrong way to handle projects, this study gathers data from various persons to obtain reliable results on the parts of project management that are generally managed well and the parts that are causing problems internally or externally.

The underlying purpose of this study is to identify the existing strengths and weaknesses of project management processes and working methods currently prevailing in the companies investigated for this study. Once the strengths and weaknesses have been identified, the project management processes can be improved with the help of current literature on best practices related particularly to customer deliveries. Naturally, one objective is to deal specifically with the weaknesses in project management revealed by the Current State Analysis carried out in Section 3 of this Thesis. This study goes through the interviewees' experiences and combines this data to clarify what the most critical weaknesses of current prevailing project management processes and actions are in their respective companies.

One of the aims for this report is to explore in detail the current project management strengths and weaknesses in the customer delivery projects. These weaknesses are then used to find the best practices from the literature to build up the conceptual framework for the list of recommendations for improved project management of customer deliveries in B2B contexts.

1.1 Key Concepts

Project management is the application of knowledge, techniques, tools and skills to project activities to meet project requirements. Project management is accomplished with the use of methods such as: initiating, planning, executing, controlling and closing. The project team manages the work and duties of the projects, and the work typically includes different issues such as competing demands (scope, time, cost, risk and quality), stakeholders with differing needs and expectations and identified requirements (PMBOK Guide, 2000).

Projects are usually implemented to achieve organization's strategic plans. Organizations perform work and this work normally includes either projects or operations. Projects and operations differ primarily in that projects are temporary and unique and operations are ongoing and repetitive. Every project has stakeholders and these stakeholders are individuals and organizations. Stakeholders are actively involved in the project, these actions can be positive or negative affected to a result of project execution or project completion (PMBOK Guide, 2000).

Critical activity is any activity on critical path. Critical path is a series of activities that determine the duration of the project. Critical path is the longest route through the project. Critical path method is one of the analysis techniques that predicts the project duration by analyzing which sequence of activities has the least amount of scheduled flexibility. Still, some activities are critical without being on the critical path (PMBOK Guide, 2000).

Knowledge management is an asset to many companies nowadays. Individual employee knowledge or human capital is currently one of the key assets. It is crucial, therefore to make project knowledge transfer a priority, especially if the benefits of a project are not achieved immediately (Schwalbe, 2010).

1.2 Target Group

This thesis studies project management of customer delivery projects in technical projects in a B2B context. The study is carried out for an entire group of people who work in project management duties in customer delivery projects. The purpose of this study is to provide an improved concept for customer delivery projects so that project management personnel will be able to perform their work more effectively and cost efficiently. The

results of this study are used to find new improved methods for currently existing bottlenecks, both internal and external. The target groups' main duties should be serving the customer and the improved methods in this study will help support these duties. This study is done with the Finnish project management specialists in Finnish B2B contexts. These Finnish project management specialists are working in project management in customer delivery projects in the technical field, providing unique solutions and products to the customers.

1.3 Business Challenge

Customer deliveries in all kinds of business are critical for the company future and the company existence. All departments in a company play an important role but if the project delivery phase does not work as planned this will increase the cost from the budgeted. For instance, ineffective project management could lead to delays in the project. In the worst case, costs will increase from the budgeted and the customer will also receive the materials late and perhaps even unfinished. This might, in turn, lead to losing at least that particular customer even permanently. These issues can be handled with proper project management because surprises can be dealt with more easily. Customer project deliveries are done by project managers who are working across the company departments and across the different subcontractors depending on the scope of the delivery. Project stakeholders tend to change from one project to another. Project scopes and sizes change which affects the amount and the type of the stakeholders. Project managers need to adapt to these changes and try to manage them with particular resources.

The business challenge for this study is to how to make project managers most effective in serving customer needs. Do all people among the project management have knowledge regarding customer deliveries to customers in B2B contexts? Additionally, how could this knowledge be improved to have teams and individuals work more effectively?

1.4 Objective and Scope

The objective of this Thesis is to identify the weaknesses in current customer delivery project processes and explore best practices to find solutions for dealing with these weaknesses. These literature best practices will be used to develop a proposal for improved project management of customer delivery projects in B2B contexts.

The outcome of the Thesis is a list of recommendations for customer delivery project management in the technical field in B2B context.

This Thesis is written in seven sections. Section 1 is the Introduction which is followed by section 2 describing the methods and material used in this study. Section 3 illustrates the study Current State Analysis including the definition of the prevailing process for the customer delivery projects and also founded weaknesses and strengths from the defined process. Section 4 presented the Conceptual Framework for this study. Conceptual Framework combines best practices from the literature concerning the selected weaknesses from the Current State Analysis. Section 5 introduces the initial proposal for this study built on with the data collected during the previous sections. Section 6 discusses the validation of the initial process. With this feedback initial proposal will validated to final proposal during this section. Section 7 summarizes the findings of this study and give recommendations to further implications and finally this last section evaluates the thesis results and also it reliability and validity.

2 Method and Material

This section discusses the research method and research design used in this study. This section will also present the data collection and analysis methods used in the thesis.

2.1 Research Approach

The research approach used in this study is qualitative research. Qualitative research is a type of scientific research. This scientific research consists of an investigation that seeks answers to a question, systematically uses predefined processes to answer questions, collects evidence, produces findings that were not determined in advance and that are applicable beyond the immediate boundaries of the study. Also, qualitative research seeks to understand a given research or topic from the perspectives of the local population it involves. Qualitative research is especially effective in gaining culturally specific information about the opinions, behaviours, values and social contexts of particular populations (Family Health International, 2005).

Qualitative research has three most common qualitative methods. These methods are participant observation, in-depth interviews and focus groups. Each method is suited for obtaining a specific type of data as shown in Table 1 below. The data of these three methods is collected with field notes: audio (sometimes even video), recordings and transcripts.

Table 1: Three Different Qualitative Research Methods

Method	Type of data
Participant observation	Collecting data on naturally occurring behaviors in their usual contexts
In-depth interviews	Collecting data on individuals' personal histories, perspectives and experiences, particularly when sensitive topics are being explored
Focus groups	Eliciting data on the cultural norms of a group and in general broad overviews of issues of concern to the cultural groups or subgroups represented

Qualitative research methods differ from quantitative research methods primarily that they have different analytical objectives, the types of questions they pose and the types

of data collection instruments they use. Additionally, the forms of data they produce differ and the degree of flexibility built into study design varies. The most important difference between qualitative and quantitative research methods is their flexibility. Normally, qualitative methods are more flexible, as quantitative methods are seen fairly inflexible. Qualitative methods allow greater spontaneity and adaption of the interaction between the researcher and the study participant. In quantitative methods researcher need to follow surveys and questionnaires with all participants' identical questions in the same order. Qualitative research focuses in understanding a research query as a humanistic or idealistic approach. Though quantitative research is seen reliable method as quantitative methods are based upon numeric and methods that can be made objectively and propagated by other researchers (Pathak et al. 2013).

The advantage of the qualitative methods is when using open-ended questions and giving the participants opportunity to answer in their own words. Quantitative methods rather forces participants to choose from fixed responses. Another qualitative method advantage is that the researcher has flexibility to probe initial participants' responses, by asking why or how. Qualitative research methods with open-ended questions allow participants to answer in their own words instead of using just words "yes" or "no" (Family Health International, 2005).

Qualitative research is selected for this study due the nature of the thesis business challenge and objective. Defining of the prevailing current process and its strengths and weaknesses qualitative research provide possibilities to ask same questions to all interviewees but at the same time all participants are able to give as detailed feedback as possible in every question. This detailed feedback from each interviewees provides possibility to researcher forms a true image from the current state and it weaknesses and strengths.

2.2 Research Design

In this study, research design is divided into five main stages which are business problem identification, Current State Analysis, best practices from literature and conceptual framework, initial proposal and final proposal. Figure 1 illustrates these main stages and data collections points.

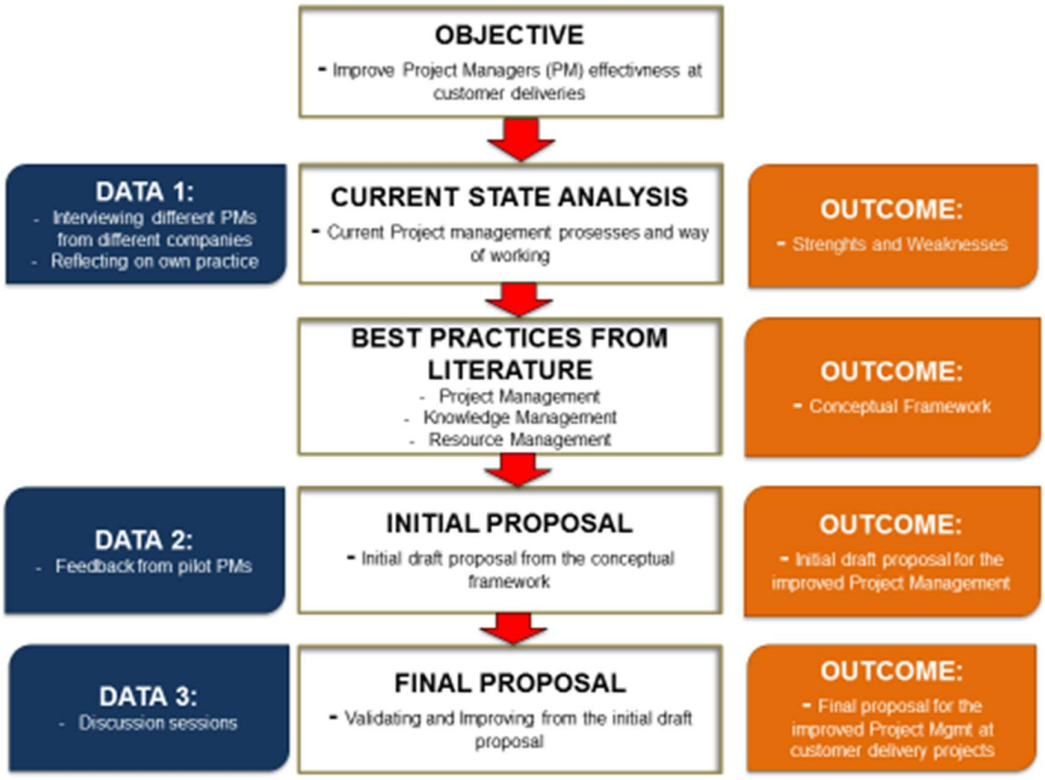

Figure 1: Research Design

Figure 1 presents the step-by-step research process utilized in this study. The study starts by recognizing the research problem and forming the research objective. After recognizing the current business challenge the research objective of the study project is defined. The next step is divided into two parts, the Current State Analysis and best practises from the literature and building the conceptual framework. The Current State Analysis is based on interviewing different project managers from different companies from different industries in the Finnish B2B customer delivery project context combining the author's own reflections from objective practises and experiences. After identifying the current state and challenges, these findings are compared to the best practices found from the literature to build up the conceptual framework.

Best practices from the theories and ideas found from the literature are used to help build the reasoning behind the challenges. In the fourth step, the Current State Analysis and the conceptual framework are combined for building the initial proposal for the concept to be developed. The initial proposal is built using the data from Data 1, Data 2 and best practices from the literature. Finally, the initial proposal is reviewed with a selected pilot

project manager from the Data 1 group. After reviewing the initial proposal and with feedback from Data 3, the final proposal is presented.

2.3 Data Collection and Analysis

Data collection and analysis in this study in done by using qualitative data and analysis methods, such as documentation analysis, interviews and observations. This is different from quantitative research, which focuses on numerical data. The data collection in this study consists of three parts. The data source for Data 1 was a group of project managers from different companies and different industries. This data was collected by interviewing the selected key stakeholders. Data 1 was conducted to analyse the current situation and practises in the current project management processes. Data 2 was conducted to build an initial proposal together with the literature best practices. The first version of this initial proposal was built based on the findings from the interviews and findings from the literature. The second version of the initial proposal was built after evaluation and feedback from the pilot project managers. In Data 3 stage, the initial proposal was improved at a discussion session together with the test person to validate the final proposal. The details of data collection are shown in Table 2 below.

Table 2: Data Collection

Data	Data Source	Data Type	Analysis
Data 1	Interviews – Projects Managers	Current process overview	Section 3, Current State Analysis
Data 1	Interviews – Projects Managers	Current process challenges	Section 3, Current State Analysis
Data 1	Researcher	Own reflections	Section 3, Current State Analysis
Data 2	Discussions – Pilot project managers	Ideas to initial proposal	Section 5, Building the proposal
Data 3	Discussion – Test Person	Result of the initial proposal test	Section 6, Validation of the proposal

Table 2 shows the data collection point steps as shown also in the research design figure. The qualitative data for the Current State Analysis is gathered by interviewing selected project managers. A smaller group of project managers is selected for the piloting phase to build the initial proposal. Test person, with proper knowledge, is selected to validate the final proposal.

Table 3: Key stakeholder interviews in Data 1

Data ID	Type	Position	Person ID	Date	Duration	Document
1	Interview (Face-to-face)	Project Leader	A	9.2.2016	60 min	Field notes Appendix 1
2	Interview (Face-to-face)	Project Manager	B	9.2.2016	70 min	Field notes Appendix 1
3	Interview (Face-to-face)	Project Manager	C	11.2.2016	75 min	Field notes Appendix 1
4	Interview (Face-to-face)	Senior Manager - Projects	D	12.2.2016	60 min	Field notes Appendix 1
5	Interview (Face-to-face)	Project Manager	E	15.2.2016	60 min	Field notes Appendix 1
6	Interview (Face-to-face)	Project Manager	F	15.2.2016	60 min	Field notes Appendix 1
7	Interview (Telephone)	Project Manager	G	22.2.2016	40 min	Field notes Appendix 1
8	Interview (Face-to-face)	Project Manager	H	29.2.2016	70 min	Field notes Appendix 1
9	Interview (Face-to-face)	Project Manager	I	3.2.2016	45 min	Field notes Appendix 1
10	Interview (Face-to-face)	Project Manager	J	10.3.2016	60 min	Field notes Appendix 1

Table 3 shows that totally 10 key stakeholders were interviewed for the study. The interviews were conducted either face-to-face or by the telephone (Data 1 A-J). The purpose of the interviews was to get a wider understanding of the current project management processes and processes strengths and weaknesses. Data 1 interview questions are itemized in four parts. The first part clarifies the interviewees' professional background

and how the interviewee is connected to project management. Secondly, the interviewees are asked to explain the customer delivery project process as in as much detail as possible. Thirdly, the interviewees are asked to explain all the strengths and weaknesses they are currently facing in their project work. Fourthly, the interviewees are given a chance to freely suggest ideas to improve the current situation. These questions have been developed in order to clarify that that interviewees has solid knowledge on the topic. The rest of the questions are selected to clarify the current process and its strengths and weaknesses. Data 1 was finalized with the researcher's own reflection on project management processes and their strengths and weaknesses. Data 1 have been analysed detailed in section 3, the Current State Analysis. After Data 1 was validated, the focus area of this study was defined, and the best practices search from the literature and building the conceptual framework was started.

Data 2 includes the notes from discussions with the selected pilot project managers. More detailed Data 2 can be found in Table 4 below.

Table 4: Data 2 Collection

Data ID	Type	Position	Person ID	Date	Duration	Document
K	Discussion	Project Manager	A	1.4.2016	45 min	Field notes Appendix 2
L	Discussion	Project Manager	B	4.4.2016	45 min	Field notes Appendix 2

Data 2 was collected from discussions with selected project managers who act as a pilot projects managers for this study. The pilot project managers were selected due to their background and working history in order to get the best possible feedback from the Data 2 interviews. After arriving at a common understanding on the process current state and its weaknesses, the initial proposal was built combining the conceptual framework and improvement ideas from the pilot project managers. Data 2 have been analysed detailed in section 5, Building the Proposal.

Data 3 is used for validating the initial proposal. The pilot team members were involved in the study to do the validation. Table 5 shows the collected data for Data 3.

Table 5: Validation of the Initial Data 3

Data ID	Type	Position	Person ID	Date	Duration	Document
M	Workshop	Project Manager	K	16.04.2016	45 min	Field notes Appendix 3

As Table 5 shows Data 3 was collected from the test person in a workshop / group interview. This test person is selected for the validation of the proposal thanks to the person's strong knowledge of project management and the proposed issues. During this discussion the initial proposal was validated and improved for the final proposal. Data 3 have been analysed detailed in section 6, Validation of the Proposal.

2.4 Validity and Reliability Plan

The concept of reliability is considered through how well the researcher has carried out the research project. Is it carried out in such a way that if another researcher were to look into the same questions in the same setting, this other researcher would come up with fundamentally the same results. If this happens, then the research might be judged reliable (Blaxter et al, 2010). Validity refers to the correctness of the research and evaluates the methods, approaches and techniques, related to the issues researcher has been explored (Blaxter et al, 2010).

The validity of this study has been ensured with the following actions. The data collection process is described on a detailed level. The collected data from the interviewees is analysed and validated together with the selected interviewees. The gathered data is reported in detail by using direct quotes from the interviewees. The selected interviewees are involved in the development and evaluation of the proposal.

For any qualitative research, meeting of validity and reliability requirements are necessary. Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. (Golafshani 2003). Reliability is sometimes seen as an assessment of whether the same findings would be achieved if the same researcher repeated the study, or if some other researcher conducted it. Research strengthening can be improved by the following methods: using differing data sources; using different data collections points; applying established theory from one area to another; collecting data at different time points; or using different researchers at different points of the research (Quinton and Smallbone 2006).

The reliability of this study has been ensured with following criteria. First, the number of interviewees is big enough and these interviewees have an appropriate background for this study to ensure extensive data for the study. Second, the researcher's own reflections and experiences have been considered together with the data from the interviewees. Additionally, the preliminary proposal of this study will be validated with the selected interviewees during a discussion.

The next section of this study presents the Current State Analysis for finding out the weaknesses in the prevailing customer delivery projects process. Next section also defines the used process in order to understand the general process for customer delivery projects and understand the founded strengths and weaknesses.

3 Current State Analysis

This section presents the Current State Analysis (CSA). First, it gives an overview of the Current State Analysis procedure. This is followed by a description of the project management process of customer delivery projects and an identification of the current strengths and weaknesses in the process. Finally, the section summarizes the key findings from the Current State Analysis.

3.1 Overview of the Current State Analysis Procedure

The Current State Analysis procedure for this study was selected after the study had the business challenge, objective and outcome and after the research design was planned. As was shown in the research design, data 1 for the Current State Analysis was collected by interviewing a selected group of project managers. These project managers were selected from different companies and from different industries to obtain as wide as possible view of the current state. The goal of the Current State Analysis was to find out the process that all the projects are following despite the products, companies or customers they are working with. Another aim was to identify the current strengths and weaknesses of this process and the methods the projects are following currently.

This Current State Analysis was conducted by interviewing the selected persons with premade questions. In this way, the content of the interviews could be compared to each other. But as the research was done by using qualitative research methods each interviewee could reply to the questions in their own way and own words. During the interview the researcher focused on finding out the interviewee positon at the company, how the interviewee is related to projects, how interviewees' projects are conducted currently, what the current strengths and weaknesses of this process from the interviewee point of view are and how the interviewee would improve these weaknesses. The focus of the Current State Analysis was to find out the weaknesses that are currently causing problems for the projects and whether these weaknesses are the same despite the companies or the products.

The outcome of the Current State Analysis helped to clarify the current process map for the customer project deliveries and all the findings from this process, including the strengths as well as the weaknesses. This Current State Analysis provides a solid

grounding for the literature review as the selected weaknesses are used to find best practices to tackle the weaknesses revealed by the Current State Analysis.

3.2 Definition of the Current Process

This study explores the project management process for the customer delivery projects. Figure 2 below shows the prevailing process flow for a customer delivery project and connections between the main stakeholders based on the responses from the interviewees. These projects have three main stakeholders: Client, Project Manager and Project Team Members.

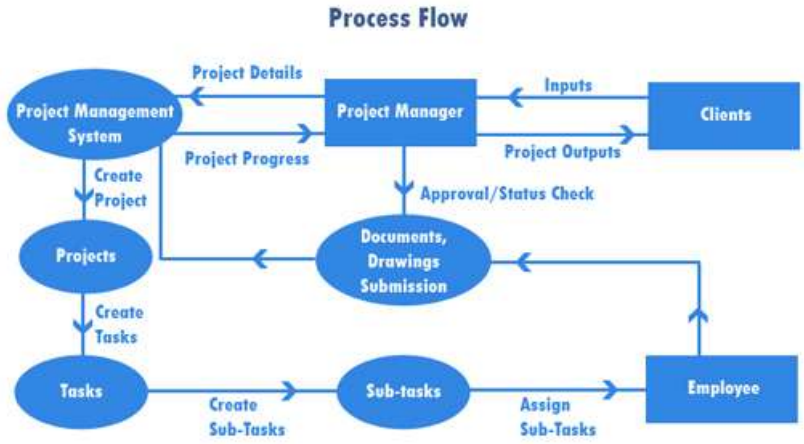

Figure 2: Project Management Process Flow (www.kalpaksolutions.com)

This process flow shown in Figure 2, seems almost identical despite the company or the product. The customer delivery projects have the same beginning as the customer has a need for something and the company has something to provide to satisfy the customer demands. Customers have different demands, however, and companies need to adapt to those. To fulfill customers' individual wishes and demands, companies need to be ready to provide unique products and solutions to their customer to keep their customer and gain new customers. Additionally, the interviews revealed that sometimes the customers do not even know that they have demands before companies' sales representatives introduce new kind of solutions or equipment for doing their business more effectively.

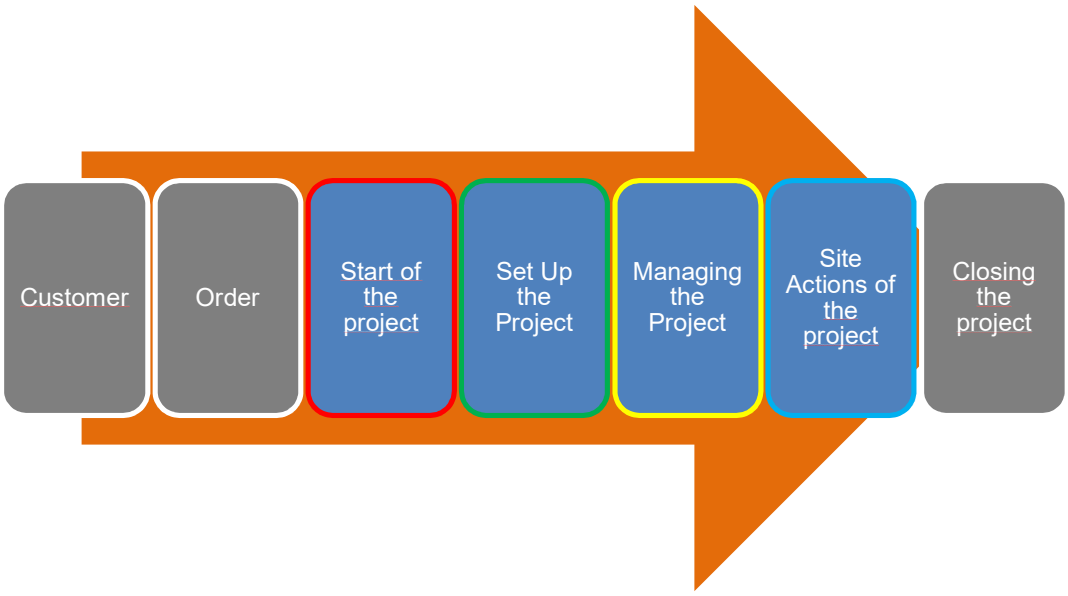

Figure 3: Simple Project Process for the Customer Delivery Project

Figure 3 shows the coarse process chart for the prevailing customer projects deliveries as revealed by the interviews. A customer delivery project always starts from a customer and customer need. Sometimes the company sales department can initiate the need for the customer with new products or solutions which can benefit the customer and their business. These unique projects with customer focused products and solutions will be designed during the project to fulfill the customer need and probably to fit to customer's existing plant. Every customer has a different type and size of business and the companies providing project solutions need to fit these needs.

Figure 4 below shows the detailed project process according to the information received from the interviewees during the interviews. This process has all the phases that are included in the customer project delivery process according the interviewees feedback. This process and its phases are described detailed below. In Figure 4 boxes with red outlines are part of the "Start of the Project" –phase, boxes with green outlines are part of the "Set Up the Project" –phase, boxes with yellow outlines are part of the "Managing the Project" –phase, and boxes with blue outlines are part of the of the "Site Actions of the Project" –phase. These four phases are presented in Figure 3 with same colors.

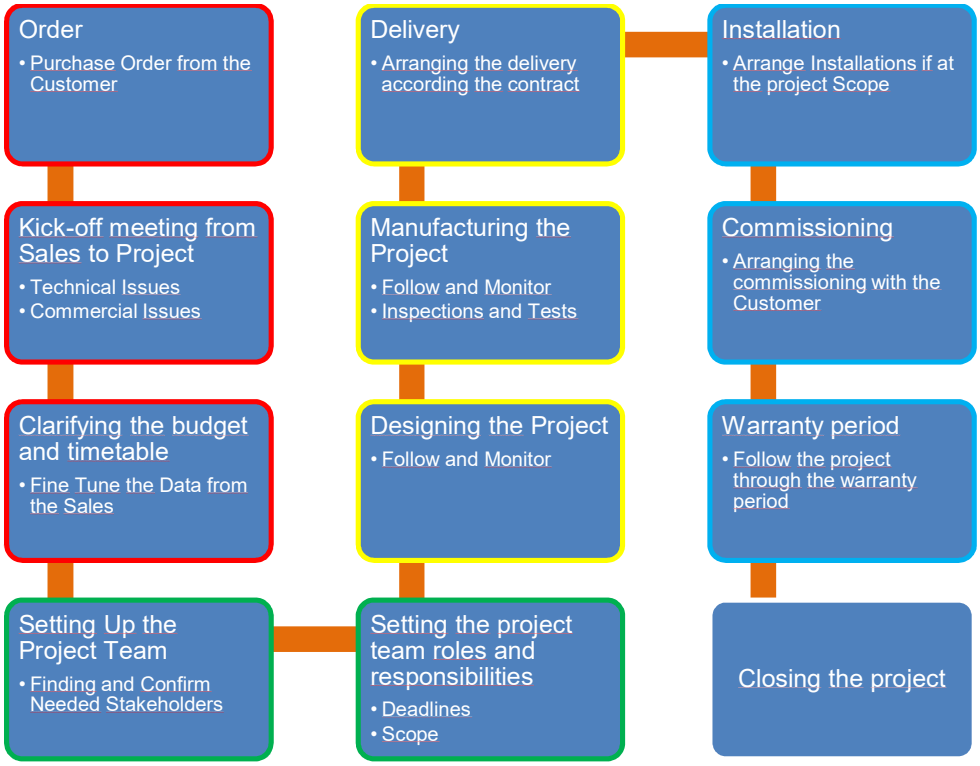

Figure 4: Detailed Customer Project Delivery Process

According the interviewees feedback during the current state analysis interviews, the project management duties officially start when the project is transferred from the sales department to the project department. This is the moment when the project is established. This is when it has passed all the needed internal gates, including the final gate when the customer has sent the order and it has been accepted inside the company. This is the last stage when the project management must become involved in the project. Still, the project management personnel might be participating already in the sales phase to support the sales trying to ensure that all the data and the budget includes everything the scope of the delivery needs for the sales phase. Co-operation between the sales department and the project management can provide more accurate figures and data to produce the quotation to the customer as the project management can provide actual figures from the delivered projects. This data can be used as a lesson learned and can be used to prevent possible mistakes that have occurred in previous quotations or even previous projects. As shown in Figure 4, the project managers will start their duties in projects when the customer has sent the purchase order to the company and the actual project will start.

It is seen from the interviewee feedback that the project manager duties start when the sales person, who has closed the deal and has the all sales materials and arranges the meeting with the selected project manager. During this meeting the sales department transfers this new customer delivery project under the responsibility of the project manager responsibility. In this meeting the sales person presents all the case information, documents and issues which may influence and what has been the basis for the project. This includes all the project's technical and commercial issues. During this meeting the project manager should have a clear picture of what the company has sold to the customer and what the customer expects to receive. With this information the project manager updates the budget, if needed, and updates the sales team delivery schedule for the project.

This meeting is very crucial for the project as this meeting gives structure and guidelines for the project. After this meeting the project manager should have the scope of delivery, budget and schedule and the project manager can start to plan how the project will meet all these points with the correct level of quality and the most important that customer needs are fulfilled and customer is satisfied with the project and its deliverables. The project manager can always ask more questions from the sales department but this first key information sets the project management direction for the individual project. After this the project manager should have all the information regarding the project to manage it successfully. If at this stage, the project manager receives wrong or inadequate information it will take much extra effort, time and money to get the project back on the correct track with proper data. Based on the interview results, Figure 5 below shows these phases.

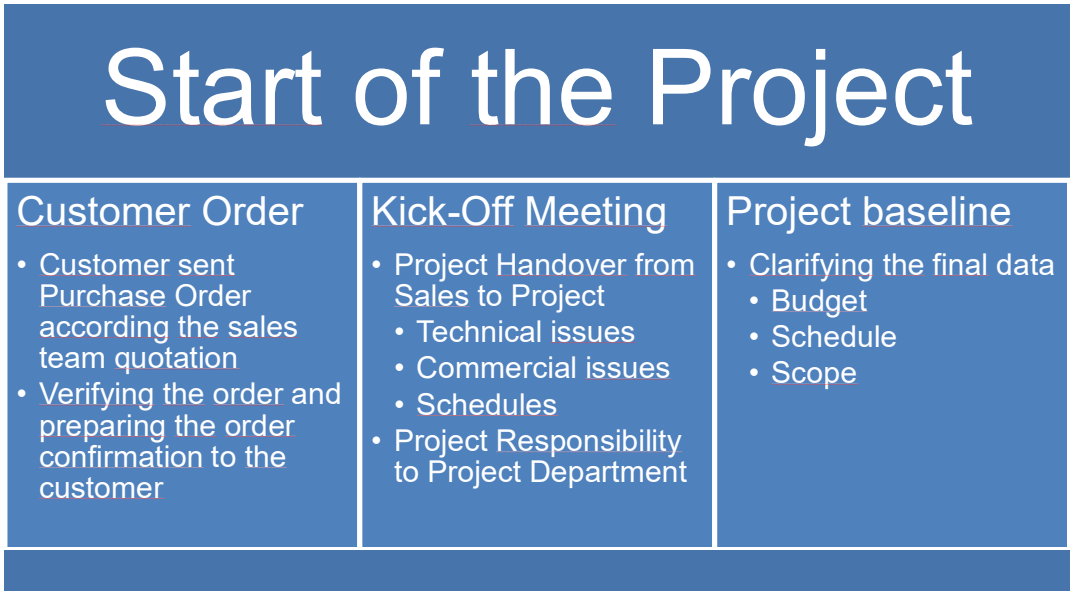

Figure 5: Start of the Project

Interviewees' feedback shows that when the project manager has received all this information, the project manager will start gathering the project team. The project scope of delivery, delivery schedule and budget set the demands for the needed stakeholders for the project. When all the project team members are deployed to the project, the project manager keeps the first project meeting to introduce the project and its scope of delivery to the project stakeholders. The project manager will go through the contract, quotation, scope in a detailed level and all the needed appendices so the project team is aware of what needs to be done.

The purpose of this meeting is also to produce the final schedule for all the needed internal phases. The project manager also divides the project team roles and their responsibilities regarding the project, including all the needed tasks and deadlines for these individual tasks. When all the project team members know their duties and timetables the actual project work can start. Based on the interview results, Figure 6 below shows the setting up of the project phases.

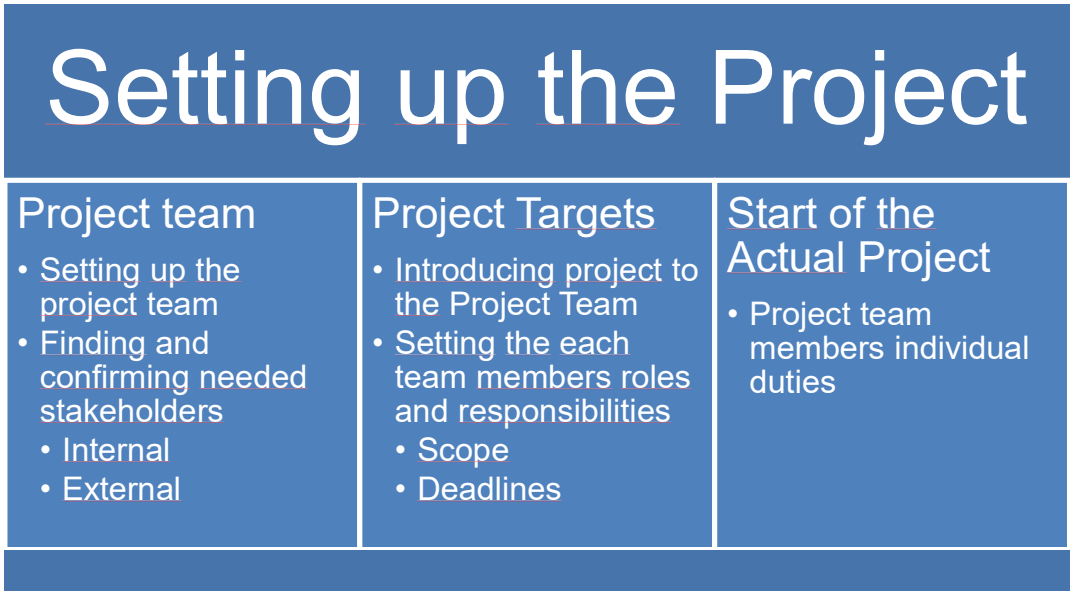

Figure 6: Setting Up the Project

The project team is now set up and all the project team members are aware of their duties and responsibilities, the actual project work start with the customer specific design. Companies has products which are designed to certain level, depending on the company and on the products and solutions. The project team need to finalize the design to meet the customer needs and to meet the agreed scope of delivery at the contract.

Most of the cases project managers will received all the detailed information regarding the scope but sometimes sales personnel has agree only the bigger lines which has impact on budget or delivery time. The project manager duty is together with the project team to clarify these detailed information. The project manager need clarify with the project team what data is missing and what need more clarification. The project manager will acquire this data from the customer with close communication with them. Or even visiting at the customer site with selected team members. The schedule of the customer project deliveries are often very tight and data which the project manager uses to start the project is in key role despite the company or the products what are being delivered.

The project manager main duties in this phase is make sure that the project team has the correct information where they based their design work and following and monitoring different design teams work that design will proceed on time and on budget. Depending on the product design stage has several approval stages before final design is ready. The project manager need arrange internal approval for the design as well approval from

the customer and in some cases approval also from the separate third party. The project manager has several stages to pass before the design is ready and the project can move to the next stage. When the final design is ready, the project manager need carry out needed purchasing and make sure that manufacturing starts according the schedules. This purchasing may include for example purchasing manufacturing from own factory or from subcontractor, separate components from third party supplier, project specific spare parts and external employees for project phases at the company or for the site activities.

During the manufacturing the project manager has two main duties. One is following and monitoring the manufacturing and trying to tackle possible problems in advance. Another duties is communication with the customer, to keep customer informed the current situation and making sure that company scope of delivery will meet customer expectations. The project manager need follow that not only products are manufactured according the drawings and specifications but all the needed manufacturing related documents and manuals will be made before the deadline. When manufacturing is ready, manufactured products need to test and perform an inspection to them. The extent of these tests and inspections depending on the product type and on the customer and their demands. The project manager need to make sure that all these actions are made as agreed and all the documents from the inspections are done. Sometimes customer want to participate to these factory tests and the project manager need communicate with the customer and factory to find out the time for this visit. Delivery time cannot still jeopardize due to this visit. In these kind of moments the project manager need balance between the customer demands and factory demands and the project manager need to fulfill them both.

After all the products according the customer scope are ready and all the needed inspections and tests are done and documents produced materials will be packed. The project manager need to follow that contract specification are followed as different type of transportations needs different type of packing materials and methods. Wrong type of packing can damage the products during the delivery. Packing need to be correct to protect the products against the all the possible contacts during the delivery, packing need to be strong enough for needed hoisting and packing need to be durable enough against the weather and other conditions what package might face during the shipping. All these issues are in the project manager responsibilities. When materials are packed, the project manager arrange shipment with the customer and project logistics person. Depending on the customer and final destination delivery might need even great efforts before all the needed documents are ready and all the shipment related parties are confirmed

that shipment can be made. Sometimes some customers' needs a lot of documents regarding the shipment and sometimes final destinations countries and their customs needs multiple clearances and documents before transportation can proceed to the final destination. The project manager need clarify these possible obstacles with the project team in advance so the project delivery date will not be compromised due to any of these stages. According the feedback from the interviewees' Figure 7 below shows these project management phases.

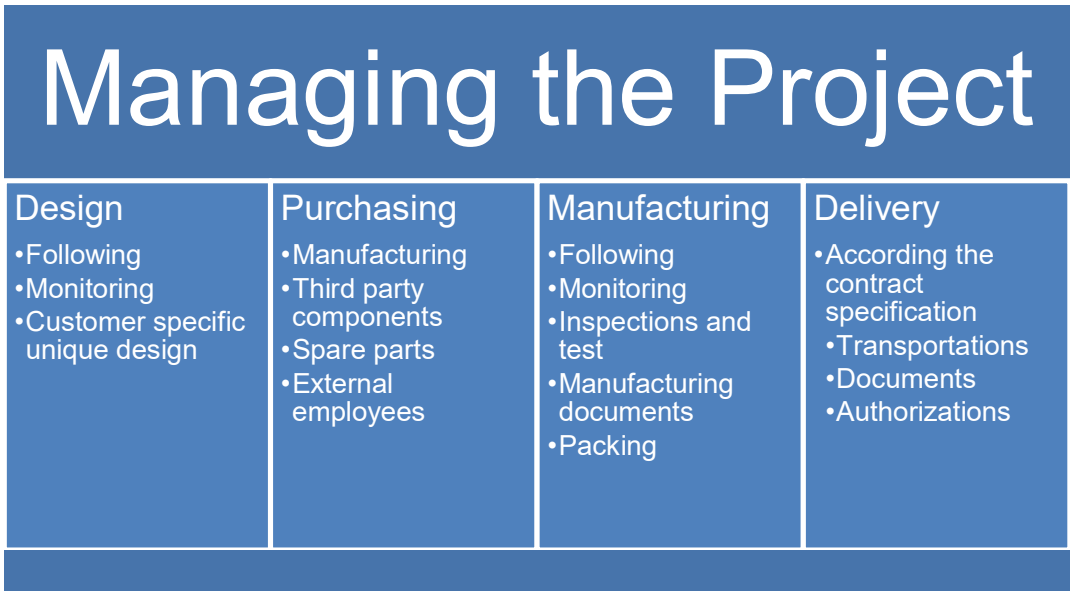

Figure 7: Managing the Project

Depending on the customer project delivery scope, project can end after the delivery has been done and all the project related invoicing is done. Projects which ends after delivery do not need any specific installation support from the company or either specialist from the company to do the products commissioning. According the interviewee feedback both these project types exists depending on the customer needs and customer situation, but if the scope of delivery is more unique and products complicated, part of the scope is that company specialist will be as an installation supervisor on the site during the installation phase. These kind of cases when company provide only the site supervisor who will act as an advisor who follows that installation is done correctly and everything is installed as shown in the drawings. The customer will provide the installation team with their supervisors and the company specialist will guide and monitor this team is using accepted installation methods and the final result as according the company instructions before installers can proceed to the next stage.

During this installation phase the project manager need to communicate closely with the personnel who are on the site to make sure that work is good track and also with the customer that installation team has everything to proceed work on schedule. Especially in modernizations projects, installation schedules are very tight and product delivery cannot delay if installations are wanted to perform on time. During the installation site might have multiple companies and several installation teams on the same area which might cause that all the works cannot perform as planned. The project manager need follow installations carefully so he communicate with the customer to solve these possible problems as soon as possible and the customer can adjust their whole schedule that all the actions can be done before the deadline. Distance to the site and possible big time difference causes challenges to the project manager to monitor the installation and the commissioning but with close communication and co-operation these can be managed. Some of the cases the project manager act as a site supervisor so then the project manager is located on the site and can follow all the actions there and make sure that everything is proceeding as planned and as agreed.

Depending on the project scope and products types commissioning phase might need several different stages. The project manager need to plan these phases well before so all the needed resources are reserved. Most of the cases need only the commissioning after the installation are done. Then the company specialist fine tune the equipment to meet the customer needs and their processes. Some of the cases installation supervisor are different specialist than commissioning specialists and project manager need to adjust all the schedules with customer schedule to make sure that project will be delivered on time. When all the commission phases are ready and systems are adjusted to work properly and customer has started their production again project can be handover to the customer. More complex projects need several adjusting before equipment can be handover to the customer.

After the installation are ready, and also during the installation, specialist need to perform the cold commissioning. During this phase they adjust all the equipment to work with each other’s as planned. This phase is also crucial to the project as this is the last phase to test that everything is working normally. If something has been damaged during the transportation or during the installation, these defects can be found new and project manager can respond to these before the production starts. The project manager need to make sure that everything is working and all the agreed products and parts are on the

site. Without this project cannot be commissioned on time and whole project will be delayed. The project manager need coordinate all these site activities and monitor that all the actions are done on time and according the agreement.

The project final and important stage is the customer final acceptation. After the project has been delivered according the scope of delivery customer need to accept the project. This acceptation will be made with signed document and with this document project will be handover to the customer and the warranty period will start from this date. These types of acceptances are done when project includes installation and system specific commissioning. With this documentation the customer will accept the project and its delivery, installations and commissioning as system has been installed as a part of existing system. With this signature customer will accept that all these actions has been made correctly and if scope of delivery has some performance tests, these tests has been done also acceptably. This document is important to the project manager also due that in many cases this document is part of the final invoice, so the project manager can meet the project financial targets. Based on the interviews results, Figure 8 below shows the project site actions phases.

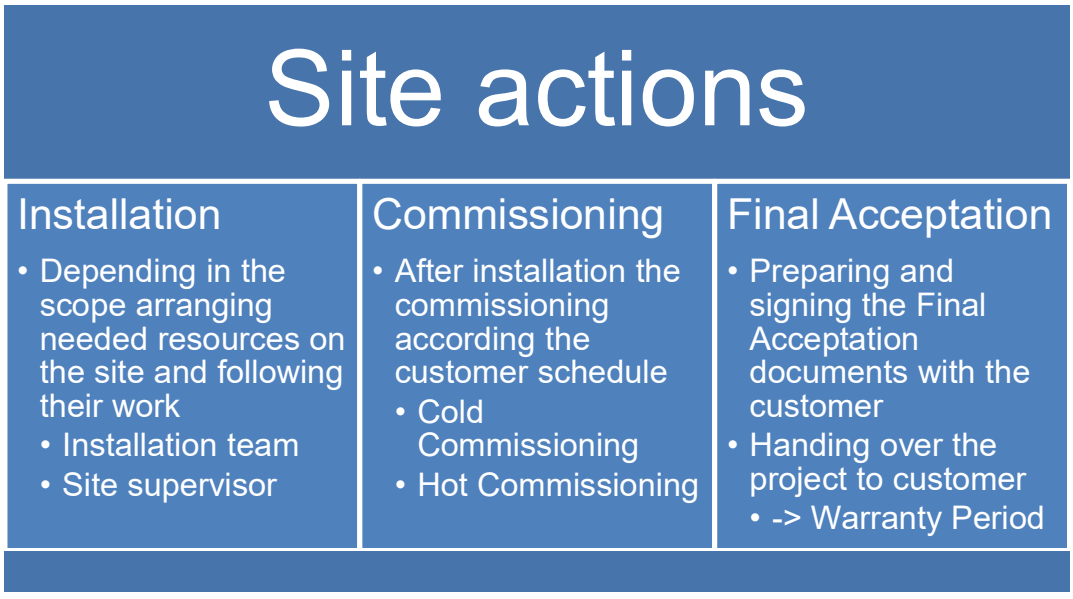

Figure 8: Project Site Actions

The project is now delivered to the customer according the scope of delivery and project has been invoiced fully according the contract invoicing milestones, the project will be transferred to warranty period. This means that project will be closed from the other part

except the warranty part. Although many of the companies has own departments for the warranty period actions the project manager still act key role during the warranty period. The project manager will remains as a contact person for customer to whom customer can contact if they have any concerns with their products. If needed the project manager will coordinate warranty actions with warranty specialist and possible site visits with the company specialist. After the warranty period is over the project manager can close the whole project with correct internal stakeholders and then the project manager can make the final check the projects financial figures and then do the needed lessons learned actions.

3.3 Main Findings from the Current State Analysis

This subsection lists the main findings from the Current State Analysis by showing first the strengths of the current customer delivery process. The weaknesses are covered after that. The strengths and weaknesses are grouped according to the previously presented phases.

3.3.1 Strengths of the Current Process

The current prevailing customer delivery process has several strengths according to the interviewees. One of the key strength is that companies, where the interviewees currently work, have worked with customer delivery projects for a long time. During these several years, or even decades, companies have developed a project delivery culture. This culture has shaped the company internal work as most of the companies' key business is delivering these unique projects to the customer. Therefore all the companies' functions and departments are working with the project department.

During these decades the companies have developed also processes and tools for project managers and project management. The overall project management process is good and relevant in these companies and these processes support the management of the customer delivery projects. These processes have been shaped up during decades of customer delivery projects and at the same time different departments' working methods have been shaped together. Also inside the companies all the stakeholders have learnt the company project culture and they know what the projects are expecting from

them. During these years other department have shaped their format so they may respond better to customer delivery project demands. This long history with the projects has guaranteed that in every department there is a lot of person with a long work history with company products and projects. Due to this every company has a high level of knowledge available in every stakeholder group. This ensures that project work will proceed smoothly throughout the final project scope.

According to the interviewees, most of the customer delivery projects are rather similar to each other. The products are always slightly unique depending on the customer but still the common customer delivery project structure follows the same pattern and it has always the same phases with mainly the same stakeholders. And due to this also the project team members, different stakeholders and possible subcontractors know what the project is expecting from them.

One of the strengths according to the interviewees is that despite the different kinds of problems and challenges caused by internal or external issues, the companies can still adapt to these situations and the customer delivery projects are delivered on time almost always. Sometimes the project might face different or even multiple internal problems but still the project manager with the project team together with several stakeholders can manage these situations professionally and the schedule, budget or quality of the project is not jeopardized. Customers or subcontractors may also cause problems when the customer delivery project cannot anymore follow the original plans and the project manager together with the project team needs to adjust plans, deadlines and individual tasks.

Table 6 below shows a list of the strengths according to the Current State Analysis interviews.

Table 6: Current Process Strengths

Strengths of the Current Customer Delivery Project Process
• **Companies have long history to operate with customer deliveries business**
• **Companies' processes and project teams have developed during past several years - Project culture is good**
• **Due to long history companies' different stakeholder groups have a high level of knowledge**
• **Current tolls support project management work**
• **Current processes are in good level overall**
• **Although project management has improved, companies are trying to develop project management processes and tolls all the time to support project deliveries even better**

These strengths are found according to the interviewees in all the areas of customer delivery project process shown below in Figure 9.

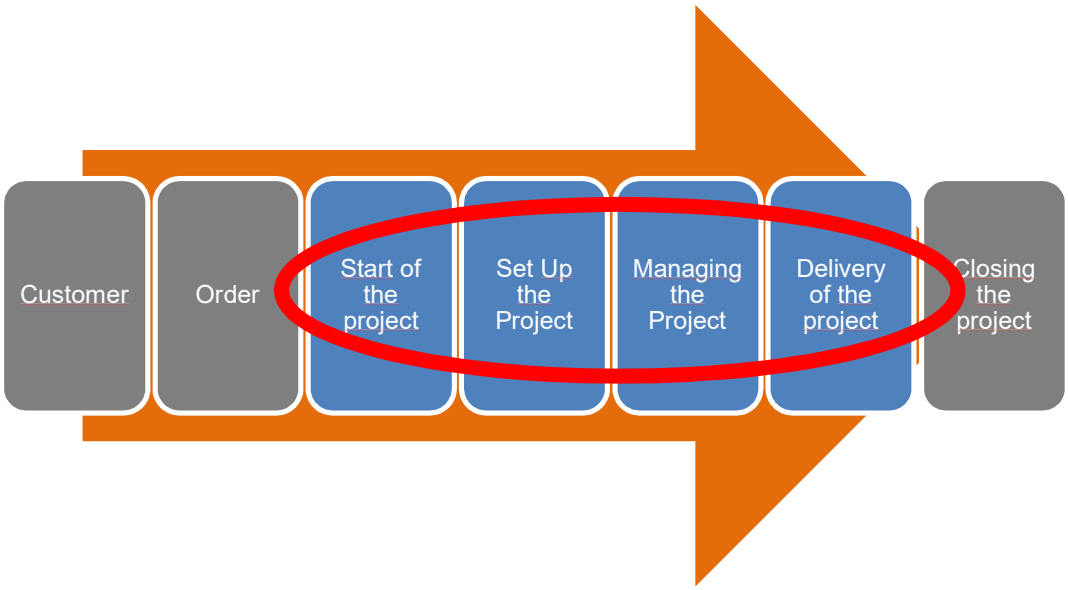

Figure 9: Located Areas of the Current Process Strengths

3.3.2 Weaknesses of the Current Process

The Current State Analysis revealed that even though the companies have a long history with the customer delivery projects and the companies have worked and are working with the customer project delivery processes, tools and methods, there is still room for improvement. The weaknesses of the current customer delivery project depend a lot on company and their level of project processes, the products they are offering and also individual persons who are working in project management duties. These three issues make up the list of weaknesses which need attention according to the interviewees who participated in the Current State Analysis. Table 7 below explains the meaning of the abbreviations in Table 8, showing the current process weaknesses.

Table 7: Project Phase Abbreviations

St	Start of the Project
Se	Setting Up the Project
Ma	Managing of the Project
Si	Site Actions of the Project

Table 8: Current Process Weaknesses

Weaknesses of the Current Customer Delivery Project Process	
Type of Weaknesses	*Occurring area*
1. Inadequate or missing data at the beginning of the project	(St)(Se)(Si)
2. Unclear scope of delivery	(St)(Se)
3. Not enough resources for the projects	(Se)(Ma)
4. Change management	(Ma)
5. Communication (Internal / External)	(St)(Se)(Ma)(Si)
6. Unclear project interfaces (Internal / External)	(St)(Ma)
7. All the used tools are not sync or not very user friendly	(Ma)
8. Internal processes changes often and are not communicated clearly to project managers	(Ma)
9. Internal documentation	(Ma)
10. Own factory or subcontractor delays or unreliable promises	(Ma)
11. Project team and stakeholders are focusing irrelevant project items	(Ma)

Below in Figure 10 are illustrated the locations of the weaknesses in the prevailing customer delivery project process, listed in Table 8.

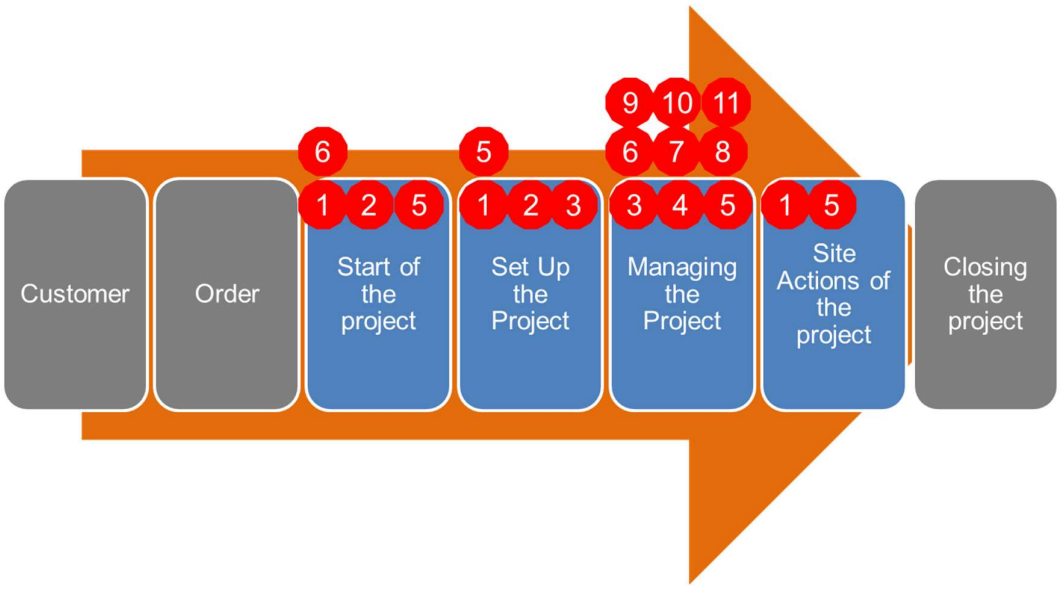

Figure 10: Locations of the Founded Weaknesses

Most of these weaknesses are recognized in multiple phases during the customer delivery project process. The weaknesses are presented using the same structure as defining the used customer delivery project process as weaknesses were noticed everywhere in the process chain.

Based on the interviewees' feedback the first weakness, which is also one of most important weaknesses, was found at the start of the project phase. When a new project is started the project manager and the project team need to have complete data from the sold project and from the customer's current state. This starting information is in key role when the project team is planning the project and needed tasks. This data is showing the customer current state regarding the existing systems and processes. When this data is combined to particular project sales material the project has a rough roadmap of what needs to be done. If the project team has wrong information about the current systems or customer processes there is a high risk that new products will not fit the planned place. New products will not fit either physically or they do not work in the customer process. If the project does not get correct information at the beginning of the project, there is a big

chance that the project will go to a wrong direction and the closer the project is to the end, the costs to fix the project is all the time higher. The weakness is mentioned by Interviewee E below:

> *The biggest reason for inadequate information is that sales persons do not know product as well as needed so they could provide the correct scope for the customer and for the customer's actual needs.*
>
> *Data 1: Interviewee E*

Another big weaknesses at the start of the customer delivery project phase is an unclear project scope of delivery. When the scope is not agreed and documented clearly it will cause a lot of problems to project managers. If the scope is not clear the project might proceed to incorrect direction and the project manager need to spend a lot of extra time and effort to clarify the actual situation and scope. Along the extra effort it always has some economic impact on the project also which causes other problems for the project manager who is responsible for the whole project. If these missing parts or work cannot be invoiced from the customer, the project manager needs to find the slot for these expenses from the project budget. This problem is highlighted by Interviewee B below:

> *The company is acting and selling products in multiple countries and personnel in many locations do not know all the products as well as they should which leads that factory does not receive correct information although the end customer has provided this information to local representatives. Without all the detailed information the factory cannot provide the correct products.*
>
> *Data 1: Interviewee B*

The previous points present also partly the next problem that the project managers are currently facing during the project management duties. One weakness is communication and especially the lack of the communication. In addition to lack of communication, communication can be inadequate or misleading. Then communication does not include all the available information or part of the information is not correct for one reason or another. The lack of communication can be internal or external. Internal communication includes all the communication between the project team members and between the company internal stakeholders. Lack of communication might lead the project to a wrong direction and due to that the end result might be different from the scope of delivery that

was agreed with the customer. Due to lack of communication the team members or internal stakeholders might assume something and act according to this assumption. The project manager needs to keep all the project in his hands all the time and try prevent going in the wrong direction during the project. This challenge is pointed out by Interviewee H below:

> *One key concern is the internal and external communication. Incorrect and inadequate information will jeopardize the project.*
>
> *Data 1: Interviewee H*

One concern at the start of the project is the external interfaces. If the scope of the delivery is unclear and the contract does not have clear information what is included and what is excluded from the scope of the delivery this might lead to a situation where the customer and the project manager assumes that the other party is responsible for the mentioned matters. The later these interface problem arise the harder the correction work is for the project team and for the project manager. The same problems may occur when the customer understands the contract and the scope differently than it actual is and the customer demands regarding the project delivery are overly optimistic. This problem is mentioned by Interviewee F below:

> *One concern is customer overly optimistic demands during the project. Customer might demand something what is not agreed on the contract and project manager need to find out is this actually agreed with someone from the company. Sometimes customer and the interviewee understand the contract differently and sometimes contract is missing something which affect to the scope.*
>
> *Data 1: Interviewee F*

Table 9 below lists the weaknesses from the start of the project phase.

Table 9: Weaknesses of the Start of the Project Phase

Weaknesses of Start of the Project Phase
• **Inadequate or missing data at the beginning of the project**
• **Unclear scope of delivery**
• **Communication (internal/external)**
• **Unclear project interfaces (external)**

According the interviewees' feedback setting up the project has also multiple weaknesses. This phase shares several weaknesses with the start of the project phase as well. The most important weaknesses for this phase is inadequate or missing data and unclear scope of delivery. Lack of the starting data or unclear project scope of delivery might lead the project not having the correct team for the project targets. If the project manager needs to set up the team with wrong or inadequate data, the project team targets and goals might be set up wrongly. This will lead to the whole project starting in the wrong direction. With incorrect data the project manager might give the wrong type of duties to the project team. The lack of available resources also brings problems to the projects. Additionally, the indicated resources may not be professional enough for the existing duties at the customer delivery project. This weakness is highlighted by Interviewee A below:

> *One concern currently is that project team member does not have enough suitable training and knowledge for the needs of the projects.*
>
> *Data 1: Interviewee A*

Table 10 below shows the weaknesses for the setting up the project phase.

Table 10: Weaknesses of the Setting Up the Project Phase

Weaknesses of the Setting Up of the Project Phase
• **Inadequate or missing data at the beginning of the project**
• **Unclear scope of delivery**
• **Communication (internal/external)**
• **Not enough resources for the projects**

The biggest weakness during the management of the project is problems with the project resources according the results of the current state analysis. This critical use of the essential resources is important for the projects. When companies are trying to work with minimum resources, it affects the project managers also. Many interviewees see that the resources in the projects are causing very often at least minor problems. This is especially true when the companies have multiple projects going on with several project managers. During these times the project teams need to share the specialists between different projects. This causes problems when multiple projects are in the same phase or different project are in need of the same limited resources. The project managers do not always act as direct managers to the project team members and if, due to some reason, the team member receives instructions from the direct manager to do another project instead of the project which the worker is currently working for, and this means the project is suddenly missing an employee. If internal communication is not in the correct level and this is not communicated to immediately to the project manager this might cause big delays and problems in the project. This challenge is mentioned by Interviewee B below:

> *Sometimes there is not available enough resources for the engineering tasks. Mainly this happens because there is lack of the design engineers. Due to this design phase will need more time than scheduled. This leads that all the phases after the design need manage with less time than scheduled so whole schedule can be met.*
>
> *Data 1: Interviewee B*

One of the weaknesses of the current process is change management when managing a customer delivery project. Project managers see that changes during the project are not so easy and flexible to carry out. Sometimes the project does not face any changes and original plans and schedules can be followed without any extra efforts. Sometimes projects faces challenges during its life-cycle, project manager need to manage these challenges in order to meet the set targets. The changes might be caused by different reasons but mostly the customer realizes during the project that the earlier agreed scope of delivery does not fulfil their needs completely. After that the customer contacts the company and informs them of their new desires. The project manager needs to, together with company sales representative, discuss with the customer what cost and schedule impacts these changes will have and after those have been agreed the project manager needs to make the needed changes to the project.

The whole chain from the end customer to the last point of manufacturing can be long and if the communication is not effective the company design department or manufacturing could continue with the old plans a long time without receiving any information regarding the new scope of delivery. Companies might have several sales offices around the world and after the customer has contacted the local sales representative it might take a long time before this information flows through the organization to the project manager. This might cause a lot of extra costs if the information does not reach the correct person immediately. After the project manager there are still multiple stakeholders who need to get the information on what has changed before the project is again on the correct track. This problem is discussed by Interviewee E below:

> *The change management is one concern and especially the communication through the company. This communication need to be done effectively and promptly. Other thing regarding the changes is that when customer want to change the scope during the project. The company need be effective so these changes can be made easily and the project manager need to communicate with the customer what kind of impacts these changes has to the project price or the project delivery time.*
>
> *Data 1: Interviewee E*

Communication during the projects is in key role. This means previously mentioned internal communication inside the project team and the company and also the external communication. External communication includes communication between the project manager and the customer as well the communication between the project and the external subcontractors and suppliers. This communication should be smooth to ensure project progression as planned. The project manager is responsible for communication to the customer and the project manager needs to make sure that the project team members will receive all the needed answers and information from the customer on time. Especially if in the sales phase, the company and customer have agreed only on the big picture of the project and the project manager together with the team need to clarify all the detailed open issues from the customer before the design can start properly. Also if the customer needs to approve some of the drawings or other documents which are needed in the later stages of the project, the project manager needs to ensure that communication with the customer is working well and without any unnecessary delays. This weakness is pointed out by Interviewee B below:

There is not too much communication on the project, internal or external.
Data 1, Interviewee B

Unclear project interfaces causes problems for the project operation when managing the customer delivery project and thus also for the project managers. These interfaces can be interfaces between different team members, between different departments, or between other project stakeholders. Interface between project and customer can also causes challenges. If at the beginning of the project, the project manager together with the project team has not clearly agreed the roles and responsibilities for each team and team members these interfaces can cause problems. If another department output is not completely compatible with the next department, the project work will stop until the project team has agreed on how to continue and finalize the current output for the project. Between the individual team members the problem might be the same if they have not communicated clearly enough what the needs are and what the outputs of each individual workers are. The project manager is accountable for the whole project and if the project manager is not sure that these gaps do not exist, the project manager need to work with these issues during the project so the project will still meet all the agreed milestones and deadlines. The challenge is highlighted by Interviewee H below:

Second concern for the interviewee is different interfaces in the project. This includes concerns in internal and external interfaces. If these interfaces are not agreed clear enough these might causes problems with responsibilities and how persons will manage duties in these border line. Internal interfaces are inside the company and inside the project team and external interfaces are between the project and the customer.
Data 1: Interviewee H

The project managers are facing problems when managing the projects if the used tools and software are not in sync with other tools. This means that the project manager needs to report and fill in the same data to different tools and locations as they are not connected together. This extra work needs a great deal of effort and time which could be spent on some other thing for the project. The tools should support the project management work, not causing additional work and do not support any of the stakeholders. Tools and software are not sometimes user friendly, which means that project managers and project management persons need to spend more time with them than is actually necessary. This problem is mentioned by Interviewee A below:

> *One concern for the current project management processes are that three different system need some overlapping work. There is a lot of same information what is needed for all the mentioned processes but every process need it in different format.*
>
> *Data 1: Interviewee A*

The companies are trying to improve and develop their processes generally and also regarding the project delivery processes. One of the weaknesses according to the interviewees is that internal communication is not good enough as some of the process and working methods changes are informed to project managers and other stakeholders too late or sometimes not at all. It is hard for the project managers to follow what is the latest and correct process or document for each phase and if changes are not announced officially inside and the information from different sources is not identical, it is hard for the project manager to operate. This will cause unnecessary uncertainty for the project manager and also inside the project team. This weakness is discussed by Interviewee F below:

> *One concern is how to keep up with all the internal changes. The interviewee sees that it is not always easy to know what has happened and how it will affect the daily work of an individual employee.*
>
> *Data 1: Interviewee F*

Internal documentation is a key aspect for the projects and if these internal documents for products, project milestones or other things related to the project scope are missing, then the project may very well be in deep trouble. These documents are supposed to support the project manager and the project team but due to unfinished documents the project team needs to every time find the missing data and make sure that existing data is correct. The shortage of data causes extra work for the project team and it will always cost time and money. This challenge is pointed out by Interviewee C below:

> *Project documentation causes sometimes problems to the project managers. If documentation needs something extra it will take more the project manager time and this time is always away from other duties. Company tools are not always completely suitable for the documentation updates.*

> *Also these special manuals are not calculated to the budgets and schedules. Unplanned work always need more time and money than standard documentation.*
>
> *Data 1: Interviewee C*

A big concern for the project managers during the customer delivery projects is problem with manufacturing, subcontractors and third-party part suppliers. They are sometimes making unrealistic promises causing many problems for the project manager and the project team which may result in serious delays on the delivery. If these parties would inform the project manager of possible delays at the first possible point, the project manager could do something to prevent the delay of the whole project. Or at least the project manager could start a discussion with the customer that a delay can be possible and negotiate which kind actions will be made. If the project manager does not get any information about possible problems, the project manager cannot do anything to solve the problem. The suppliers and the subcontractors may also give impossible promises. Mostly these promises are related to the delivery time of their parts or portion of the project. Thus, promises and realization are not in the line together. Perhaps the suppliers and the subcontractors have promised to deliver the products on time to get the deal with the company. This will cause problems for the project and the project manager needs to get the wasted time back somewhere else during the customer delivery project. This problem is mentioned by Interviewee G below:

> *One of the key concern is suppliers' promises versus their actual outcome. Suppliers promises often too much and their schedules are not plausible. If suppliers do not deliver their products on time whole project schedule might be jeopardize, or even stopped for a moment.*
>
> *Data 1: Interviewee G*

One weakness for the project manager is that the project team is not entirely focusing on the same goal, the project goal. The project team should be focused on fulfilling the customer and project demands and the needed tasks regarding it. Sometimes other incentives might lead the project member's focus away from the project targets to other targets. The project targets will be fulfilled also but not by effective methods and schedule. All project efforts should be on the correct level regarding the targets and the goals. The effort of each individual project team member should be directed to fully support the

project goals. If not, the project manager has to work hardly to keep the project on track. This weakness is highlighted by Interviewee H below:

> *Inside the company and inside the project, all the persons should focus on agreed project targets and goal and no one should not do anything else. Project team members should focus to correct issues.*
>
> *Data 1: Interviewee H*

Below Table 11 are listed the weaknesses for managing the project phase.

Table 11: Weaknesses of the Managing the Project Phase

Weaknesses of the Managing the Project Phase
• **Not enough resources for the projects**
• **Change management**
• **Communication (internal/external)**
• **Unclear project interface (internal/external)**
• **All the used tools are not in sync or not very user friendly**
• **Internal processes change too often and are not communicated to project manager**
• **Internal documentation**
• **Own factory or subcontractor delays or unreliable promises**
• **Project team and stakeholders focusing irrelevant project items**

During the site actions the customer delivery projects have two major weaknesses. One weakness is communication and especially lack of communication between the project manager, company site specialists and customer. Effective communication ensures fluent progress of site actions and prevent possible problems early enough. Another weakness is the missing or inadequate information and data. Without correct data the site actions can proceed effectively but the project manager and site personnel need to look for missing data while working. Table 12 below shows the weaknesses in the site actions phase.

Table 12: Weaknesses of the Site Actions Phase

Weaknesses of the Site Action Phase
• **Inadequate or missing data**
• **Communication (internal/external)**

As this Current State Analysis clearly shows the same problems occur in customer delivery projects despite the company or the products. Also several of the same problems occur in multiple phases of this process. The most common problems according to the Current State Analysis are: (1) Inadequate or missing project data, (2) unclear project scope of delivery, and (3) improper use of critical project resources.

3.4 Summary of the Key Findings from the Current State Analysis

The Current State Analysis of the Customer Delivery Projects was conducted by interviewing a group of project managers who are working with customer delivery projects in Finnish companies in B2B contexts. The Current State Analysis revealed three main points for the customer delivery project process: (1) a prevailing, currently used process for the customer delivery process; (2) strengths of this process; and (3) weaknesses of this process.

The key findings from the Current State Analysis are a list of strengths and weaknesses of the current customer delivery project process grouped in phases identified during the customer delivery project process. The current prevailing customer delivery project process has multiple strengths and those should be kept as they are currently. The companies have a long history of delivering customer delivery projects and due to this long history working methods and processes have been developed so that they support the project manager's work. These working methods and current employees' have strong knowledge of the products and projects which help the projects during unexpected events. Despite the weaknesses identified, the project managers and companies have capabilities to solve these problems during the customer delivery projects and the projects are delivered on time in most of cases. Lessons learned from the previous projects have improved the companies' processes and working methods and also lessons learned sessions have improved the project manager knowledge.

According to the interviews carried out during the Current State Analysis, the key findings regarding the weaknesses are clearly occurring in every stage of the currently prevailing customer delivery project process. Even though the companies have delivered customer delivery projects for a long time and they work continually to improve processes and working methods, there are still problems in every phase of the customer project delivery. Several of these weaknesses occur in multiple phases of the identified customer delivery project process. The actual project lifetime is much longer than the study introduces. Project work start much earlier with customers. This work starts due to previous projects and the success and extra value they have brought to the customer. With these references, companies can continue negotiations with the customer regarding new deliveries already at the end of a previous project. Also the end of the project lifetime often ends later than the final delivery has been done or when the warranty period has finished. But in this study, the project definition has been limited to cover the stages from the customer order to the final delivery according to the scope.

The project managers see that customer delivery projects have many small and bigger issues during the project process which can cause problems for the project managers and the project team. The project manager tries to clarify these issues every time individually so the project will meet the agreed targets and goals. Some of the identified weaknesses occur in several phases of the current customer delivery process. These identified weaknesses has different type and different size impact to the projects. The selected weaknesses are chosen as they have a major impact on the projects and to project management. Improving these selected weaknesses companies can develop their customer delivery projects project management. Therefore, the selected weaknesses for this study are: Project resources and inadequate project data. The project resource issues cause problems for the project in several phases and especially the critical use of company resources in multiple projects simultaneously. Missing or inadequate project data and unclear scope of supply affects the project management daily work in every project phase. Figure 11 below groups these selected weaknesses.

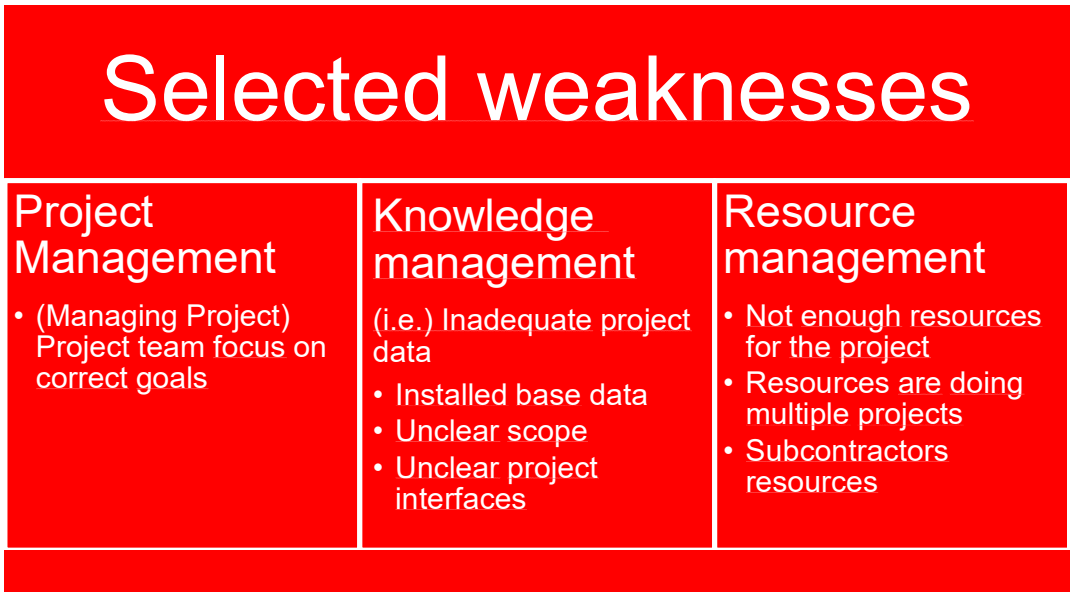

Figure 11: Selected Weaknesses from the Current State Analysis

Inadequate data includes all the previous data that the company should have from the customer, from the site or from the current system installed on the site which affects the new customer delivery project. This weaknesses includes also all the new project data which affects the project scope and end result containing the interfaces inside the project. The recourses weaknesses includes the situation when the projects do not have enough resources or when resources are used in multiple projects at the same time and project managers are not clearly informed if resources are transferred to another duties. This topic covers also subcontractors' resources when subcontractors and suppliers are promising more than their resources can provide. This topic includes next when project team members are not fully focusing on the projects goals and their focus is distracted with other issues.

With these particular weaknesses selected, the next section discusses best practices in current literature for dealing with Project management, Knowledge management and Resource management in order to create a Conceptual Framework for this study. Next section of this study present the Conceptual Framework, which is used as the grounding of the initial proposal. Conceptual Framework present the three different areas of literature best practices and finally combines this to one conceptual framework for this thesis.

4 Best Practice for Successful Project Management of Customer Delivery Projects

This section discusses best practices from the existing literature regarding project management, knowledge management and resource management. The section forms the theoretical part of the study and it discusses practices and models to improve the current prevailing project management process for customer delivery projects. The perspective of this section is derived from the findings of the Current State Analysis in section 3.

The Current State Analysis revealed three specific areas for improvement. These areas are (1) Project Management, (2) Knowledge Management, and (3) Resource Management. The Project management area concentrates generally on project management and from that perspective introduces literature for the identified weaknesses. The Knowledge management area addresses weaknesses revealed by the Current State Analysis including unclear scope, inadequate data and unclear installed base data. Therefore, this section discusses the knowledge transfer and how it can improve the current customer delivery project process. The third area is Resource management and this area focuses on the use of critical resources in projects. The use of resources is looked at from the critical path point of view.

Section 4.1 discusses the project management processes generally by introducing project management key concepts and key terms in order to clarify project management in this particular context. Section 4.2 discusses effective knowledge management and how knowledge management can be improved. Section 4.3 explains the critical path method as a part of critical resource planning. Section 4.4 summarizes this section and provides the Conceptual Framework of this study.

4.1 Introduction to Project Management

Organizations perform work. This work includes operations or projects and depending on the case, these two actions may overlap. Projects and also operations share several features, for example, they are performed by people; constrained by limited resources; and these actions are planned, executed and controlled (PMBOK Guide, 2000). A Project is a temporary effort to create a unique product, service or other kind of result. Projects are generated incrementally. First and foremost, projects need resources, then projects need to have a sponsor and projects and involve a certain amount of uncertainty.

Project management has the triple constraint referring to managing the scope, time and cost dimensions of the project (Schwalbe, 2010). Figure 12 below shows constraints of a typical project.

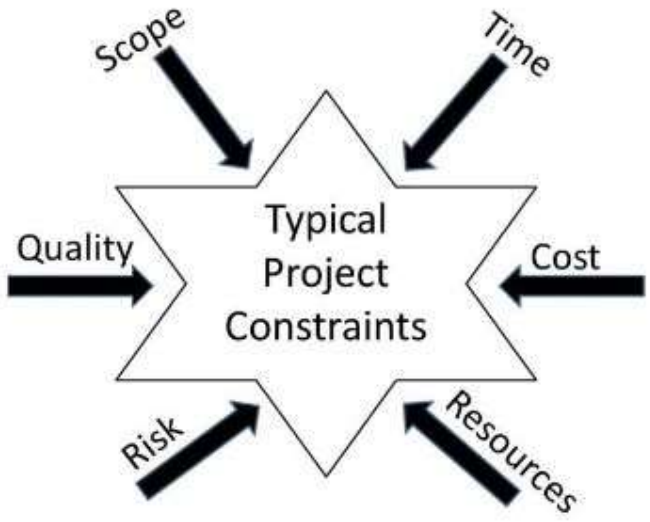

Figure 12: Constraint of the Typical Project (www.kathyschwalbe.com)

Project management is the application of knowledge, skills tools and techniques for the project to meet the project requirements (PMBOK Guide, 2000). Project management has four unambiguous components. These components are necessary for the project management and these components are: elements of project management, project lifecycle, group work, and common project vocabulary (Forsberg et al., 2003). The project management framework includes the project stakeholders, project management knowledge areas, and project management tools and techniques. Stakeholders are the people who are involved in the project activities. Project management knowledge area includes nine separate areas. These areas are: project integration management, scope, time, cost, quality, human resource, communications, risk, and procurement management (Schwalbe, 2010).

These project management knowledge areas are shown below in Table 13.

Table 13: Project Management Knowledge Areas

Project Management Knowledge Areas
• **Integration management**
• **Scope**
• **Time**
• **Cost**
• **Quality**
• **Human Resources**
• **Communications**
• **Risk**
• **Procurement Management**

Another important concept to understand is the five project management process groups. These process groups are initiating, planning, executing, monitoring and controlling, and closing. With these processes the project increases its chance of success (Schwalbe, 2010). These groups of processes are linked by the results they produce. The result or the outcome of one process group is an input for the next process group. The project management process groups are not individual or one-time events. These processes are overlapping activities that occur during different levels of each phase of the project (PMBOK Guide, 2000).

These project management processes groups are shown below in Figure 13.

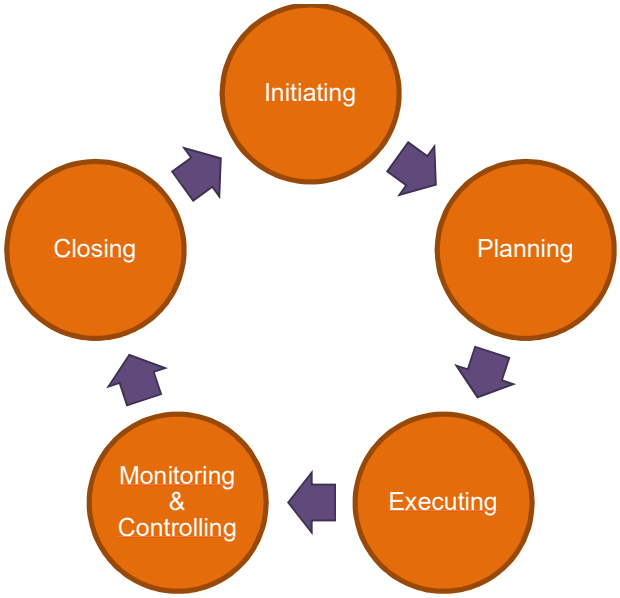

Figure 13: Project Management Process Groups

Many organizations today have a renewed interest in project management. In the past, project management primarily focused on supplying schedule and resource data to top management. Today's project management involves more people. (Schwalbe, 2010). Demands for the project management are increasing. Project objectives and targets are tighter due to global competition. Project organizations are more complex and project organizations has currently a great amount of different stakeholders. These stakeholders are for example other companies, subcontractors, subcontractor's subcontractors, and suppliers. The whole project work has scattered to cover the entire globe (Pelin, 2011).

Project management is the management of deviations. These deviations in a project are a continuous process. Project management need to understand the difference between risk, change and deviation. Risk and change recognize major happenings and leave out with presumably less consequence on the cost, time and scope. However, change and deviation are both identified in relation to a plan. While change focuses on the major project plan, deviations concentrate to project operational day-to-day plan (Hällgren and Maaninen-Olson, 2005).

4.2 Effective Knowledge Management

Knowledge management is vital factor to successful projects (Sokhanvar et al., 2014). Currently knowledge is recognized as a critical competitive asset for the companies (Ajmal et al., 2010). Projects have temporary nature and due to this projects requires useful knowledge management practices for tackling issues as knowledge leakiness and rework. Knowledge management has been recognized as a critical point for companies. It is critical for both, project success and also organizational performance (Sokhanvar et al., 2014). If companies want to grow and survive, organizations need to continually learn and change their knowledge into innovative and improved services and products. Currently high project failure rate is due to the insufficient knowledge acquired and transferred from the past projects (Handzic and Durmic, 2015).

Knowledge management in project-based organizations do not work as enterprises. Project team members are disband or leave after project completion. These actions determines number of further actions such as “reparative actions”, “leaking of project knowledge”, and “reworks”. Mentioned three issues have become to major challenge in projects and project-based organizations (Sokhanvar et al., 2014). Knowledge management should be focused to project initiation, planning and execution & monitoring phases. Project managers need to focus on capturing projects knowledge at the closing phase (Sokhanvar et al., 2014). Nevertheless, many project-based companies are lacking the expertise to handle their knowledge assets. This problem exists especially with the knowledge gained from the previous projects. There is multiple reasons why knowledge-management initiatives have been failed in project-based companies. Reasons for this failure are technological, cultural, knowledge content, and project management reasons (Ajmal et al., 2010).

Knowledge management process is divided into four part: 1) Knowledge Capturing, 2) Knowledge Creation, 3) Knowledge Transferring, and 4) Knowledge Reusing. As knowledge management is important factor for improving the project performance, firstly the knowledge capturing should be improved together with the knowledge creation section (Sokhanvar et al., 2014). Ajmal et al. (2010) point out couple barriers to successful knowledge management initiatives. These points are concerned to the culture inside companies. Another barriers is the knowledge sharing and another management com-

mitment. Organizations do not share the knowledge as effective as possible and management does not support the knowledge management as effectively as they could. Table 14 points these out more clearly.

Table 14: Cultural Barries to Knowledge Management

Cultural Barriers to Successful Knowledge Management	
Knowledge sharing	Staff do not share knowledge within the organization due to reasons such as a lack of trust and a knowledge-hoarding mentality.
Management commitment	Management appears keen to commence the knowledge management project. However, when problems emerge, commitment to the knowledge management project is quickly withdrawn.

If companies with the project-based organizations want to initiate knowledge management initiatives, these companies need to ensure first that organizations members, especially project team members, are familiar with company knowledge management. Organization team member also need to have clear strategy for contributing to specific knowledge management. If employees are not familiar with knowledge management initiatives, most of the knowledge transfers will fail (Ajmal et al., 2010). There is no two similar projects, even project are framed by comparable historic and organizational environments, at the same type of industry or market. Discontinuities between the projects are located in flow of the personnel, data and information, research, and other inputs which are hard to develop steady-state routines, flows of knowledge or seed of learning around the project. These discontinuities mean that used and available knowledge need to be understood, accepted and exploited in order to be transferred within the pluridisciplinary team (Serrat, 2012).

4.3 Efficient Use of the Critical Resources

Most of the projects include risks and these risks are difficult to manage. Therefore, several techniques have been developed to the so-called critical path. Critical path define the project completion time. Once the critical path of the project is identified, project managers can focus on founded critical path to control time and costs and efficiently allocate resources (Zammori et al., 2009). The project management environment is extremely turbulent. One of the keys to effective project management is disciplined time management. If project managers cannot control their own time, how project managers can control anything else on the project. Time is a resource, when it is lost or misplaced, it is gone forever (Kerzner, 2013). Strategic planning and its influence on the companies' performance is parallel to project planning and its impact to the project success. Therefore, strategic planning seems to be a major source of knowledge complementing the discussion of project management (Dvir and Lechler, 2003). Projects has unplanned or unexpected events and these events will take place during the whole project duration. The implementation process of the delivery project is in fact improving the entire project. These consequences in project phase are measured with economical manner (Haimala and Salminen).

When defining the projects critical path, the project must be broken in separate parts. These separate parts will be collected to a list of project activities. Achieving the best possible categorizing of project tasks and possible subprojects can be done when project team and scheduler collaborate. All these project tasks and subprojects are founded and located and sequenced on a logic diagram (Sandru and Olaru, 2013). The next phase when defining the critical path is to estimate these different tasks durations and sizes of the implementing to project team work. This scheduling phase can be done by using either "forward pass" technique or "backward pass" technique. Forward pass scheduling starts from time zero and project schedule network is made wherein an activity is added to its starting time to determine its completion. Whole scheduling process is continued sequentially though the entire project network. Backward pass scheduling process is started with final project activity using the estimated project duration as referential (Sandru and Olaru, 2013).

After all the task durations have been defined and amount of the needed project resources are estimated together with logic diagram of founded tasks, the project critical path can be defined (Sandru and Olaru, 2013). Events in this path are most critical for

the success of the project. Therefore, management should pay special attention to these events. These critical events are the key points when improving the total project life-cycle. Project critical path is always the longest path to do the project. Thereby, project other paths must be either equal in length or shorter than identified critical path. Therefore, there is events and activities which can be completed before than needed. This time difference between scheduled completion and required completion date in order to meet critical path is referred to as the slack time (Kerzner, 2013).

The critical path is vital for resource scheduling and allocation. Since project manager, co-operation with the functional managers, are able to reschedule critical events from the critical path can be accomplished earlier with maximum utilization of resources. With rescheduling the project manager need to ensure that critical path time is not extended. This rescheduling though the available slack time provides better balance of resources throughout the whole company. This might also reduce project costs by eliminating waiting time or idle. Negative slack usually create when project pass the agreed customer's completion date. Negative slack is result when required resources would not be available until a later day or the assigned resources did not possess the correct skill levels. In any event, negative slack is a warning sign to the project manager that corrective actions are needed to keep the scheduled customer's end date (Kerzner, 2013). Table 15 below shows reasons when negative slack most likely might occur. Resources need to commit fully to the project and its goals during the whole project lifecycle. Project resources commitment seems to be on a full-time basis as long as a person is defined as a team member (Engwall and Svensson, 2004).

Table 15: Project Negative Slack

Reason for the Negative Slack during the Project
• **The original plan was highly optimistic, but unrealistic**
• **The customer's end date was unrealistic**
• **One or more activities slipped during project execution**
• **The assigned resources did not possess the correct skill levels**
• **The required resources would not be available until a later day**

There are two replanning techniques regarding the resources: resource leveling and resource allocation. Resource leveling technique attempts to eliminate the manpower

peaks and valleys. This technique smooths out the period-to-period resource requirements ideally without changing the project end date. However, in reality, the end date changes very often and additional costs are incurred. Resource allocation technique, also called as resource-limited planning. This technique attempts to find the shortest possible critical path based on the available or fixed resources. This approach problem is that all the employees may not be qualified technically to perform more than one type of activity in a network. Despite the used technique project manager should make every attempt to reallocate the resources to reduce the projects critical path. The slack was not intentionally planned as a safety valve for the project managers (Kerzner, 2013).

Transferring resources from slack paths to more critical paths is only one method for reducing expected project time. Table 16 below shows other methods which are available for critical path time reduction. Normally project has fixed start and end dates. Project team performance must be completed within this time scale within the guidelines given by the statement of the work. Set up project team need perform given project within project time schedule and extra resources during the project is not always possible. Planned activities often need certain type of expertise and all the available company employees are not capable perform for the needed tasks (Kerzner, 2013).

Table 16: Methods to Reduce Critical Path

Methods for Reducing the Critical Path Time
• **Eliminating some parts of the project**
• **Adding more resources**
• **Substituting less time-consuming components or activities**
• **Parallelizing activities**
• **Shortening critical path activities**
• **Shortening early activities**
• **Shortening longest activities**
• **Shortening easiest activities**
• **Shortening activities that are least costly to speed up**
• **Shortening activities for which have more resources available**
• **Increasing the number of working hours per day**

Project scheduling is greatly affected by human behavior. Project teams add their estimates, up to 200 per cent, to protect ourselves from the negative effects from missed

deadlines. At the same time, project managers are doing this same by adding own safety factor to the estimates project managers receive from the project team. Finally, project managers are expected cuts from the top managers when they present project schedules. The result of this is a fraught and dishonest activity estimating and scheduling process at every stage and added with excessive safety. Because no one takes estimates seriously, no one gives serious estimates (Pinto, 2002).

4.4 Conceptual Framework

Literature of the project management defined best practice related to develop the customer delivery project process. This section defined the conceptual framework of the study. Findings from the literature that were introduced in this section can be used as basis when analyzing the current state of the customer delivery project process.

Project management area will cover general methods to improve all selected weaknesses. Knowledge management include literature best practice as well from the unclear project scope as from the inadequate project data. Resource management covers the use of the critical resources best practices. Figure 14 summarizes the conceptual framework introduced and analyzed in this section.

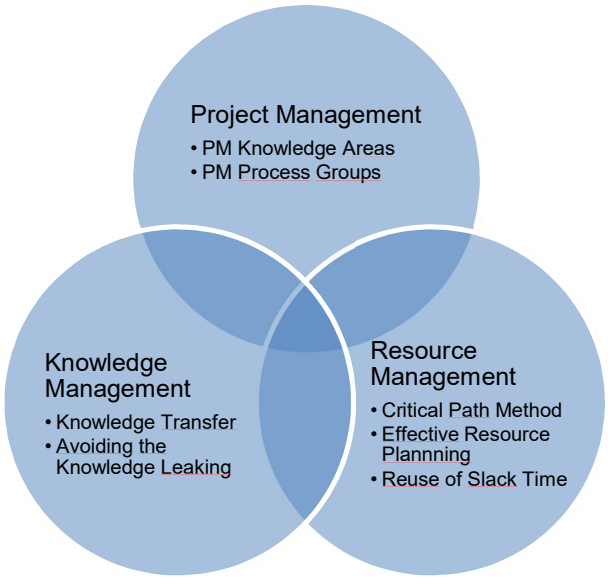

Figure 14: Conceptual Framework

The conceptual framework of this study represents the two development elements for the customer delivery project in B2B context. General project management processes

were studied first to gain general knowledge of the topic. Project management includes the project constraint and project management applications and knowledge areas. These are explained to understand the customer project delivery nature.

The first section for the conceptual framework is the knowledge management. This section introduces the knowledge transfer. Mainly different format of knowledge transfer and plausible reasons for its defects. This section discusses also the knowledge as it has been an asset to the companies now days and it should be treated correctly.

The second section presents resource management. This section discusses the critical path and the critical path method as a one tool for the critical resources. Another point for this section is also the slack time, how it could avoid or used more usefully for the projects. One point for this sections was also proper planning of needed and/or available resources and avoiding the human behavior error.

Next section of this study combines the results of the Current State Analysis, presented Conceptual Framework with received feedback from the interviewees to initial proposal to improve the project management of customer delivery projects project management. Next section first present the steps for this study has built the proposal. Secondly, next section illustrates the improving ideas from selected project managers and finally, next section will show the initial proposal the thesis.

5 Building Proposal for the Successful Project Management

This section merges the findings from the Current State Analysis (Data 1) with the best practice combined to the conceptual framework and additional ideas and suggestions from the Data 2 into the initial proposal.

5.1 Steps of Building the Proposal

After a completion of the Current State Analysis, specific improvement areas for the customer delivery project management were identified. Combining with the Current State Analysis information (data 1) and the best practices from the conceptual framework this study presents the proposal for the improvements to customer delivery project process. Data 2 is gathered during this initial proposal building and it will be validated later on this study with the thesis research data 3.

Key findings of the Current State Analysis are presented on section 3. These findings will be presented in briefly. According the interviewees current customer delivery process has several strengths. Top strengths are that companies have long history with the customer delivery project business and due to that companies project culture is in good level. Long history has enabled employees' high knowledge in their specified areas and companies' general processes support companies' project-based business. Despite that interviewees who are working in different companies and in different type of industries, main weaknesses of the current customer delivery project were focused in rather narrow area. Current State Analysis of this Thesis points out several weaknesses everywhere the customer delivery process. Selected weaknesses occurs in several phases in the customer delivery project and these weaknesses affects greatly to project daily work. Selected weaknesses are: (1) Use of the critical resources, and (2) Inadequate project data.

After Current State Analysis weaknesses are identified and selected, literature for best practice was chosen to focus to selected weaknesses. Selected areas for the literature and its best practices are (1) Project Management, (2) Knowledge Management, and (3) Resource Management. Project management will cover the project process generally. Knowledge management concept covers the knowledge transfer, which the key thing in order to improve project data. This knowledge transfer includes the internal and external project data as well the other company data related to project management. Resource

management focuses on effective resources planning and resources critical paths. This topic go through the projects slack time and reuse of this possible slack time to shorten the project critical path.

These topics have been selected as selected weaknesses occurs on most of the customer delivery projects and these weaknesses easily affects to end result of the customer delivery project. These topics can also easily develop to achieve improved project management for customer delivery projects, notwithstanding the industry nor the company which are delivering customer delivery projects.

5.2 Findings of Data Collection 2

For drafting the initial proposal this study conducted discussion session with two selected pilot project managers. During these discussion sessions findings from the Current State Analysis (Data 1) and conceptual framework were presented to the pilot project managers. Regarding the data, pilot project managers present their improvement ideas to selected weaknesses. The memos from these discussions are attached to the study as Appendix 3. These memos are used as Data 2 for building the initial proposal for improving the customer delivery project process. Founded improvement ideas (Data 2) are presented below in Table 17.

Table 17: Improvement Ideas from Data 2

The Areas of Weaknesses	The Improvement Ideas
Unclear Project Scope	To ensure proper and effective data transfer company should have light and efficient Data Check List. This list can act as a checklist, to be sure that all the needed data has been acquired and transferred to next stakeholders.
	Companies need to make sure that employees are aware that why all the data need to transfer to all other stakeholders.
	Lessons Learned. Companies and projects need to use more effectively lessons learned sessions to improve data management and previous mistakes.

	New type of project scope model. Project can start although scope is not 100% clear. Project model clarifies missing data during the project and before certain point all the data is clarified. All the projects have full scope defined at the same point of the project process.
	Big project scope is more difficult to communicate through the company stakeholders. Project is easier to split to smaller pieces and these smaller pieces are easier to communicate forward.
Inadequate Project Data	Employees engaging to projects and to projects data transfer.
	Companies' processes need to have built-in data transfer management to ensure effective data transfer inside the projects.
	Lessons Learned. Companies and projects need to use more effectively lessons learned to improve data management and its previous mistakes.
	Every time when new challenge during the data transfer occurs, it do not need always need new tool or software to fix the challenge. First companies need to improve the communication between the employees. Improved communication is always better than new tool.
Use of Critical Resources	To reduce resources critical path companies should anticipate more during the projects. For example if customer needs are recognized but companies do not want to place the order due to long delivery time. Companies should coordinate with the customer order from e.g. only from engineering and documentation part and later send the order from actual equipment. Then companies could distribute better available resources.
	All the projects are not critical and are not delivered to the customers. Then projects and their resources

	should be prioritized inside the whole company to ensure that most critical projects will get first the needed know-how.

As Data 1 provides challenges for the case study and Data 1 also provides understanding of the current customer delivery projects process. Data 2 offers improvement ideas based on the Data 1 which was founded after the Current State Analysis, combining with the conceptual framework which was built using the best practices from the literature.

Unclear project scope challenge receives several ideas how current situation could be improved. First idea was that between company's different interfaces there should be a data check list. This list should indicate all the needed data what need to transfer in particular interface. Interface could be for example between company's subsidiary who has done the deal with the end customer and company sales persons in location who will do the engineering, manufacturing and delivery. Another interface is the local sales persons and project manager. Inside the project there is also multiple interfaces where data needs to transfer without any shortages. Despite the fact that this check list needs to include all the possible data which is necessary for this stage, list should be easy to use and it should not be painful to use. If the list is too complex, there is a risk that stakeholders will not use the list properly. With this list all the project members and other persons at the company can easily see if the data has been transferred, when and also who has transferred the data to whom. This idea is highlighted by Interviewee B below:

> *This data check list would ensure that all mandatory data will transfer to correct stakeholders. This list will act as a backup check list but this list cannot be too heavy or complex to use and it cannot take too much time.*
>
> *Data 2: Interviewee B*

Another idea for the unclear project scope was that companies need to make sure that all the employees are aware why the data needs to be transferred and what data needs to be transferred. If employees near the interfaces do not know the reasons and needs for the data transfer, these personnel's might not do the transfer effectively, properly nor entirely. Employees need to be motivated and informed properly of importance of the data transfer during the projects.

Effective lessons learned session was seen good improvement idea for the data transfer weaknesses. After all projects lessons learned sessions are arranged properly with whole project team and needed other stakeholders project manager can collect all the issues what need to improvement. This points can improve also data transfer all the way from the company employee who is contacting the end customer. Project team can give improvement ideas in reverse order compared to normal project. This idea is pointed out by Interviewee B below:

> *Lessons learned session are effective method to improve the data transfer challenges inside the project team and also inside the whole company.*
>
> *Data 2: Interviewee B*

One idea to data transfer in unclear project scope was that company has new type project model. With this type of project model, project process do not need complete project scope when project is started. This certain model has fixed steps where the project scope will be clarified during the project first steps, if scope is not fully defined when the project has been hand over from the sales to project management. In this model project has certain freezing points and this model clarifies all the projects scope of delivery completely before this point. Then all the projects scope is defined in the same phase of the project process and it will not cause problems to the project or to project team. Using this particular model project management do not suffer so much with inadequate data transfer as this project model steps find out these missing data in any case. So project model and its processes replace possible shortages of the data transfer. This idea is mentioned by Interviewee A below:

> *Company has launched new type of project model. This model allows to start the project without final scope of delivery. All the projects proceed with same phases and these phases collect missing data during the project. This means that all the projects has defined project scope at same phase of the project process.*
>
> *Data 2: Interviewee A*

This previous model has also process which divide the project to smaller parts. When project and its scopes are divided small pieces data transfer is not so complicated. Smaller parts are much easier to communicate without any defects to other employees and stakeholders. This will ease the data transfer as the need amount of the data transfer

at one time is much smaller. Then there is not so much room for mistakes and employees remember easier transfer all needed data at every particular phase and interface. This idea discussed by Interviewee A below:

It is much easier to eat elephant in smaller pieces than in one piece.
Data 2: Interviewee A

Inadequate project data has a lot of same weaknesses and challenges as unclear project scope according the discussions. Project team members, other employees and stakeholders need to be engaging to the project and to project goals and targets. With that project data transfers will go smoother as employees are feeling that they are part of the project and its success. Employee engaging is key factor to have successful data transfer during the whole project life-cycle. This idea is highlighted by Interviewee B below:

Employees engaging to projects is in key role.
Data 2: Interviewee B

Same time with the employee engagement companies need to built-in knowledge management inside the customer delivery project processes. With this built-in actions in project processes data transfer will be more automatically and team members will do the data transfer more effectively and precise every time. Companies need to built-in strong data transfer culture inside the processes, projects and company way of working to ensure data transfer in customer delivery projects. This idea is pointed out by Interviewee B below:

These built-in processes should clearly show to all project team members and to all company employees the needs and the reasons for particular data transfer.
Data 2: Interviewee B

Lessons learned sessions are effective method to improve data transfer in inadequate project data cases also. Founded weaknesses in data transfer process need to be collected systematically and after project go through with whole project team and related stakeholders in order to reduce deficiencies in data transfer in future. Lessons learned are seen usefully in both unclear project scope challenges as inadequate project data

challenges. However, this method can help only in future projects. This idea is mentioned by Interviewee B below:

> *Lessons learned sessions are effective way to improve inadequate project data mistakes.*
>
> *Data 2: Interviewee B*

One point to inadequate project data was seen that companies and project teams need to just increase the communication between individual persons. This is the best way to ensure that correct data will transfer on correct time. Communication need to be on proper level inside the project team, inside the whole company and also between all concerned interfaces which are related to project success and goals. Sometimes inadequate data transfer are fixed with new tool or software and according the discussions this is not the best way improve the knowledge transfer inside the company. Most cases new tools are not proper for the existing challenge and not only this new tools does not fix the problem but causes extra work and effort to whole project team. This idea is discussed by Interviewee A below:

> *Improved communication is always better than new tool.*
>
> *Data 2: Interviewee A*

Use of critical resources receives mostly same ideas from both discussion sessions. Key idea for improve the resource challenges was anticipation. Company should work more over the internal interfaces to find out the best use of the critical resources. Many times company is recognized customer needs and customer could place an order to the company. Nevertheless company are not always starting their actions regarding the delivery. In these cases pilot project managers sees that company should start some of the project actions well in advance in order to reduce project critical path at the end of the project. Many time actual project has started so late stage that project's critical path are the same as the whole project schedule. Then project management does not have any room for any changes during the project. But if the some of the project actions would be done as soon as customer need is recognized, for example project engineering and project documentation could be done in advance, when the workload is smaller, then these resources can be used for project other actions, if possible. Or then they could perform for another project which have tight schedule. This idea is mentioned by Interviewee A below:

With proper planning companies can reduce challenges with resources.
Data 2: Interviewee A

If project actions are started in advance then the scheduling for the resources is easier at the end of the project. Project has more room for unexpected changes. Now days as several companies are working in the matrix organizations. This means that resources are located in different department as project managers are located. Then project managers need to reserve and borrow needed resources from these departments. With anticipation project manager would have more options for scheduling critical resources. Smaller projects with are operating with smaller budgets have small window when resources are needed and then these projects cannot keep these resources too long either. This fine adjustment is in key role for scheduling of the project resources. And this fine adjustment need co-operation with company's other department as well with other company's projects and operations which are using these same resources. This idea is highlighted by Interviewee B below:

Prioritizing and fine adjustment is needed when projects do not have enough resources to manage their critical path.
Data 2: Interviewee B

In order to manage better critical resources companies need to recognize different type of projects and their priority. Companies need to prioritize more effectively their projects and after that locate resource accordingly. Not all the project are not critical ones. Not even all the customer delivery projects. Some might have tight penalty clauses on the contract, but in the other hand some the customer delivery projects can be negotiated to delivered later. Then same resources can do internal development or other internal project, some project testing, project commissioning work at site or resources can perform service work at customer premises. These different type of resource needs need to clarify at the company high level enough to get clear rules for using of the resources when these are very critical.

5.3 Proposal Draft

Initial proposal for this study is drafted from the improvement ideas gathered from the Data 2 and combined them with Current State Analysis findings and with conceptual framework built from the best practices from the literature. Figure 15 shows how these various data sources were used to build the initial proposal.

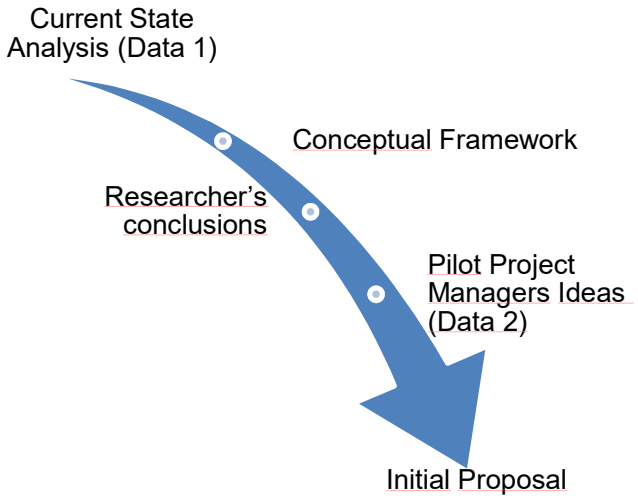

Figure 15: Process of Building Initial Proposal

5.3.1 Initial Proposal for Knowledge Management

The current customer delivery project processes were analysed from the project manager perspective. The analysis revealed two obvious weaknesses at customer delivery project knowledge management. These biggest weaknesses were unclear project scope and inadequate project data. The initial proposal were made combining the analysis of the Current State Analysis (Data 1), best practices from the literature, researcher's own reflections and improvement ideas from the Data 2.

To solve the unclear project scope at customer delivery projects companies need to reduce leaking of the knowledge and due to that rework to find the missing and lost data. As in sales phase someone has find out all the needed information to produce the detailed quotation to the customer, this data should be transferred to project manager when project start. If data is not transferred completely, project team need to find out this data

again from the customer or from different internal or external stakeholders. This will take valuable time away from the customer delivery projects. And in worst case if project team are looking for the data from the incorrect sources, chance of the misunderstanding and unclear project scope increases again. Lack of data transfer might be due to several reasons but most common ones might be that employees are not familiar with the knowledge management initiatives or employees are suffering lack of trust which is causing a knowledge-hoarding mentality. Notwithstanding the reason why the data transfer does not work properly between the sales department and project department, project manager together with the project team need to find out a lot of data which should be clarified and transferred before the project start. Companies need to ensure that project after project sales material including all the sort out data will be transferred to projects.

Referring this leaking of knowledge combining the improvement idea from the data 2 companies need to include document to hand over phase from sales to project, which would prevent the knowledge leaking. This document will act as data check list so, even in that point, unimportant information will be concerned as other data. This list should include all needed information topics what project manager need to receive before the project can be started, and final plans and scheduling can be finalized. With one page document sales can easily show that all needed document related to project scope is available and delivered to project manager.

Data check list should include information if data has been hand over to project manager and if it is not, there should be marking where the data can be found. At the same time this list can be schedule for the handover meeting. List should be light to use so it will not add unreasonable effort to any stakeholder. If users experience that list is too complicated to use or it will take too much time from other activities, employees will not use the list even if they would feel that it would help in some part of the work. With correct use of this list this will support the all project stakeholders to clarify all the needed data and also to transfer it to all the correct stakeholders at proper time of the customer delivery project.

With this simple data check list project team can be sure that sales department has transfer all the data what is concerned to the project scope of delivery. If sales team is using this list effectively they cannot do any shortcuts while preparing the sales and sales related documents. Data check list will oblige sales to follow all the documentation phase same way in every project. Also this list would set certain and continuous practices to

transfer the project sales phase data to project manager and to project team members. When sales person or sales team are doing their work they can also use the list as a backup for their actions. They can easily put marking to the list when some part of the documents or crucial data has been acquired and where the data has been stored. Then there is not any misunderstandings inside the sales department. With this data check list sales person do not have trust only to their memory. As sales persons are working with multiple cases with multiple customers, sales persons cannot remember all by their hearts. If companies want to be effective and cost efficiency they need to process their sales data every time with same methods to gain best possible advantage to their business. These coherent working methods will support companies to survive and grow. Now days knowledge is seen as one of the company assets and it need to be treated that way also. Currently high rate of project failures are caused by insufficient knowledge management and knowledge transfer.

All used documents and tools are as good as the data placed there. All stakeholders need to use this data check list properly or it will not give any benefit to the company or to the project. As mentioned above this list does not only support the project manager and the project team members, but after the list is properly fulfilled and stored as agreed in the project files, it can help other company stakeholders to see the project scope. This list will increase the transparency inside the whole company as then the available project scope and other project scope related documents are available to stakeholders who need to access to them.

Data check list will increase the transparency, decrease the need of the individual person personal memory capacity and will do the data transfer in each project similar. This list will decrease of possible knowledge leaking as all the key knowledge and data can be put to this particular check list. As this study do not have any specific case company and thesis focuses on project management on technical customer delivery projects in B2B contexts, thesis cannot provide exact list what companies can use in order to solve unclear projects scope issues regarding the insufficient knowledge transfer. Companies need to develop the company and product specific data check list which support the particular company business. Table 18 below gathers most important topic what this list should include and companies need to develop these point to support better their available sales documents.

Table 18: Improvement Ideas for Unclear Project Scope

Suggested points for Data Check List
• **Agreed Scope of Delivery**
• **Customer Details**
• **Project Prizing Details**
• **Project Budget**
• **Project Schedule**
• **Site Details (Especially if products need to connect to existing system)**
• **Customer Contact Details**
• **Agreed Subcontracting Quotations, Documents and Contact Details**
• **Other Project Related Data**

These points are not listed in any specific order and companies can arrange point's suitable order for particular case.

Another challenge regarding the knowledge management in this study was inadequate project data. This is a crucial problem at companies and especially in projects if available data is not correct. Or even that project team members doubts that data might be incorrect. Then they need use the valuable project delivery time to clarify the available data and its veracity. If project team members has faced several time inadequate data regarding the ongoing project they will not trust the available data in future either. These kind of cases if project delivery has been budgeted and scheduled so that all the needed data is available already in the company systems, project team will have serious problems. Biggest problems are that schedule does not time for data clarification or budget does not have money to this clarification.

Inadequate data might lead project team work to wrong direction and this direction team will produce incorrect products for the project scope of delivery. Correct data is the most important factor for companies in the project deliveries. Companies are lacking to handle their knowledge assets and it is causing the leaking of the knowledge problem. First the knowledge has been created, it need to be transferred effectively and after that knowledge need to be treated so that it can be reused if needed without any delays or possibility of misunderstanding. Companies should gain the knowledge from the previous projects and use this knowledge in for next projects. Seed of the learning or

knowledge flows all around the project. These pieces of the knowledge need to be understood in order to knowledge can be transferred forward.

To improve the project data quality and correctness companies need to improve their commitment to the knowledge management. Leaking of the knowledge and rework due to that is not acceptable way of working in short response time project-based organizations. If the whole company is commitment to knowledge management and that project data is always correct, no one need to do rework regarding the project data. One of the improvement area for the companies is that they need to along all the employees engage and commit employees more to project targets and quality. This means also management level of the companies. Management has very often high interest on knowledge management issues, but too often when problems occurs, management commitment to knowledge management project is withdrawn. In these kind of cases the whole previous for the knowledge management work will be useless. Another issues is that companies do not transfer data as effectively that they could. Employees do not always understand the present data or the reason why it need to be transferred to another stakeholders. People are sometimes suffering the trust inside the company or the project and that is causing lack of data transfer or even knowledge-hoarding mentality.

These challenges are all caused due to employees' lack of commitment to projects. These can be easily improved to a better level. If employees are engaged to the projects from start to the end of the project, these employees will be more committed to the project and to the project goals, especially regarding the data management issues. Data management challenges will remain project to project if data is not stored and transferred properly. Company management level need to be committed to projects knowledge management, so they will provide correct guidelines and processes for projects. These guidelines need to steer the data management to correct direction. If company management level does not follow agreed guidelines or believe on them, there is a high risk that no one on employee level will follow them either. Also projects need to have scheduled and budgeted for data management. If projects does not have money or resources to finalize project documentation after installation, those changes will not be updated to company systems. Information regarding possible updates on the site are only on couple site personnel possession.

When project team members are engaged to the project from the start they feel that they actually are part of the team and part of the project. All the employees who will participate

to the project, even a small part of it, should be invited to project kick-off meeting. In this meeting project members could meet each other's and after that communication between team members should be easier and then data transfer between project team members should be in higher level. When employee feels that he/she is equal member of the team, employee efforts for the project will be higher also. If employees are asked to do small duties middle of the project without any proper familiarization or without knowing other project team, this worker hardly transfer all available data to other members or to other stakeholders.

To improve project data companies need to improve employees' commitment all the way from the management to the employee level. Committed employees are working towards the company and projects goals and they will follow the company processes. Company processes should support projects and project team members work during the project data gathering and recording. All employees need to also understand the data and the meaning of the data, so they can effectively use it and especially transfer it to other members. If employees are familiar with the company knowledge management initiatives, data transfer has much bigger change to succeed. Company management level should build atmosphere where all the employees are motivated to update the project data when it is changed, especially when closing the project.

Companies need to build positive atmosphere for data management and encourage employees to store all the available data in proper way and also transfer it effectively always when needed. Company management need to lead the company by example and they need to transfer the data strongly and they need to keep employees aware all the time why data need to be transferred and stored according the used processes.

Table 19: Improvement Ideas for Inadequate Project Data

Improvement Areas for Inadequate Project Data
• **Engage and Commit Whole Company to Projects**
• **Make Sure That All the Employees Are Aware of Knowledge Management Reason and Initiatives**
• **Motivate Employees to Transfer the Data Effectively**

Above are shown in Table 19 best improvement areas for the inadequate project data.

5.3.2 Initial Proposal for Use of the Critical Resources

Companies which are working in project-based business are struggling with the resources challenges. Project schedules changes all the time and this causes challenges to schedule the needed resources with needed projects and possible other stakeholders. Companies are working now days largely in matrix organizations and needed resources are located in different department as project manager are. Project manager needed to struggle needed resources with other projects and also with other company activities what these specialist are supporting. Changing project schedules and urgent service needs are affecting that company specialist schedules might change in very short notice. This will cause problems if project member are taken away to work with another project or duty. With proper communication project might survive but it will always affect to project success.

Employees who are working at projects critical path are most critical workers through the eyes of the project. If these team members are inhibited to work with assigned project, critical path actions will be delayed. If critical path actions are not finalized at all, all other project activities will also stop eventually. To avoid this kind of situations companies need to have strong communication over the departments. If resources are relocated due to any kind of emergency, all related stakeholders need to be informed. Critical path workers schedules are the most important schedules at the projects. If critical path fails, then the whole project fails.

Companies need to improve the projects activities in the critical path and same time the use of the critical resources, who are very often doing these critical path duties. Other project activities do not get attention as critical path does, as small delay in other activities does not jeopardize whole project schedule. Easiest way to improve critical path for companies, is to start projects earlier than last possible date. If companies could start projects earlier, so then the schedule would not be same thing as the critical path. Then there would be more room for resources changes and possible delays. If project would have more time than the critical path, project manager can update and fix the project schedule accordingly in order to keep all the activities inside the final schedule. This anticipating on the projects could give more time to critical phases on project. If the company recognize customer needs and sales department and customer has common agreement about the scope. Customer will not send the order as he does not need the products yet. The company should get the order from the customer example from the

engineering and documentation. Company could do those well in advance at the best possible time for them, without any hurry or rush. Customer could send the another order from the actual products later and then company has done several part of the project already and then rest of the project do not have so much activities left anymore. Then critical path will be shorter and project is not so critical of availability of this small bunch of specialist.

Project should do effective planning over the departments if critical resources are detected. With proper planning well in advance with other stakeholders who know already that they need this resource also and with stakeholders who might need these resources in short notice. All the projects which use resources that have more planned duties than they have time to spend with them should plan the use of these critical resources together well in advance to solve every project needs and demands.

Prioritizing of ongoing projects and other company activities what critical resources need to perform is one way to ensure that all the key operations will be done as planned. As all the actions and projects what company is doing do not have high priority. With prioritizing critical resources activities critical duties will be done on time. Company internal development projects or other internal projects are not often that critical that those projects should require presence of these critical resources. Companies need to learn to recognize their activities priorities and then distribute the specialist accordingly to projects.

Project can reduce critical path on projects by improving three points: (1) Anticipate more on projects, (2) Do better planning over the company's different departments, and (3) Prioritize more company actions and use critical resources on most critical projects. Use of the critical resources are not any easy and fast way to fix it. Best way to improve individual companies' use of the critical resources is that companies need work inside the company to improve the possibilities of anticipating on projects sale and project phases. Then companies could reduce the critical path time and then possible risk on these critical phases when there is more to spend. This combining together with proper planning over the different departments, critical resources can be located to correct places at all the time. After this companies need to prioritize their projects in order to clarify the most important customer delivery projects will always have needed resource during the project. Below Table 20 shows the key improvement points for use of the critical resources.

Table 20: Improvement Ideas for Use of the Critical Resources

Improvement Points for Use of the Critical Resource
• **Anticipate**
• **Proper Planning**
• **Prioritizing**

5.3.3 Summary of the Initial Proposal

For unclear project scope proposal is simple list where all needed data is listed for ensuring the project scope information from sales department to project management. For inadequate project data companies and projects need engage employees to project and its targets. For use of the critical resources proposal is that resources need to be prioritized and planned better in order to do more anticipating and reduce the critical paths in projects. Table 21 below summarizes initial proposals for all selected weaknesses.

Table 21: Initial Proposal

Initial Proposal	
Unclear Project Scope	- Data Check List ○ including all the company/ products specific data what are crucial for project management
Inadequate Project Data	- Engaging employees to projects from the start - Make sure that all employees are aware of the reasons of data transfer and understand the data - Motivate employees to transfer the data effectively
Use of the Critical Resource	- Anticipate more on projects - Do proper planning over the department to ensure that critical resources are located always to correct places - Prioritize projects so critical resources are located to correct projects

Next section of the thesis present the validation of the initial proposal and after that final proposal to improve the customer delivery project process and project management. First, next section present the used validation process. Secondly, next section shows the improvement ideas for the initial proposal to develop the final proposal. Finally, next section of the thesis present the final proposal in order to improve the current project management of customer delivery projects.

6 Validation of the Proposal

This section presents the results from the validation of the initial proposal for customer delivery projects project management. First, the initial proposal validation process is discussed. Second, development ideas for the validation are introduced. Finally, the section presents the final proposal for the selected improvement areas for the customer delivery projects project management.

6.1 Validation Process

Initial proposal for this thesis were built on combination of different data sources. These sources for initial proposal has been Current State Analysis (Data 1), conceptual framework which were developed based on best practice from the found weaknesses literature, researcher's own reflection of studied field and improvement ideas from the selected pilot project managers (Data 2). Initial proposal were presented to test person in order to receive feedback from the initial proposal to produce the final proposal. Test person has been selected for the validation phase due the person strong knowledge of the project management and field of the proposed improvements. Data 3 was collected during the face-to-face discussion with the test person.

During the Data 3 session the study and its findings were presented together with the initial proposal to the test person in order to receive as good as possible feedback from the initial proposal. Test person has long history with customer delivery projects and its project management. This is the reason why person has been selected to give feedback for this stage of study. Due the test person working history and therefore test person knowledge of these issues are very relevant for the study, test person feedback is very accurate and detailed. During the Data 3 session discussion regarding the initial proposal was very lively and initial proposals were seen usefully to improve selected weaknesses. Test person give to the study a lot of usefully feedback to improve the presented initial proposals.

6.2 Development Ideas Based on Validation

During the Data 3 session study received valuable feedback in order to improve the initial proposals. Regarding the unclear project scope and its proposal to develop a individual company product specific data check list. This data check list will be fulfilled by the company sales persons in order to be sure that all the needed data will be transferred to project manager and to the project team. Test person see that this list will be usefully and necessary to ensure the correct information from sales to projects. Test person did not have any special amendments for the content of the data check list as the study does not have specific case company but test agrees that suggested points for the data check list are valid and need for this list.

Test person development suggestions for the data check list was that this list need to be used correctly in order to get the best result from it. So this data check list need to be used from the first sales contact who start negations with the customer. This first contact might be somewhere else than the office where project team and local sales team is located. If local sales team is the first who fulfill the list then valuable and crucial information might leak out of the project team. This data check list need to be the first contact sales person tool.

The test person sees that this data check list need include also information about possible interfaces and also if project has a lot of detailed specification from the customer or from the third party. Sales team need to put the list if project has some special interfaces what project will do normally differently. Data check list need have own spots for the possible specification which is not from the company itself, and if this specification has impact on project engineering or the manufacturing. Data check list should show clearly what kind specification and how many of them are part of the project scope. Also data check list need to show who responsibility at the company is go through them and transfer the necessary data to other project stakeholders. Normally either sales person need to clarify the specs as usually all customer demands has time or cost effects. If for some reason sales person has gone through these documents and it has affect to project this should be informed to this data check list in order to ensure the correct data transfer.

Regarding the inadequate project data test person agrees that whole project should be present at the project kick-off meeting. Even those person who have only small task at the end of the project. This action will unite all the individual persons to the project team.

After all the members has met each other communication will be easier between the team members. In this meeting also project manager can introduce the project and its scope. When all the members are present all the stakeholders in different phases of the project can understand the whole project and also previous and next phases of individual member task. Then members will know what data they should receive and what data they should transfer to forward. All the team members need to understand the whole project chain and the data chain inside the project. The kick-off meeting where all the members are present can clarify these issues.

Company and project need to have atmosphere where all the project members are aware that all the persons work is important. Small things can grow to major problems if there are not treated correctly. Also project data ownership need to clear and it need to be in one person possession at the all the time to ensure that data will be transferred, updated and stored correctly and on time.

For the initial proposal of the use of the critical resources test person sees also that anticipating is the key for solving the problems in lack of resources. Improvement idea to initial proposal test person mentioned that resources need to have clear ownership so all the particular resources are reserved from the one department and from that department head. Now day's companies are working in increasing amounts in matrix organizations and in these matrix organizations project manager is located different department as the resources. Also all the different resources has their own department so all the resources are coming to the project from different departments. Then easily these resource request might go to wrong persons and critical resources are taken from another duties with the wrong way and this might cause to another project crucial problems. When all the resources, and their planning, is addressed to one person and all the resources booking and requests need to go through the same process then the planning of the recourses would be easier and then resources usage would be more transparency.

6.3 Final Proposal

Final proposal have been divided to sections in the same way as initial proposal was divided. Final proposal included proposal to improved knowledge management and to improved use of the critical resources. Knowledge management has two different points: (1) Unclear Project Scope and (2) Inadequate Project Data. Use of the critical resources do not have any subsections.

6.3.1 Final Proposal for Knowledge Management

Final proposal for the knowledge management and to unclear project scope is the proposed data check list. This data check list need to include points as mentioned on Table 18. These suggested points are all relevant for the project-based companies which are working with customer deliveries projects. Basic points are relevant for all the companies but detailed points companies need to develop according their products and key information concerning these products. This data check list is toll for the companies to ensure that all the information from sales to project will be transferred. Sales person responsibility is to acquire the data, fulfil this data check list and then present it to member of the project management. This list will improve the transparency of the project scope and general data, when sales are managed every project data same way and every project data is transferred same way.

Key thing regarding this data check list is that it need to be used correctly and in every project. This data check list tool for the company whole sales employees and that is why it need to be used in every sales location. The very first company sales contact need to start using the data check list and it need to transfer this list inside the company sales functions before it will be transferred to project management. All the missing data what is missing from the list and it is not transferred to project management causes rework for the project team.

Final proposal for the inadequate project data is that companies need to update their project kick-off mode of operations so that it is mandatory to have every member of the forthcoming customer delivery project. Test person agrees also all the mentioned points on initial proposal are valid when improving the inadequate project data. As these initial proposal points are more intangible actions during the project, but still these are very important. The final proposal is to improve the project kick-off meeting activities, and

especially the participants of the project starting meeting. Project mode of operations should include that all the project members need to participate to this meeting. During this meeting team members can meet each other's. At the same time when project scope and timeline is introduced, the team will received understanding of the project data flow and what kind of information each member should receive and what they should provide to next phase of the project. When project flow is clear team members should have clear picture of the project data and reason why it should be transferred. Project manager can also use some of the time to motivate the project team members to project and its data transfer and same time each individual team members will understand their importance of the project. If the data transfer link is broken then the data will not either move forward.

This meeting can be used to improve all the mentioned points in initial proposal. The actual meeting will engage team members more to project and to other team members. And when all the team members are present, transferred data can be explained to the team members and ensure that all are aware why data need to transfer.

6.3.2 Final Proposal for Use of the Critical Resources

Final proposal for the resource management and use of the critical resources is that companies need to have clear ownership of the resources which are utilized to all the companies' customer delivery projects and also to other company activities. When resources and especially critical resources are managed by one location, companies can do more detailed resource planning and at the same time better anticipating. When one organization will receive all the resource requests, this location can plan resource to correct locations all the time. Then there should not be any unexpected surprises to resource management or need of the resources. When resources are managed by one location, company can do the anticipating if project schedules and resources workload enables this kind of actions. At the same time projects can be prioritized and resources can be relocated accordingly.

Companies need to clearly determine the resource ownership in order to improve the use of the critical resources. When resources are located from one place companies can ensure that project resources cannot be removed to another place at the middle of the critical event. Or at least then project is clearly informed and grounded why resources are removed. Resource ownership department can do also anticipating and prioritizing as much is possible during the resource planning. Key thing to improve the use of the

critical resources is that resources need to be scheduled from the one location. This will reduce the misunderstanding of resource scheduling and locating.

6.3.3 Summary of the Final Proposal

After presenting the initial proposal and its background to the test person I received valuable feedback during the validation session. With these feedback, comments and improvement ideas final proposal for this Thesis were developed.

According this feedback final proposal for the unclear project scope data check list remains as in initial proposal phase. Only change was that companies need to start using that from first contact to customer in order to get all the project related data into this data checklist. After the feedback from the initial proposal to the inadequate project data all proposed development ideas are combined in point in final proposal. Companies need to have mode of operation, or even part of their processes, that projects kick-off meeting is mandatory for all project members. During this meeting team members can be motivated to the project and ensured that all are aware of the project stages and data what need to be transferred between all stakeholders. For use of the critical resources final proposal was updated according the feedback from the validation session. In this point also initial proposal points are combined to one point in final proposal in order to reach the same affect with one concrete action. All stakeholders should plan better and anticipate whenever it is possible, but resource ownership is in one location, this location can do all these actions better when they have best visibility for the resource request and current workload.

Below Table 22 summarizes final proposals for all selected weaknesses.

Table 22: Final Proposal

Final Proposal	

Unclear Project Scope	- Data Check List
	  o including all the company/ products specific data what are crucial for project management
	  o Need to use from the company sales spearhead

Inadequate Project Data	- Companies need to improve the kick-off meeting processes. All the project members need to participate to this meeting in order to increase the unity of the project. - During the meeting Project Manager can engage the members to project, be sure that everyone are aware of the reason of data transfer and motivate members to transfer the data effectively
Use of the Critical Resource	- Companies need to have only one resource owner which can do all the resource planning. - When resource are planned from one location, all resource requests and actual workload is more transparency. - Resource planning can do with better anticipating when all need are visible. With one location can prioritize better and more effective way to available resources.

Next section summarizes the thesis. Secondly, next section also evaluates the credibility of the data and used research methods in the thesis. Thirdly, next section compares the thesis outcome to the objective set at the beginning. Next section is the last section of this Thesis.

7 Discussion and Conclusions

This section presents the main results of the study and proposes possible next steps for implementing proposed improvements. It also evaluates the objectives and outcome of the study. Finally, is discusses the study reliability and validity and its research process. This section is the last section of this thesis.

7.1 Summary of the Findings

The focus of this study was to improve the project management of customer delivery projects. The study was focused on customer delivery projects on companies who are acting in Southern Finland and provide technical products and/or solutions to customers in B2B context. The objective was to develop a concept for improved project management in customer delivery projects.

Customer delivery projects are facing different kind of challenges during their life-cycle. Study is not trying to improve the whole project management chain in these projects but study first clarifies the customer delivery project process overview and its strengths and weaknesses. In this study project is understood from the customer purchase order to hand over the project to customer. After the process and challenges are clarified study focuses few selected areas in order to providing improvement concept for them. This study is not focusing any particular company or product but study is focusing on customer delivery projects project management more generally. Even small improvement on these projects project management can provide great benefits to the particular company.

The research approach in this study was qualitative research. The research design of the thesis, presented in Figure 1, structures the thesis phases. This research was conducted by interviewing selected project management stakeholders in order to receive their opinion on the current process as well as on current challenges on this process. For current state analysis 10 professionals were selected and interviewed face-to-face. These findings from the current state analysis are presented in Section 3. Based on the current state analysis, a lot of challenges were found. After the closer analysis of the current process three weaknesses were selected in this study. Selected weaknesses can be improved without any major changes and then companies can improve their customer delivery projects efficiency.

The conceptual framework of the thesis collects the building blocks for the initial proposal to improve the selected weaknesses. The conceptual framework is divided in three sections: (1) Project management, (2) Knowledge Management, and (3) Use of Critical Resources. The project management section lays foundation to project management activities. Knowledge management describes the reasons and challenges regarding the knowledge transfer in the projects and inside the whole company. Use of the critical resources discusses who projects critical path can be treated and how critical events could be avoided.

Next part of the thesis combines current state analysis, conceptual framework, researcher's conclusions and pilot projects managers improving ideas to initial proposal, as illustrated in Figure 15. Initial proposal was presented to the selected test person in order to give valuable feedback from the proposal. This feedback was used to improve the initial proposal to final proposal. Final proposal includes the initial proposals partially with updates according the final feedback. Final proposal suggested new tool for companies in the sales phase and also improvements for the company customer delivery project process in order to engage the people more to the projects with small but important actions during the project life-cycle.

During the thesis the prevailing process of customer delivery was defined and weaknesses and strengths of this process was identified. With methods mentioned above Thesis presents development ideas to selected weaknesses in order to improve project management on customer delivery projects. These development proposals are easy to do in every company, but still all of these proposals can provide improved project management to project-based companies. All these development proposals can be implemented during the normal operations and these proposals need only changes in companies' mode of operations, or perhaps in their project processes to be sure that proposals will be used in future. With these development proposals companies can have more transparency data and resource workload, which helps companies to manage possible unexpected events during the customer delivery projects.

Proposed development ideas in the Thesis are focusing on a smaller challenges, which are according the interviewees, occurring often in customer delivery projects. All of the selected weaknesses are occurring at the beginning of the project life-cycle and therefore

these are affecting greatly to project success. These development ideas can help projects when they have started to ensure the right direction to them. As the project data and project resources are critical points for the projects and for the project's success.

7.2 Managerial Implications

This study includes several managerial implications for the companies and their project management departments in order to obtain the proposed improvements. Firstly, companies need to develop together with sales department, project department and company management data check list which is suitable for particular company business and products. Companies need to find correct things to this data check list from the suggested points to ensure that all the sales data will be transferred to project department. Then companies need to add this data check list to their processes to ensure that the first company sales contact will use this list and transfer the list and the data forward inside the company when new departments and stakeholders are joining the upcoming customer delivery project. Company management need to develop the suitable data check list with proper stakeholders and add it to company processes so it will used from the first sales contact.

Secondly, companies need improve their processes and working methods regarding the project kick-off meeting. Companies need to carry out this project starting meeting mandatory to all employees who will participate to the project, even smaller part in the middle of the project. Companies, and especially project manager, need to invite all the selected team members to this kick-off meeting. Project managers need to automatically invite all team members and stakeholders, and follow that everyone is coming to this meeting so proper data transfer atmosphere can be created to the particular project. Company management need to make sure that project process updated and according this change project managers will always invite all team members and stakeholders to this project starting meeting.

Thirdly, companies need to improve the resources ownership. Resource ownership need to clear and this ownership cannot be in multiple locations. When particular resources are managed from one source, then this source will receive all the request from the resources. This will increase the transparency and resources can be planned even more effectively. Company management need to update resource management guidelines

and communicate it to employees that resource request will be handled from one location only.

7.3 Evaluation of the Thesis

This section of the study evaluates the objectives outcome set at the beginning of the thesis. This sections also discusses the study reliability and validity and the study research process.

7.3.1 Outcome vs Objective

The objective of this study was to develop a list of recommendations for improved project management of customer delivery projects in B2B contexts. The current state analysis section of the thesis illustrates the current customer delivery projects process and also present current strengths and challenges of this process. Current process has been built according the interviewees feedback and comments. After the process has been built, founded challenges were presented with the same structure as the process. The current state analysis phase found several strengths and weaknesses and study select the most common ones. These selected weaknesses were also the ones which can be developed in order to improve the current customer delivery project process.

The conceptual framework of the thesis concentrates on the selected weaknesses and will provide best practices to improve the current status. The conceptual framework provides support from the literature to knowledge management and resource management challenges. The conceptual framework offers the guidelines to proposal building. The proposed proposal follows the same structure as the current state analysis findings. The conceptual framework emphasizes the role of the whole project team and whole company role to improve these founded challenges. However, the actual change will start from the company management level and after that from the each project acting project manager. The proposal building focuses to small changes which still can provide great assistance to existing challenges.

Proposed data check list when used correctly will give transparency to projects and reduce unclear data on project scope. With this data check list project data will be transferred to project management always in the same way and change of misunderstanding will also reduce as all the key information has stored in written format. New project kick-

off meeting procedures will improve the particular project team spirit and it will engage team members better to the project. During the meeting all the team members receive information regarding the data forms are they will be aware regarding the reason why the data need to be transferred. Clear resource ownership will increase possibility to increase the advance planning of the resource and also it will prevent double booking of the critical resources when one location will manage the resource planning.

The study purpose was not improve the whole project management chain in customer delivery projects, but study objective was to clarify the customer delivery project process and its strengths and weaknesses and after selection of weaknesses develop improving concept for them. To conclude, the outcome which were set as targets for the study, develop a concept for improved customer delivery project management, were produced, so therefore the objective can be considered to be achieved.

7.3.2 Reliability and Validity

This section discusses the reliability and validity of the thesis achieved results. According the Section 2.3, numerous actions were taken to ensure the reliability and validity of this study.

Firstly, data for this study were collected great number of face-to-face interviewees, discussions and observations in different stage of the thesis. Data collection for the whole study was conducted in 3 rounds. These interviewee data was combined to researchers own reflection to handled topic. Critical self-awareness was used to evaluate the output as the researcher was closely involved in the studies themes. To avoid researcher's personal bias, the key stakeholders and other participants were involved several times to the study in order to collect their feedback and ideas. Each data collection and analysis of the data was presented transparently and reported in detail in field notes. During the data collection interviews, to all interviewees were presented same questions in order to receive transparency feedback from each participants. Although, all the questions had possibility for the interviewee to give their personal as detailed reply as possible. This helps to build the correct process for current customer delivery projects and identify the locations of the founded weaknesses and strengths.

Secondly, all the participants of this study were representing various different companies in order to receive as wide feedback as possible. All involved participants were working

in project management duties in different technical fields. Due their long working history and knowledge of project management they all had clear picture of their own customer delivery project process and its challenges and strengths.

Thirdly, well-established academic and business literature were chosen to the study to build the conceptual framework for the thesis. This well focused literature provides robust groundings for the thesis conceptual framework. This literature were acquired after the current state analysis of this study was finalized and weaknesses of the current process were identified and three of those were selected to study to find improvement.

Finally, the researcher select the wide amount of interviewees according their working history and their expertise's so they could support this study with their knowledge. Thus, the researcher's level of knowledge about the researched topic could be considered sufficient to ensure credibility in the research. Founded weaknesses were familiar also to the researcher as well the general process of the customer delivery projects. It also helped to build the initial proposal and handle all the data and ideas from the interviewees. Mentioned issues were familiar to the researcher due to the almost decade of experience from the customer delivery projects project management. This can also be considered as an improvement to the objectiveness of this study.

7.4 Closing Words

As the competition in most of the business and industries is getting tougher and tougher, it is important for companies to continuously improve their performance to be able to manage against their competitors. As this study has shown, project management and its processes are in key role in companies' success and different project-based companies in different industries are suffering same kind of challenges in their customer delivery project processes. This study provides list of recommendation to improve customer delivery project processes and improving just one, company can already achieve positive results. But when all the recommended issues are considered together companies' can have better results and can improve their project management in customer delivery projects.

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Data 1 Questions

Current State Analysis Research Interview (Discussion)

TOPIC: _Improving Project Management for Customer Delivery Projects in B2B Contexts_____

Information about the informant (Interview 1)

Table 1

Details	
Name (code) of the informant	
Position in the case company	
Date of the interview	
Duration of the interview	
Document	Field notes

Field notes (Interview 1)

Table 2

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
1	**Starting point: the interviewee describes his/her position and duties regarding the topic**	*What is your position at the company?* *How have you been involved in your project management and its processes?*	
2	**The interviewee describes his / her experience regarding the topic**	*Can you describe as detailed as possible the project management process what you are using currently?*	
3	**Identify strengths / weaknesses**	*What are your key concerns and problems regarding the project management processes or the daily work with project management?*	
4	**Analysis**	*In which areas do you think there is space for improvement? In what way? How could that be done?*	

Current State Analysis Research Interview (Discussion)

TOPIC: _Improving Project Management for Customer Delivery Projects in B2B Contexts_____

Information about the informant (Interview 1)

Table 1

Details	
Name (code) of the informant	C
Position in the case company	Project Manager
Date of the interview	11.02.2016
Duration of the interview	75min
Document	Field notes

Field notes (Interview 1)

Table 2

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
1	**Starting point: the interviewee describes his/her position and duties regarding the topic**	*What is your position at the company?* *How have you been involved in your project management and its processes?*	The interviewee position is project manager. The project manager duties are to handle the company's customer delivery projects.
2	**The interviewee describes his / her experience regarding the topic**	*Can you describe as detailed as possible the project management process what you are using currently?*	The interviewee project start in the kick-off meeting which is held by the sales manager. Project manager support also the sales team during the sales phase to ensure that the budget and the scope would be as exact as possible. During this kick-off meeting sales manager will go through the particular sales case and the scope of delivery. After this meeting project is in project manager responsibility. In addition to sales manager and project manager all the necessary project team will participate to this meeting as the most of the team has been agreed before the meeting. If needed rest of the project team will agreed at the meeting depending on the scope of the project. After the kick-off meeting interviewee starts to handle the design phase and make sure that the project team knows what they need to do and what the schedule is. During this design phase project manager need to communicate closely with the customer as additional information from the customer is needed to finalize the exact design. When the design is ready project manager need to open the individual codes for the each delivered equipment if particular part has not been delivered before. These internal codes has a certain process which need to follow. When the codes are ready, all the materials can be ordered through the company ERP system and factory can start the manufacturing. During the manufacturing project manager need to update all the necessary customer document with the project team. Depending on the scope or especially depending on the customer as some customers as own request regarding the documentation. After manufacturing is ready project manager need to make sure

			that all the materials are shipped to the customer according agreed schedule. After that starts installation on site and if the scope includes installation project manager need to handle that also with the installation team. If installation is not part of the scope, customer will handle it themselves and project manager need follow that so he knows when installation are done. During the installation project manager might need to send some more material due to different reason. This also might generate additional sales what project manager will coordinate with needed persons. After installation delivered products need to be commissioned. Project manager will find out the available commissioning engineer internally and then agree the commissioning schedule with the customer. Along this all project manager need to discuss closely with third party authors and do the needed updates according their comments. When installation are done and system is commissioned project manager need to make sure that project team update the as-built drawing according all the updates what are done on the site. Project manager also act as a contact person for the customer during the warranty period and handles possible warranty claims with the warranty engineer. To support the project managers company has tools for the scheduling the projects and company has also own toll for the project follow up, controlling and reporting.
3	**Identify strengths / weaknesses**	***What are your key concerns and problems regarding the project management processes or the daily work with project management?***	The interviewee sees that the main concern regarding the project management is the projects tight schedules. When schedules are agreed at the first place already to very tight there is not room for any kind of error or mistake. Second concern for the interviewee is the factory and warehouse delays. These two stakeholders' causes pretty often problems and they are at the late part of the delivery change, these delays often affect delays for the delivery to the end customer. The interviewee sees also that new internal processes need more time before those are working smoothly and do not need so much time anymore. Project documentation causes sometimes problems to project managers. If documentation needs something extra it will take more project manager time and this time is always away from other duties. Company tools are not always completely suitable for the documentation updates. Also these special manuals are not calculated to the budgets and schedules. Unplanned work always need more time and money than standard documentation. The interviewee sees that also special projects need more resources from the project manager than standard projects. Internal communication is also in concern to the interviewee. E.g. in product data sheets do not always contain latest information, or some information is missing. Internal change management also causes concerns to the interviewee as always internal processes or way of working do not support effective and fast change management. The interviewees that not the all of new tools what company provides are not user friendly and the interviewee sees that it will take more time than should to use these tools. Workload is also one concern to the interviewee. Interviewee has several projects ongoing and workload variates daily depending the projects and the customers. This affect that somedays interviewee sees that he does not have enough time to concentrate all the ongoing issues and some of the issues need to finalize faster than planned.
4	**Analysis**	***In which areas do you think there is space for improvement? In what way? How could that be done?***	One of the improvement area according the interviewee is the documentation generally. This documentation should be generally in better shape. All the latest information has not updated to all the needed documents.

			Second improvement for the interviewee is related to change management. How it should be arranged and how it should be recorded so whole project team and also other people at the company should has easy way to see what are latest revisions and version from the drawings and the products. Third issue for the improvement according the interviewee is the manufacturing. As it causes so often delays easiest way to interviewee to avoid these delays is that interviewee gives delivery deadline to the factory two weeks earlier that it actually is. Interviewee knows that it is not the best solution but it is the easiest for the interviewee. Unfortunately project schedule do not give always this opportunity to have this kind of two buffer inside the project.

Data 2 Questions

Data 2 Interview (Discussion)

TOPIC: _Improving Project Management for Customer Delivery Projects in B2B Contexts_____

Information about the informant (Interview 1)

Table 1

Details	
Name (code) of the informant	
Position in the case company	
Date of the interview	
Duration of the interview	
Document	Field notes

Field notes (Interview 1)

Table 2

	Topic(s) of the interview	FIELD NOTES
1	**Unclear Project Scope**	
2	**Inadequate Project Data**	
3	**Use of the Critical Resources**	