Mats Ekblom

Creating a Process to Improve Continuity in IT Support Services

Helsinki Metropolia University of Applied Sciences

Master's Degree

Industrial Management

Master's Thesis

2 May 2018

Metropolia

When I graduated as a Bachelor of Engineering in Telecommunications nine years ago I swore to myself that I am done with extensive studies. So naturally, here I am now writing the preface of my Master's Thesis. The past year has been very demanding and laborious, but also very interesting, fruitful and rewarding. I have learned many new things and I have had the privilege to meet all the new people in our class. Applying for this program has been one of the best decisions I have made in my life!

Of course, I could not have done this all by myself. First of all, I want to express my gratitude for all the instructors of the Industrial Management Master's Programme in Metropolia University of Applied Sciences for their hard work in teaching us, for which they should get the appreciation they deserve. Special thanks go to Dr James Collins for the guidance on keeping the thesis on the right track. Also, I would like to thank Sonja Holappa for her assistance during the writing clinics. I want to thank Dr Thomas Rohweder, Zinaida Grabovskaia, PhL and Dr Juha Haimala for their guidance and constructive feedback throughout the thesis.

The second group, of which I am grateful for, can be found in the case company. The participation of my colleagues, Team Leads and Directors throughout the thesis was indispensable. Special thanks go to the Director of the Support Services.

Dear classmates, I would like to argue that we have been one of the best, if not the best, classes this Programme has ever seen. That indescribable support I have got from you, all the great discussions and the magnificent atmosphere during the lessons...you made this worth it all!

Last, but definitely not least, I would like to extend my gratitude to my mother and her fiancé, my big brothers Stig and Markus (and his family) as your support meant so much to me. Thank you my closest friends, also.

Mats Ekblom
Helsinki
May 2, 2018

Author Title Number of Pages Date	Mats Ekblom Creating a Process to Improve Continuity in IT Support Services 70 pages + 2 appendices 2 May 2018
Degree	Master of Engineering
Degree Programme	Industrial Management
Instructors	Dr. James Collins, Senior Lecturer Sonja Holappa, M.A., Senior Lecturer

As the Team Leads of the IT case company are encouraging employees to engage in job rotation, the business challenge is that every now and then people are leaving from the First Level Support Team to other units inside the company or even to other companies. This disrupts the continuity of the first level support services. Therefore, the objective of the thesis is to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

The case study method with the qualitative research approach was chosen to carry out this study. The research design included five key stages: the objective, the current state analysis, existing knowledge, building the proposal and validation of the proposal. Data was collected in three stages through interviews and workshops.

As a result of the current state analysis, strengths and weaknesses related to current practices and processes were identified. Based on the findings in the current state analysis, relevant literature was explored to form the conceptual framework of the thesis. The proposal was built based on the findings of the current state analysis and the conceptual framework, and suggestions by informants. Naturally, the proposed suggestions can be fully validated only after they have been tested in action. Therefore, the thesis validation was done based on the gathered feedback from the Directors and Team Leads. The suggestions were presented step-by-step after which the informants had the opportunity to comment and either validate the suggestion or decline it. As a result, all the suggestions were validated to be tested in action.

The outcome of this thesis is a proposal for capturing knowledge and skills from outgoing employees to orientate incoming employees more effectively. If implemented, the business impact is that the continuity in the support services increases as knowledge management, and orientation and learning practices are improved through quality management.

Keywords	Knowledge capturing, knowledge management, orientation, learning, process development, process improvement, process design, IT support services

Contents

Appendices

Appendix 1. Data Collection 1, Informants 1

Appendix 2. Data Collection 1, Informants 2

List of Tables

List of Figures

1 Introduction

As the working practices in the business world are continuously changing to more and more digitized it has become essential to invest in technical equipment and know-how (Dobb, R. et al., 2014). Earlier, companies used to buy all the devices and had to have all the skills required in-house. However, it was not cheap to employ system specialists and to have over-sized technical environments. And what if something broke down or the system administrator left elsewhere, what then? Enter IT service providers with their service-dominant IT outsourcing services in the 1990s and early 2000s. They offer all the expertise and technical solutions needed as service including infrastructures, platforms and software. They make sure that they have the infrastructure needed including necessary backup systems for possible failures and enough skilled system specialists so that service is always available at the highest level possible. As a result, IT outsourcing business has become a multimillion business in Finland and even bigger globally. (TEKES, 2010)

Devices and service offerings between IT companies could be somewhat similar and prices may vary but one of the biggest customer satisfaction factors is the quality of service. More specifically, in IT outsourcing services customer satisfaction comes mostly from system users' satisfaction and the support services play a significant part in that. However, people leaving could have negative effects on continuity if outgoing people take their skills and knowledge with them without the possibility of orientating their replacements properly.

1.1 Business Context

The case company in this study is one of the leading IT business-to-business service providers in Finland. Its turnover is about 70 million euros per year and most of its clients are very well-known to the public.

The organization chart of the case company focused on the Support Services is shown in Figure 1.

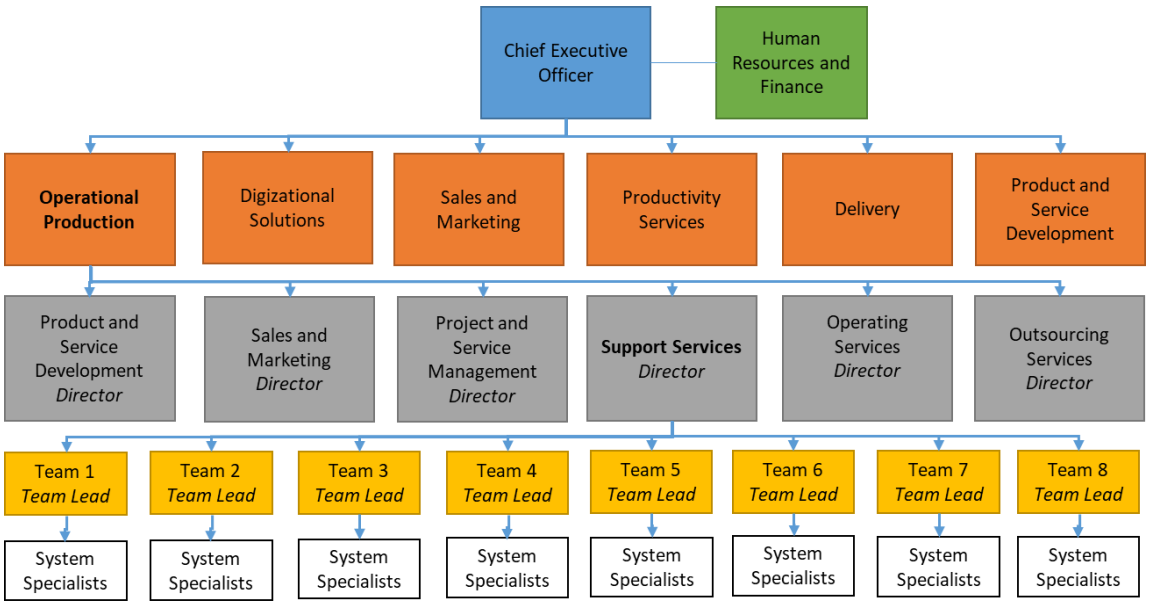

Figure 1. Organization Chart of the Case Company

As seen in Figure 1, the case company provides services such as consulting, project management, architectural services, datacenter and communication services, cloud solutions, IT devices as service and support services. It is a subsidiary company and the IT Business Unit of one of the telecommunications, ICT and online service companies in Finland.

Their head office is in Helsinki and they have a branch office in Tampere. There are more than 400 employees in the company. Most of their customer companies are located in Helsinki Metropolitan Area and some of them have branch offices around Finland.

The Service Desk of the company operates as a single point of contact (SPOC) to the customers and their employees. System Specialists in the On-site Support Team operate at customers' premises only as needed or throughout all the working days regardless of actual need depending on service level agreements. Terminologically, the First Level Support Team consists of those two teams mentioned above. As they are arguably the most visible part of the company from the customers' point of view, it is essentially important to have the possible skills and knowledge in place. Usually skills and knowledge are obtained by education and work experience. Maintaining skills and knowledge in the unit is very important for service continuity and customer satisfaction.

1.2 Business Challenge, Objective and Outcome

As the Team Leads of the case company are encouraging employees to job rotation, **the business challenge** is that every now and then people are leaving from the First Level Support Team to other units inside the company or even to other companies. This causes at least the following three events: (1) a lot of knowledge (including tacit) and skills are lost, (2) the company is forced to spend resources to the recruitment process of the replacement and (3) the company is forced to orientate the replacement properly before this person is ready to work all by themselves All of these three events causes only expenses and disrupts the continuity of the first level support services.

Therefore, the objective of the thesis is to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

The outcome of the thesis is a process for capturing knowledge and skills from outgoing employees to orientate incoming employees more effectively in order to reduce case related expenses and disruptions in continuity.

1.3 Thesis Outline

The rest of the thesis includes six sections. Section two describes the research methods used in this study. Section three includes the current state analysis of information capturing, passing on captured information and recruitment practices in the case company. Section four introduces existing knowledge on knowledge management, learning and orientating, and process development. Building on the findings of the current state analysis and existing knowledge, building on the findings of the current state analysis and existing knowledge, Section 5 describes in detail the proposal for the business challenge in the case company. Section six discusses the validation of the proposal. Finally, Section 7 states the conclusions.

2 Method and Material

This section describes the research approach, data collection and analysis methods used in this Thesis.

2.1 Research Method and Approach

The research method was chosen based on the type of research question posed, the extent of control a researcher has over actual behavioral events and the degree of focus on contemporary as opposed to historical events as suggested by Yin (2009:8) and as shown in Table 1.

Table 1. Relevant Situations for Different Research Methods (Yin 2009: 8).

Method	Form of Research Question	Requires Control of Behavioral Events?	Focuses on Contemporary Events
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival Analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case Study	how, why?	no	yes

This Thesis answers to questions why capturing knowledge and orientation was not working (Section 3) and how it is going to be improved in the future (Sections 6 and 7). Control of behavioral events was not needed and it focuses on contemporary events. As shown in Table 1, for those reasons **case study method was chosen**.

As Creswell (2014: 32) suggests, the research approach is chosen based on the research design, the nature of the research issue being addressed, the researchers' personal experiences, and audiences for the research.

Creswell (2014) explains qualitative research, quantitative research and the distinction between them as follows:

Creswell (2014) describes qualitative research as an approach used to explore and understand social or human problems, and in particular, the meaning individuals or groups ascribe to them. According to Creswell, the research process contains “emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particulars to general themes, and the researcher

making interpretations of the meaning of the data". Characteristically the structure of the final written report is flexible. Qualitative researchers engaging in this form of study tend to honor an inductive style, and center on individual meaning as well as the importance of interpreting the complexity of a situation.

Creswell (2014) describes quantitative research as "an approach for testing objective theories by examining relationship among variables." This method is used, for example, in mathematical studies. The variables are measurable and the numbered data can be analyzed by using statistical practices. Compared to qualitative research, in quantitative research the final written report has more established structure consisting of introduction, literature and theory, methods, results, and discussion. Quantitative researchers engaging in this form of study "have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings".

As Creswell (2014) summarizes, qualitative research and quantitative research are differentiated based on whether words (qualitative) rather than numbers (quantitative) are used, or open-ended questions (qualitative interview questions) rather than closed-ended questions (quantitative hypotheses) are used. The more concrete way to explain the differences of qualitative research and quantitative research is "in the basic philosophical assumptions researchers bring to the study, the types of research strategies used in the research (e.g., quantitative experiments or qualitative case studies), and the specific methods employed in conducting these strategies (e.g., collecting data quantitatively on instruments versus collecting qualitative data through observing a setting).”

Due to the qualitative nature of the business challenge, the objective, the outcome and data used in this study, **qualitative research approach was chosen**. It suits better than the quantitative approach or mixed approach as, for example, this research answers to questions “why” and “how” mainly in text format rather than numerically.

2.2 Research Design

The research design is shown in Figure 1 including the five key stages of the research: the objective, current state analysis, existing knowledge, building the proposal and validation of the proposal.

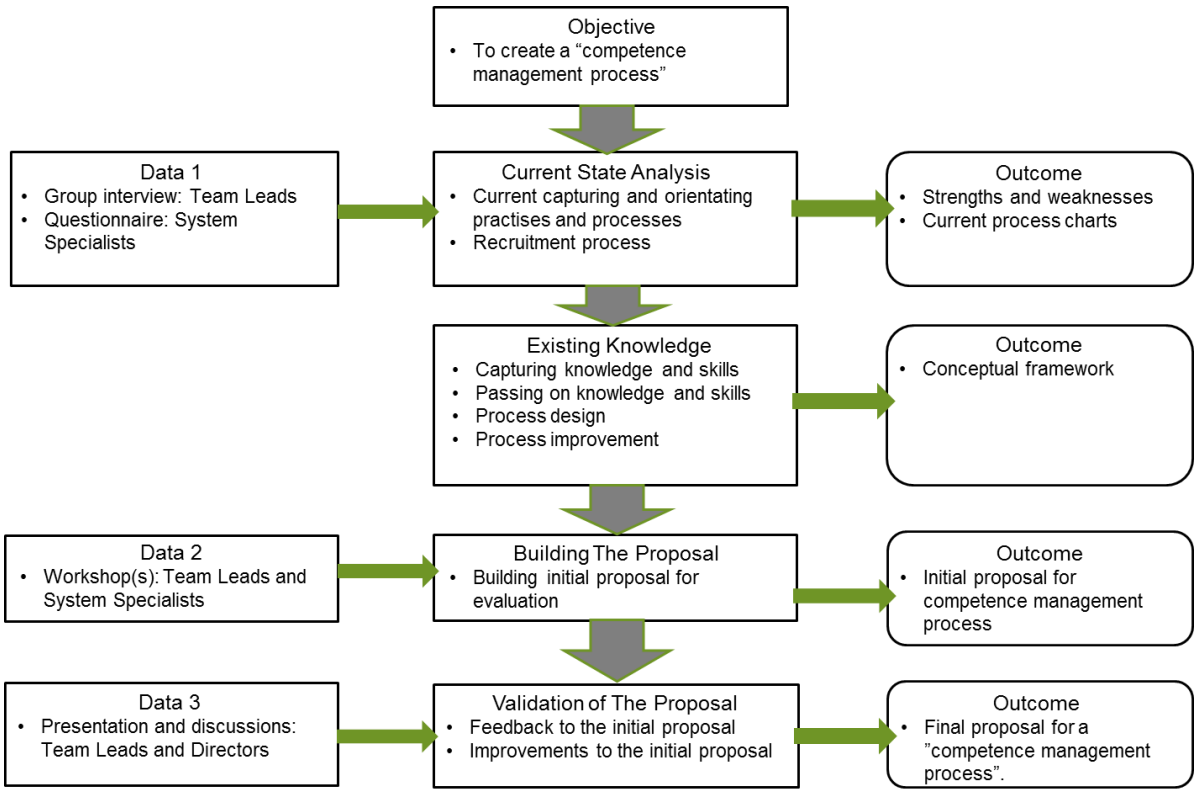

Figure 2. Research Design

As shown in Figure 2, the objective was to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively. Then, the current state of capturing and orientating the case company employees about practices and processes was explored. This was done by interviewing Team Leads and making a questionnaire for the current System Specialists working in the First Level Support Team. Also, the current recruitment process was documented with Team Leads to determine if there was something specific that does not attract more skilled applicants to shorten the need for orientation time. The second reason for studying the current recruitment process is that the lead time between one System Special leaving to the new one being orientated depends on the orientation time needed but also how long the recruitment process takes. The outcome from the current state analysis was a list of strengths and weaknesses, and current process charts.

After the current state analysis, relevant literature of existing knowledge (capturing knowledge and skills, passing on knowledge and skills, process design, and process improvement) was researched. The outcome of this stage is presented as a conceptual framework.

After the research of existing knowledge, an initial proposal was built. It was based on the findings of the current state analysis and the conceptual framework and it was discussed with Team Leads and System Specialists in workshops. As a result, the outcome was an initial proposal for a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

In the validation phase the initial proposal was presented to Team Leads and Directors above them in the case company's hierarchy. Feedback for the initial proposal was given and improvement suggestions to the initial proposal were discussed. As a result the outcome was the final proposal for a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

2.3 Data Collection and Analysis

This study draws from current System Specialists, Team Leads and Directors as data sources in three data collection rounds as shown in Table 2.

Table 2. Details of interviews, workshops and discussions, in Data1-3 (based on: Aittola 2015).

	Participants / role	Data type	Topic, description	Date, length	Documented as
	Data 1, for the Current state analysis (Section 3)				
1	Respondents 1: System Specialists (11) Team Leads (1)	Online questionnaire	Their views how information and knowledge is captured and passed on (what works, what does not work and what are the biggest challenges in efficiency)	January/ February 2018	Answer sheets
2	Respondents 2: Team Leads (2)	Group interview	Their opinion how information and knowledge is captured and passed on, and how they describe the current recruitment process	January 2018, 2 hours	Field notes and recording
	Data 2, for Proposal building (Section 5)				
3	Participants 3-4: Team Leads (0) and System Specialists (6)	Workshop/ discussion	Initial proposal building	April 2018 5 hours	Recording
	Data 3, from Validation (Section 6)				
4	Respondents 5: Team Leads (1) Respondents 6: Directors (1)	Group interview/ Final presentation	Validation, evaluation of the Proposal	April 2018 1 hour	Recording

As seen in Table 2, data for this project was collected in three rounds. The first round was collecting Data 1 for the current state analysis. In this round interviews of Team Leads and the questionnaire for the System Specialist made the primary method of data collection. The group interview was conducted as semi-structured, face-to-face interview, held on the company premises, with some of the questions created in advance but some of the questions created during the interview based on discussions. The questions and answers of the questionnaire and the field notes of the interview can be found in Appendices 1 and 2.

In the next round, Data 2 was collected to gather suggestions from System Specialists and Team Leads for building the initial proposal based on the findings of the current state analysis and existing knowledge. This was done in a workshop including System Specialists and Team Leads. The workshop was conducted as semi-structured and the topics were discussed together with those present. The workshop was held in company premises.

The final data was collected when receiving feedback for the initial proposal from Team Leads and Directors.

3 Current State Analysis

In this section the current state of information capturing, passing on captured information and recruitment practices in the case company were studied according to the research plan and the data collection plan. They are discussed in the respective order.

3.1 Overview of Current State Analysis Stage

The current state analysis was conducted by interviewing System Specialists via an online questionnaire (Appendix 1) and Team Leads in a group interview (Appendix 2).

The invitation to the group interview was sent to five Team Leads and the Director of the Support Services working in the main office. One of the Team Leads and the Director participated. The group interview was conducted in two parts. In the first part the interviewees shared their opinions about capturing and passing on knowledge and skills. In the second part they described the current state of the recruitment process.

The online questionnaire was sent to 100 System Specialists. As the participation of the Team Leads in the group interview was not sufficient the rest of them had a chance to answer the online questionnaire. 11 System Specialists and one Team Lead answered. In the first section of the online questionnaire the respondents revealed their status in the case company and how long they have worked for the case company. Then they shared their opinions about capturing and passing on accumulated knowledge and skills in the second and third sections respectively.

The key findings in the highest level from the collected data are shown in Figure 3.

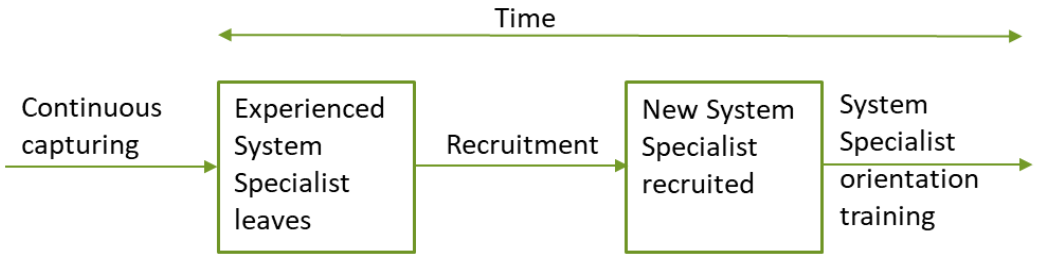

Figure 3. The Key Findings in the Highest Level from the Collected Data.

As seen in Figure 3, based on the findings from the collected data there is continuous information capturing and system specialist orientation training and between these two an existing recruitment process in the case company.

After continuous capturing of knowledge and skills, when an experienced System Specialist leaves their job, it takes a relatively long time to train a new recruit and pass on all significant knowledge and skills needed to carry out the system specialist's job due to the lengthy recruitment process.

3.2 The Current State of Capturing Knowledge and Skills

The views on the current state of capturing knowledge and skills were mixed between the System Specialists and the Team Leads. The System Specialists focused more on weaknesses than the Team Leads, who in turn, found more strengths from the current practices. This can be explained by the fact that both sides see things from different perspectives.

3.2.1 Summary of the Findings from the System Specialists

Summary of the findings from the System Specialists are shown in Table 3.

Table 3. Summary of the Findings from the current state of Capturing Knowledge and Skills (System Specialists)

Point	Findings
Clearness of the current practice	Unclear, too many ways, it varies
Definition of the current practice	Fragmented, random, voluntary, variable, messy
Quality ensuring	By using it, when "situation is on", irregularly
Quality monitoring	Unclear if monitored, by using, not actively
What works	Everyone can test, edit or comment
What does not work	Information defective / outdated / does not exists / fragmented, no clear instruction
To add	Team Leads not guiding actively enough, standards missing, more time needed

As seen in Table 3, the findings from the System Specialists about the current state of capturing knowledge and skills focused mainly on weaknesses but some strengths were found, too.

The current practice is not clear. For example, one of the informants said that "it is not very clear. There are too many ways to do that right now." And another one stated "the practice is, in principle, clear but the implementation is not working well at all. Everyone does not use the tools provided correctly or actively enough. Unity is missing."

The current practice was defined with terms like fragmented, random, voluntary, variable and messy. For example, one of the informants said that it is "voluntary and you do it if you have extra time."

Some of the informants were not sure if there is quality ensuring in place. According to one of the informants, quality monitoring is done by testing: "A person executes a task, for example a computer installation, with a document (captured information). If the installation is successful it could be stated that the information was of high quality. I also

think that employees have a duty to do high-quality work, which means that bad information is not acceptable." However, one of the informants disagrees: "Quality assurance is not really there. Documentation is updated and corrected as flaws are detected."

As with quality ensuring, some of the informants questioned if the quality of captured information is monitored but some of the informants said that it is done by testing.

According to the System Specialists, the biggest strengths of the current state of capturing knowledge and skills are that there is "a central place where information is captured (Wiki)", "it is there for everyone to see and comment" and "new documents are usually right and well documented".

However, there are many things that do not work in the current practice:

> Informant 2: "The dedicated resource (mentor) is not available or is too busy. The information is defective or outdated or it does not exist. The information is often fragmented. There are often challenges to communicate between teams, hard to find the right wise man. There are a poor information flow and information in general."
>
> Informant 3: "The so-called free model. That is, the "collecting" System Specialists collect all in their own style, and the quality of the data collected is uneven. There should be a so-called standard / guideline how to collect information. For example, what information should be obtained that a high-quality documenting / instruction can be made to install a program."
>
> Informant 10: "There is no clear instruction or recommendation about capturing, at least not clearly raised. For this reason, capturing in a controlled manner is completely left untouched."

In addition, one of the informants said that "standards needs to be created to keep the final documentation always clear and more time needs to be given" and another one continued with a wish that "the Team Leads would be more active to guide in a coherent collection style as well as writing instructions."

3.2.2 Summary of the Findings from the Team Leads

A summary of the findings from the Team Leads is shown in Table 4.

Table 4. Summary of the Findings from the current state of Capturing Knowledge and Skills (Team Leads)

Point	Findings
Clearness of the current practice	Clear, Wiki in use
Definition of the current practice	System Specialists responsible for documenting and updating, needs for training found out in one-to-one conversations
Quality ensuring	Document proof reading, training needs written down
Quality monitoring	By Team Leads, System Specialists and customers, regular auditing is missing
What works	Everyone has a chance and obligation to document, a lot of information
What does not work	The version management is poor, missing labels and tags causes poorly performing search function
Challenges in efficiency	Information of skills and courses not shared actively enough, there is not always chance to document immediately, there is not always the feel of the need for documenting
To add	The implementation of known errors' database considered

As seen in Table 4, compared to the previous sub-section, the findings from the Team Leads about the current state of capturing knowledge and skills focused on strengths more but weaknesses were found, as well.

The Team Leads regards the current practice as clear but challenging and their definition of it is that "we have Wiki in use. Every System Specialist is responsible for documenting and keeping information up to date. We have also one-to-one conversations to find out the skill levels to determine the need for training."

The Team Leads have a clear view of how quality is ensured. According to them, colleagues read documents with the responsibility to update if necessary and training needs are written down in development discussions.

Consistently, the Team Leads think that quality monitoring is also clear, but is not done regularly:

> Director: "Team Leads, 2nd level System Specialists and 1st level colleagues are monitoring the quality. Certain customer related documents are monitored by customers."

> Team Lead: "Customers are actively requesting changes if needed. The life cycle management of documentation could be better. Regular auditing is missing."

The Team Leads agreed with the System Specialists what works well in the current state of capturing knowledge and skills. They highlighted that “every System Specialist has a chance and obligation to document and a lot of information is gathered”.

They also agreed that too much old information exists. They brought up one important point that the System Specialists did not mention: “The search function of Wiki is not serving users due to missing labels and tags (there are too many similar documents).”

According to the Team Leads, the biggest challenges in capturing efficiency are as follows:

> “System Specialists are not sharing the information of their courses and skills actively enough to let us know who knows what. If they did we could suggest them to teach others their skills. We have skills in the Support Services we are not aware of.”

> “Onsite System Specialists does not necessarily have a chance to document at the moment when they are at users’ workstations so they have document when they come back to their own computers. They do not always feel the need for documenting.”

In addition, Team Leads have considered several times the implementation of a database for known errors.

3.3 The Current State of Passing on Knowledge and Skills

As with capturing, the views on the current state of passing on knowledge and skills were mixed between the System Specialists and the Team Leads. The System Specialists focused more on weaknesses than the Team Leads, who in turn, found more strengths from the current practices.

3.3.1 Summary of the Findings from the System Specialists

A summary of the findings from the System Specialists is shown in Table 5.

Table 5. Summary of the Findings from the Current State of Passing on Knowledge and Skills (System Specialists)

Point	Findings
Clearness of the current practice	Quick, unclear, fragmented, too complex, variable
Definition of the current practice	Unclear, depends on informer, quality depends on resources, no clear model, the checklist is clear what should be passed on
Quality ensuring	Mostly not ensured, sometimes by testing
Quality monitoring	Little monitoring, mainly by asking how a new employee begins to perform his duties
What works	You can always ask, the current model works if there is enough time and involvement
What does not work	Fragmented, cohesion is missing, no clear guidelines, not enough time, lack of designated tutors
Challenges in efficiency	lack of resources, lack of time, lack of passing on instructions
To add	a check list needed, enough time needed

As seen in Table 5, the findings from the System Specialists about the current state of passing on knowledge and skills focused mainly on weaknesses but some strengths were found, as well.

The current practice seems to be quick, unclear, fragmented, and too complex. For example, one of the informants said that the current practice is “too complex. Data is too much in silent mode. In many cases you need to know what to ask. Maybe some specialists are just too familiar with it and assume that everybody already know certain things.”

According to the System Specialists there is no clear model, the current practice depends on who is orientating, and the quality depends on the resources, as seen in the comment below.

> “Very variable. At some customers works perfectly and at some other customers orientating may remain very superficial. The lack of resources has also contributed how good orientating period has been. There is no clear orientating model though. Clarity and thorough orientating depends a lot on the informer.”

However, one of the System Specialists apparently is aware of a clear checklist on what to do: “The check list is clear about what the orientation should include.”

Based on the data, quality ensuring hardly exists. Sometimes it is done by testing as one of the informants concludes: “Client will tell if the new person doesn't know anything. Not the best possible situation”.

Quality monitoring hardly exists, either: Many of the informants said that quality is not monitored at all really, only by seeing how a new employee can work alone.

The System Specialists feel that the current orientating practice works well if there is enough time and involvement in place, and it is easy to ask from the colleagues and they will advise. As a proof of this one of the informants said that “if the induction is long enough and high quality so that both the introducer and the practitioner can get involved properly, the current model works well.”

The biggest weaknesses in the functionality of the current orientating practice are that it is fragmented, cohesion is missing, there are no clear guidelines, there is not enough time for orientating and there are no designated tutors taking care of orientating periods. As a result, the quality of orientating varies a lot.

The lack of resources, the lack of time and the lack of orientating instructions were mentioned again when discussing challenges in orientating efficiency. Sometimes the responsibilities are unclear, too, as one of the informants indicates regarding challenges:

> “Important things are forgotten to be passed on and orientating responsibilities. Is it a colleague or a Team Lead who orientates? More training is needed in the form of training days to introduce Wiki and IT Service Management systems.”

In addition, according to the System Specialists, a common check list what needs to be passed on is needed.

3.3.2 Summary of the Findings from the Team Leads

A summary of the findings from the Team Leads is shown in Table 6.

Table 6. Summary of the Findings from the Current State of Passing on Knowledge and Skills (Team Leads)

Point	Findings
Clearness of the current practice	A pretty good model which depends on the role of the new employee
Definition of the current practice	See above
Quality ensuring	Discussions are held with a new employee, actively asking from the System Specialists
Quality monitoring	Check lists, obligatory courses, random incident tickets checked
What works	New employees are welcomed warmly, experienced System Specialists are very committed to orientate new employees
What does not work	Sometimes new employees are too eagerly hurrying themselves to work alone, employees do not know customers well enough
Length of the appropriate orientating period	Depends on the ground level of new employees, 1-3 months
Challenges in efficiency	Lack of time due to lack of resources. Team Leads cannot see themselves how new Onsite System Specialists are doing.
To add	Nothing to add

As seen in Table 6, compared to the previous sub-section, the findings from the Team Leads about the current state of passing on knowledge and skills focused on strengths more but weaknesses were found, as well. In their opinion, the current practice is clear as there is a pretty good model which depends on the role of the new employee (Service Desk or Onsite).

Team Leads ensure the quality by actively discussing with the System Specialists and asking them how well a new employee has been doing during their first weeks and months at the job. Discussions are held with a new employee during the trial period.

According to the Team Leads, for quality monitoring there are check lists what needs to be passed on. There are compulsory internal courses which must be accomplished every year. The Team Leads randomly check how incident tickets are handled.

The Team Leads feel that the biggest strengths of the current practice are that new employees are welcomed warmly and experienced System Specialists are very committed to orientate new employees.

The Team Leads could not state any exact length of the appropriate orientation training because it depends on the ground level of new employees but they feel that one to three months would be appropriate.

Like the System Specialists, the Team Leads identified lack of time and lack of resources as the main challenges in efficiency. They also remarked that they cannot see themselves how new System Specialists in the Onsite are doing:

> "We do not have any access to customers' premises to see how new System Specialists in the Onsite are doing. The only information sources we have are our customers. System Specialists in the Service Desk are easier to follow as we see them at our office."

3.4 The Current State of the Recruitment Process

Based on the findings from the current state of the recruitment process it is a clear and reliable process. However, there are many steps and a high number of people or teams involved and it takes time. The process is described in more detail below.

3.4.1 Description of the Recruitment Process

When one of the Team Leads recognizes that recruitment is needed they make a recruitment proposal answering to questions such as why recruitment is needed, what happens if it is not made, and what the business impact of the recruitment is. The Team Lead sends the recruitment proposal to the Director of the Support Services. This takes from 10 to 15 minutes.

The Director of the Support Services approves the recruitment proposal and presents it in a board meeting of the business unit which is held once a week. If the recruitment immediately fits to the budget the proposal is approved. If it does not fit, the proposal is considered in a board meeting one level higher. It does not take long to make the decision but waiting time depends on the time of the next board meeting and could be anything between one day and one week. The Director of the Support Services notifies the Team Lead about the approval.

The Team Lead creates a recruitment proposal to the Human Recourses (HR) system of the case company. This takes about five minutes.

The HR person responsible for the case company's HR matters works for the parent company of the case company. The HR person checks the proposal and approves. This takes about one minute working time but the waiting time could be anything between one day and two weeks. Also, this could require some phone calls between the Team Lead and the HR person with pleas to hurry up.

The Team Lead designs the job advertisement, the length of the application period and publishing channels with the Recruitment Team of the parent company. The Recruitment Team publishes the job advertisement. This takes one day in total.

The application period is usually from one week to one month. The Team Lead checks the applications continuously as they arrive during the application period. The interviews are usually held in two rounds with two interviewers per round (The Team Lead and one of the System Specialists in the first round and two other Team Leads or Directors in the second round). In urgent cases they are combined as one interview with at least three interviewers.

The Team Lead chooses maybe three or four (or more depending on who is the recruiting Team Lead) and schedules the first round of interviews. This takes about 10 minutes per application and couple of minutes per scheduling. The interviews are usually between one day to one week from the scheduling time and they take about one hour per interview.

After the interviews, the interviewers discuss and select the applicants to the second round interviews (usually one to three applicants). The Team Lead schedules the interviews which take about three minutes per applicant. The interviews are usually between one day to one week from the scheduling time and they take about half an hour to one hour per interview. Security check forms are filled during the interviews by the interviewees. After the second round interviews all the interviewers discuss who to hire.

The Team Lead makes the final decision. The HR Helpdesk creates a work number to the HR system. The Team Lead sends the security check forms to Finnish Security Intelligence Service and it takes from one week to six weeks to get the security check approval.

The Team Lead starts to negotiate a work contract and starting date with the successful candidate. Usually it takes about 10 minutes to write and send an initial work contract proposal and one day or two days to get the response from the future employee.

The Team Lead inputs the initial work contract proposal to the HR system which takes about 30 minutes. The Chief Operational Officer approves the initial work contract proposal in the HR system usually within 15 minutes.

The Chief Executive Officer signs the work contract. The signing itself does not take long but there is a waiting time from one day to two weeks to make it happen.

The future employee comes to sign the work contract usually within two days. The starting date is within one month depending on the future employee's current situation.

The new employee has the first day in the case company.

The recruitment process is shown as a chart in Figure 4.

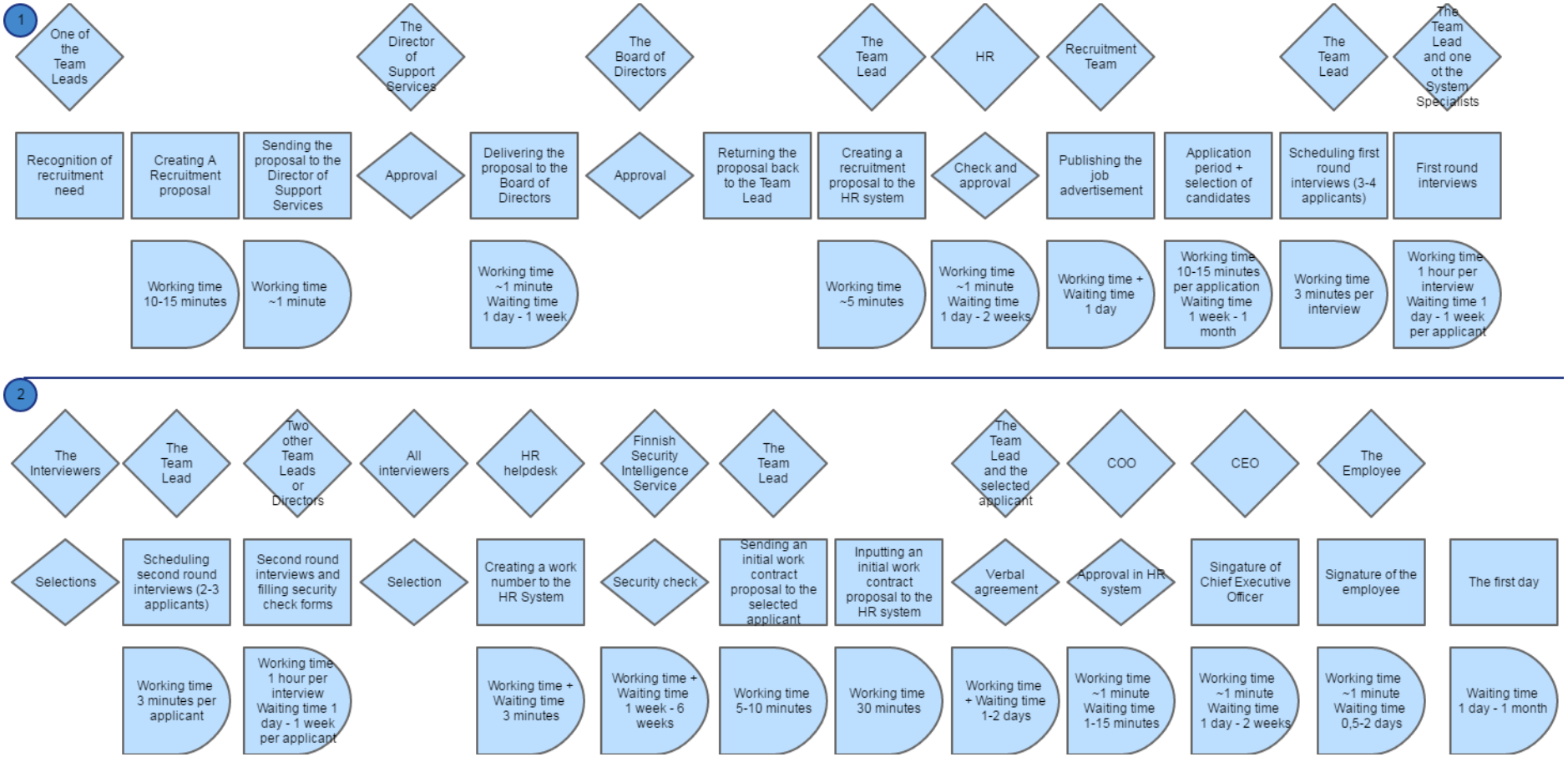

Figure 4. Process Chart of the Recruitment Process

Metropolia

As seen in Figure 4, the process chart of the recruitment process highlights how many tasks and decision making points there are, and how many people are involved when recruitment is made.

3.4.2 Observations on the Recruitment Process in the Case Company

To ensure the quality of recruitments a great deal of sound judgement has to be made. The case company hardly makes unsuccessful recruitments. Therefore, a heavy process is justified up to certain extent. However, duo to the heaviness of the process, recruitments take up to several months in both working and waiting times to hire a new employee if they are not hurried along actively.

As the object of this Thesis is to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively, the focus is not on the improvement of the recruitment process. The case company should nevertheless consider why there are so many approval points in the recruitment process as they slow down the process and whether the involvement of all 11 parties (The Team Lead, the Director of the Support Services, The Board of Directors, the HR person, the Recruitment Team, some of the System Specialists, two other Team Leads or Directors, the HR Helpdesk, the COO and the CEO) in the case company is necessary. When an experienced System Specialist leaves, this kind of too lengthy recruitment process causes an unnecessarily long time to train a new recruit and pass on all significant knowledge and skills to carry out the System Specialist's job. These two issues are therefore closely linked, and by improving the current recruitment process the disruption in continuity also decreases.

Also, the case company should consider why only one person in the HR department can check and approve the recruitment proposal sent by the Team Lead making the waiting time considerably long compared to the working time it takes to execute that task. Correspondingly the same should be considered whether the CEO is the only one allowed to sign the work contract on behalf of the case company.

One major slowdown in the process is typically the security check by the Finnish Security Intelligence Service. It cannot be helped though as the reliability of the employee must be ensured without any exemptions.

3.4.3 Summary of the Findings from the Recruitment Process

A summary of the findings regarding the recruitment process is shown in Table 7.

Table 7. Summary of the Findings from the Recruitment Process

The Recruitment Process	
Steps	26
People or teams involved	13 (The Team Lead, the Director of the Support Services, The Board of Directors, HR, the Recruitment Team, some of the System Specialists, two other Team Leads or Directors, the HR Helpdesk, the COO and the CEO in the case company, the applicants and Finnish Security Intelligence Service)
Strengths	New employees are carefully chosen to minimize the amount of unsuccessful recruitments.
Weaknesses	The HR recruiting decisions and signing the contract may take a month. There are too many approval points in the process. The security check by Finnish Security Intelligence Service takes time but is, however, obligatory.

As seen in Table 7, the recruitment process is heavy but reliable. There is room for improvement, however, but it is up to the case company if they want to improve the process.

3.5 Key Findings from the Current State Analysis (Data Collection 1)

The key findings from the current state analysis are summarized in Figure 5.

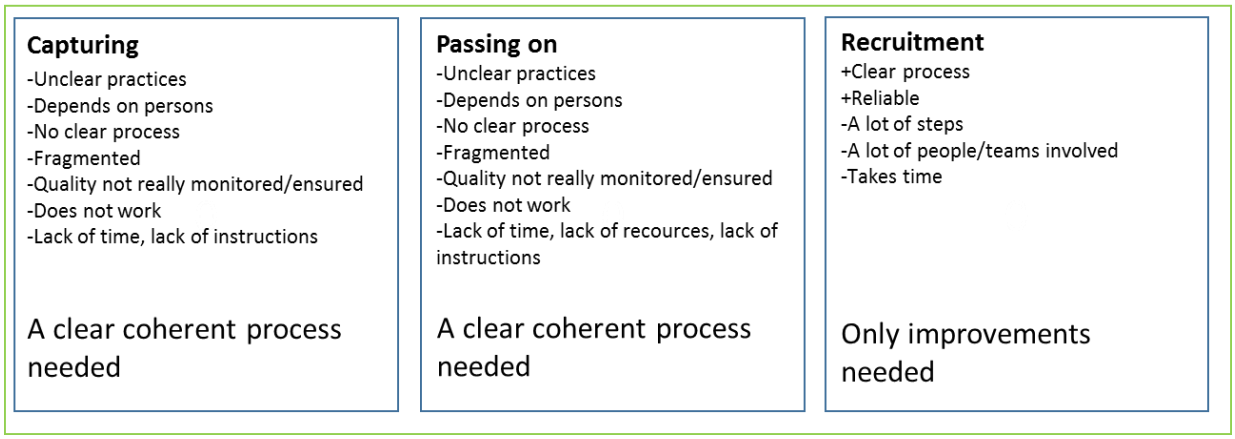

Figure 5. Key Findings from the Current State Analysis (Data Collection 1)

As seen in Figure 5, based on the findings from the current state, the development of the recruiting process is left to the case company to be considered. However, a clear coherent process is needed for both capturing and passing on knowledge and skills in order to ensure a solid accumulation of knowledge and skills and passing them on to new employees.

Capturing and orientating processes together form a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively, as shown in Figure 6.

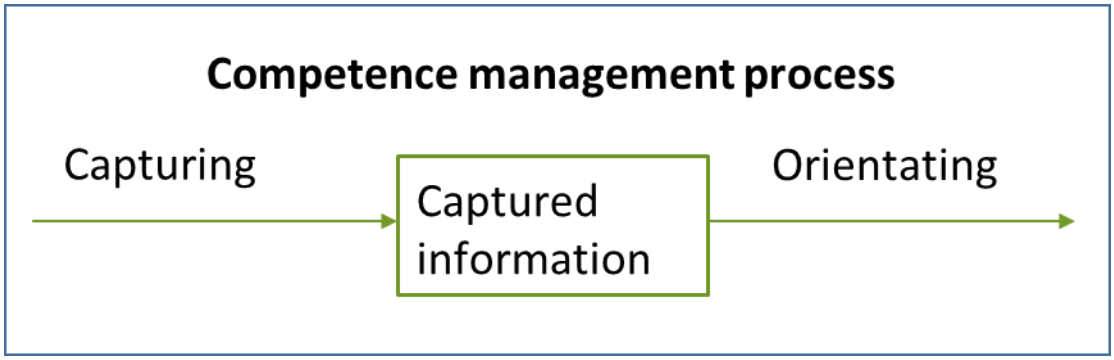

Figure 6. A process to Capture Knowledge and Skills from Outgoing Employees to Orientate Incoming Employees More Effectively in the Highest Level

As seen in Figure 6, there cannot be capturing or orientating in the process without the other one. Therefore, both of them need to be addressed to build a successful initial proposition for a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

4 Existing Knowledge on Creating a Process for Employee Knowledge Management and Orientation

The Current State Analysis carried out in Section 3 revealed a need for improvements on capturing and passing on knowledge and a clear coherent process. Therefore, this section discusses existing knowledge related to knowledge management, orientation, learning and process development in the corresponding order. The section ends with the conceptual framework for the Thesis.

4.1 Knowledge Management

As described by Becerra-Fernandez et al. (2010: 4), knowledge management may be simply defined as “doing what is needed to get the most out of knowledge resources.”

Employee turnover is one of the forces driving knowledge management, as suggested by Becerra-Fernandez et al. (2010: 7) and Inmon et al. (2007: 91). Employee turnover occurs voluntarily (for example, due to employee’s decision of career advancement) or involuntarily (for example, due to health-related reasons). The departing individuals possess some of the knowledge that the organization loses and may benefit competitors. Retraining is necessary when staff leaves which strains company resources and this may lead to negative effects on productivity and profitability. Therefore, for an organization to uphold its competitive edge effective methodologies, including tools and techniques to capture vital knowledge, are essential.

Also, as suggested by Steinberg (2011: 165), ITIL (Information Technology Infrastructure Library) in IT service operation encourages staff retention but acknowledges that the service desk can be used as a stepping stone into more advanced roles. In that case attention is needed to ensure that appropriate succession planning takes place so the service desk does not lose all of its key knowledge in any area at one time by having good documentation and cross-training.

As discussed by Becerra-Fernandez et al. (2010: 25-27), to determine what kind of knowledge needs to be documented there are several different ways that knowledge can be classified: Declarative (facts) or procedural (how to drive a car), tacit (insight, intuition, and hunches) or explicit (expressed into words and numbers), and general (possessed by many individuals) or specific (possessed by a very limited of amount of

people). Also, knowledge can be simple (focuses on one basic area) or complex (draws upon many different zones of expertise).

4.1.1 Knowledge Management Processes

Knowledge management relies on four main kinds of knowledge management processes, as suggested by Becerra-Fernandez et al. (2010: 56) and shown in Figure 7.

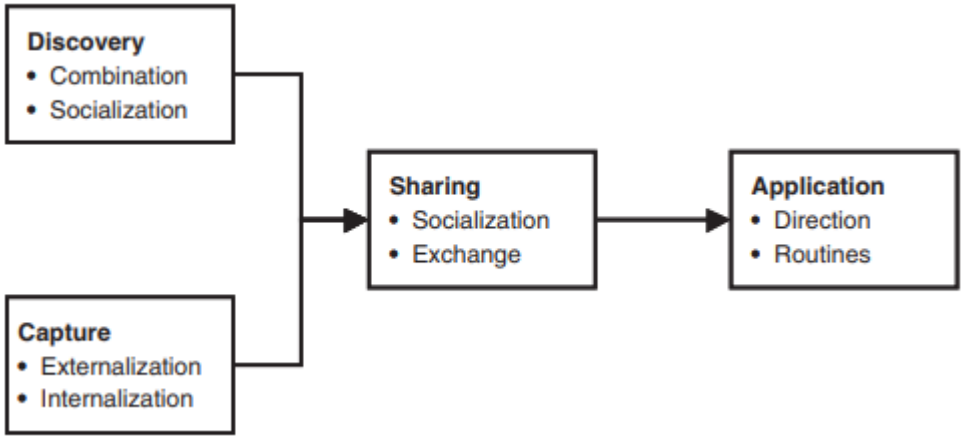

Figure 7. Knowledge Management Processes (Becerra-Fernandez 2010: 57).

As seen in Figure 7, the four main types of knowledge management processes are discovery, capture, sharing and application. Discovering new explicit knowledge relies mostly on combination, whereas discovering new tacit knowledge relies mostly on socialization. Converting tacit knowledge into explicit form is involved in externalization, whereas the conversion of explicit knowledge into tacit knowledge is involved in internalization. Explicit (exchange) or tacit (socialization) knowledge is communicated to other individuals in the knowledge sharing process. In the knowledge application process knowledge is used to make decisions and perform tasks, whereas direction involves the transfer of instructions or decisions without transferring the knowledge required to make those decisions, and in contrast routines utilize embedded knowledge in processes, guidelines, and standards that guide future behavior.

4.1.2 Knowledge Application Systems

As suggested by Becerra-Fernandez et al. (2010: 94) and shown in Table 8, to support the development of knowledge application systems rule-based expert systems and

case-based reasoning are the two most relevant intelligent technologies. Constraint-based reasoning, model-based-reasoning and diagrammatic reasoning are worth mentioning, as well.

Table 8. Technologies for Knowledge Application Systems (Becerra-Fernandez et al. 2010: 97)

Technology	Domain Characteristics
Rule-based systems	Applicable when the domain knowledge can be defined by a manageable set of rules or heuristics.
Case-based reasoning	Applicable in weak-theory domains, that is, where an expert either doesn't exist or does not fully understand the domain. Also applicable if the experience base spans an entire organization, rather than a single individual.
Constraint-based reasoning	Applicable in domains that are defined by constraints or what cannot be done.
Model-based reasoning (MBR)	Applicable when designing a system based on the description of the internal workings of an engineered system. This knowledge is typically available from design specifications, drawings, and books, and can be used to recognize and diagnose its abnormal operation.
Diagrammatic reasoning	Applicable when the domain is best represented by diagrams and imagery, for instance when solving geometric problems.

As seen in Table 8, in rule-based systems rules or models are used to represent the domain knowledge (for example with if-then statements). When people face new problems, using case-based reasoning systems means that people search their memories for past problems resembling the current problem and adapt the prior solution to "fit" the current problem. Constraint-based reasoning uses "what cannot be done" method to find a solution and is convenient in logically constrained tasks such as planning and scheduling a meeting where all the individuals required must be available at the same time. In model-based reasoning normal behavior is simulated and, for example, can be used to predict a hurricane's trajectory based on current weather conditions. To understand concepts and ideas using diagrams that represent knowledge diagrammatic reasoning is used.

4.1.3 Knowledge Capture Systems

Using organizational stories with a plot, major characters, an outcome and an implied moral is one way to capture and pass tacit knowledge, as suggested by Becerra-Fernandez (2010: 126). Stories make information livelier, engaging, entertaining, and easily connected to individual experience. The influence of narratives or stories as a

knowledge capture mechanism in an organization is based on the fact that narratives capture the knowledge content as well as its context and the social networks that define the way “things are done around here.”

One other type of knowledge capture system is based on the use of concept maps as a knowledge-modeling tool, as discussed by Becerra-Fernandez et al. (2010: 131). The objective of using concept maps is to represent knowledge through concepts enclosed in circles or boxes of some types, which are linked with connecting lines or propositions. The vertical axis in a concept map states a hierarchical framework for organizing the concepts (more general and comprehensive concepts at the top of the map, and more specific and less comprehensive below them). In addition, to visualize how different domains are linked with each other, cross-links can be used.

A third option is to use context-based reasoning as a model to represent tactical human behavior, as suggested by Gonzales et al. (2008). The understanding that people tend to use only a fraction of their knowledge at any given time is one of the key motivation factors for context-based reasoning. If the knowledge can be grouped together into what a human would need to know when in specific context, "contextualized" in other words, the task of behavior representation would be greatly simplified. For example, if an onsite support system specialist, who also happens to be an expert chess player, is driving a car to a customer's premises he needs to keep in mind the operation of the car in such a way that he reaches his destination safely including focusing on the rules of the road and on the surrounding traffic. His knowledge of making a winning chess move or how to solve technical computer problems is irrelevant to his current task.

4.1.4 Knowledge Sharing Systems

To help users share their tacit and explicit knowledge, knowledge sharing systems, also often called as knowledge repositories, are designed as suggested by Becerra-Fernandez et al. (2010: 151). “In a knowledge sharing system, knowledge owners want to share their knowledge with a controllable and trusted group, decide when to share and conditions for sharing, and seek a fair exchange or reward for sharing their knowledge.” Similarly, “knowledge seekers may not be aware of all the possibilities for sharing, thus the knowledge repository will typically help them through searching and ranking, and want to decide on the conditions for knowledge acquisition.”

As pointed out by Becerra-Fernandez (2010: 156) and Inmon (2007: 269) knowledge is communicated through face-to-face interaction such as brainstorming sessions, employee mentoring, and Internet-based channels such as wikis, blogs, social networking, and collaboration software enabled by modern age technological solutions.

Knowledge sharing systems are classified according to their attributes by Becerra-Fernandez et al. (2010: 159): incident report databases (incidents together with explanations of incidents described), alert systems (intended to spread information about a undesirable experience that has occurred or is expected to occur), best practice databases (successful efforts described), lessons learned systems (knowledge or understanding gained by experience) and expertise locator systems (to help locate intellectual capital).

4.1.5 Knowledge Discovery Systems

Knowledge can be discovered through socialization with other knowledgeable people and by finding interesting outline in observations, typically covered in explicit data, as suggested by Becerra-Fernandez et al. (2010: 193).

As pondered by Becerra-Fernandez et al. (2010: 195), in socialization, joint activities (between masters and apprentices or between researchers at a scientist conference, for example) are usually used instead of written or verbal instructions to combine tacit knowledge across individuals. In terms of using cocktail napkins to document new ideas, even simple discussions over lunch among colleagues may lead to knowledge discovery. In addition to share knowledge, creative brainstorming sessions can be used to discover new knowledge, too.

The other way to discover new knowledge is to find and interpret patterns from explicit information. That action can be called either knowledge discovery in databases or data mining. Data mining systems are used across business problems such as marketing, retail, banking, insurance, telecommunications, and operations management. The essential phases of data mining includes business understanding (what is the business problem), data understanding (allows the designer to tailor the algorithm or tools used), data preparation (to select suitable variables, and reorder and reformat the data fields), model building and validation (a trial-and-error process to build an accurate model), evaluation and interpretation (the validation data set is inputted through the model and

the predicted results are compared with the actual results in the validation data set), and deployment (the model is implemented within an organization).

4.2 Learning and Orientation

The term *instructional design* refers to a field of practice and ways to get valuable work results from employees in organizational setting, as suggested by Rothwell et al. (2015). It was invented to organize efficient, effective, systematic, and results-oriented training. The three most important elements regarding the conceptual framework of the Thesis are introduced in the next sub-sections.

4.2.1 Learner-Related Characteristics

When a new employee is recruited and orientation is needed, it is important to understand that learners are not alike as individuals differ in the ways they learn best. Identifying the characteristics of the targeted learners is called *learner assessment* by Rothwell et al. (2015: 61).

As suggested by Rothwell et al. (2015: 64), there are two kinds of characteristics: prerequisite knowledge, skills, and attitudes (or simply *prerequisite*), and *other learner-related characteristics*. Four types of prerequisites are identified: *physical traits* (such as hearing ability), *previously learned skills* (such as the ability to use certain types of machines or tools), *previously learned knowledge* (such as awareness of electricity), and *previously learned attitudes* (such as awareness of interpersonal relations at work).

Other learner-related characteristics (Rothwell et al. 2015: 66-70) focus on the learners' *demographic characteristics* (such as age, gender, and race), *physiological characteristics* (such as general physical condition), *aptitude* (such as talents and skills), *experience* (such as experience with present job activities prior to job entry), *learning styles* (classified according to standardized categories), *attitudes* (how learners feel about performance they voice to other people), *job categories* (job duties and responsibilities within the organization), *value systems* (associated with organizational culture), *life-cycle stages* (individuals' experiences of central life crises that stimulate interest in learning) or, as shown in Table 9, *career stages* (such as apprentice, colleague, mentor, and sponsor).

Table 9. Summary of Career Stages (Rothwell et al. 2015: 71).

Stage	Focus	Affects Instruction
Apprentice	Performs technical work Deals with authority Learns from others about work and about dealing with others	Interest in techniques and technical issues Interest in dealing with others
Colleague	Begins to specialize Regarded as competent Makes contacts	Interest in maintaining professional competence
Mentor	Provides leadership Develops more contacts Demonstrate ability to get things done	Interest in dealing with others Interest in guiding/influencing others
Sponsor	Initiates programs Guides others Continues to develop contacts	Interest in exerting long-term impact by influencing "up-and-coming" people

As seen in Table 9, interest in learning focus depends on the career stage heavily. For example, apprentices want more practical and hands-on instruction than other learners because other learners see that kind of instruction as serving other purposes.

To summarize, it is important to understand that the time needed for orientation of new employees varies depending on the learners' characteristics. Also, some individuals learn best by reading and some individuals by doing themselves.

4.2.2 Orientation Methods

As Rothwell et al. (2015: 98-111) discuss, there are several different kinds of media and tools available that can be used in orientation and training such as gamification, social media, podcasts and vodcasts, mobile learning, blogs, wikis, other e-learning solutions, and printed literature. Due to environmental and printing cost reasons, among other things, nowadays e-learning methods are preferred as technology advances.

There are at least nine approaches how performance objectives and thereby the skills and knowledge planned to meet those objectives can be sequenced, as suggested by Rothwell et al. (2015: 93-97): In *chronological sequencing* the content is arranged by time sequence and it is typically used with history. In *topical sequencing* headlines may

be used as a starting point for instruction. In *whole-to-part sequencing* learners are first presented with a complete model and then parts of the whole. Logically, in *part-to-whole sequencing* learners are familiarized with each part of a larger work duty and by the end of orientation they should be able to perform the entire duty. In *known-to-unknown sequencing* learners are introduced to their existing knowledge and progressively led to their nonexistent knowledge. On the contrary, *unknown-to-known sequencing* highlights how little learners know before introducing the knowledge needed. In *step-to-step sequencing* learners are introduced to work duty based on the steps of the work duty itself or based on the knowledge or the skills that learners must already possess. In *part-to-part-to-part sequencing* learners are introduced lightly to first topic, then lightly to second topic, then lightly third topic before returning to the first topic with more in-depth exposure and so on. In *general-to-specific sequencing* all learners are introduced to the same foundation of knowledge of the same skill but later each learner specializes. When orientating a new System Specialist, several of the sequencing methods can be used based on the topic and the stage of the orientation period.

As suggested by Rothwell et al. (2015: 196-198), the development of instruction materials is needed to help learners achieve anticipated performance objectives. The development steps include preparing a working outline, conducting research, examining existing instructional materials, arranging or modifying existing materials, preparing tailor-made instructional materials and selecting or preparing learning activities.

4.2.3 Evaluating Orientation and Learning

The need for evaluation and revision applies to orientation and learning, as well. Stakeholders and their interests in evaluation are shown in Table 10, as suggested by Rothwell et al. (2015: 235).

Table 10. Interest in Evaluation by Stakeholder (Rothwell et al. 2015: 235).

Stakeholder	Key Questions or Interests
Instructional designers	Did the learning work as intended? Did learners respond favorably to the learning?
Instructors or facilitators	Were learners satisfied with the experience? Did learners achieve the intended outcomes? How can I improve my delivery?
Learners	Did my knowledge or skill improve? Am I more productive or effective in my job?
Managers of learners	Did my people acquire new knowledge or skills? Are they more productive or effective in their jobs? Did the benefits received outweigh the "cost" of participating?
Executives or sponsors	Are learners more productive? Are learners demonstrating behaviors that will further our strategic objectives? Are learners adding greater value than prior to participating?

As seen in Table 10, the interests and objectives vary depending on the roles of the stakeholders. Whilst instructional designers and instructors are interested in the learning experience itself, learners are interested in what added value the learning experience brought to them in terms of knowledge and skills. Managers and executives, on the other hand, are interested in the learning experience from the production point of view.

As discussed by Rothwell (2015), evaluation data can be collected quantitatively or qualitatively through several data collection methods such as interviews, focus groups, observation, surveys or questionnaires, tests, or extant data review.

According to Rothwell et al. (2015: 239-259), there are two different kinds of evaluating methods: *formative* (evaluating throughout the orientation and learning design) and *summative* (happens at the end of orientation period).

As continued by Rothwell et al. (2015), developing a formative evaluation plan starts with determining purpose, objectives, audience, and subject. The second step is to assess information needs (for example, how well the materials meet previously identified instructional needs). The third phase is to consider proper protocol (for example, how much do the learners expect to be consulted about a formative evaluation before, during, and after it is conducted). The fourth stage is to describe the population to be studied and selecting the subjects (instruction materials or methods tried out with a sample). The next step is to identify other variables of importance, such as what positive but post instructional outcomes of the planned learning experience can be anticipated. Step six includes formulating a study design how the formative evaluation is

conducted. Finally a management plan to guide the study is formulated (a detailed schedule of procedures, events, and tasks to be completed tom implement the evaluation design). Conducting formative evaluation can be done through expert reviews, management of executive rehearsals, individualized pretests and pilot tests or group pretests and pilot tests.

Kitpatrick's "four levels" framework is widely used for conducting learning evaluation, as suggested by Rothwell et al (2015: 254). Learner satisfaction is focused in level 1, a sample of which is shown in Table 11.

Table 11. Example of Level 1 Evaluation Form (Rothwell et al 2015: 254).

Directions: To evaluate your satisfaction with this program, please circle the number that most closely represents your opinion					
	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Overall, this program was helpful	1	2	3	4	5
The materials used in this program helped me to understand the content	1	2	3	4	5
The type of instruction helped me to learn the principles and concepts of this program	1	2	3	4	5
The location was appropriate	1	2	3	4	5
Participating with the other learners was useful to me	1	2	3	4	5
This program took about the right amount of time needed	1	2	3	4	5
I would recommend this program to my friends and colleagues	1	2	3	4	5
I am likely to take other instructional programs similar to this one	1	2	3	4	5
Please add anything else that you would like to say about this program:					

As seen in Table 11, level 1 evaluation is easy to administer and yields many useful insights but the feedback is, however, strongly subjective.

Similarly, the acquisition of new knowledge or skill is evaluated in level 2. This kind of evaluation can be done at the end of a learning program but can also be done throughout by using knowledge and skill tests. Pretesting to determine ground level of knowledge and skills can be used.

Learning transferal from orientation to work duties is examined in level 3. While levels 1 and 2 takes place during or immediately learning, level 3 occurs post-program and tries to offer information how learning is applied on-the-job. Feedback for level 3 can be gathered from direct managers, peers and customers who interact with learners on what they have seen the learner apply.

Finally, also taking place post learning, the impact of the orientation on organizational or business outcomes is determined in level 4. Metrics used in level 4 are usually quantifiable measures such as quality, productivity, efficiency and profitability. As suggested by Rothwell et al. (2015: 257), due to time, cost and resources usually involved and the expertise needed to do it effectively, level 4 evaluation is the least frequently used level among the four.

4.3 Process Development

As suggested by Lloyd (2011) and defined by ITIL, *process* is “a structured set of activities designed to accomplish a specific objective. A process takes one or more defined inputs and turns them into defined outputs. It may include any of the roles, responsibilities, tools and management controls required to reliably deliver the outputs. A process may define policies, standards, guidelines, activities and work instructions if they are needed.”

As discussed by Martinsuo et al. (2010), there are several different kinds of frameworks for process improvement implementation to choose from, but the basic steps in them can be identified as shown in Figure 8.

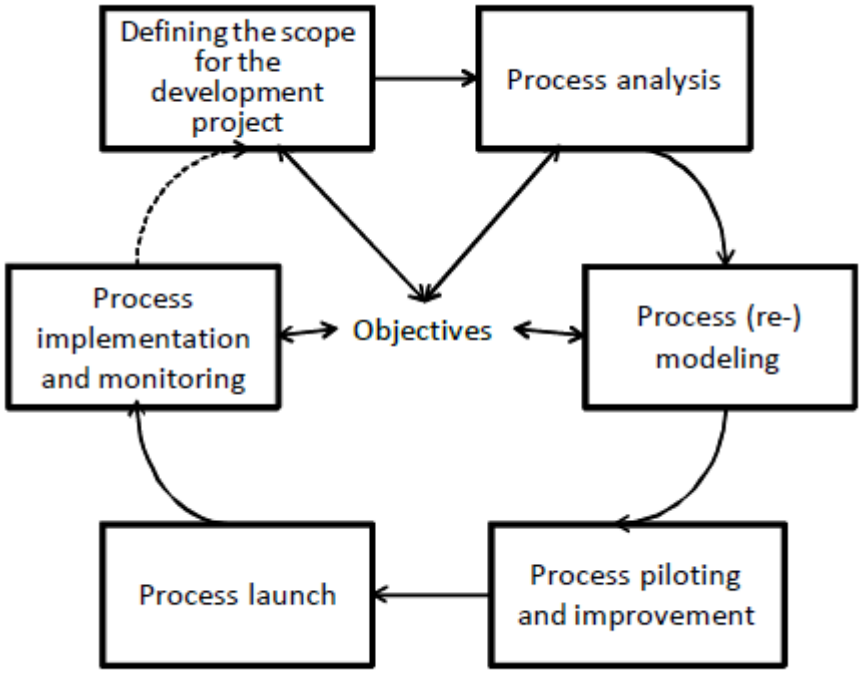

Figure 8. Basic Steps in Process Development (Martinsuo et al. 2010).

As seen in Figure 8, first it is important to define the scope for the development project. After that follows capturing as much reliable data concerning the current process as possible. In third phase areas for process development are identified and the target process is modelled. Before the process is approved to be implemented it is tested and improved if needed. After the process is implemented it is time for continuous monitoring and improvement as the process is never ready.

There is no one exact right or wrong framework or tool for process development and improvement as you can always choose the one that suits your needs. In the next subsections seven of them are introduced.

4.3.1 Process and Enterprise Maturity Model (PEMM)

In Michael Hammer's (2007) Process and Enterprise Maturity Model there are five process enablers (design, performers, owner, infrastructure and metrics) and four enterprise capabilities (leadership, culture, expertise, governance). Companies are allowed to evaluate the maturity of their business processes and the receptiveness of their organizations to process-based changes by using this framework that the process enablers and the enterprise capabilities create. All of the enablers and the enterprise ca-

pabilities could be evaluated with a rating scale from 1 to 4 and a process is in overall as strong as its weakest element. It means that if any of the enablers or the enterprise capabilities of the process are at level 1 the process is in level 1 even if some enablers or capabilities are in higher levels.

For instance, evaluating criteria for performers as suggested by Hammer (2007) are shown in Table 12.

Table 12. Evaluating Criteria for Performers According to PEMM (Hammer 2007).

	Performers	**Process**
(P-0)	So weak that it does not meet even P-1 level.	Erratical
P-1	Employers are aware of the process.	Reliable and predictable
P-2	People are able to describe the process and where they fit into it.	Delivers superior results
P-3	Employees can express how their work affects the company's performance.	Delivers optimal performance
P-4	Employees have the knowledge how their work affects customers and suppliers.	Best in class

As seen in Table 12, to determine one of the enablers regarding how mature a process is, performers are evaluated on how much the people executing a process have knowledge and skills.

Similarly evaluation criterions for culture as suggested by Hammer (2007) are shown in Table 13.

Table 13. Evaluating Criterions for Culture According to PEMM (Hammer 2007).

	Culture	**Enterprise**
(E-0)	So weak that it does not meet even E-1 level.	Erratical
E-1	Some experience with teamwork.	Ready to advance to the P1-level
E-2	Cross-functional project teams, people are familiar with teamwork	Ready to advance to the P2-level
E-3	Teamwork is the norm inside the company	Ready to advance to the P3-level
E-4	Teamwork with suppliers and customers must be the routine	Ready to advance to the P4-level

As seen in Table 13, to determine one of the enterprise capabilities regarding how mature a process is, culture is evaluated based on how customer focused a company is and how much teamwork, personal accountability and willingness to change there is.

As Hammer (2007) discusses, PEMM is easy to administer. There is no need to rely on experts or consultants as the model's simplicity allows people to evaluate the enablers and the enterprise capabilities themselves, even personnel who are new to processes after a brief introduction. As a result, it increases the likelihood of employees believing in and acting on such assessments as engaging employees increases their commitment to change.

As Hammer (2007) continues, PEMM differs from other process maturity frameworks. For example, Carnegie Mellon's Capability Maturity Model Integration (CMMI) "applies to specific processes like software development and acquisition." In CMMI model the best practices for certain processes are identified and the maturity of a company is evaluated in terms how many of those practices are implemented in a company. By contrast, companies in any industry can use PEMM and it is not specified in PEMM what a certain process should look like.

4.3.2 Reengineering

As discussed by Grover et al. (1996), a company can discard an existing process and re-develop it entirely by thinking completely in a different way and doing completely in a different way. In that case, it is all about radical changes and not about fine tuning. This framework became more visible when IT based systems became more common in the mid-1980s and 1990s. Four elements form the nucleus of reengineering: "it consists of radical or at least significant change, the unit of analysis is the business process as opposed to departments or functional areas, it tries to achieve major goals or dramatic performance improvements, and IT is a critical enabler of this change." "Out-of-the-box" thinking is needed in reengineering. Also, teams should appreciate new ideas and fresh perspectives by involving some outsiders.

As suggested by Grover et al. (1996), methods of reengineering look at six generic phases shown in Table 14.

Table 14. A Generic Reengineering Methodology (Grover et al. 1997).

	Central questions addressed	Key activities	Types of tools / techniques
Preparation	• What is the level of commitment of senior executives? • How can reengineering address our business goals? • Who should be represented on the reengineering team? • What skills will team members have to learn? • How do we communicate this effort to employees?	Evaluating organization and environment, recognizing need, setting corporate and reengineering goals, identifying and motivating team, training team on reengineering concepts, development of a change plan, development of project scope, components and approximate time frames	Planning • Team building • goal seeking • motivation • change management • project management
Process-think	• What are our major business processes? • Who are their customers? • What are our strategic / value-added processes? • What processes get highest priority for reengineering?	Model processes, model customers and suppliers, define and measure performance, define entities or “things” that require information collection, identify activities, map organization, map resources, prioritize processes	• Customer modeling • performance measurement • cycle time analysis • cost analysis • process modeling • process value analysis • Value chain analysis • Workflow analysis • Organizational mapping • Activity-based cost accounting
Creation	• What are our sub processes, activities and steps? • How do resources and information work through processes? • Why do we do things this way? • What are the key strengths and weaknesses of our processes? • Can we benchmark? How? • Ideally how would we like these processes to work? • Can IT be used to transform these processes? • What are our stretch goals for these processes?	Understand process structure, understand process flow, identify value-adding activities, benchmark performance, brainstorm IT possibilities, estimate opportunity, envision the ideal process, integrate visions, and define components of visions.	• Work flow analysis • Process value analysis • Benchmarking • Cycle time analysis • brainstorming • visioning • documentation

Technical design	• What technical resources will we need? • How can these resources best be acquired? • How will all the technical elements work? • How will the technical elements interact with the social elements?	Examine process linkages, model entity-relationships, develop performance metrics, consolidate interfaces, consolidate information, design technical systems, modularize, plan implementation.	• Information engineering • Work flow analysis • Performance measurement • Process modeling • Project management
Social design	• What human resources will we need for the reengineered processes? • How can we best acquire these resources? • Who is likely to resist these changes and why? • How will the social elements interact with the technical elements? • What will the new organization look like?	Empower customer contact personnel, identify job clusters, define jobs/teams, define skills/staffing, specify organizational structures, design transitional organization, design incentives, manage change, plan implementation.	• Employee empowerment • Skill matrices • Team building • Self-managed work teams • Case managers • Organizational restructuring • Change management • Incentive systems • Project management
Implementation	• How do we ensure that the transition goes smoothly? • What mechanism should be established for unanticipated problems? • How do we monitor and evaluate progress? • How do we build momentum for ongoing change?	Develop test and rollout plans, construct system, monitor progress, evaluate personnel, train staff, pilot new process, refine, full rollout, continuous improvement.	• Process modeling • Information engineering • Skill matrices • Performance measurement • Just-in-time training • Project management

As seen in Table 14, the preparation stage is where the development of executive consensus on the importance of reengineering happens, and breakthrough business goals and reengineering projects are linked between them. The process-think stage is where building and understanding a customer-based process model of the business is involved. The creation stage focuses primarily on recognizing current process elements, such as organization, systems and information flows, and a new process ‘‘vision’’ on what modifications are required in order to achieve the desired changes in performance. Descriptions of hardware, software, procedures, systems, and controls employed by the reengineered process are concerned in the technical design. Social design considers staffing, jobs, career paths and incentives in conjunction with technical design. Finally the technical and social plans are realized in the implementation stage.

4.3.3 Value Stream Mapping

Another alternative for process improvement is to use value stream mapping, as suggested by Womack (2006). One example of using value stream mapping is shown in Figure 9.

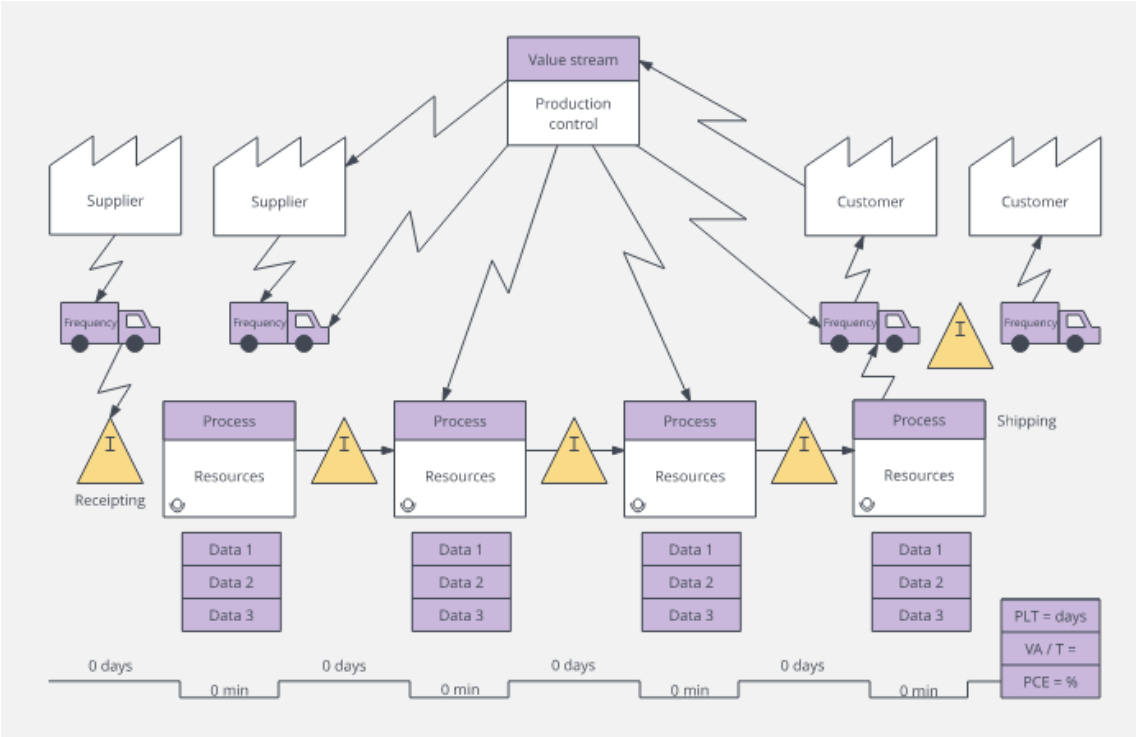

Figure 9. Example of Value Stream Mapping (Lucidchart 2016).

As seen in Figure 9 and discussed by Womack (2006), identifying and documenting carefully every important action required to create the anticipated value is the objective in drawing a map. When using value stream mapping the drawer wants to know whether every process step is valuable, capable, available, adequate and flexible. Therefore, a drawer creates a data box below every step to record information on these attributes.

4.3.4 PICK Chart

A PICK chart is one available tool for organizing and prioritizing solution ideas, as suggested by George (2003) and shown in Figure 10.

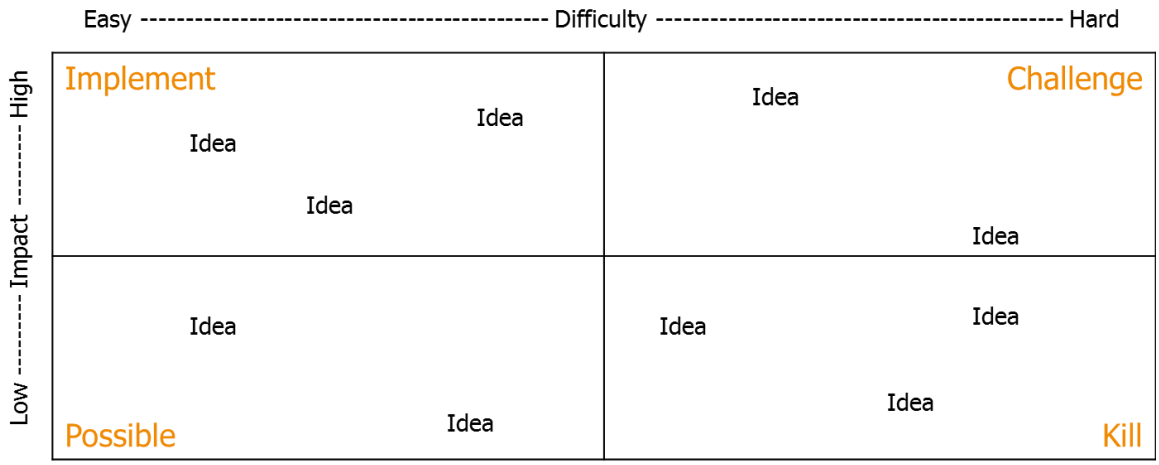

Figure 10. PICK Chart (Based on George 2003).

As seen in Figure 10, solution ideas are separated into four categories based on how hard they are to implement and how much value they bring. Ideas that are hard to implement with low payoff are discarded and the easy ones with big payoff are executed. Others are considered.

4.3.5 Flowchart

One way to present graphically and logically the flow of activities in a process is to use a flowchart, as suggested by Andersen (2007) and seen in Figure 4 in Section 3.4.1. The basic idea of using a flowchart is that it is usually easier to understand something presented graphically instead of defined by words. Different alternatives in the symbols can be used as long as the users understand them.

4.3.6 Plan-Do-Check-Act Cycle

As suggested by Lloyd (2011), Plan-Do-Check-Act (PDCA) cycle is the framework used in ITIL for continuous development and improvement and it is shown in Figure 11. The PDCA cycle is also known as the Deming Cycle, named after William E. Deming.

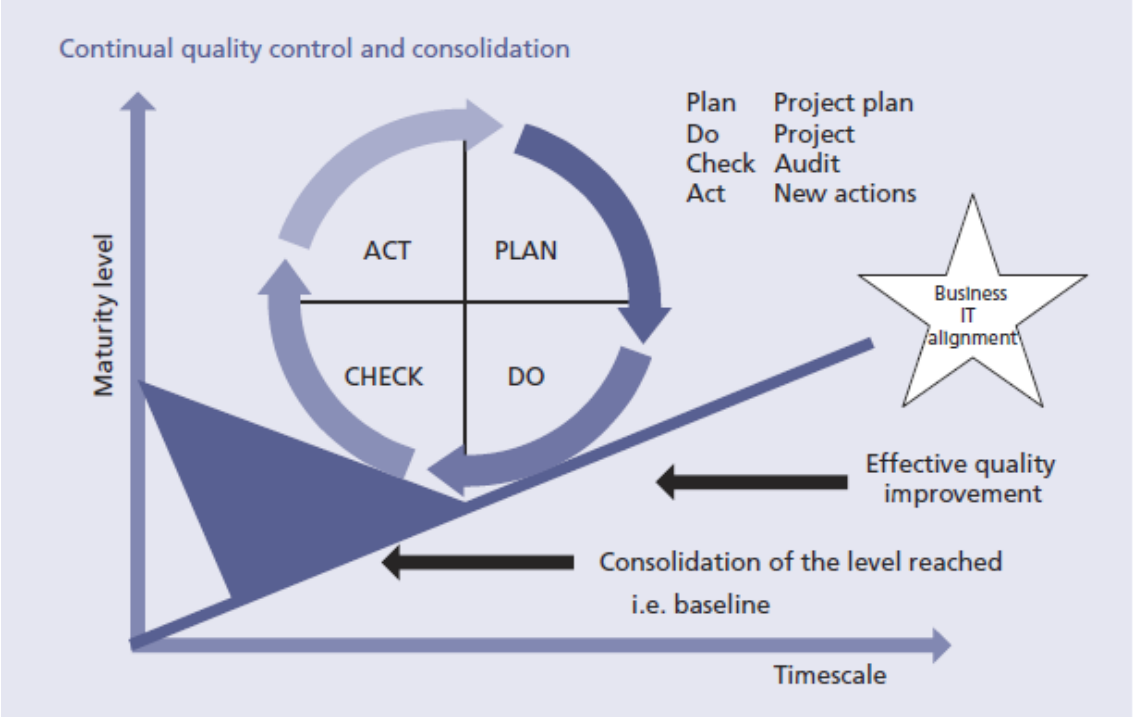

Figure 11. Plan-Do-Check-Act Cycle (Lloyd 2011: 27)

As seen in Figure 11, there are four key stages in the cycle. After Plan, Do, Check and Act there is the consolidation phase that prevents the circle going backwards.

In the “plan” phase, strategy for improvement is identified and measurement factors are defined. In the “do” phase the data is gathered and processed. In the “check” phase the

information and data is analyzed and the information is presented and used. In the "act" phase improvement is implemented.

4.3.7 RACI Model

As suggested by Hunnebeck (2011: 64-68), RACI model is used for designing and defining roles in processes. RACI is an acronym for the four main roles defined in ITIL as follows:

Responsible - The person or people responsible for correct execution

Accountable - The person who has ownership of quality and the end result. Only one person can be accountable for each task

Consulted - The people who are consulted and whose opinions are sought. They have involvement through input of knowledge and information

Informed - The people who are kept up to date on progress. They receive information about process execution and quality.

A simple RACI matrix can be shown as in Table 15.

Table 15. An Example of a Simple RACI Matrix (based on Hunnebeck 2011).

	Director	Team Lead	Tutor	Other Experienced System Specialists	New System Specialist
Activity 1	A	R	C	C	I
Activity 2	A	R	C	C	I
Activity 3	A	C	R	I	
Activity 4	A	C	R		I

As seen in Table 15 and suggested in ITIL, only one person should be accountable and usually that is the process owner. There is only one responsible person, as well, as having too many can lead to a situation where no one actually takes the responsibility. If there are no empty spaces it needs to be asked whether that role needs to be involved in so many tasks.

4.4 The Conceptual Framework of the Thesis

Based on the current state analysis, the conceptual framework of creating a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively is shown in Figure 12.

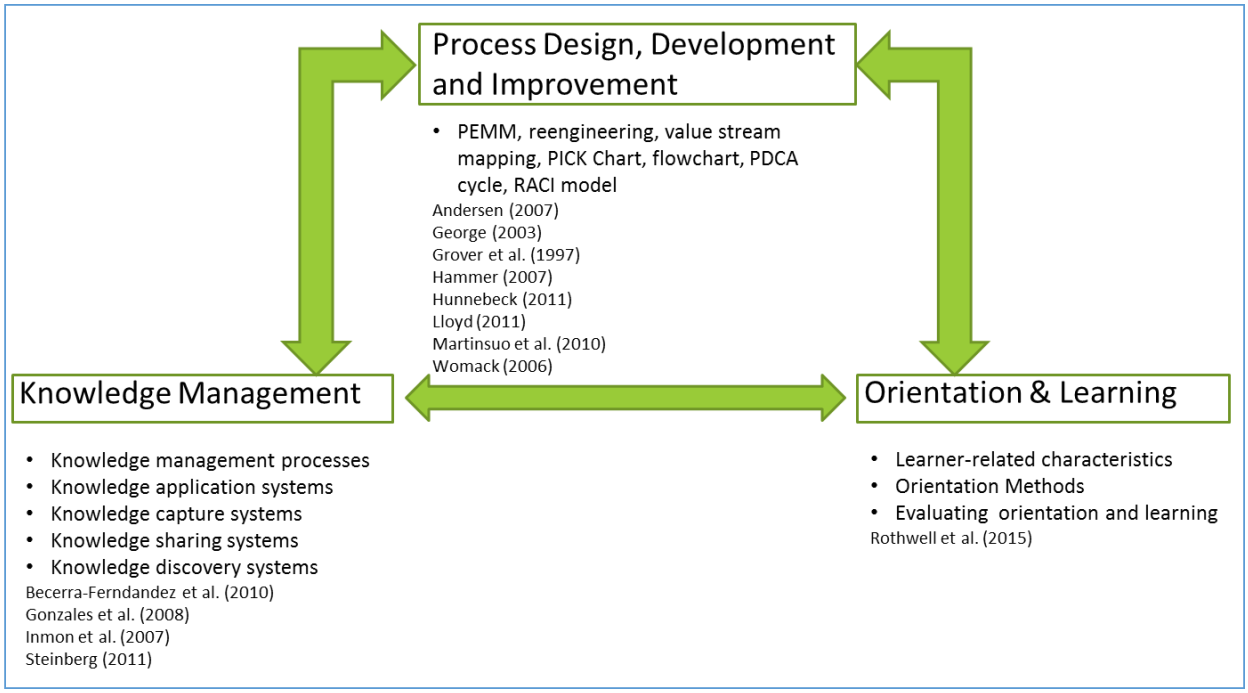

Figure 12. The Conceptual Framework of Creating a Process to Capture Knowledge and Skills from Outgoing Employees to Orientate Incoming Employees More Effectively.

As seen in Figure 12, the conceptual framework of creating a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively includes three main elements. The first element is continual knowledge management as the knowledge of existing employees needs to be captured and documented before it can be passed on to a new recruit. Logically the second element consists of orientation and learning as new employees need to be trained before they can work alone. The third element is to develop a process for the two elements mentioned above.

Next, in Section 5 an initial proposal is built for the case company using the conceptual framework as a basis.

5 Building a Proposal for Improved Continuity in IT Support Services

In this section the initial proposal for the case company is built based on the findings in the current state analysis and the conceptual framework, and using Data 2. This section starts with the overview of the proposal building stage, followed by findings of data collection 2. Finally, the proposal draft is discussed.

5.1 Overview of Proposal Building Stage

As the current state analysis showed, clear and coherent processes for both knowledge management and orientation are needed. Therefore, the initial proposal for the case company focuses on tackling these issues through the findings of the conceptual framework and suggestions by informants (Data 2).

The overview of the model to build the initial proposal is shown in Figure 13.

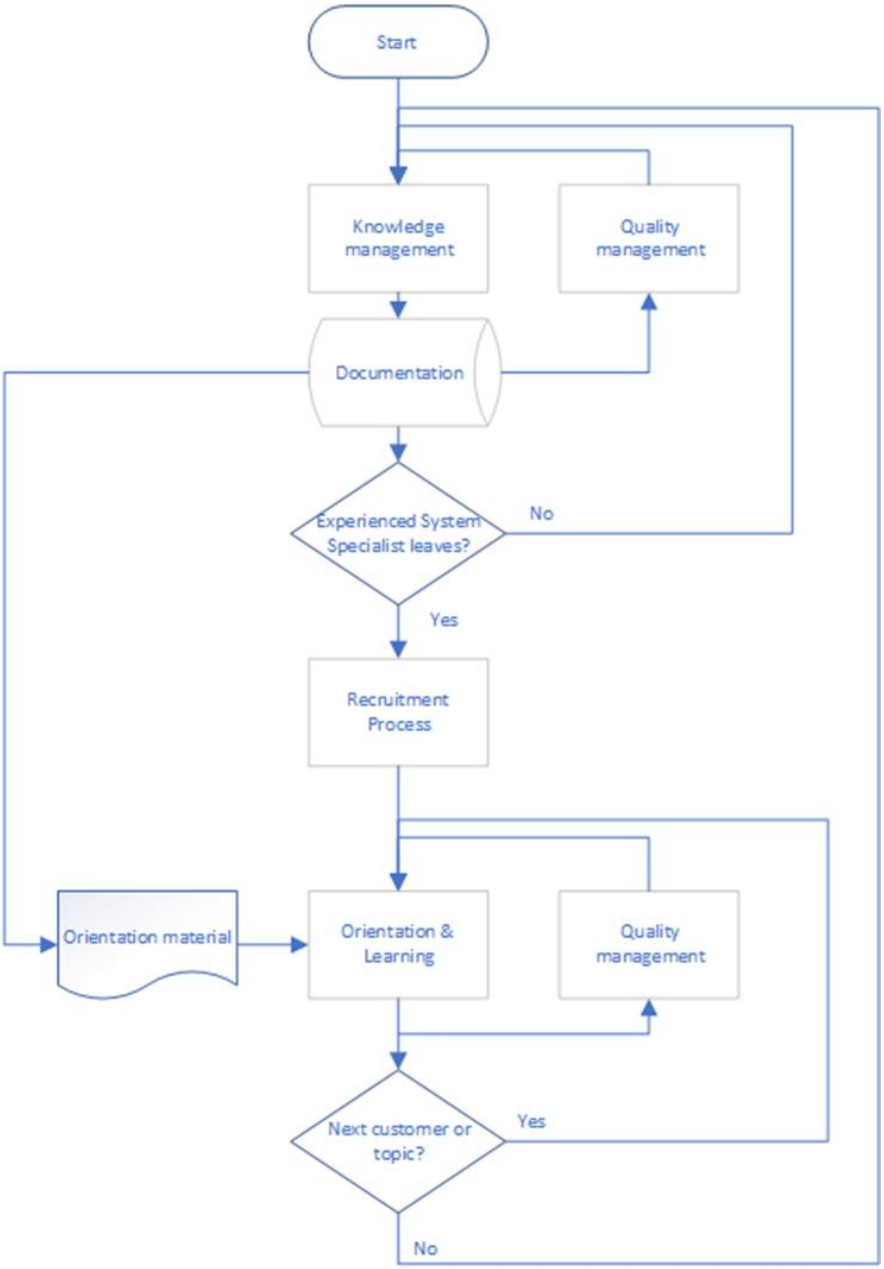

Figure 13. The Overview of the Model to Build Initial Proposal

As seen in Figure 13, the initial proposal is based on knowledge management and its quality management, as well as orientation and learning and their quality management. As stated in the current state analysis, the improvement of the development of the recruiting process was left to the case company to be considered.

The conceptual framework in mind, and to gather suggestions from Team Leads and System Specialists, a workshop was conducted. The initial plan was to divide System

Specialists into four groups all of which would brainstorm on one of the topics with Team Leads brainstorming how to commit System Specialists and arrange time at a profound level, and then discuss the findings together. Since the amount of participants was lower than expected (six System Specialists) and no Team Leads were present due to scheduling issues, the topics were discussed together with those present in chronological order. As a result, many useful ideas were presented during the discussion. These are discussed in more detail in the next subsection.

5.2 Findings of Data Collection 2

In Table 16, key focus areas from the current state analysis are shown in the first column, suggestions on a broad level from informants in the second column and more detailed suggestions in the last column.

Table 16. Key informant suggestions for proposal building (Data 2) in relation to findings from the current state analysis (Data 1) and the key elements from the conceptual framework.

	Key focus area from Current State Analysis (from Data 1);	**Suggestions from informants, categorized into groups (Data 2)**	**Description of the suggestion**
1	Knowledge management unclear, depends on persons, fragmented and does not work	a) Documenting is not voluntary. b) Documentation must be clear. c) Information needs to be found in one place.	As the informants suggested, System Specialists are not eligible to choose whether to document or not so Team Leads need to emphasize more effectively that documenting and quality management is part of the work. Documentation needs to be written in such way that even children understand. Solutions and tips for common problems need to be documented to knowledge base shared among Support Services.
2	Quality assurance of knowledge management is not really in use	a) Quality to be assured by testing every document regularly. b) Customers to be involved.	Due to lack of resources, the informants suggested that testing is done on two Saturdays a year with overtime pay. In addition to overtime pay, rewarding is needed to increase motivation for testing. The case company needs to consult and commit customers more for the correctness of the documentation.
3	Orientation unclear, depends on persons, fragmented and does not work	a) Orientation must be clear b) Orientation practices must be coherent	According to the informants, a list of things requiring orientation is needed. Tutors needs to be trained. Orientation needs to be done in such a way that even children learn. All user accounts must work before a new employee starts.
4	Quality management of orientation is not really in use	Quality management of orientation needs to be implemented.	Quality of orientation needs to be analyzed by feedback. Team Leads should follow the incident tickets resolved by the new employee.

As seen in Table 16, the suggestions from the informants tackle the issues found in the current state analysis as follows:

Documenting is not voluntary among System Specialists, as one of the informants suggested: "The responsibility lies with those who produce and need the documentation." In other words, documenting is part of the work and the System Specialists are not allowed to choose whether to document or not.

Documentation must be clear, as another informant suggested: "A document should be written in such a way that even a 7-year-old can understand that."

As one of the informants suggested, solutions and tips for common problems need to be documented to a knowledge base shared among Support Services instead of customer-specific pages. However, the knowledge base needs to be prioritized in search results.

Time needs to be arranged for quality assurance testing and System Specialists need to be rewarded, as suggested by one of the informants: "Documentation should be reviewed all the time but due to lack of resources and heavy workloads, it is difficult. If, however, the case company's intentions to improve the quality of the documentation are high enough, for example, on two Saturdays per year, there might be documentary workshops for which overtime compensation is paid (not just hours in). But even then I would not necessarily come if the case company does not serve food and drinks."

Help from the customers is needed as recommended by one of the informants: "As customers are the best people to tell how their applications should normally work, they should be committed to checking our documentation more efficiently."

It was agreed among the informants that it should be clear what topics require orientation, as one of the informants pointed out: "A list of topics requiring orientation should exist because currently those topics are discussed that are remembered to discuss."

As commented by one of the informants, the success of orientation needs to be evaluated by feedback: "The best feedback is how well a new employee performs after an orientation period but feedback forms filled in by a new employee and work orientation

supervisor could be useful. I do not know how others orientate but I make new employees to work as independently as possible while monitoring them close by."

5.3 Proposal Draft

The proposal draft consists of two topics discussed in this sub-section: Knowledge management, and Orientation and learning with quality management. This sub-section contains the direct suggestions presented to the case company.

5.3.1 Knowledge Management with Quality Management

System Specialists share continuously their knowledge by writing documentation to the case company's Wiki. Wiki is used to have one logically structured knowledge repository instead of having fragmented documentation outspread to the work notes and the resolving notes of several incident tickets in the content management database. The documentation is accessible to other System Specialists who need to use the documentation.

On a regular basis during the team meetings as often as the Team Leads consider the reminder necessary, Team Leads require the System Specialists to share their knowledge and emphasize more effectively that documenting and quality management is part of their work as they are not eligible to choose whether to document or not.

Knowledge management with quality management can be summarized as shown in Figure 14.

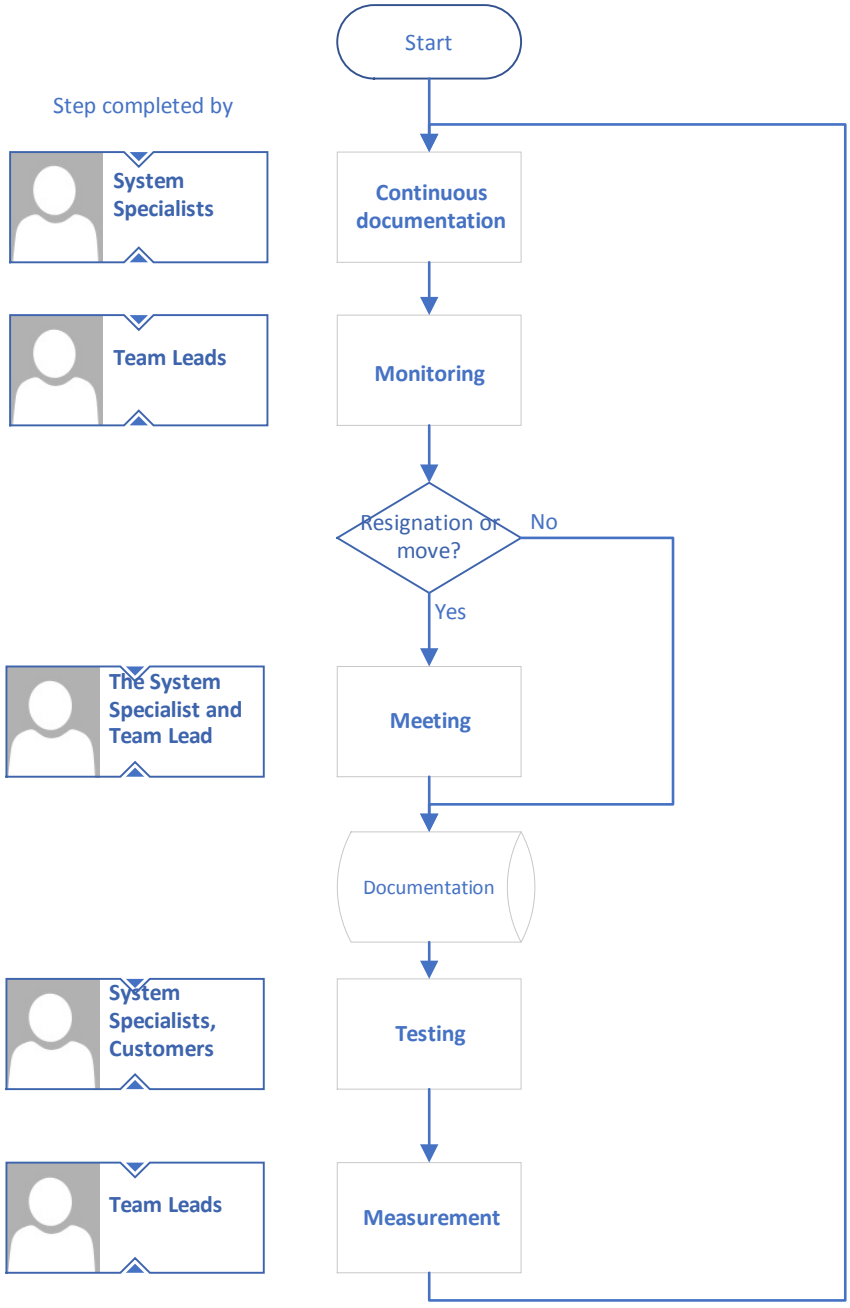

Figure 14. Summarization of Knowledge Management with Quality Management

As seen in Figure 14, the process starts with the idea that System Specialists write regularly customer-specific documents on customer-specific pages as they are with a simple and easy way to follow logic (for example, step-by-step software installation instructions with screenshots). System Specialists document solutions and tips for common problems to the common knowledge base shared among Support Services in the case company's Wiki. This requires that the instructions and the practice is understood and used by every System Specialist.

Team Leads monitor that System Specialists really share their knowledge by following the change logs in the Wiki regularly at least once a month but preferably more often. This requires that Team Leads have allocated time to do so.

When a System Specialist resigns, or moves to another role, the System Specialist and Team Lead arrange a meeting where the Team Lead ensures that all information is documented. This requires that all the unshared information is shared during or after the meeting, which is checked by the Team Lead.

System Specialists test every document always when a document is used on a regular basis and in documentary workshops on two Saturdays a year with overtime pay.

The case company serves System Specialists food and drinks in documentary workshops to increase motivation for testing.

The case company requires continuously the customers for their part to co-operate for the correctness of the documentation. This means that customers' key personnel go through the documentation for each document with Service Managers and check the correctness of the documentation as far as customers can with their knowledge (for example, the names of the application administrators or the list of applications in use). This is done by Service Managers in co-operation with customers during meetings between customers and the case company at least two times a year and the practice to execute this must be agreed between customers and Service Managers in the next possible meetings.

An example of quantitative metrics to be measured determined by Team Leads is shown in Table 17.

Table 17. An Example of Quantitative Metrics To Be Measured

Metrics On a Broad Level	Very poor	Poor	Average	Good	Very good
Purpose	1	2	3	4	5
Accuracy	1	2	3	4	5
User-friendliness	1	2	3	4	5
Spelling and grammar	1	2	3	4	5
Usability	1	2	3	4	5

As seen in Table 17, Team Leads determine quantitative metrics to be measured based on the purpose, the accuracy, the user-friendliness, spelling and grammar, and the usability of the documentation. This requires that the collected data is easily usable and fit to meet the needs, and that Team Leads have allocated time to analyze the collected data. Team Leads determine where and in which format the collected data is documented to be communicated to System Specialists. This is checked by the Director of the Support Services.

For knowledge management, based on the RACI model Team Leads are accountable as they have ownership of quality and the end result, Systems Specialists are responsible for correct execution, and customers are consulted and whose opinions are sought.

For quality management, based on the RACI model Team Leads are accountable, System Specialists are responsible and customers are consulted.

5.3.2 Orientation and Learning with Quality Management

As suggested by Data 2 and the conceptual framework, Team Leads select tutors from experienced System Specialists based on their social skills and their ability to consider learner-characteristics and sequencing to be used.

As suggested by Data 2, organizational topics requiring orientation are shown in Table 18 as forms to be filled in during and after the orientation is complete.

Table 18. Organizational topics requiring orientation.

Topic	Instructions in Wiki?	Notes	Orientated?
Health check	□Yes □No		□Ok
Office tour	□Yes □No		□Ok
Work equipment			
Workstation	□Yes □No		□Ok
Phone	□Yes □No		□Ok
Other accessories	□Yes □No		□Ok
Systems / User accounts			
Content Management System	□Yes □No		□Ok
Active Directory	□Yes □No		□Ok
E-mail	□Yes □No		□Ok
Skype	□Yes □No		□Ok
Lunch benefit application	□Yes □No		□Ok
Travel expense system	□Yes □No		□Ok
Work time management	□Yes □No		□Ok
HR system	□Yes □No		□Ok
Internet Relay Chat	□Yes □No		□Ok
Wiki	□Yes □No		□Ok
Intra	□Yes □No		□Ok
Self-service portal	□Yes □No		□Ok
Wiki introduction			
Work shift list	□Yes □No		□Ok
Customer matrix	□Yes □No		□Ok
Customer responsibilities	□Yes □No		□Ok
Wiki training	□Yes □No		□Ok
Principles of the content management system			
Introduction	□Yes □No		□Ok
Work time items	□Yes □No		□Ok
Training schedule	□Yes □No		□Ok
Functionalities / tips	□Yes □No		□Ok
Work shift practices			
Always at customers' premises	□Yes □No		□Ok
When needed at customers' prem-	□Yes □No		□Ok

ises			
Working hours	□Yes □No		□Ok
Holidays	□Yes □No		□Ok
Flexitime	□Yes □No		□Ok
Overtime	□Yes □No		□Ok
Absence practices	□Yes □No		□Ok
Work shift planners	□Yes □No		□Ok
Management			
Human resources	□Yes □No		□Ok
Information management	□Yes □No		□Ok
Security	□Yes □No		□Ok
Training			
Virtual training lounge	□Yes □No		□Ok
Self-learning material on the network drive	□Yes □No		□Ok
Employee benefits	□Yes □No		□Ok
Leisure activities	□Yes □No		□Ok
Code of conduct	□Yes □No		□Ok

In the initial proposal, System Specialists will be orientated in all matters relating to employment as shown in Table 18. These include for example work equipment, systems and user accounts, and work shift practices. Orientation on organizational topics takes half a day or a whole day. Based on the RACI model, it is the Team Leads' job to carry out the orientation in these topics as the Team Leads are both accountable and responsible. Experienced System Specialists and tutors can be consulted as well. New System Specialists are informed as they are kept up to date on progress.

As suggested by Data 2, Onsite Support related topics requiring orientation are shown in Table 19, again as a form to be filled in.

Table 19. Onsite Support related topics requiring orientation.

Topic	Instructions in Wiki?	Notes	Orientated
Case company			
Service Manager	□Yes □No		□Ok
Production Manager	□Yes □No		□Ok
Customer expert	□Yes □No		□Ok
Customer group	□Yes □No		□Ok
E-mail distribution list	□Yes □No		□Ok

Customer VIP			
Information Management	□Yes □No		□Ok
Application administrators	□Yes □No		□Ok
VIP users	□Yes □No		□Ok
Offices			
Service time	□Yes □No		□Ok
Keys	□Yes □No		□Ok
Room allocated for System Specialist	□Yes □No		□Ok
Branch offices	□Yes □No		□Ok
Parking	□Yes □No		□Ok
Office tour			
Coffee and food	□Yes □No		□Ok
Break rooms	□Yes □No		□Ok
WC	□Yes □No		□Ok
Conference rooms	□Yes □No		□Ok
Auditorium	□Yes □No		□Ok
Devices	□Yes □No		□Ok
Waste recycling	□Yes □No		□Ok
User accounts			
Own user accounts	□Yes □No		□Ok
Password management system	□Yes □No		□Ok
Customer related other user accounts	□Yes □No		□Ok
Content Management System			
Access to customer related incident ticket queue	□Yes □No		□Ok
Device cards	□Yes □No		□Ok
Tablets	□Yes □No		□Ok
Workstations	□Yes □No		□Ok
Phones	□Yes □No		□Ok
Incident tickets			
Handling of incident tickets	□Yes □No		□Ok
Ticket/Request filters	□Yes □No		□Ok
Included in the service agreement	□Yes □No		□Ok
Separately billed	□Yes □No		□Ok
Computers			
Device distributor	□Yes □No		□Ok
Life cycle	□Yes □No		□Ok
Device models	□Yes □No		□Ok
Special devices	□Yes □No		□Ok
BIOS settings	□Yes □No		□Ok

Reinstallation	□Yes □No		□Ok
Computer repair	□Yes □No		□Ok
Bitlocker	□Yes □No		□Ok
System Center Configuration Manager	□Yes □No		□Ok
Virus protection	□Yes □No		□Ok
Phones			
Lifecycle	□Yes □No		□Ok
Phone models	□Yes □No		□Ok
Deployment	□Yes □No		□Ok
Phone repair	□Yes □No		□Ok
Phone accessories	□Yes □No		□Ok
Printers			
Printer repair	□Yes □No		□Ok
Printing queues	□Yes □No		□Ok
Print server	□Yes □No		□Ok
Secure printing	□Yes □No		□Ok
Supply orders			
Order practices	□Yes □No		□Ok
User accounts and management			
Management server	□Yes □No		□Ok
SCCM	□Yes □No		□Ok
Remote connection tools	□Yes □No		□Ok
Office365	□Yes □No		□Ok
Active Directory	□Yes □No		□Ok
Active sync management	□Yes □No		□Ok
Citrix	□Yes □No		□Ok
Manual software installations	□Yes □No		□Ok
Installation medias	□Yes □No		□Ok
Network			
Wireless network	□Yes □No		□Ok
Cross-connections	□Yes □No		□Ok
Device rooms	□Yes □No		□Ok

In the initial proposal, System Specialists will be orientated in all role-based topics as shown in Table 19. These include for example devices, incident tickets, and user accounts and management. In the Onsite Support team, orientation on role-based level topics takes from one week to two weeks per customer. Based on the RACI model, team Leads are accountable but it is the Tutors' job to carry out the orientation in these

topics as they are responsible. Experienced System Specialists and other tutors can be consulted. New System Specialists are informed.

The case company creates a similar list of Service Desk related topics requiring orientation.

As suggested by Data 2 and the conceptual framework, at least the first three levels of Kitpatrick's "four levels" are to be used to evaluate the quality of orientation and learning. A tutorial feedback form that a new employee fills is shown in Table 20.

Table 20. A tutorial feedback form that a new employee fills.

Assessor (name)_____:_____ Work orientation supervisor (name):_____ The subject of orientation:_____ Date(s):_____					
Directions: To evaluate your satisfaction with this orientation, please circle the number that most closely represents your opinion					
	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Overall, this orientation was helpful	1	2	3	4	5
The materials used in this orientation helped me to understand the content	1	2	3	4	5
The type of orientation helped me to learn the principles and concepts of this job	1	2	3	4	5
The working environment was appropriate	1	2	3	4	5
The work orientation supervisor had sufficient technical knowledge	1	2	3	4	5
Work orientation supervisor's human relationship skills were sufficient	1	2	3	4	5
The work orientation supervisor took into account my personal style of learning	1	2	3	4	5
This orientation took about the right amount of time needed	1	2	3	4	5
The topic sequencing in this orientation was logical	1	2	3	4	5
I would recommend the work orientation supervisor to future new employees	1	2	3	4	5
After this orientation I am capable of working	1	2	3	4	5

independently					
Please add anything else that you would like to say about this orientation:					

One part of the evaluation of an orientation period is done as illustrated in Table 20 by a new employee. The form is filled in for every Tutor or Team Lead who orientated the new employee during the orientation period. Ideally the form is filled in the first time during the very first day after learning organizational topics, the second one next week or two weeks later after learning role-based topics related to the first customer and the next one after some time after learning role-based topics related to the second customer. Based on the RACI model, team Leads are accountable, responsible and informed that the form is filled in properly.

A tutorial feedback form that the work orientation supervisor fills is shown in Table 21.

Table 21. A tutorial feedback form for the supervisor to fill.

Assessor (name):_____ New employee (name):_____ The subject of orientation:_____ Date(s):_____					
Directions: To evaluate your satisfaction with this orientation, please circle the number that most closely represents your opinion					
	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Overall, this orientation was helpful	1	2	3	4	5
The materials used in this orientation helped me to inform the content	1	2	3	4	5
The new employee was motivated to learn	1	2	3	4	5
The new employee had the right attitude	1	2	3	4	5
The new employee learned and understood the informed topics	1	2	3	4	5
The new employee had sufficient basic skills and knowledge previously acquired	1	2	3	4	5
The communication skills of the new employee are sufficient	1	2	3	4	5
After this orientation I believe that the new employee is capable of working independently	1	2	3	4	5
After this orientation I would say that the new employee is a	1	2	3	4	5

successful recruitment.					
Please add anything else that you would like to say about this orientation:					

Another part of the evaluation of an orientation period is done as depicted in Table 21 by the supervisor (Team Lead or Tutor). The form is filled in for every new employee that has been orientated.

System Specialists' learning success is to be tested during orientation periods by conducting knowledge and skill tests.

Feedback from managers, other System Specialists and customers is to be gathered after the orientation period.

Based on the RACI model, Team Leads are accountable, responsible and informed that the evaluation of orientation and learning is done properly.

This completes the proposal for a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively. Next, this initial proposal is validated in Section 6.

6 Validation of the Proposal

In this section the initial proposal for the case company is validated and further developments to the initial proposal discussed. This section starts with an overview of the validation stage, followed by findings of data collection 3. Finally, the final proposal is presented.

6.1 Overview of Validation Stage

The proposed suggestions can be fully validated after they have been tested in action. That, however, is very time-consuming. Therefore, at this point the validation was done based on the gathered feedback from the Director of the Support Services and one of the Team Leads who attended the presentation of the initial proposal.

The suggestions developed in Section 5 were presented step-by-step after which the informants had the opportunity to comment and either validate the suggestion or reject it. The topics were discussed in the same logical order than they were discussed in Section 5.

6.2 Findings of Data Collection 3

In Table 22, the elements of the proposal are validated.

Table 22. Validation of the Proposal

Key Topic	Suggestion	Validated? (Yes/No)
Knowledge Management	Wiki is used instead of the work notes and the resolving notes of several incident tickets in the content management database	Yes
	Team Leads require the System Specialists to share their knowledge.	Yes
	Team Leads emphasize more effectively that documenting and quality management is part of System Specialists' work.	Yes
	System Specialists write customer-specific documents on customer-specific pages.	Yes
	System Specialists document solutions and tips for common problems to knowledge base.	Yes
	System Specialists write the document with a simple and easy way to follow logic.	Yes
	When a System Specialist resigns a meeting is arranged where the Team Lead ensures that all information is documented.	Yes
	Team Leads monitor that System Specialists really document.	Yes
	Team Leads determine metrics to be measured.	Yes
Quality Management (Knowledge Management)	System Specialists test every document always when a document is used on a regular basis.	Yes
	There are documentary workshops twice a year with overtime pay.	Yes
	The case company requires the customers for their part to co-operate for the correctness of the documentation.	Yes
Orientation and Learning	Lists of topics requiring orientation to be implemented.	Yes
	Appropriate tutors are selected.	Yes
Quality Management (Orientation)	Tutorial feedback forms are filled in by a new employee and a work orientation supervisor.	Yes
	System Specialists' learning success is to be tested during orientation periods by conducting knowledge and skill tests.	Yes
	Feedback from managers, other System Specialists and customers is to be gathered after an orientation period.	Yes

As seen in Table 22, the informants agreed that the suggestions are valid to be tested in action. The Thesis was challenged to propose to the Team Leads a way of monitoring that the System Specialists really share their knowledge by writing documentation, and manage the quality of the existing documentation. Also, it was found out during the presentation that the fourth level of Kitpatrick's "four levels" is already in use in the case company to evaluate the quality of orientation and learning.

Scalability was also discussed. The Director of the Support Services suggested that the proposal is in principle scalable for use by other units, but needs to be proof-tested in the support services first.

6.3 Developments to Proposal Based on Findings of Data Collection 3

As asked by the Director of the Support Services, the thesis suggests that Team Leads monitor the execution of documentation by monitoring the working hour reports. In other words, System Specialists record the time spent on the documentation. What is created, edited, or checked is written in the description field of every work item related to documentation. There is one task in each customer group for work items, which makes it easy for the Team Leads to see work items related to the documentation of all System Specialists at once.

In addition, instead of using just the first three levels of Kitpatrick's "four levels", all four levels are to be used to evaluate the quality of orientation and learning. In other words, Team Leads evaluate the impact of the orientation on business outcomes using the metrics the case company has defined to measure.

6.4 Final Proposal

The final proposal for a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively to be implemented to improve continuity in the Support Services is shown in Table 23.

Table 23. The Final Proposal

Key Topic	Suggestion
Knowledge Management	Wiki is used instead of the work notes and the resolving notes of several incident tickets in the content management database
	Team Leads require the System Specialists to share their knowledge.
	Team Leads emphasize more effectively that documenting and quality management is part of System Specialists' work.
	System Specialists write customer-specific documents on customer-specific pages.
	System Specialists document solutions and tips for common problems to knowledge base.
	System Specialists write the document with a simple and easy way to follow logic.
	When a System Specialist resigns a meeting is arranged where the Team Lead ensures that all information is documented.
	Team Leads monitor that System Specialists really document by monitoring the working hour reports.
	Team Leads determine metrics to be measured
Quality Management (Knowledge Management)	System Specialists test every document always when a document is used on a regular basis.
	There are documentary workshops twice a year with overtime pay.
	The case company requires the customers for their part to cooperate for the correctness of the documentation.
Orientation and Learning	Lists of topics requiring orientation to be implemented.
	Appropriate tutors are selected.
Quality Management (Orientation)	Tutorial feedback forms are filled in by a new employee and a work orientation supervisor.
	System Specialists' learning success is to be tested during orientation periods by conducting knowledge and skill tests.
	Feedback from managers, other System Specialists and customers is to be gathered after an orientation period.
	Team Leads evaluate the impact of the orientation on business outcomes

As seen in Table 23, the final proposal is as suggested in Section 5.3 and validated in Section 6.2 written in green, with the two additions as discussed in the previous subsection above written in blue.

To finalize this Thesis, Section 7 presents the conclusions and managerial implications along with an evaluation of the Thesis.

7 Conclusions

This final section of the Thesis contains an executive summary, managerial implications, thesis evaluation and closing words.

7.1 Executive Summary

The case company in this study is one of the IT business-to-business service providers in Finland and the first level support is one the services the case company provides. As the Team Leads of the case company are encouraging employees to engage in job rotation, the business challenge is that every now and then people are leaving from the First Level Support Team to other units inside the company or even to other companies. This disrupts the continuity of the first level support services in terms of loss of skills and knowledge. In addition, recruiting a replacement is required, and an orientation period for a new employee is needed. Therefore, the objective of the thesis was to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively.

The case study method with the qualitative research approach was chosen to conduct this study. The research design included five key stages: the objective, the current state analysis, existing knowledge, building the proposal and validation of the proposal. Data was collected in three stages: (1) from Team Leads and System Specialists for the current state analysis, (2) from Team Leads and Systems Specialists for building the proposal, and (3) from Team Leads and Directors for validation.

As a result of the current state analysis, strengths and weaknesses related to current knowledge capturing and orientation practices and the existing recruitment process were identified. Based on the findings, the development of the recruitment process was left to the case company to be considered but a clear coherent process was needed for both knowledge capturing and orientation. The literature search concentrated on three key areas including knowledge management, orientation and learning, and process design, development and improvement and these three key areas formed the conceptual framework of the thesis.

The proposal on a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively was built based on the findings in the current state analysis and the conceptual framework, and suggestions by informants (Data 2). The initial proposal consisted of suggestions for knowledge management and its quality management, and orientation and learning and their quality management.

Suggestions for knowledge management and its quality management included, for example, direct operating instructions for Team Leads and System Specialists, and that the case company requires the customers for their part to co-operate for the correctness of the documentation. Suggestions for orientation and learning and their quality management included, for example, lists or topics requiring orientation to be implemented, and four different evaluation methods to be implemented. Also, tutors are to be selected from experienced System Specialists based on their social skills and their ability to consider learner-characteristics and sequencing to be used.

The proposed suggestions can be fully validated after they have been tested in action. Therefore, in the thesis, validation was done based on the gathered feedback from the Director of the Support Services and one of the Team Leads to whom the initial proposal was presented. The suggestions were presented step-by-step after which the informants had the opportunity to comment and either validate the suggestion or decline it. As a result, all the suggestions were validated to be tested in action.

As a result of the Thesis, if implemented, the business impact is that the continuity in the support services increases as knowledge management, and orientation and learning practices are improved through quality management.

7.2 Managerial Implications

First, The Director of the Support Services and the Team Leads need to discuss together the proposal and get on the same page regarding the proposal.

After that, the Team Leads need to pass the proposal to the System Specialists and avoid the possible negative response to change by getting the System Specialists behind the proposal.

Once the proposal has been proof-tested it needs to be implemented in action and scaled for use in the other units, or discarded entirely if found inefficient.

7.3 Thesis Evaluation

This sub-section evaluates the thesis by comparing the objective to the final outcome and revising the reliability, the validity, the logic, and the relevance of the thesis.

7.3.1 The Objective versus the Final Outcome

Based on the business challenge, the initial objective of this thesis was to create a process to capture knowledge and skills from outgoing employees to orientate incoming

employees more effectively to improve continuity in the support services of the IT case company. Based on the findings in the current state analysis, the scope of the study was narrowed down to improving knowledge management, orientation and learning, and monitoring the quality of them. The outcome of this study is a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively, which defines the roles and responsibilities for executing the process. The process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively is a systematic and logical approach to improve continuity in the support services, and therefore, it can be concluded that the objective of the thesis was met and the business challenge was addressed.

7.3.2 Validity, Reliability, Logic and Relevance

Validity and reliability are considered throughout the Thesis to ensure the quality of the research. As suggested by Yin (2009: 40-45) and as shown in Table 23, ensuring validity and reliability was done by four logical tests shown in Table 24.

Table 24. Case Study Tactic for Four Design Tests (Yin 2009: 41).

Tests	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	Use multiple sources of evidence	Data collection
	Establish chain of evidence	Data collection
	Have key informants review draft case study report	Composition
Internal validity	Do pattern matching	Data analysis
	Do explanation building	Data analysis
	Address rival explanations	Data analysis
	Use logic methods	Data analysis
External validity	Use theory in single-case studies	Research design
	Use replication logic in multiple-case studies	Research design
Reliability	Use case study protocol	Data collection
	Develop case study database	Data collection

The four tests in Table 24 have been summarized as follows:

> *Construct validity*: identifying correct operational measures for the concepts being studied.
>
> *Internal validity*: seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships.

> *External validity*: defining the domain to which a study's findings can be generalized.
>
> *Reliability*: demonstrating that the operations of a study, such as the data collection procedures, can be repeated, with same results. (Yin 2009: 40)

To ensure *construct validity* in this Thesis multiple sources were used in data collection. Also, relevant literature was reviewed.

Internal validity refers to being able to verify that the relationships between key concepts in the developed process for capturing knowledge and orientation are reliable and accurate and that they reflect the case company's needs. Internal validity was ensured by interviewing Team Leads and Directors in the validation stage of the Thesis.

External validity was ensured using a model to analyze the current states of capturing knowledge and orientation in the case company and studying relevant literature for theories based on the findings.

Reliability was ensured by conducting semi-structured and documented interviews and workshops in the case company with open-ended questions. However, conducting the online survey for System Specialists was a mistake as it gave them on opportunity to answer shortly and superficially which some of the informants took advantage of, as seen in Appendix 2.

The *logic* of the Thesis was ensured by following Quinton et al.'s (2006: 89) suggestions of constructing the Thesis process clearly, by adding value to the conclusions and explanations by using tables and figures, and by making it possible to follow the key argument through logical and systematic development.

The *relevance* was ensured by following Quinton et al.'s (2006: 11) suggestions of verifying that the research will be of concrete use. This was done through the current state analysis, and by verifying that the outcome of the Thesis is a relevant solution to the business challenge by getting the acceptance from the directors. As the process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively was created specifically for the use of First Level Support Services, from the case company's viewpoint, relevancy demanded that the principle of the outcome had to be scalable for the other units of the case company.

7.4 Closing Words

The continuity of services is essential for successful IT service companies. As the support services is arguably the most visible unit of any IT service company to their customers, the best possible knowledge and skills there are necessary for maintaining customer satisfaction.

Although this study aimed to create a process to capture knowledge and skills from outgoing employees to orientate incoming employees more effectively, it was not possible to test-proof the suggestions within this study let alone implement them. The ultimate level of success of this study remains to be seen, but the author is currently looking forward to pushing the proposal forward in co-operation with the case company to better serve the customers in future.

References

Aittola, A. (2015). Improving the Open Innovation R&D Process and Opportunities for Industry-University Collaboration. Metropolia University of Applied Sciences. Available from: http://www.theseus.fi/bitstream/handle/10024/93678/Aittola_Aki.pdf

Andersen, B. (2007). *Business Process Improvement Toolbox*. 2nd ed. ASQ Quality Press.

Becerra-Fernandez, I. and Sabherwal, R. (2010). *Knowledge Management: Systems And Processes*. M. E. Sharpe.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th ed. Thousand Oaks, CA: Sage publications

Dobbs, R., Ramaswamy, S., Stephenson, E., and Viguerie, S. P. (2014). Management Intuition for the Next 50 years. *McKinsey Online*.

George, M. L (2003). *Lean Six Sigma for Service: How to Use Lean Speed and Six Sigma Quality to Improve Services and Transactions*. 1st ed. McGraw-Hill Education.

Gonzalez, A., Stensrud, B., and Barret, G. (2008). Formalizing context based reasoning-A modeling paradigm for representing tactical human behavior. *Journal of Intelligent Systems*, 23(7), 822–847.

Grover, V. and Malhotra, M. H. (1997). Business Process Reengineering: A Tutorial on the Concept, Evolution, Method, Technology and Application. *Journal of Operations Management*. Vol. 15, 193-213.

Hammer, M. (2007). The Process Audit. *Harvard Business Review*. Vol 85(4), 111-123.

Hunnebeck (2011). *ITIL Service Design*. TSO.

Inmon, W. H., O'Neil, B., and Fryman, L. (2007). *Business Metadata: Capturing Business Metadata*. Elsevier Science & Technology.

Lloyd, V. (2011). *ITIL Continual Service Improvement*. TSO.

Lucidchart (2016). *Value Stream Mapping Template*. Available from: https://www.lucidchart.com/pages/examples/value-stream-map/value-stream-mapping-template (Accessed 17 April 2018).

Martinsuo, M. and Blomqvist, M. (2010), *Process Modeling for Improved Performance*. Aalto University.

Quinton, S. and Smallbone, T. (2006). *Postgraduate Research in Business: A Critical Guide*. SAGE Publications.

Rothwell, W. J., Benscoter, B., King, M., King, S. B. (2015). *Mastering the Instructional Design Process: A Systemic Approach*. 5th ed. Wiley.

Steinberg, R. (2011). *ITIL Service Operation*. TSO.

TEKES (2010). The Future of Service Business Innovation. Tekes Review 272/210.

Womack, J. P. (2006). *Value Stream Mapping*. Available from: http://www.sme.org/Tertiary.aspx?id=30192&terms=value%20stream%20mapping%20%2bwomack (Accessed 25 March 2018).

Yin, R. K. (2009). *Case Study Research: Design and Methods*. 4th ed. Thousand Oaks. SAGE Publications.

Data Collection 1, Informants 1

Number	Question	Options
1	Your role in the case company?	Team Lead Service Desk Onsite
2	How long have you been working for the case company?	0-3 months 3-6 months 6-12 months 12-24 months Over 24 months
3	How clear is the current practice to collect knowledge and skills to be passed on to others?	Open text field
4	How would you define the current practice of capturing knowledge and skills?	Open text field
5	How the quality of captured knowledge and skills is ensured?	Open text field
6	How the quality of captured knowledge and skills is monitored?	Open text field
7	What works in the current practice of capturing knowledge and skills?	Open text field
8	What doesn't work in the current practice of capturing knowledge and skills?	Open text field
9	Anything else about capturing knowledge and skills?	Open text field
10	How would you define the current practice of passing on knowledge and skills?	Open text field
11	How clear is the current practice to pass on knowledge and skills to new employees?	Open text field
12	How the quality of passed on knowledge and skills is ensured?	Open text field
13	How the quality of passed on knowledge and skills is monitored?	Open text field
14	What works in the current practice of passing on knowledge and skills?	Open text field
15	What doesn't work in the current practice of passing on knowledge and skills?	Open text field
16	What are the biggest challenges in passing on efficiency?	Open text field
17	Anything else about passing on knowledge and skills?	Open text field

Informant	Role	Time in the Case Company
1	Team Lead	0-3 months
2	Service Desk	Over 24 months
3	Onsite	0-3 months
4	Onsite	12-24 months
5	Onsite	12-24 months
6	Onsite	3-6 months
7	Onsite	6-12 months
8	Onsite	Over 24 months
9	Onsite	Over 24 months
10	Onsite	Over 24 months
11	Onsite	Over 24 months
12	Onsite	Over 24 months

Question Informant	3	4	5	6	7	8	9
1	This is mostly affected by the ability of a person to parse their own data. Emptying an own head on paper is challenging and I have not heard of any easy tools or ways to do this.	As I wrote previously, at the moment the practice depends on persons themselves. In my own team, we have tried to make another person to proof read the documentation to get a fresh view.	To make another person, who is not familiar with the subject, to proof read the documentation,	Responsibility for this lies mainly with the team that uses the documentation.	At least some of the information is captured.	The biggest shortcoming at the moment is a clear process and its knowledgeable people. The introduction of a new person to work must be always identical and well-planned in advance so that everything can be explained in logical order.	

2	Unclear	Bad	No checking	Not implement-ed	Nothing	The dedicated resource (men-tor) is not avail-able or is too busy. The infor-mation is defec-tive or outdated or it does not exist. The infor-mation is often fragmented. There are often challenges to communicate between teams, hard to find the right wise man. Poor information flow and infor-mation in gen-eral.	room for im-provement

3	Asking is, of course, clear.	I do not really know the current practice / practices enough to answer that.	By testing. A person executes a task, for example a computer installation, with a document (captured information). If the installation is successful it could be stated that the information was of high quality. I also think that employees have a duty to do high-quality work, which means that bad information is not acceptable.	Perhaps by creating standards how information is captured.	I do not really know the current practice enough to answer this.	The so-called free model. That is, the "collecting" System Specialists collect all in their own style, and the quality of the data collected is uneven. There should be a so-called standard / guideline how to collect information. For example, what information should be obtained that a high-quality documenting / instruction can be made to install a program.	Standards need to be created to keep the final documentation always clear + more time needs to be given.
4	Variable. Wiki is a good place but you can't put everything there.	Information is captured and saved to Wiki. Each System Specialist has an obligation to maintain up-to-date documentation	Quality assurance is not really there. Documentation is updated and corrected as flaws are detected.	I can not say.	Everyone can edit documents freely		

5	The practice is, in principle, clear, but the implementation is not working well at all. Everyone does not use the tools provided correctly or actively enough. Unity is missing.	Fragmented. There are many different ways and practices.	Is it ensured? I can ask my colleague to review my documentation but always it cannot be done.	Is it monitored?	Each one can pick up the information that interests and they feel necessary in their work.		I wish the Team Leads would be more active to guide in a coherent collection style as well as writing instructions.
6	It is not very clear. There are too many ways to do that right now.	Difficult to say because I do not know the latest method to do that.	One good practice would be some kind of test.	In certain time of periods would be good to send short WEB-interview to customers.	Information flow between different depts. is smooth and easy if you dear to ask.		All information about your work and duties and habits should be free for everyone in some job position. This makes routines easier.

7	It's bit different. In some companies knowledge and skills are collected and passed very well, others not. There should be one system for all companies.	It various a lot. Some companies you can find the answer right away and some you don't. Companies which have had mainly one person working seem to have less info in database. But there is much of silent knowledge. Maybe those companies are too familiar to the worker and then it feels that you don't need collect knowledge and skills collection.	Quality is measured be using it. If there is something wrong, it will be corrected by users.	By using those and in the database there is system that informs that information might be old and it should be inspected.	New documents are usually right and well documented.		
8	There is no clear process. Instructions are captured to Wiki.	Random. In the case of passing on, if the informer has time and motivation	The information captured in the Wiki is checked irregularly.	The information captured in the Wiki is checked irregularly.	A central place where information is captured (Wiki)	There are no clear "processes" or practices in which and where information is collected.	
9	It's clearish (documenting in Wiki) but it's up to person if she/he is active in writing there. There are no guidelines though.	Voluntary and you do it if you have extra time.	By feedback from other coworkers and clients. If the written information does not work in practice, it'll be corrected. Hopefully.	It's monitored? Most likely if the If the written information does not work in practice, it'll be corrected as above.	It's there for everyone to see and comment.		Not sure how skills are captured here, only knowledge.

10	There is no clear way to capture tacit information	Creating Wiki documentation and relying on it.	Only by following the instructions obtained when "the situation is on"	Updated when an error is detected (wiki).	There is a lot of information but has been sown in customer-specific documentation. The same instructions might also apply in other places.	There is no clear instruction or recommendation about capturing, at least not clearly raised. For this reason, capturing in a controlled manner is completely left untouched.	
11	Not much	Said if remembered.	By testing	By testing	The place for captured information exits.		
12	Instructions on the wiki, information about tools and practices in many places.	Messy	Shows in my own work how clear the way things are done is.	Not monitored actively.	Depends on the System Specialist.	Introduction Excel	Checking lists and process planning and definition of responsibilities

Question Informant	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
1	Induction is essentially a quick explanation of how customer environments work.	Depends on the informer. There are no clear processes.	Quality is not monitored. The responsibility to be passed on is left to a lot of self-learning.	The quality monitoring is mainly done by monitoring how a new person begins to perform his duties	It's pretty fast.	Describing and understanding the entirety is remained at a low level. Programs are quickly introduced. There is not much customer-related training as learning is done by following tutor.	Non-existent induction can paralyze even the best of the new employees.	The orientating should have a clear process and common materials.
2	Monkey see, monkey do	Bad	No checking	We do not	Not much	Fragmented knowledge, no proper training	Too much work, not enough time and resources	Room for improvement.
3	Unclear	Unclear at my point but now that a standard list was made (Orientation Team) it definitely clears up a lot.	By testing. As well as giving time without rushing to get acquainted with shared information.	Feedback surveys. It is known if orientated persons have really understood things or have they just said "yes" and it turns out that they did not know anything.	You get help by asking.	Different answers may come from the same things that you need to become familiar with choosing A or B and the customer would have liked the option C.	Time, more time will give you a better understanding of customer documentation, environment, goals, etc.	

4	A new System Specialist gets orientated with a more experienced System Specialist to customer's environment. Induction time and "quality" vary a lot.	Very variable. At some customers works perfectly and at some other customers orientating may remain very superficial. The lack of resources has also contributed how good orientating training has been. There is no clear orientating model though. Clarity and thorough orientating depends a lot on the informer.	Not really at all. A new System Specialist could get into work with very brief induction.	I cannot say. I guess it is not monitored.	If the induction is long enough and high quality so that both the introducer and the practitioner can get involved properly, the current model works well.	There are no clear guidelines for induction and hence the quality varies a lot. Sometimes lack of resources has also contributed greatly to how thorough the induction has been.	Lack of resources, rush at customer's premises (the informer does not have time to orientate), lack of instructions (all things are not remembered to be told)	

5	The same fragmentation as in everything else	There isn't.	Is it ensured?	Is it monitored? Maybe the feedback from orientated persons is monitored.	Well, something certainly works as the employees have learnt something.	-	Important things are forgotten to be orientated and orientating responsibilities. Is it a colleague or a Team Lead who orientates? More training is needed in the form of training days to introduce Wiki and IT Service Management systems.	I wish we are even partially heading to the right direction.
6	Quit easy to get information.	Many things are very nicely done already.	Make sure that new employees know and understand their training.	By asking from current customers or coworkers.	There are enough different phases in current training and it is good.	Time table is too tight. It is not possible to work in peace and try to think what you do. You have to work already with full information even if you have only 30% of it.	Time is limited and work flow demands too many persons in different positions.	There should be full 2 weeks Tutor an Mentor period before actual work.

7	Too complex. Data is too much in silent mode. In many cases you need to know what to ask. Maybe some specialists are just too familiar with it and assume that everybody already know certain things.	It's also various. It depends about Specialist and database.	By using . Let the other specialist do the work and question will appear. Of course there must be some guidance.	Using and updating	You can always ask and you will be advised. Community works excellent.	Data is too shredded. Too much silent information.	There should be only one way to do it.	
8	Variable.	Depends on the informer. There are no clear processes.	Not ensured.	Not monitored	If the informer has time and motivation then the induction works. However, it is the responsibility of the informer, and there is not any processes as a support.	There is no clear process or practice.	Time and differences between customer environments.	

9	Seeking information is up to the person to do.	Not clear and depends on the person who is tutoring the new employee, IF there's a tutor.	Client will tell if the new person doesn't know anything. Not the best possible situation.	I have no idea? From ticket feedback?	I'm not convinced that it works.	There isn't a designated tutor that makes sure that the new person learns all the given information.	No designated tutor and not enough time.	The list about things that need to be taught should be clear for tutor so that everyone gets the same information about the clients and common practices in this company.
10	Just Wiki, the rest are asked via Skype when the situation comes.	Depends on the informer how comprehensively documentation is walked through.	Not ensured.	Correct the documentation when you notice incorrect information when executing instructions	There is a lot of information in Wiki.	Much knowledge that has only shifted from one specialist to another. A posted link to the online instruction that “you should do this”.	It is difficult to estimate the ground level of knowledge so you cannot necessarily estimate how precisely things should be technically told.	
11	Documentation, oral orientating.	Moderately clear.	Not at all.	Not at all.	If the introducer and the documentation are up to date, then any problem hardly exists.	Not necessarily united practices between informers, mixed knowledge	Time, sometimes it may take a while to get a task that can be used to introduce with.	

12	Many ways.	The check list is clear what to should be orientated.	The instruction is up to date and will be conducted during the orientation.	Not monitored, just how a new System Specialist can work alone.	Introduction list	Creating user accounts various systems.	Time.	We are going to get tools for orientation in the Spring.

Data Collection 1, Informants 2

Research Interview
TOPIC: Capturing and Passing on Knowledge and Skills

Information about the informants

Table 1

Details	
Name (code) of the informants and positions in the case company	*Mrs. A* (Director of Support Services) *Mrs. B* (Team Lead, Support Services)
Date of the interview	January 26, 2018
Duration of the interview	38 minutes
Document	Field notes

Field notes

Table 2

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
0	Introduction	-	The subject of the Thesis and the agenda of the interview were explained. Permission to tape-record the interview was granted by the informants.
1	**Capturing Knowledge and Skills from Current Employees**	How clear is the current practice to collect knowledge and skills to be passed to others?	B: "We have Wiki in use. Every System Specialist is responsible for documenting and keeping information up to date." A: "Yes, that is the place. We have also one-to-one conversations to find out the skill levels to determine the need for training."
		How do you define the current practice of capturing knowledge and skills?	A & B: "Nothing to add to the previous answer."
		How the quality of captured knowledge and skills is ensured?	A: "Colleagues read documents when they are using them. If some document is not right or not up to date the reader has the responsibility to update." B: "During development discussions with System Specialists training needs are written down."

		How the quality of captured knowledge and skills is monitored? Who is monitoring? How actively? Who is responsible for quality?	A: "Team Leads, 2nd level System Specialists and 1st level colleagues are monitoring the quality. Certain customer related documents are monitored by customers." B: "Customers are actively requesting changes if needed. The life cycle management of documentation could be better. Regular auditing is missing."
		What works in the current practice of capturing knowledge and skills?	B: "Every System Specialist has a chance and obligation to document and information accumulates a lot." A: "System Specialists are actively pointing out if something is missing."
		What does not work in the current practice of capturing knowledge and skills?	B: "The version management is not working properly (too much old information). The search function of Wiki is not serving users due to missing labels and tags (there are too many similar documents)." A: "Nothing to add."
		What are the biggest challenges in capturing efficiency? Do you see any signs of negligence (a System Specialist just does not want to document nor has not time to document)?	B: "I did not quickly find any." A: "System Specialists are not sharing the information of their courses and skills actively enough to let us know who knows what. If they did we could suggest them to teach others their skills. We have skills in the Support Services we are not aware of." B: "Onsite System Specialists does not necessarily have a chance to document at the moment when they are at users' workstations so they have document when they come back to their own computers. They do not always feel the need for documenting."
		Regarding to capturing knowledge and skills, is there anything that you would like to add that we have not yet discussed?	B: "We have considered several times the implementation of known errors' database."
2	**Passing on Knowledge and**	How clear is the current practice to pass knowledge and	B: "We have had a pretty good orientating

	Skills To a New Employee	skills to new employees?	model in our company." A: "The orientating model depends on whether a new employee is coming to the Service Desk or to the Onsite (listening to calls or being at customers' premises)."
		How do you define the current practice of passing knowledge and skills?	A & B: "Nothing to add to the previous answer."
		How the quality of advertised knowledge and skills is ensured?	B: "We are actively asking from the System Specialists their feelings whether they need more orientating or not." A: "We are actively asking from the System Specialists how well a new employee has done during his first weeks and months. During probation discussions are held with a new employee."
		How the quality of advertised knowledge and skills is monitored?	A: "We have check lists what needs to be orientated. We have certain obligatory internal courses which must be accomplished every year." B: "I randomly check how incident tickets are handled."
		What works in the current practice of advertising knowledge and skills?	B: "New employees are welcomed warmly and experienced System Specialists are very committed to orientate new employees." A: "Nothing to add."
		What does not work in the current practice of passing knowledge and skills?	A: "Sometimes new employees are too eagerly hurrying themselves to work alone. Orientating period should be more moderate especially with more challenging customer environments." B: "Understanding the differences between customer requirements is not in good enough level. Customers should come to discuss about their businesses to become more familiar."
		How long is the appropriate orientating period?	A: "It depends on the ground level of new employees. Some of them are ready to work

			alone almost immediately and some of them need to be orientated longer. I would say from one month to even three months." B: "I agree."
		What are the biggest challenges in passing efficiency?	B: "Lack of time due to lack of resources. We do not have spare System Specialists in reserve as they cause expenses and we have to be profitable company." A: "Lack of time. We do not have any access to customers' premises to see how new System Specialists in the Onsite are doing. The only information sources we have are our customers. System Specialists in the Service Desk are easier to follow as we see them at our office.
		Regarding to passing on knowledge and skills, is there anything that you would like to add that we have not yet discussed?	A & B: "Nothing to add."
3	**To add**	Is there anything that you would like to add that we have not yet discussed?	A & B: "Nothing to add."