



Expertise
and insight
for the future

Hannamaria Väyrynen

Improving IT Service of Delivering the Field Service Management Service and Device for Users in Company X

Metropolia University of Applied Sciences

Bachelor of Engineering

Industrial Management

Bachelor's Thesis

18 June 2019

Author Title	Hannamaria Väyrynen Improving IT Service of Delivering the Field Service Management Service and Device for Users in Company X
Number of Pages Date	41 pages + 1 appendix 18 June 2019
Degree	Bachelor of Engineering
Degree Programme	Industrial Management
Professional Major	International ICT Business
Instructors	Head of Service Management Nina Hellman, Head of Industrial Management, Senior Lecturer Sonja Holappa, Senior Lecturer
<p>The objective of this thesis is to propose improvements to the end-to-end Field Service Management service of ordering and delivering an FMS license in Finland. The outcome of this study is a proposal of improvements to the FSM process in Finland in order to ensure the smooth service delivery for the user.</p> <p>This thesis was conducted as a case study and it is based on the internal documents and interviews with company' experts as well as the analyzed service request –tickets and benchmarking Norwegian FSM process. The thesis was conducted by first investigating the current state of the case company's Field Service Management service order process, then exploring available knowledge and best practices from literature on Lean Management in IT, maximizing efficiency by using Value Stream Mapping methods and ITIL. The proposal was built based on the current state analysis, best practices from the literature, benchmarking Norwegian FSM process and analyzing Service request -tickets.</p> <p>The proposal how to develop the Field Service Management process in Finland. The proposal also includes the description of unnecessary steps in the process. The main areas for development are reducing the manual work in the process and restructuring the process to become more straightforward and productive. The organization will be able to achieve benefits in quality and customer satisfaction by allocating resources more effectively.</p>	
Keywords	Value Stream Mapping, Process Management, IT-Service Management, ITIL, Lean IT

<p>Tekijä Otsikko</p> <p>Sivumäärä Aika</p>	<p>Hannamaria Väyrynen Yrityksen kenttätyön hallintasovelluksen käyttäjäoikeuksien myöntämis- ja hallintaprosessin kehittäminen</p> <p>41 sivua + 1 liite 18.6.2019</p>
<p>Tutkinto</p>	<p>insinööri (AMK)</p>
<p>Tutkinto-ohjelma</p>	<p>Tuotantotalous</p>
<p>Ammatillinen pääaine</p>	<p>Kansainvälinen ICT-liiketoiminta</p>
<p>Ohjaajat</p>	<p>IT Palveluhallintapäällikkö Nina Hellman, Tuotantotalouden tutkintovastaava, Lehtori Sonja Holappa, Lehtori</p>
<p>Tämän insinööriyön tavoitteena on ehdottaa parannusehdotuksia kenttätyön hallintasovelluksen käyttäjäoikeuksien myöntämis- ja hallintaprosessiin Suomessa. Tavoitteena on, että prosessi olisi yhdenmukaisempi ja tehokkaampi.</p> <p>Tämä insinööriyö on tehty tapaustutkimuksen ja se pohjautuu kohdeyrityksen sisäisiin dokumentteihin, haastatteluihin sekä palvelupyyntöihin pohjautuvaan analysoituun dataan sekä vertailuanalyysiin Norjan prosessista. Parannusehdotusta tehdessä on tutkittu Lean-ajattelua erityisesti IT-ympäristössä, parhaita käytäntöjä tehokkuuden maksimointiin kuten myös ITIL-viitekehyksen määrittämiä IT-palveluhallinnan parhaita käytäntöjä.</p> <p>Tämän insinööriyön kehitysehostus esittelee päivitetyn prosessikuvauksen ja listauksen prosessia hidastavista ja resursseja kuluttavista vaiheista. Keskeisimmät ehdotukset liittyvät manuaalisen työn minimointiin sekä prosessin uudelleenjärjestelyyn niin, että prosessi olisi suoraviivainen. Prosessia kehittämällä voidaan saavuttaa hyötyjä niin resurssien kuin laadun ja asiakastytyvyyden kannalta. Tämä opinnäytetyö tukee myös organisaation muita IT kehitysprosesseja. Huomattuja kehitysehdotuksia voidaan implementoida myös muihin IT palveluihin.</p>	
<p>Avainsanat</p>	<p>Arvovirtakuvaus, Prosessikuvaus, IT-palvelunhallinta, ITIL, Lean IT</p>

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Key Concepts and Abbreviations

FSM	Field Service Management, software for managing company's resources in field.
Lean IT	Lean Management in IT Services, additional Lean management framework applied in an IT environment.
ITIL	Information Technology Infrastructure Library, a framework which include best practices for IT Service Management
ITSM	IT Service Management, a set of practices for delivering services in order to create value to customers
VSM	Value Stream Mapping, a flowchart method created to analyze the phases to deliver a service to customers.

1 Introduction

Developed information technologies and practices have required industrial companies to improve and establish their IT functions in order to achieve the end-to-end service levels. The service provision is usually outsourced to the third-party providers assisting companies with the time and resources in service development and management. When the amount of the service providers has increased, the management of the supplier network has become more challenging though important. The suppliers have to maintain their service levels to ensure the customer satisfaction.

Technology has been a massive element in most industries during the past centuries. To stay on the top of the development, the construction industry has to implement new technologies and applications in order to enable the business to be more straightforward and productive.

1.1 Business Context

The case company, for which the thesis was carried out, is a large global company operating in the building service industry. Currently, the case company is operating multiply countries in Europe and employs roughly less than 20 000 persons. The company has two business units, which are projects and services. (The case company's website.)

The case company has outsourced its IT operations as much as possible and is only keeping the governance and management of IT services. Therefore, the organization is operating in a multi-vendor environment.

As mentioned earlier, technological integrations have forced enterprises as well as the different divisions within a company to research advanced ways in adapting digitalized applications to the daily work. The maturity of the digitalization alters within the operating countries. The usage of the digital services varies widely among the divisions. The Nordic countries have digital services used by the employees widely in the Services – business unit. Cloud based applications are implemented into daily operations and technicians are using a Field Service Management –tool (FSM).

End-to-end activities like scheduling, dispatching, invoicing and billing are managed by the Field service management system. An FSM user gets access to the information required in order to perform the task. The user also reports the hours and the costs of the job through the FSM.

In the Nordic countries, Field Service Management (FSM) is based on mobile computing. In other countries, FSM is still handled manually. In those countries service orders are carried out by using the printed documents transferred by the line managers. This study concentrated on the IT department and the operations related to granting Field Service Management –access for the onboarding employees in Finland.

1.2 Business Challenge, Objective and Outcome

The business challenge relates to the complexity of the FSM –process in Finland. The structure and the steps of the processes vary which effects the lead time of the process as well as the quality of the delivering service.

The objective of this study is to propose improvements to the end-to-end FSM service of ordering and granting an FMS license in Finland. The outcome of this study is a proposal for improvements to the FSM process in Finland in order to ensure a smooth service delivery for the user. The proposed order process includes an analysis of the defined steps and lead times of the process including the best practices of delivering the services to the users.

1.3 Thesis Outline

This study is restricted to analyzing and developing the onboarding processes of an employee from the IT point of view. The study audits the current state of the process in Finland. The study is limited to examining the order of the FMS license when the new employee is hired since it is the most critical part of the process.

This thesis was conducted researching the current process in place in the different divisions and analyzing them by interviewing the superusers, the FSM – head and additional key employees regarding the process. Taking into account the company insights

when building the proposal, the study ensures that the proposed outcome will be suitable for the company.

The thesis is divided into seven sections. The first section contains the introduction of the study and the case company for which the study is carried out. The second section presents the methods used in the study. The third section presents the current state of ordering the FMS license in Finland. The following section is an introduction to available literature and the conceptual framework of the study. The following section benchmarks the Norwegian process which is considered the most effective. Section six describes how the proposal was built following the final validation of the proposal in section seven. The final section consists of a summary and the evaluation of the thesis project.

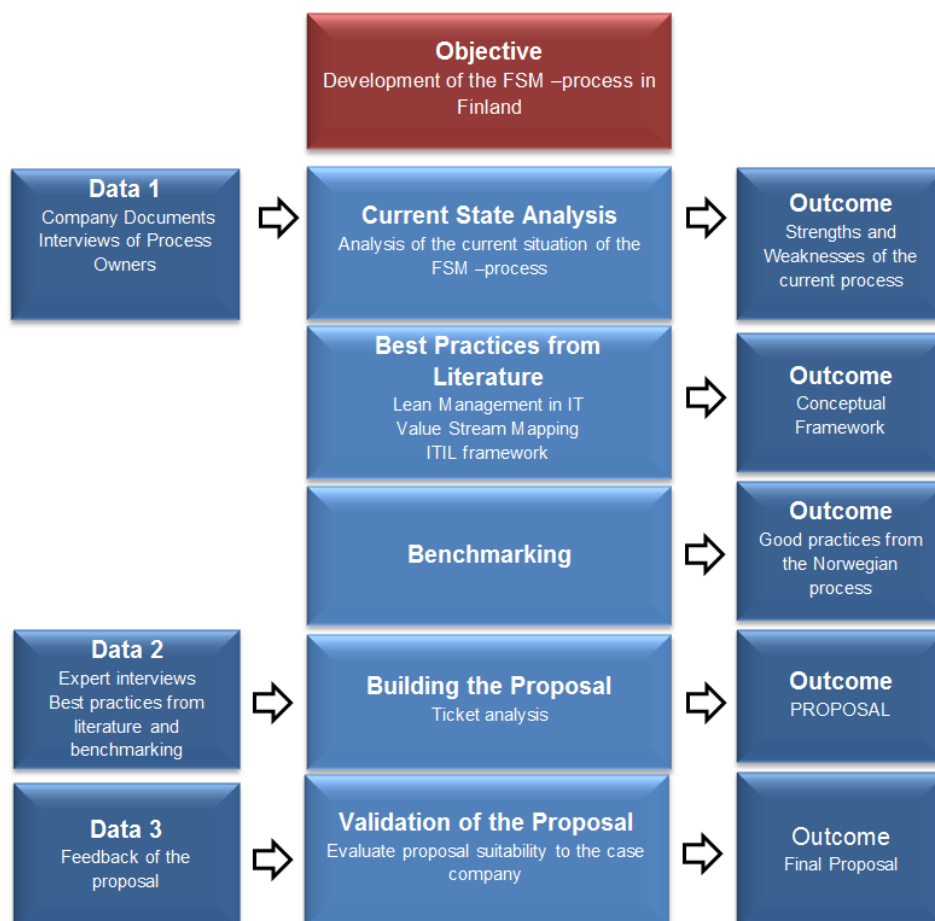
2 Method and Material

This section discusses the methods and materials used to conduct this study. The following sections go through the stages, materials and the used methods for delivering the outcome defined in the previous chapter.

2.1 Research Design

Figure 1 describes the research design of the thesis. It consists of information of the data sources used in the thesis as well as the steps and the outcome of these steps.

Figure 1. Research design



As shown in Figure 1, the study began establishing by defining the business challenge, objective and outcome. As seen in Figure 1, the objective of this study was to “develop the FSM –license ordering process in Finland”. Data 1 was used for the current state

analysis. The outcome of these steps was the analysis of strengths and weaknesses which was used as a baseline for understanding the current processes and topics for improvement.

As presented in Figure 1, best practices from literature forms the conceptual framework for the study. The study investigated best practices and available knowledge of the Field Service Management –processes. The goal for this stage was to review the literature and gain knowledge from the experts and later apply it to solve the business challenge. The outcome of this stage was the conceptual framework which presents the key elements of best practices and knowledge needed for building the proposal. Additional practices for the proposal were gathered through benchmarking the Norwegian FSM –process.

Based on the findings from the current state analysis, combined with best practices identified from literature and targeted interviews as well as the practices from the Norwegian process, this study built a proposal for the Field Service Management –license order in Finland including the recommended steps.

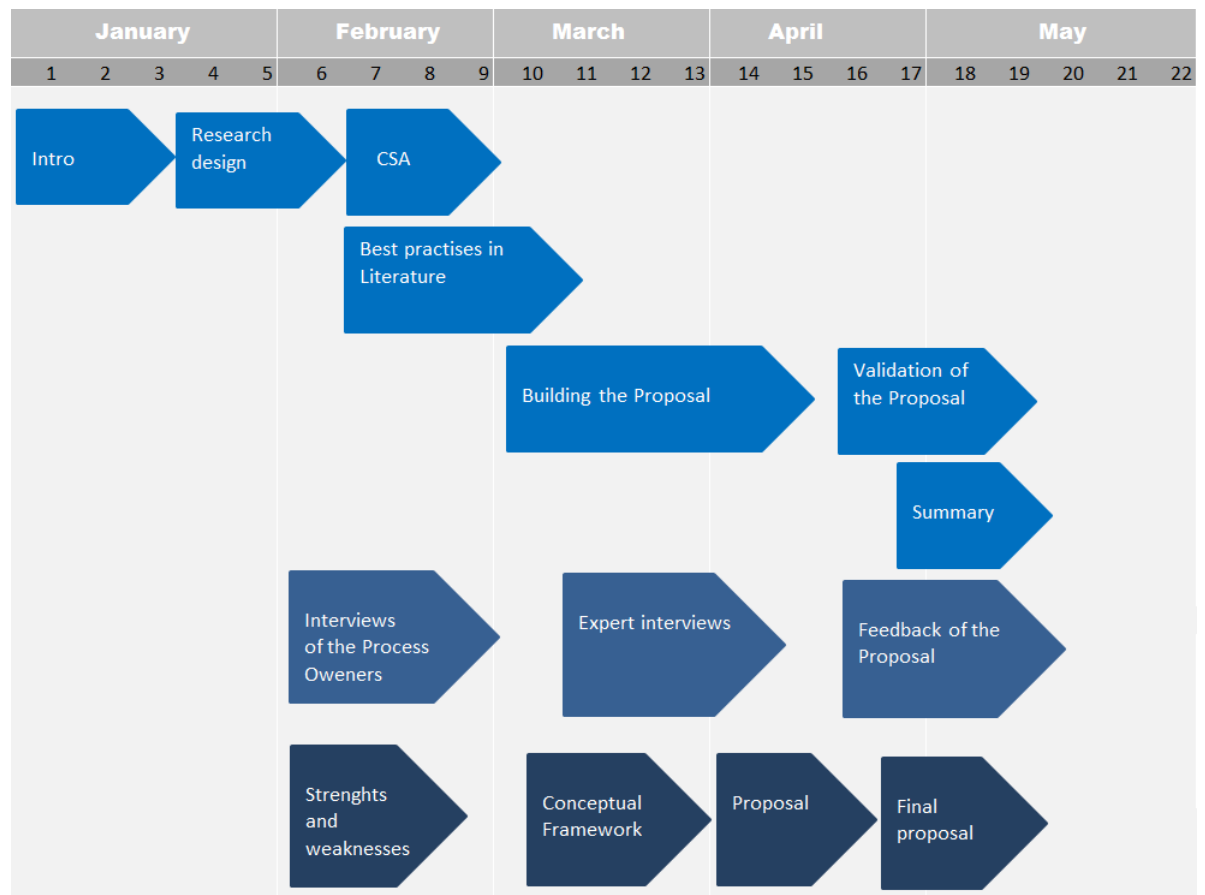
Finally, after the proposal was built, it was demonstrated to the case company's representatives and discussed during the final presentation session. The results from the final presentation were included as company feedback when building the final version of the proposal.

2.2 Project Plan and Schedule

This study was carried out as a bachelor's thesis of a student graduating from the study programme of Industrial engineering at Metropolia University of Applied Sciences.

The study was carried out from the beginning of January until the end of May 2019. To manage the timetable, the project was divided into smaller steps, which all have individual outcomes. The schedule of the study can be seen in Figure 2 below.

Figure 2. Gantt Chart



2.3 Data Collection and Analysis

The data used to conduct this study was collected form several data sources. The data used are presented in Table 1 below.

Table 1. 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 and benchmarking (Section 3 & 5)					
1	Kick off –meeting: IT Service manager, DevOps	Lync meeting	Current situation of the FSM – processes, defining the success factors	13 Dec 2018, 2 hours	Field notes

	Service manager				
2	IT Service manager	Lync meeting	Validating the project plan, process descriptions of the FSM – processes	16 Jan 2019, 1 hour	Field notes
3	IT Service manager	Lync meeting	Interview about current process and its common pitfalls	5 Feb 2019, 1 hour	Field notes
4	DevOps Service manager	Face-to-face Interview		14 Feb 2019, 1 hour	Field notes
Data 2, for Proposal building (Section 6)					
9	Development Specialist	discussion	Proposal building	15 May 2019, 1 hour	Field notes

As seen in the table presented above, the data for this study was gathered in two parts. The first round, Data 1, was collected for the current state analysis. The meetings were discussions to understand the current situation.

The second round, Data 2, was collected to gather suggestions from the case company and the project team for developing a proposal.

Table 2. Internal documents used in the current state analysis, Data 1 (Lapin 2014).

	Name of the document	Number of pages	Description
A	Case company's SLA and KPI	7 pages	Service Level Agreement
B	Case company's IT	7 pages	Organization Chart
C	Process Descriptions of the FSM - processes	7 pages	Process descriptions
D	Tickets	1 page	Tickets from the ServiceNow

3 Current State Analysis

This section presents the results from the current state analysis of the onboarding process. The current state analysis includes the process descriptions as well as the analysis of the strengths and weaknesses.

3.1 Overview of Current State Analysis Stage

The current state analysis was conducted in three steps. The first step was to collect information from the internal documents. It was relevant to understand how the onboarding process is organized in the divisions using the FSM application.

Secondly, the discussions were held to understand the processes in the different divisions and to compare them. During the discussions, deeper knowledge concerning the process was gathered. The purpose of these discussions was to gather opinions and views of the current process and the operating model. The last stage of the current state analysis consisted of analyzing all the gathered information and summarizing the development needs regarding the FSM process in Finland. The outcome of the current state analysis is the analysis of Strengths and Weaknesses.

3.2 Field Service Management in the Case Company

The Field Service Management in the Nordic divisions in the case company is executed partly by the application. The employee uses the application as a reporting tool. The application to be investigated in the study is integrated to different modules of SAP. The connection enables on-time reporting which immediately affects the business. It ensures agile invoicing as well as increases productivity and data quality.

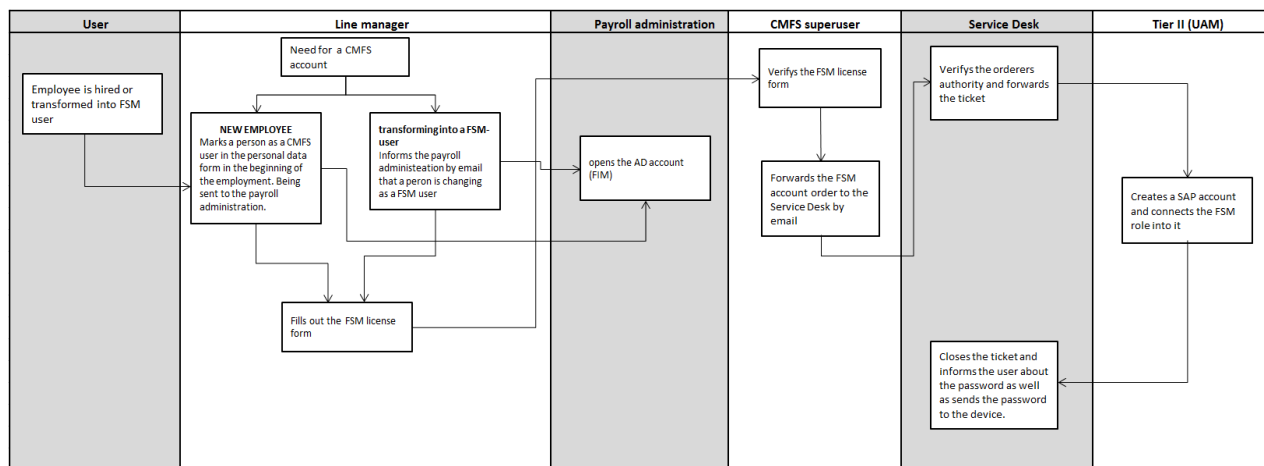
3.3 Overview of the Case Company's Onboarding Process in IT point of View

This section provides an overall image of the case company's FSM- process starting from the need for a new account to the actual use of an account and delivering value to the business. The process differs within the divisions which is why it is critical to investigate the process in a deeper level. This study concentrates on the process in Finland.

During the discussions, it was noticed that in Norway the process was the most effective when in Finland it was heavier and took longer than in the other countries. Keeping in mind that the processes should be consistent, it is efficient to identify the pitfalls and best practices from the Finnish process.

3.3.1 Process in Finland

Figure 3. FSM license order -process in Finland

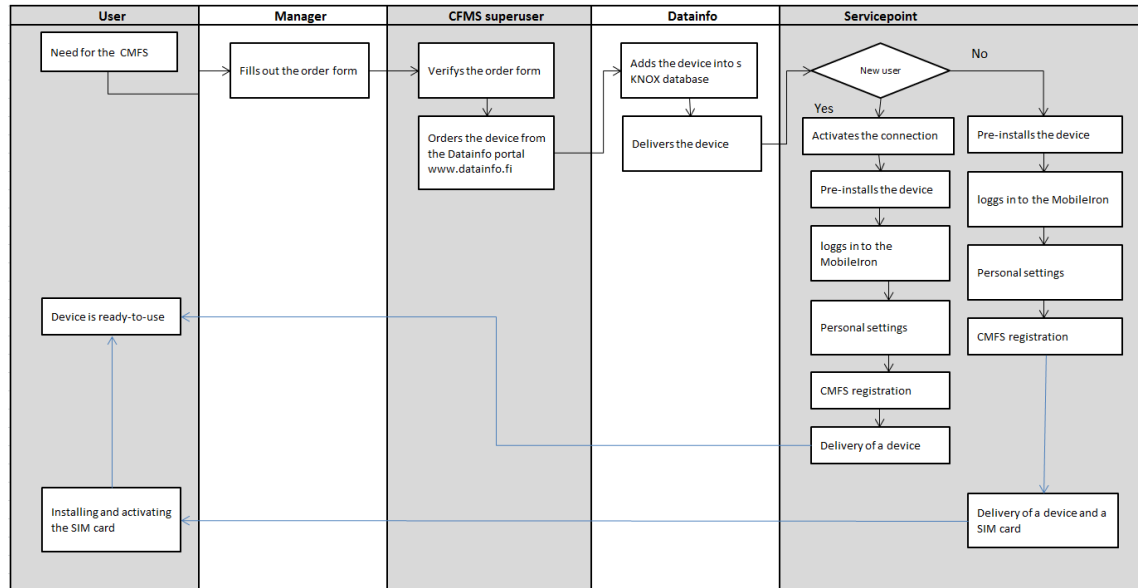


As seen in Figure 3, the FSM-process starts with the user's need for the account. If the user is a new employee, the line manager marks the person as a user to an application in the personal data form in the beginning of the employment. This document is sent to the Payroll administration. If a person already working in the company is transformed in an application user, the line manager informs the Payroll administration by email that a person is changing to an FSM user. The line manager also contacts the Service Desk to open an incident number for the request. In either of the cases, the line manager fills out the license form.

The payroll administration opens the AD account which is created by FIM (Frontend Identity Management). FIM is a system that automatically handles AD accounts based on SAP HR setting. After the AD account is created, FSM super users verify the license form and forward the account order to the Service Desk by email. Service Desk verifies the orderer's authority and forwards the ticket to Tier II which creates a SAP account and connects the FSM role into it. After the connections are made, Service

Desk closes the ticket and informs the user about the password as well as sends the password to a device.

Figure 4. Delivery of an FSM device –process in Finland



In most cases, the FSM device needs to be ordered as well. The process is described in Figure 4 above. The line manager orders the device from the Datainfo web portal. Datainfo adds the device into a KNOX database and delivers the device. The device is delivered to the Service point where the device, settings and applications are activated and installed. After the device is installed, Service desk informs the user and the line manager that the device and a SIM card will be delivered to the user. The user then installs and activates the SIM card and is able to start using the device as well as the FSM application.

3.3.2 Other Observations of FSM Process in Finland

Besides identifying the Finnish Field Service Management process, the internal experts were interviewed about the current state of the FMS in the organization. It is also worth mentioning that the information was gathered through working in the company.

It was noticed, that seemingly the Finnish process is not as effective as the other Field Service Management processes in the Nordic countries. It seems that the process includes more manual work. The process might also include unnecessary phases which

cause bottlenecks in the FSM process and makes it slower than in the other Nordic countries.

During the interviews it was also noticed, that data concerning the Service Requests is located in several systems. Most of the data is located in ServiceNow, but some information is located in SAP and its several modules.

3.4 Analysis of Strengths and Weaknesses

This section provides the key findings from the current state analysis presented in the SW matrix in Table 3 below. Strengths and weaknesses of the current process in Finland were gathered to the matrix. The matrix serves as a guideline for the conceptual framework.

Table 3. SW matrix of the FMS processes in the organization

STRENGTHS	WEAKNESSES
The roles of the process are well-described	Finnish process is considered ineffective due to the processes being slow. The order goes through many steps and people
IT services are in the transition and the need for the development is recognized	The process includes a lot of manual work
The device has been tested during the process which enables the ready-to-use device and customer satisfaction	Servicepoint has faced rush due to the device setup which has led to the longer waiting times
	The processes differ between the divisions
	Data for analyzing the tickets is located in several systems

As seen in the SW matrix, the process is described well. Roles are defined inside the IT organization. The Finnish IT department delivers ready-to-use devices and services to the user. Servicepoint test the device during the set up –process to make sure that the user can have access to the system immediately.

The Organization has changed the main vendor of IT services some years ago. That has led to the temporal dissatisfaction in the quality of service delivery. The additional

steps were added to the process in order to maintain the quality of the service. Those steps were not revised after the transition phase which has caused the ineffectiveness in the FSM process.

The FSM processes differ within the divisions and the IT has recognized that the Finnish process is inefficient. This fact and the development need have been recognized by the IT organization. At the same time, the data of the FSM –process is located in several systems as well as departments in the organization. Due to the scattered data, the process analysis may end up being challenging.

The goal is that by defining and analyzing the current processes, the IT service delivery could be more effective. The processes in the divisions would be more in-line with each other which improves the quality of the service delivery to the user. The process steps should be measured and examined for a smoother FSM delivery process.

Table 4 below presents the available knowledge and best practices focused on the weaknesses identified in the current state analysis. The available knowledge and best practices from the literature described in Table 4 are explored in Section 4.

Table 4. Identified Weaknesses of the FSM process addressed by available knowledge and best practices from literature

Key Findings from CSA	Reference in Section 4	Purpose of the Addressed Knowledge and Best Practises
The process is considered slow	4.1 Lean IT	To explore how the process could be more efficient by Lean management
Due the inefficient process, the servicepoint has faced rush and because of that, longer waiting times	4.1.1 Value Stream Mapping 4.3.5 Functions of Access Management	To explore what are the wasteful phases of the proces
The additional phases were added to the FSM process	4.1 Lean IT 4.3.1.3 Process Activities of ITIL Request Fulfillment	To explore the best practises of delivering a service
The processes are not in line between the divisions	4.3.2.2 Process Activities of ITIL Access Management	To explore the most important steps of how to deliver a service

As described in Table 4, the described weaknesses are related to the theme, that the process is not line with the user's experience of a high standard of service. The pro-

cess could be developed further by using best practices from Lean Management especially in the IT environment. It is also highly linked to Access Management and Request Fulfillment according to ITIL framework.

4 Conceptual Framework

This chapter discusses best practices to deliver the FSM –service to the end user. Best practices of Lean were used in order to inspect the ideal process for the FSM. The ITIL framework is highly linked to Lean IT and therefore Access Management will be also explored.

4.1 Lean IT

The heart of Lean is the improvement of process-based work, which then includes the IT as well. (Williams and Duray 2012: 3) The objective of Lean IT is to provide value to the business which means customer value. All the activities which are not meeting the objective should be inspected and possibly eliminated. The aim of Lean IT is to improve value, optimize flow and eliminate so called waste. (Williams and Duray 2012: 59) All the IT operations should be organized toward delivering customer value meaning that the products and services should be designed created and delivered regarding the customer needs. (Williams and Duray 2012: 59)

The activities can be categorized into processes that clearly create value, processes that do not create value but are necessary and processes that neither create value nor are necessary. The time spent helping the customer is value adding activity. ((Williams and Duray 2012: 59) This kind of activity is for example when the customer fills the order form when ordering the FSM –device. The time spent to gather information from the customer is considered necessary but it does not add value to the customer experience since the activity does not directly help the customer. This kind of activity can be for example when the Service Desk contacts the user to verify the authority. These kind of activities could be removed. Any time the customer has to wait is nonvalue-adding time and from the customer's perspective it is considered waste.

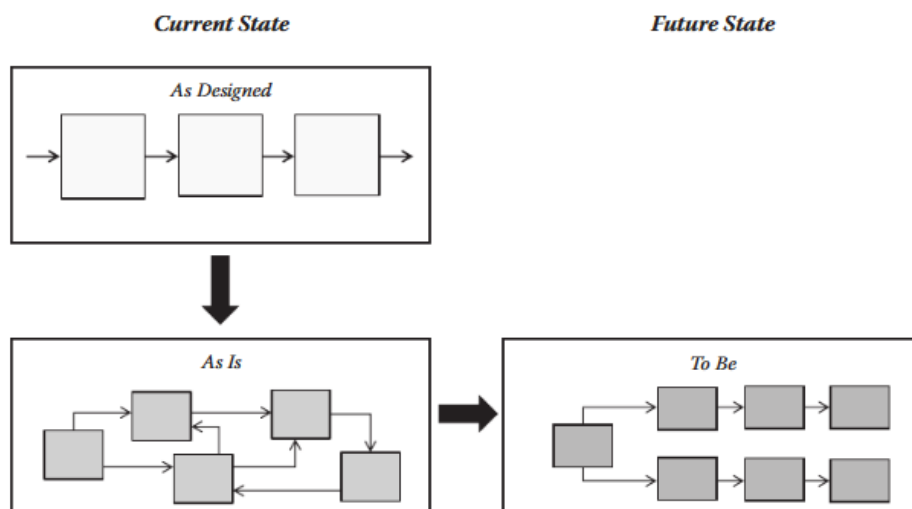
As described in the previous chapter, the waste adds no value to the customer experience and it is not necessary either. The waste can be for example overprocessing meaning that there is more processing than is needed to meet customer requirements. One type of waste is transportation. It can mean for example transferring a service ticket unnecessarily from place to place. (Williams and Duray 2012: 75-76)

In Lean IT, the improvement practices of Lean can be applied to the IT operations. The IT processes might face delays, bottlenecks, backlogs and defects which waste high amounts of time and resources in IT. (Williams and Duray 2012: 1-2) The idea behind Lean IT is to identify those inefficient phases and find the tools to improve the processes and find the solution for the problems. (Williams and Duray 2012: 4-5)

People working in the IT often recognize the need for the improvement. They might observe low-quality service delivery, inefficient processes and operations as well as low productivity. In spite of the recognized needs for the improvement, it is often noticed that the IT practitioner is too busy or has limited resources to find the solutions. The immediate needs are often handled when the systemic issues are usually being forgotten. (Williams and Duray 2012: 11-12)

The IT Process can be seen in three states which can be seen in Figure 5 below. The current state which includes the view on how the process is designed and how it actually is working as well as the future state which is the requested state based on improvement to the current state. (Williams and Duray 2012: 13)

Figure 5. States of process-based IT work (Williams and Duray 2012: 13)



4.1.1 Value Stream Mapping

Value stream means creating products and services through the process without unnecessary activities which cause waste. It can be seen as the flow of work where cus-

customer value is created. With Lean, the problems with value stream flow are analyzed, the source for the waste is recognized and the improvements are implemented. (Williams and Duray 2012: 61)

Value streams are represented in Value Stream Mapping (VSM). It is a tool for identifying the value-adding and wasteful activities. It can be illustrated as an as-is/to-be approach to the improvement. The Current State describes all the variables of the process. The Future State is made for addressing the pitfalls and flow is optimized. (Williams and Duray 2012: 61)

The VSM helps to see the whole picture of the process. It is often recognized that one department or a group of people are motivated and willing to make improvements for the service they are producing. Even with the improvements the process is not more efficient than before since the other departments are still keeping up with the old process. This kind of sub-optimization can be prevented by value stream mapping. (Martin 2010)

4.1.1.1 Metrics of VSM

The metrics of the Value stream Mapping are defined and the decision making is clear and visible. It is only possible to affect the metrics and numbers by developing the process. The metrics are divided into categories which are time and quality.

Time can be then divided into Process time (PT) and Lead time (LT). Process time means the time it takes to actually perform the work, if the work would be able to perform without interruptions. It includes all the effort the employee does for the process including doing, talking and thinking. Lead time then describes the time from the time work is made available until it's completed and passed on to the next person or department. It includes the PT as well as waiting time and delays. (Martin 2010)

Quality can be calculated from the percentage of process being complete and accurate. It describes the percentage of someone's input being "usable as is" by the person doing the work. This means that the customer is able to perform the task without having to correct information or material being supplied, add information that should have

been supplied or clarify information that should have or could have been clearer. (Martin 2010)

4.2 IT Shift Left

Shift Left focuses on sharing the service desk's knowledge within the whole organization so that the user will get more out of the service. Shift left brings the IT support closer to the operational users. It is an ITSM strategy for improving IT service delivery and support. The main roles if shift left lies in knowledge management, self-service and automation. (Van Elsacker Louisnord 2016)

The service desk and IT experts often face the same questions and requests as well as completing similar transactions that the users could handle by themselves. Shift left focuses on reducing the administrative workload by training support staff to become self-supporting. The workload can be also reduced by automating routine tasks. Those teams are then able to guide users on the use of the product or service provided. (Van Elsacker Louisnord 2016)

In practice shift lifting means that the support request solutions are being moved closer to Level 1 support so that the support lies closer to the customer interface. The aim for this is to reduce the need for moving or escalating the requests to the background teams. In the best case scenario, the customer does not have to contact the support since the user is able to solve the situation by using the solution databases, instructions or networks. (Torkkeli n.d.)

The IT achieves many benefits by introducing shift left in the organization. The benefits include increasing self-service, increasing the support proactivity, reducing the costs for the processing the request by minimizing the time spent on the process as well as the amount of people involved. When introducing shift left in the organization, the capacity of Level 1 support is being utilized more efficiently, leaning the processes and increasing customer satisfaction when the customer gets a faster solution. It also reduces the business impact when the request will be solved faster. (Torkkeli n.d.)

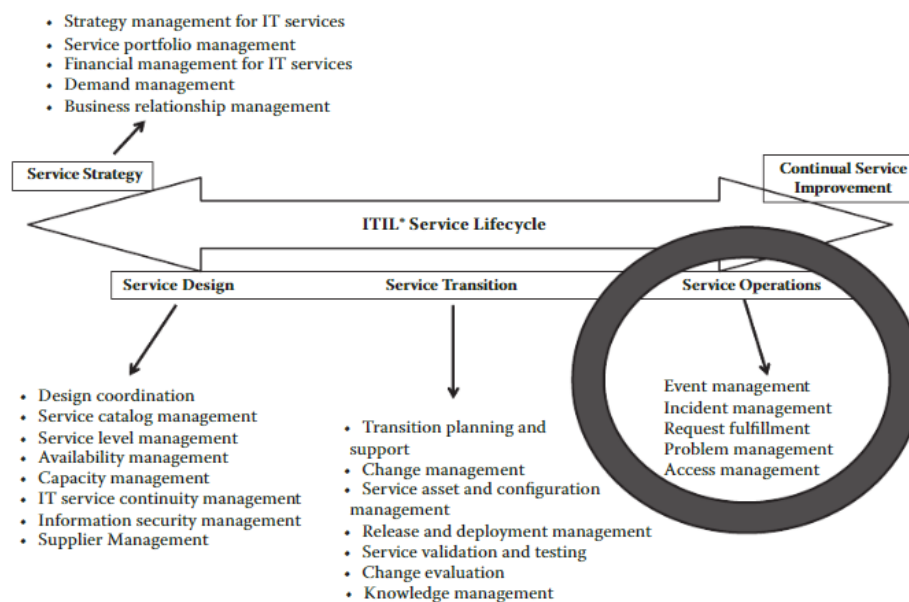
Email or other usual ways for sharing knowledge are not efficient for providing information to the individuals either working in IT or the users working in the business.

Those requests are harder to analyze and respond to employee needs. This often leads to interruptions in the process. (Van Elsacker Louisnord 2016)

4.3 ITIL

ITIL defines best practices that focus on supplying quality IT services. IT is observed as a service operation from the ITIL perspective. The Service Management lifecycle consists five phases which are Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. (Williams and Duray 2012:147-148)

Figure 6. IT Infrastructure Library (ITIL) processes (Williams and Duray 2012: 149)



All the ITIL processes are described in Figure 6 above. The Service Operation phase is considered the most important according to Lean IT. The Service Operation phase contributes the most with the Service Desk activities as well as includes all aspects of day-to-day IT operation work. (Williams and Duray 2012: 149)

4.3.1 Request Fulfillment According to ITIL

Request fulfillment is part of the ITIL Service Operation Process. ITIL define service request being a request from a user for information, advice, a standard change or access to a service. Request fulfillment is a procedure for making sure that the user will get an access to the IT services they need for completing their work tasks. The main goals for the request fulfillment are increasing efficiency and decreasing costs. (BMC 2016b)

4.3.1.1 Objectives of Request Fulfillment

The objective of request fulfillment is informing users about the services IT is providing. It also includes how to request the services and how long it will take in order to have an access. Other objectives of request fulfillment are creating specifically described process for handling service requests, to deliver all the components of the requested services accordingly and to guide with common information, comment and complaints. (BMC 2016b)

4.3.1.2 Scope of Request Fulfillment

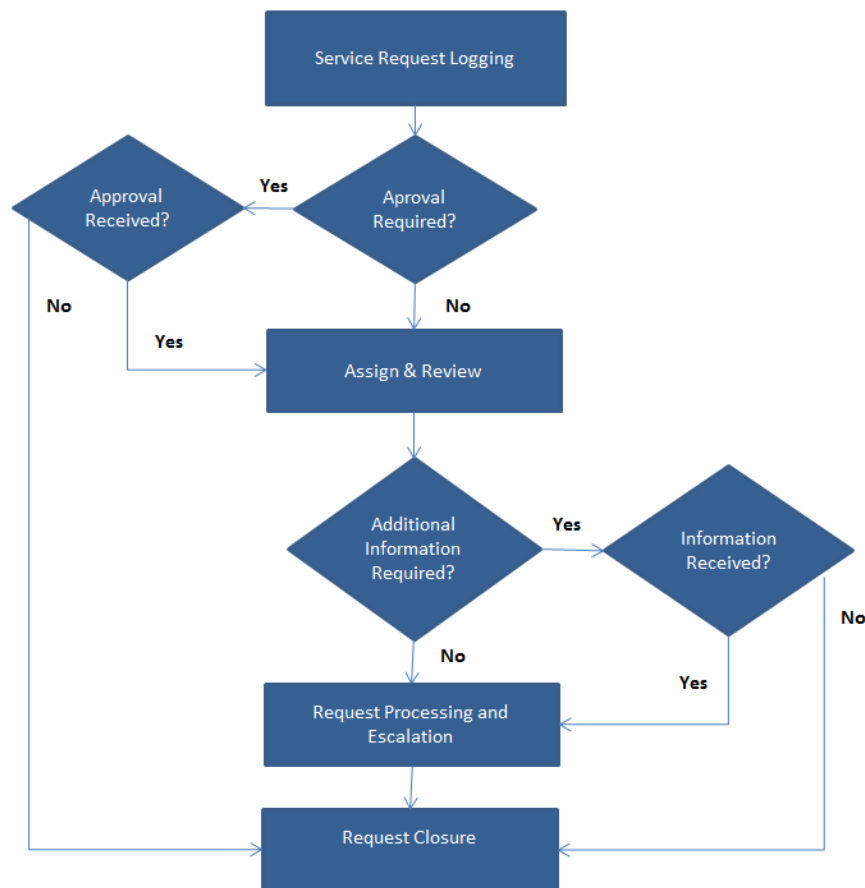
The types of offered services and received service request vary widely within organizations. The service request can be prepared beforehand which enables that the process is being able to design by the each type of service request. Those requests can be identified as different steps and documented in a process flow. It is important to consider who will handle the request, how is the service delivered, how long it will take to fulfill the service request and what happens if the service cannot be fulfilled completely. (BMC 2016b)

4.3.1.3 Process Activities of ITIL Request Fulfillment

The request fulfillment process starts with a service request from the user. The request can be made through the identified request channels like self-service portal, phone or email. When the request is registered it may be either automatically approved or sent to the approval. If the request requires approval, the steps for how the request will be handled once the approved and declined. (Brahmachary 2018)

When the requested service is approved, or when the request not require approval, the request will be assigned to the pre-defined person or team for review and fulfillment. The simple requests are often handled by the service desk. Figure 7 below illustrates the request fulfillment process. (Brahmachary 2018)

Figure 7. Activities of ITIL Request Fulfillment (Brahmachary 2018)



The requests are categorized by the status. The service desk keeps track of the statuses which are open, assigned, in progress, pending, complete and closed.

4.3.2 Access Management According to ITIL

The customer value is core value in ITIL. In ITIL, the IT delivers a service to the customers. The services are designed in order to add value to business and customer. The IT services are arranged within business service operations. (Williams and Duray, 2012: 60) Access Management is a part of a Service Operation. Access Management

is responsible for granting authorized users the permissions to use the service as well as preventing access to non-authorized users. Access Management also provides the right for users to be able to use the service. (BMC, 2016a)

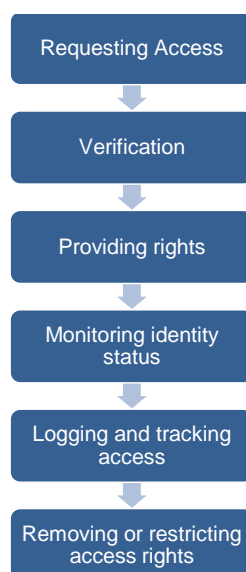
4.3.2.1 Objectives of Access Management

Access Management process manages access to services based on policies and actions defined in information security management defined in ITIL Service Design. Access Management is responsible for productively respond to request for providing the access to services, changing access rights or restricting access, ensuring that the rights are properly granted. Besides those, Access Management grant access to services, service groups, data or functions, only if they are designated to that access. Access Management is responsible for ensuring that rights for the service or device are properly used. In case the people change roles or jobs, Access Management removes access to the device or service provided to the user. (BMC, 2016a)

4.3.2.2 Process Activities of ITIL Access Management

The access management process performs six key activities which are defined in Figure 8 below.

Figure 8. Process activities (invensis 2018)



Requesting access to a specific IT service is the first step of the activity. It is done by sending the request directly from the Human Resources department, a request for change sent from the change management process, a service request from the service desk or an auto-provisioning request where the modest requests are handled automatically. The following activity is to verify the identity of the user making the request and to verify the validity of the request being made. (Kuhn 2007)

After the identity has been authorized, the access management allows the person to have access to the IT service being requested. The access rights are pre-defined during the ITIL Service Strategy but if the rights are undefined, the access management contacts the respective departments for the approval. (Kuhn 2007)

Access management has to observe the access rights given to the users. It is needed to update the rights particularly in larger organizations where there is change in the positions or requesting IT service access. After the access management has granted the users, it is also responsible for observing the users given the access for the IT service. Every activity of ITIL Service Operation processes should be overseen in order to ensure that the users are authorized and they have relevant authorization for the service. If the user should no longer have access to the IT service, the access management have to deny it. The actions depend on the user's present status. It can be either restricted or terminated accordingly. (Kuhn 2007)

4.3.3 Scope of Access Management

The Scope of Access Management is to implement the policies defined in Information Security Management. In that it enables the organization to manage the confidentiality, availability and integrity of the organization's data and confidential properties. Access Management guarantees that the users have the right to use the service, but it is the responsibility of the availability management to ensure that the provided access is available at all agreed times. (OpenCampus n.d.)

4.3.4 Value to Business

Access Management creates value to Business by ensuring that controlled access to services will allow the organization to maintain confidentiality of its information. Access management enables employees to execute their job effectively as they have the right

level access to the services. It also reduces errors in data entry or by user that has not been trained for the service. Access Management provides capabilities to audit services as well as to trace the unwanted actions. (invensis 2018)

4.3.5 Functions

In Access Management, a function is a team or group of people and the tools to execute either one or several processes or activities. Those activities are possible to divide into several departments, teams and groups in larger organizations. Service Operations has four functions which includes service desk, technical management, IT operations management and application management. (OpenCampus n.d.)

4.3.5.1 Service Desk

Service Desk is responsible for the user contact when there is distribution in a service or for service requests. It can be also single point of contact when there is a request for change. In order to provide the requested actions effectively, the service desk is usually separate from the other service operation functions. (OpenCampus n.d.)

4.3.5.2 Technical Management

Technical management provides comprehensive technical skills and the resources which are needed to support the ongoing operation of IT services and the IT infrastructure management. Technical management is also important what comes to the design, testing, release and improvement of IT service. These actions are usually divided into several technically specialized departments. Those technical management departments are in charge of the daily operation of a subset of the IT infrastructure. For that reason, people performing these activities are logically part of the IT operations management function. (OpenCampus n.d.)

4.3.5.3 IT Operations Management

IT operations management is in charge of the daily operational services required to manage IT services and supporting IT infrastructure. The performance standards which

are defined during service design are the foundation of the IT operations management. IT operations management department can be either a single, centralized department or in the other way some activities and staff are centralized and some are provided by distributed departments. (OpenCampus n.d.)

4.3.5.4 Application Management

Application management manages applications during the whole life cycle. It supports and maintains operational applications. It is also significant in the design, testing and improvement of applications part of the IT service. Application management is usually divided into departments depending the application portfolio of the organization. This enables easier specialization and more focused support. Normally, specialized staff performs daily operations for those applications being part of the IT operations management function. (OpenCampus n.d.)

4.4 Conceptual Framework

The available knowledge and best practices which were investigated in Section 4 were used in order to build the proposal for this study. The key findings from the current state analysis were addressed to the findings from the current state analysis which is described in Table 5 below.

Table 5. Conceptual Framework of the study

Key Findings from CSA	Addressed Topic from Literature	Reference in Section 4	The method how the Source is used
The process is considered slow	Lean IT, Value Stream Mapping, IT Shieft Left	4.1, 4.1.1	Using Value Stream Mapping in order to find the pittfalls in the process
Due the inefficient process, the servicepoint has faced rush and because of that, longer waiting times		4.1, 4.1.1, 4.2	To define the bottlenecks which affects to the efficiency
The additional phases were added to the FSM process	Lean IT, Value Stream Mapping, Access Management, Request Fulfillment	4.1, 4.1.1, 4.3.1, 4.3.2.	Using Value Stream Mapping define which phases of the process are not necessary
Finnish FSM process is not in line with the other departments	Access Management, Request Fulfillment	4.3.1, 4.3.2	Compare process to ITIL Access Management and Request Fulfillment to define which phases of the process are necessary

5 Benchmarking

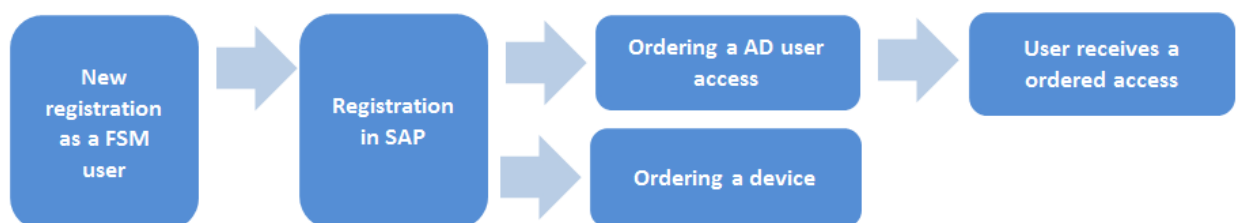
Benchmarking is a method of learning from good examples and their best practises. The aim of benchmarking is to achieve improvements in the own processes. Benchmarking helps the organization to identify weaknesses in the business and set goals for the development. (UEF n.d.) Similar processes may differ from each other significantly. The biggest differences often lie in quality and efficiency. The study focuses on internal benchmarking where the Finnish FSM process will be compared to Norwegian process. (Tuominen 2005)

In this chapter, the Norwegian FSM process is analyzed in order to identify best practices for the Finnish process. It has been noticed that the Norwegian process is the most effective and fastest.

5.1 Benchmarking the Norwegian FSM Process

Figure 9 describes the Norwegian Field Service Management order process. In Norway the line manager recognizes the need for a FSM account. In connection with new appointments, the AD account with e-mail is created automatically from SAP HR in connection with registration. Access to FSM is ordered in the Service Portal after the AD account is created. The service request is usually posted in the portal by one of the assistants at the department (Coordinator, Dispatcher and Secretary) then approved by the user's Line Manager. The request is picked up, assigned to resolver group that creates the account and communicate according to instructions.

Figure 9. Norwegian FSM process



FIM (Frontend Identity Management) automatically creates an AD account based on setting in SAP HR. After the AD account is created, the FSM -access can be ordered in Service Portal. If the person is transformed into a FSM user, payroll may also change this setting for an existing employee. FIM then picks up this change and applies changes to AD accordingly. The line manager orders the license form the service Portal which is automatically delivered to the Service Desk.

The device delivery process in Norway starts with the need for the FSM –device. The line manager orders the device from the service Portal. The order goes directly to the Datainfo, where the device is added to the KNOX –database. Datainfo delivers the device to the user who sets the device up. The user also installs and activates the SIM card.

5.2 Best practices from the Norwegian Process

This section provides the key findings from the benchmarking presented in the SW matrix in Table 6 below. Strengths and weaknesses of the current process were gathered to the matrix. The matrix will form as a guideline for the proposal.

Table 6. Strengths and Weaknesses of Norwegian FSM process

STRENGTHS	WEAKNESSES
<p>The roles of the processes are well-described</p> <p>The process is considered fast and efficient.</p> <p>The order can be done from the service portal and the the access can be automatically ordered based on the service catalog</p>	<p>The end user has a responsibility to set up the device which may cost errors in the setup phase</p>

Similar to the Finnish process (Section 3.4), the processes are well-described also in the Norwegian FSM process. The roles and responsibilities are described in the Service Catalog according to ITIL Service Design. The process is also considered fast and efficient. The order can be done from the Service Portal and the access can be automatically ordered based on the Service Catalog.

In the Norwegian process, the end user has more responsibility to set up the device and the connection after the Service Point has sent the device to the end user. This might cause errors which can affect the actual time the employee is able to use the device and then create value to the business.

The process and the process steps can be seen easily in the internal information platform online. The processes are described as well as the contact persons and persons in charge.

A well-functioning part of the Norwegian process that should be incorporated to the Finnish process is increasing the responsibility of the end-user. The order can be done from the Self-service portal which should be implemented in the Finnish process as well. The users should be informed about the phases and instructions similarly as in Norway.

6 Building Proposal for Field Service Management Process

This section describes the proposal building stage for the company. The proposal is based on three entities: (1) Analysis of the Finnish FSM process including the data of employees which have ordered FSM access and/or a device, (2) Comparing the Finnish process to the Norwegian process and (3) a giving suggestions of the possible phases of improvement. The steps for building the proposal are described first, then the key findings from the study are described and finally, the actual proposal is created.

6.1 Overview of Proposal Building Stage

The section describes the proposal building stage from the beginning to end. Figure 10 below includes the steps for building the proposal.

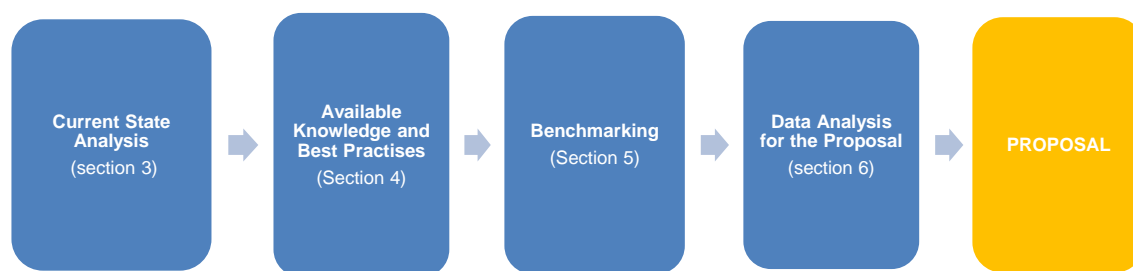


Figure 10. Steps for building the proposal

As described in Figure 10, the proposal is built in five steps. The first step was to investigate the current state of the FSM process in Finland (Section 3, Data 1). Then the knowledge available were explored based on the findings from current state analysis (Section 4, Conceptual Framework) Then, the Norwegian FSM process were investigated for the benchmarking (Section 5, Data 1). Fourth, data from the FSM process were analyzed in order to build a proposal for the company (Section 6, Data 2).

6.2 Key Findings for Building the Proposal

The chapter presents the key findings found during this study. The key findings are presented according to the proposal building steps which are current state analysis of

FSM process in Finland, best practices from literature for improving the process and Data 2 presented in Section 6.

6.2.1 Key Findings from the Current State Analysis

The current state analysis (Section 3) was conducted by examining the internal documentation and by discussing the process with internal experts. The current state analysis provided an understanding of the FSM processes in the organization as well as the deeper knowledge of the process in Finland. The key findings from the current state analysis are presented in Table 7 below.

Table 7. Key Findings from the Current State Analysis

Strenghts	Weaknesses
The roles of the process are well-described	Finnish process is considered uneffective due to the processes being slow. The order goes through many steps and people
IT services are in the transition and the need for the development is recognized	The process includes a lot of manual work
The device has been tested during the process which enables the ready-to-use device and customer satisfaction	Servicepoint has faced rush due to the device setup which has led to the longer waiting times
	The Finnish process is not line with other FSM processes in Nordics
	Data for analyzing the tickets is located in several systems

Table 7 presents the strengths and weaknesses of Finnish Field Service Management process in the organization. The results of the analysis can be found more detail in Section 3.

The discussions with the company's experts provided information that should be taken into account when building the proposal. These observations were targeted especially for the Finnish Field Service Management in the company. The findings are presented in Table 8 below.

Table 8. The expert insights for the FSM process development

Observation	
1	The process should be automated as much as possible
2	The process should be easily measurable
3	The instructions to the user has to be precise so that the user could take more responsibility of setting up the device
4	Business requirements should be taken into account when delivering the service

Table 8 presents the key findings from the discussions from the organization's experts to observations how to develop further the FSM process. The observations indicate that the process should be developed further so that the end-to-end lead time would be less than currently.

6.2.2 Key Findings from Available Knowledge and Best Practices from Literature

This chapter describes the most important findings from the section 4, available knowledge and best practices from literature. In chapter (4.1) *Lean IT* it was noted that the processes usually include wasteful activities which should be eliminated from the process. The activities can be categorized to three groups which are the processes that clearly create value, the processes that do not create value but are necessary and the processes that neither create value nor are necessary. Wasteful processes are identified as the last group. The analysis is described in Table 9 below.

Table 9. Analysis of the necessary processes

Processes that create value
Order form is filled out and sent to the SD
FSM and SAP access is granted to the user
User is informed about the access
Processes that do not create value but are necessary
Service Request received to the Service Desk
Wasteful processes
Contacts and verifications by email
Pending the AD approval from HR and Payroll

Value Stream Mapping (Chapter 4.1.1) is recognized as a tool for identifying the value-adding and wasteful activities. It can be illustrated by current and future states. The future state is made for addressing the pitfalls. In Value Stream Mapping the process is analyzed by the pre-defined metrics which are time and quality. The Value Stream Map is presented in Chapter 6.2.2 in Figure 11.

In chapter (4.3) *IT Shift Left* it was noted that when moving the support request solutions closer to Level 1 support the administrative workload will be reduced. The aim for the Shift Left is to minimize the need for moving and escalating the requests to the background teams. The target is to minimize the actual contacts between the user and IT support.

In chapter (4.4.1.3) *Process Activities of ITIL Request Fulfillment* the process was identified as well as the required process phases which include service request logging, approval, assignment and review, additional information, request processing and escalation and request closure. In chapter (4.4.2) *Access Management according to ITIL* discusses the IT responsibilities for granting the users with an access to use the services. *The functions of Access Management (4.4.5)* are service desk, technical management, IT operations management and application management.

6.3 Results of the Data Analysis for the Proposal

In the proposal building stage, the service request tickets were analyzed in order to build a Value Stream Map from the Field Service Management process in Finland. The purpose of the data analysis was to find the bottlenecks and pitfalls from the process and from that, create a proposal for the company of how the Field Service Management in Finland should be developed further. The data analysis is presented in Appendix 1.

The initial proposal for the Field Service Management process was created by analyzing the process for the employees that have requested an access to the FSM in March. The mobile indicator (FSM user) was added to the observed employees during March, but the employee may have had the official starting date in HR sooner or later. The purpose of the analysis is to find the wasteful steps and propose a development ideas based on the findings.

Table 9 below presents the duration of the access delivered to the user. The process starts when the superuser has received a FSM order and forwards the request to the payroll administration and service desk. The process ends when the service desk sends an email to the superuser informing that the access is granted and the employee can be informed about the access. The lead time is presented in the table as well.

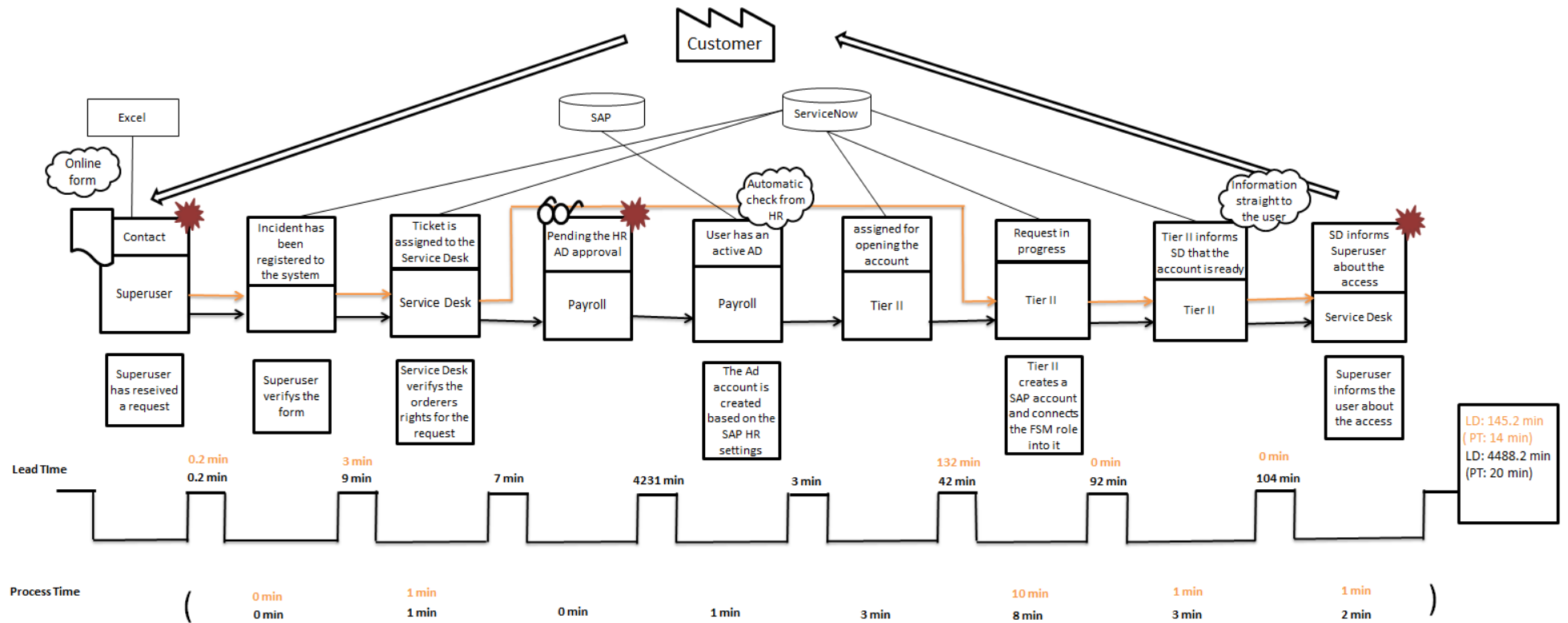
Table 9. Requested FSM access processes

EMPLOYEE	START	END	LEAD TIME
H	15.3.2019 12:18	15.3.2019 15:08	0 days 02:49
K	2.4.2019 13:07	2.4.2019 16:33	0 days 03:25
E	6.3.2019 8:41	6.3.2019 15:09	0 days 06:27
I	12.3.2019 13:03	13.3.2019 10:08	0 days 21:04
L	29.3.2019 14:42	1.4.2019 12:33	0 days 21:50
F	5.3.2019 12:32	6.3.2019 15:07	1 days 02:34
G	7.5.2019 10:00	8.5.2019 14:33	1 days 04:33
A	4.3.2019 9:37	5.3.2019 14:16	1 days 04:38
B	4.3.2019 9:37	5.3.2019 14:16	1 days 04:38
J	25.3.2019 9:10	27.3.2019 12:19	2 days 03:09
D	1.3.2019 10:11	4.3.2019 14:27	3 days 04:15
C	1.3.2019 8:08	4.3.2019 14:22	3 days 06:14

The chosen processes express the variety of how the Field Service Management accesses are granted for the user. The lead time varies from 2 hours and 49 minutes to 78 hours and 14 minutes. Delivering access for the employee K took 3 hours and 25 minutes when the process took 76 hours and 15 minutes for the employee D. When looking at the incident tickets from ServiceNow and presented in the Value Stream Map in Figure 11 below.

The colored rows in Table 9 represent the processes which are described in more detail in the Value Stream Map. The processes can be separated in two groups which were recognized during the analysis. Duration of the process was highly depending of the involvement of payroll administration and the amount of manual work in the process. In the study, the incidents were analyzed by the duration as well as the descriptions of the processes. The processes were divided into two groups based on the process steps. In order to find the pitfalls, the both types of them were described in the Value Stream Map. The data for the analysis can be found in Appendix 1.

Figure 11. Value Stream Map of the FSM process in Finland



From the Value Stream Mapping, it was noticed that the process includes manual phases which causes bottlenecks to the process. The wasteful phases are marked as red notice sign in the VSM. HR Approval includes manual work which should be eliminated from the process. It can clearly be seen that when the phase required manual actions from the expert, the duration between the different steps is longer. In the both processes the first phases are similar. The duration of the steps did not vary dramatically. Even when the steps partly required manual actions, the leads time stayed in the permitted limits. As seen in the first phase, the customer – in this case the line manager or the employee – delivers the order as an Excel document to the superuser.

As it can be seen from the Value Stream Map and by observing the lead times of each process found in Appendix 1, the difference mostly lies in the following steps where the Payroll has added their confirmation to the granting the access. Payroll adds their confirmation which then allows the AD account to be created from the HR automatically based on the SAP HR settings. The significant difference in the lead times affect to the trustworthiness of the Field Service Management access order process.

In the process, the tasks have been partly handled by email. The incident is also forwarded to Tier II for the account opening and returned to the Service Desk. Those phases were handled manually which have caused unnecessary waiting time to the process.

6.4 Proposal

The initial proposal is presented in this chapter. Based on the ticket analysis the process should be revised and wasteful steps should be eliminated (see Figure 11). Process includes wasteful phases which should be eliminated from the process. According to Williams, H. and Duray, R. (2012), wasteful steps can be identified to the groups. Table 10 presents the identified steps from the Field Service Management process.

Table 10. Wasteful phases in the FSM process

Waste description		Recognized waste
Transportation: Moving things unnecessarily from place to place	Unnecessary transfer of a service ticket	Tier II informs the Service Desk about the access, SD forwards the ticket to the superuser
Motion: Unnecessary movement in performance of a task	Searching for information that is required to resolve tickets, Searching for solutions or assistance from others via email, phone, instant messaging, or blogs	Superuser receives the email from the user or the line manager, Service Desk and Superuser have to confirm that Payroll has added AD to the user
Inventory: Too much work-in-progress	Calls or tickets waiting in queue, Backlog of pending tickets, Work sitting in in-boxes (physical or virtual), or partially completed tasks or documents	Bottlenecks appear when Tier II or Payroll have a long queue and the tickets are passed by many phases and persons
Waiting: Delays of any sort, waiting for parts, for resources, for decisions	Consistently slow system response times, Time spent waiting for reviews, approvals, decisions, or additional information, Slow employee on-boarding, or new employees waiting for phones or equipment	Any phase which requires manual work causes waiting time

According to Value Stream Mapping, wasteful phases should be eliminated. The wasteful phases are marked as a red notice sign to the Value Stream Mapping in Figure 11. The process should be evaluated so that the IT can meet the business requirements faster and the resources will be used effectively. Removed phases of the process are described in Figure 12 and the improved version of the Field Service Management process is described in Figure 13 below.

Figure 12. Removed phases from the FSM Process

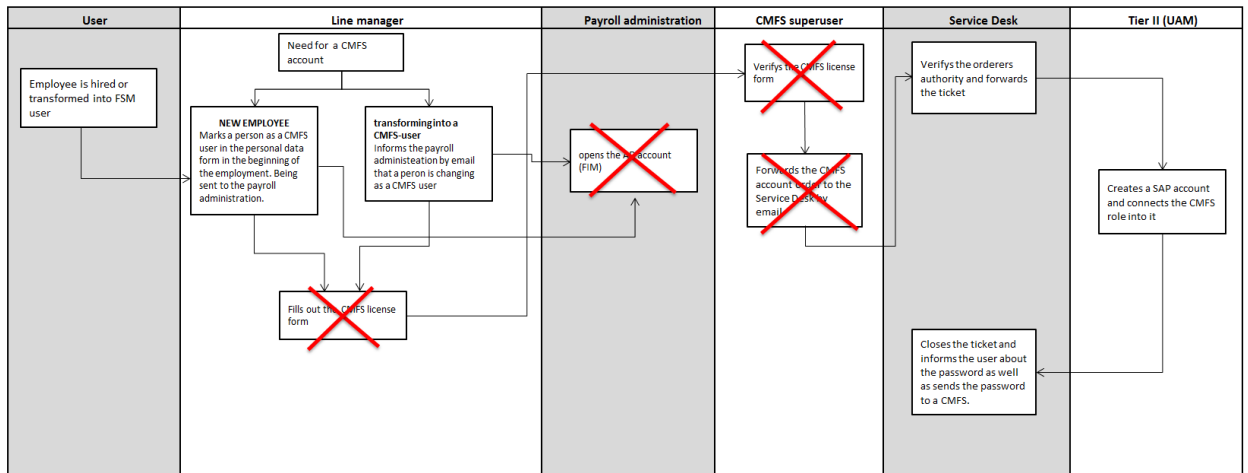
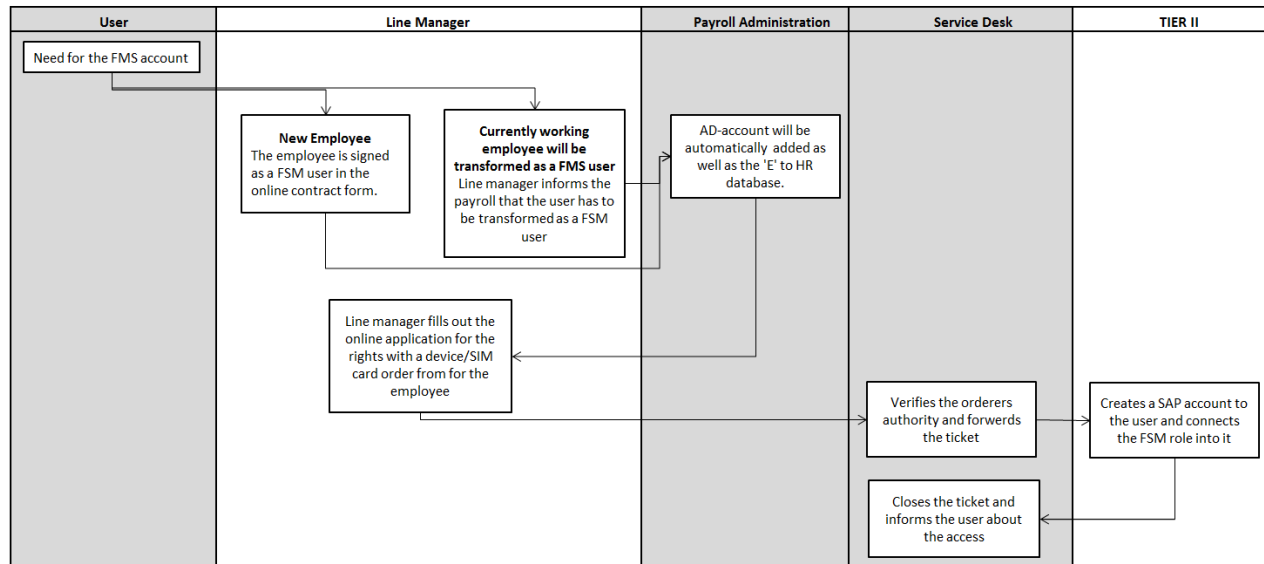


Figure 13. Improved FSM process in Finland



As shown in Figure 9, the process starts by the employee onboarding. When the Line Manager hires the employee, the information should go straight to the Payroll and HR. The online contract form should be linked to the HR database and FIM, where the AD account is created. After the accounts are created and the information has been set to the database, the Line Manager will get information that the rights and the device can be ordered online.

Service Desk receives the application and verifies the orderer’s authority. When the order is accepted the request will be sent to Tier II where the SAP account is created

and FSM role connected into it. Tier II informs Service Desk that the account is set up. Service Desk informs the user about the access to the service.

As a benefit of improving the service it is expected that the process should be faster and the resources of the involved parties should be allocated more effectively. For next steps to be taken the company should investigate how the databases and system could be linked together. It would enable that the information would be valid and the process would be automated.

7 Summary and Conclusions

This section presents the summary and conclusions of the thesis. The section consists of four sections which are an executive summary, next steps of the proposal, evaluation of the thesis and final words.

7.1 Executive Summary

Development in the information technologies and practices has forced industrial companies to improve their IT functions in order to achieve the end-to-end service levels and to respond to the business requirements. To stay on top of the development, the construction industry with other industries has to implement new technologies and applications in order to enable the business to be more productive.

The technological transformation has forced the case company to research advanced ways in adapting digitalized applications to the daily operations. The maturity of the digitalization in the case company alters within the operating countries. The employees in the Nordic countries use digital services as work tools widely. Cloud based applications are implemented into daily operations and technicians are using the Field Service Management (FSM) –tool. This study concentrated on the IT department and the FSM access for the onboarding employees in Finland.

The objective of the thesis was to propose improvements to the end-to-end FSM process in Finland. The outcome of this study is the proposal of improvements to the FSM process in Finland. The proposed process includes an analysis of the defined steps and best practices of delivering the services to the users by the IT point of view.

The thesis was divided into eight stages. The project began by introduction to the business challenge and defining the objective for the study as well as the outcome and the scope. The second stage describes the research design and the schedule of the study.

In the third stage, a current state analysis was conducted to investigate the current state of the FSM process in Finland. It was performed by examining the case company's internal documents and by interviewing the internal FSM experts. The key findings from the current state analysis were presented in the matrix of strengths and weak-

nesses. The most critical weaknesses of the FSM process are described in Table 11 below.

Table 11. Identified weaknesses of the process

Weaknesses	Solution	Benefit
Ineffective process due the multiple steps and people handling the requests	Removing the wasteful steps defined in Figure 12	Process being faster and efficient
Process includes a lot of manual work.	Using a online form when ordering the service	Request will be automatically signed to next person
Rush and long waiting times in Service Point due the device setup	Revising the method of the user should have more responsibility in setting up the device, ordering the device from the service portal	Information is already gathered when ordering the device and the Service Point does not need to verify or collect information
Finnish process differs from the FSM processes in Nordics	Using online form when ordering the service	Process being similar in every country in Nordics
Data for analyzing the tickets is located in several systems	HR and Payroll integration so that the process is automated	Removing unnecessary waiting time

The available knowledge and best practices were explored in the fourth stage. The Lean management in IT environment was investigated in order to develop the process to become faster and more effective. In addition to that, the ITIL Request Fulfillment and ITIL Access Management were investigated as well as the IT Shift Left.

It was noticed during the current state analysis that the FSM processes differ within the divisions. The Norwegian process is recognized the most effective. In the fourth stage, the Norwegian process was benchmarked in order to find the solutions to the Finnish process. The most important finding was the automated online order which goes straight to the Service point.

The Finnish Service Request –tickets were analyzed in order to create the Value Stream Map and to find the wasteful phases. Finally, the initial proposal was validated by the company’s FSM expert.

The proposal should improve the FSM process in Finland. The proposal gives suggestion for improving the Field Service Management process. As a result, the organization can compare the results of the study to their working environment and include the study to the process improvement strategy.

7.2 Next steps and Tips for Implementation of the Proposal

The study defined the current state of the Field Service Management process in Finland and included suggestions for improving the process. The thesis included a VSM of the process. Data for the map was gathered from the internal databases including SAP and ServiceNow. The Value Stream Map was built based on the service request – tickets. The Process time was estimated from the data. The lead times are suggested to observe in the IT department with the external service provider.

The organization has put a high amount of effort to improve the performance of IT services. The study can be included to the evaluation of other IT services and observed together with other IT Service Management development projects. It was also noticed that the improvement of the current process required collaboration with other departments such as Human Resources and Payroll Administration.

7.3 Study Evaluation: Objective vs. Results

The objective of the study was to propose improvements to the end-to-end FSM service order and delivery process in Finland. It was identified that the proposed process would also include analysis of the defined steps and lead time of the process including the best practices of delivering FSM to the user.

The proposal was built based on the current state which was defined with the internal experts. The weaknesses of the current process were identified and the development proposal was gathered through the best practices from the literature and benchmarking the Norwegian process as well as analyzing the service request –tickets.

Overall, when comparing the outcome and objective identified in the beginning of the study – from the author point of view – the study has achieved what it set out to do and could help managing the order process more effectively.

7.4 Final Words

I am grateful for the opportunity to develop my professional skills as well as use the existing knowledge in a real business environment. I am thankful for my co-workers who have pushed me towards the goal and shared their expertise and time with me. I would like to thank the IT department for trusting me on this as well as my lecturers and all the people who have helped me during this project.

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Appendix 1: List of analyzed Service Request –tickets

(Only for Case Company use)

