

ERP Implementation - Case study

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<p>This Master's Thesis is a case study about ERP implementation for a service company in Finland. The target company is a subsidiary of a European corporation offering expert services mainly for B2B sector. The development of the new ERP has been done in China, with a target to deploy new system in over 20 countries. Business requirements for the development are collected both from Finland and China subsidiaries.</p> <p>The purpose of the case study is to suggest deployment plan for Finnish company and make an evaluation between the old process and the new one. A qualitative research was made in order to find out best practices from previous similar projects. Based on this a deployment plan is suggested. The process evaluation is limited to the Offer process only and it is done using a Lean tool Value Stream Mapping.</p> <p>The theoretical background for thesis is based on Business Process Reengineering and Lean methodology. These theories were used also in the new system development to improve the existing processes.</p> <p>The suggested deployment model is, as of writing this, taken into practice for the ongoing deployment. The evaluation of the offer process revealed that the new process is much more efficient with a faster cycle time and it is assumed that the quality and number of errors will be lower in the future.</p> <p>At the end of the thesis you can find Abbreviations about the terms used. I suggest reader to have it available when reading the thesis, to help on understanding all the terms used in the text.</p>	
Keywords	
ERP, deployment, VSM, Lean	

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1 Introduction

1.1 Case company

The case company is a subsidiary of an European based corporation. In Finland, it is consisting of two separate legal entities. The company operates in Finland at six different locations in Helsinki, Espoo, Kotka, Tampere, Tuusula and Rauma. There are about 200 employees of which majority works at Helsinki main office. Total revenue for the year 2018 was about 23 mEUR. Company is owned by a Swiss based corporation established already at 1878, which is listed at Zurich stock exchange. Corporation is the world's leading inspection, verification, testing and certification company operating in over 2400 offices all around the world. Globally there are working over 97 000 employees and the total revenue for the year 2018 was about 6000 mEUR. (SGS 2019)

In Finland, the company's main customers are from B2B sector. The main services provided are testing- and certification services for electronic devices, laboratory analytics and inspection of petrochemicals, gases, soil and water, systems certification services and inspections of different goods. The company is exclusively providing professional services and does not produce or sell any goods.

1.2 Purpose

Company is organized in Finland into nine different business lines. Each of those is specialized for providing professional services for a specific products or operations. There are common support functions for the business lines like Finance, ICT, HR and Sales. A common financial system is used for accounting. In addition to that there are several execution systems used for order processing, job management and reporting in different business lines.

There has been a corporate standard for Order To Cash (OTC) process available already for several years. This process covers customer data management, order registration and invoicing, but not the actual execution process management. The corporate deployment strategy has been to deploy OTC process for the different affiliates based on their revenues using 80/20 principle, so that affiliates making the 80% of the corporate revenues will be implemented first. Now this 80% has been reached and rest of the affiliates not using standard OTC process are encouraged to deploy it as well.

In Finland, one of the legal entities has already deployed the standard OTC process three years ago, while the other has not, due to legacy Enterprise Resource Planning (ERP)

system in use, which covers the OTC process as well. This target business has expanded operations globally during the past years. Most of the expansion has occurred in Asia, mainly in China, South-Korea and Taiwan. Thanks to this growth, a corporate Execution System (ES) development project for this business was launched back in 2017, with a target to develop a new standard execution system for this business. The key stakeholder organizations, Finland and China, were selected as the leaders for this project. They were requested to make the requirement data collection, planning, development and propose deployment plan for the new system. The project organized so that overall project and development responsibility was given to China, while Finland and China businesses were responsible for the requirement data collection, testing and approval of the new process.

1.3 Motivation

I am working as an IT Manager for the target company Finland branch. Company's different business lines are requesting tools from IT, which support their business to allow them work more efficiently. By doing this case study I will support my work and find out the best practice to implement the new ES being developed. I have also been involved in the new system requirement data collection and development project.

1.4 Objectives and research questions

One of main objectives of the study is to document key processes of the current ERP system and find out what problems users or business are facing when using them. The main ERP processes concerned are offering for the customers, project- and job management, invoice data collection, sample inventory management and various KPI reporting. At the moment, there are multiple, separate,

systems interfaced to the legacy ERP, making them dependent of each other and also difficult to use. Before the actual ES implementation can start, business needs to think also about how to improve their business processes to be able to serve their customers more efficiently. We need to identify where we could remove duplication, delays, manual work and improve communication. The research questions (RQ) to be answered in this study are:

- RQ1: What good practices and problems have been found in earlier ES or OTC process deployments?
- RQ2: What is the optimum offer process for target company when system is in use
- RQ3: What is the optimal deployment method & schedule for new process in Finland?

1.5 Scope

The ES development project is driven by Finnish and Chinese organizations, while development is done in China. The new system is already in use in China and Hong Kong, having about 1000 users in several locations. However, thanks to the differences between Asian and European organization and processes, the service delivery model differs slightly between these two continents. Therefore, we could not use same ES process for every deployment and decided to modify it a bit for our needs.

This resulted in parallel development for some parts of the ES of which the Asian version is already deployed in earlier mentioned countries. Finland will be the first European organization to deploy the new ES process and it is important to get experiences and learn from them for the next deployments. For that reason, I concentrate only for the European version of the ES process.

Case company's total service delivery process is quite complex and too wide to be fully covered in this study. Therefore, I decided to touch into it only on a general level highlighting the main processes and systems before and after the development. I selected one process, the Offer process, for more detailed analysis and compare the old process for the new one with selected Lean tool.

Another interesting topic to study is the deployment since that, as of writing this, has not yet finished. For the deployment part, I decided to make a qualitative study by interviewing some persons from the case organization, who have experiences from previous similar projects. Based on the interviews I proposed a deployment process for Finland. While writing my study the deployment has already started and it is following the process I am suggesting here.

1.6 Structure of the thesis

The case study begins with a short introduction to the target organization, including purpose, motivation and scope for the study. Next, I introduce the methodology, which is followed by theory chapter.

From the theory, I move on to the results and analysis, where I describe the present and future systems and processes on a high level and analyze the offer process in more detail. The research results are also presented and analyzed there. Lastly, I propose a plan for the deployment process and make my conclusions about the case study. The case study structure is introduced in the Figure 1:

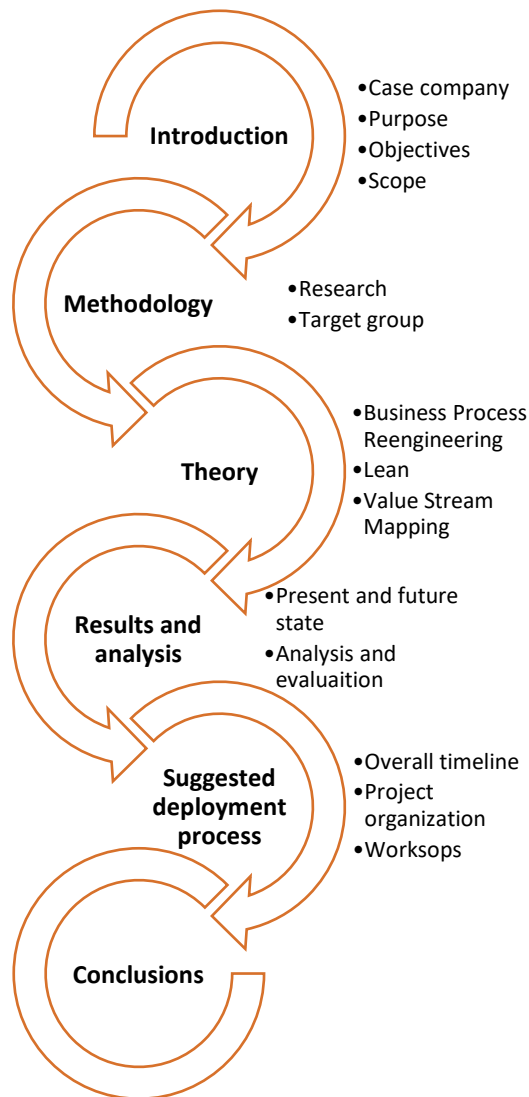


Figure 1. Case study structure

2 Methodology

2.1 Research approach

The research is conducted using qualitative research methods. Qualitative research method was selected since it is better for finding answers for questions like why, how and in what way? It is not just to get limited answers and numbers and analyze them statistically, but to gather information in interviews from stakeholders. Qualitative research is an interpretative and subjective exercise, and the researcher is participating in the interviews from the beginning and starts to get information instantaneously, not after collecting the data like in the quantitative method. (Lasey & Luff 2007)

To be able to answer to the first research question (RQ1) “What good practices and problems have been found in earlier ES or OTC process deployments?”, couple interviews we arranged. These interviews about earlier ES and OTC deployments were conducted during a one month period in Autumn 2018. In total five persons were interviewed and sessions were recorded. Interviewees were selected based on their past participation in similar change projects. The aim of the interview was to create an open dialog with the person to be able to find out the pros and cons of the person’s experiences in the past projects. I had a draft interview structure, which I used as a basis for the session. The interview structure could be seen in the figure 2:

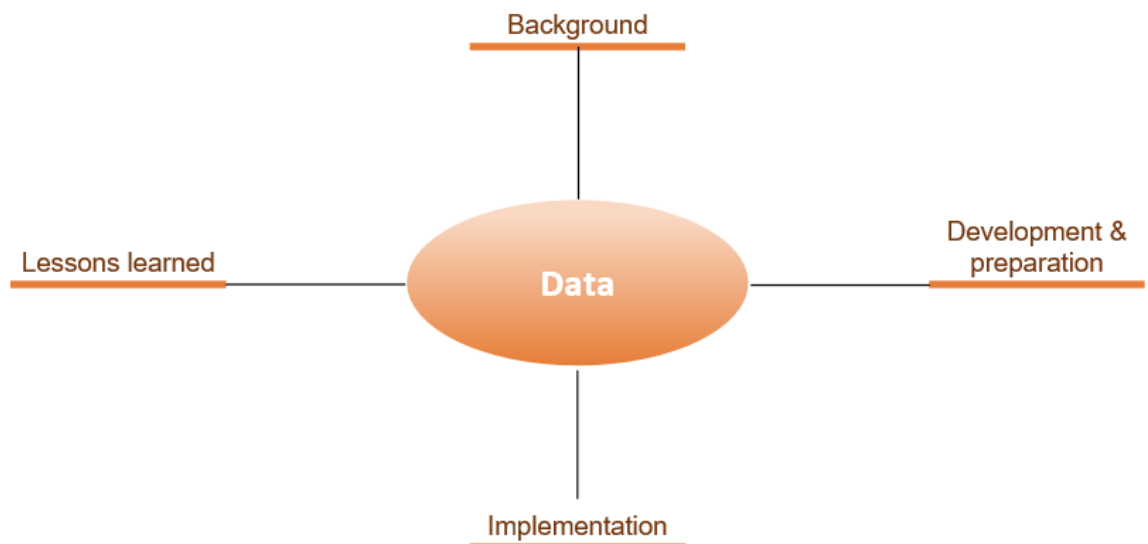


Figure 2. Interview structure

2.2 Development plan

The data collection is divided into different phases. First there is a current state analysis, where data will be collected by interviewing the business key stakeholders. The aim of this phase is to gather as much data as possible from the current systems, processes and previous implementations. Actually, this data collection has been ongoing since the development started in 2017/Q2 for the new execution system. Before starting the deployment, a kick-off meeting is arranged. During this meeting, the development team and business representatives finalize the deployment plan and decide the schedule for it.

As a result of the data collection and the development done in 2017-18, the new execution system process is presented. This phase is arranged in a form of Conference Room Pilot (CRP) workshop. The CRP process documents business processes with gaps and identify the strategies to cover these gaps. The approach to remedy the gap is either customize the ERP application or modify the business process to meet the ERP process (Grijzenhout, Dan. 2015).

Thanks to the fact that the invoicing process will not be part of the ES system being implemented, but delivered as a corporate standard OTC process, a separate OTC workshop is arranged. During this workshop, the OTC process is introduced for the people concerned and a basic training is given. This workshop is arranged together with corporate OTC implementation team representatives for the target audience.

OTC workshop is followed by the User Acceptance Testing (UAT) workshop, where the new execution system processes will be tested and eventually accepted. According to Kohlman: *"The purpose of testing is to prove a system, software, or software configuration doesn't work, not that it does"*. In practice this means a planned, formal process of testing by the business, in order to find out if the application meets the acceptance criteria and allows the business to determine whether the business can accept the system into use or not (Kohlman, Ronald. 2011)

In between these formal workshop business teams are responsible of arranging training for the end-user with a help of super- and key-users. The purpose of the workshops is to train the super- and key-users so that they can support the end-users i.e. train the trainer principle. Following table 1 gives an overview to the implementation schedule:

Table 1. Deployment schedule

Topic deadline	Topic	Participants
Q2 2017 - 15 th December 2018	Current ERP and OTC system review and new system development	Finland business representatives, ES development team
31 st December 2018	Implementation planning finished	ES development team, Finland business representatives
14 th -18 th January 2019	Kick-off meeting	ES development team, Finland business representatives
28 th January – 1 st February 2019	CRP workshop	ES development team, Finland Super- and key-users
11 th – 15 th February 2019	OTC workshop	Corporate OTC team, Finland Super- and key-users, Finance
4 th March – 8 th March 2019	UAT workshop	ES development team, Finland Super- and key-users
1 st April 2019		Go Live

During the deployment process the data is mostly collected in open interviews and workshops with people participating. This is found to be most suitable method and the discussion is guided by the workshop leader or researcher using open-end questions. Field notes are captured during the discussions and as a result qualitative data is collected. If quantitative data is found, e.g. bug listings, from previous deployments, it can be used for deployment planning.

2.3 Target group and interview themes

Data is collected from end users, both current invoicing system and execution system users, to define the requirements for the new deployment. Additionally, the Chinese ES implementation team does have experience about such projects so they will be able to tell recommended plans for the deployment. We need to get a clear picture what different processes are in use. Define the current state of processes i.e. describe the execution processes and stakeholders. Then we need to understand the data flow – what data is processed, where is it coming from, what data is transferred between systems, what data needs to be delivered to customers and other stakeholders

The interviews with previous deployments superusers had no predefined questions for the interviews. However, as a basis for discussion, following themes were discussed during each interview:

- Background
 - What deployment participant has been involved in?
 - When was the deployment – in what role?

- Overall description of the deployment process?
- Development & preparation
 - Was a current state description made in the beginning?
 - Was a target process defined before developing the ERP or Execution system?
 - If yes, was BPR affecting the ERP/ES development and deployment?
- Deployment
 - How was the end user training arranged?
 - Were workshops arranged?
 - Were bugs & improvement suggestions collected during implementation?
 - Is that data available?
 - What kind of end user roles were used in deployment? (superuser etc.)
- Lessons learned
 - What did you find especially good in this deployment?
 - What did you find especially bad in this deployment?
 - Could mention any good practices from this

3 Theory

3.1 Business Process Reengineering

There is plenty of literature and other publications available regarding ERP systems implementation. Since the case company is exclusively providing professional services, I wanted to find out publications related to that. ERP implementations require standardization of business processes from quotation to service delivery. This requires that together with ERP project also some Business Process Reengineering (BPR) is performed. (Erkan, T. 2009)

In order to maintain their competitive advantage companies must constantly seek for improvement in their processes instead of just offering their products or services for sale. According to Erkan (2009) in the 60's the emphasis was to produce more (quantity), 70's how to produce cheaper (cost), 80's how to produce better (quality), 90's how to produce quicker (lead time) and in 21st century how to offer more (service).

In the case study done by Erkan (2009) I found out that performing a BPR stage before ERP implementation improves the overall efficiency more than implementing ERP first and BPR after that. Additionally, Erkan (2009) found out that with implementing BPR the studied company improved its processes significantly more than with ERP alone. However, Erkan (2009) also states that BPR and ERP are rather complements than substitute to each other. In figures 3 and 4 below are described the improvement percentages in studied companies after the implementation:

Performance Indicators	After BPR	After ERP	TOTAL
Cycle Time	-21%	-9%	-28%
Order Fulfillment Time	-15%	-13%	-26%
Inventory Level	-8% X	-14%	-21%
Inventory Turnover	35%	18%	59%
Order to Cash Rate	3% X	2%	5%

Figure 3. Improvement in selected performance indicators after BPR and ERP in company (A. Erkan 2009)

Performance Indicators	After ERP
Cycle Time	-15%
Order Fulfillment Time	-22%
Inventory Level	-29%
Inventory Turnover	46%
Order to Cash Rate	3%

Figure 4. Improvement in selected performance indicators after ERP in company (A. Erkan 2009)

Another interesting article related to the improving business processes is published by Leite, Higor dos Reis, & Vieira, Guilherme Ernani (2015). It handles about lean philosophy implementations and best practices in service sector. The lean philosophy was developed initially for manufacturing companies by Japanese in mid 50's. However, it has now spread into services sector as well.

Lean service is defined as standardized system of service operations consisting of activities that generate value for customers, focusing on explicit tangibles and aiming to meet customer's expectations for quality and price. In this concept, the focus is on employees, their training and increase of autonomy and on customer, which is the first contact for selling the service to. Lean services solve the customer's problems, do not waste customer's time, provide exactly what they want, where and when they want it. (Leite, Higor dos Reis, & Vieira, Guilherme Ernani 2015)

3.2 Lean

The Toyota Production System (TPS) was developed in mid 50's to improve efficiency and quality of Toyota car factories. It developed into a concept of Lean manufacturing focusing on supply chain management and has become a common philosophical and practical approach to production excellence. One of the main principles of lean manufacturing is to reduce waste (Muda) i.e. eliminate tasks which do not add value. The idea is instead of producing into warehouse for storage, is to produce to a customer order. This is called pull production, which is the opposite to push, where goods are produced into storage. (Sang M. Lee, David L. Olson, Sang-Heui Lee, Taewon Hwang and Matt S. Shin. 2007)

Lean service has been studied by several authors and there seems not to be a single model which can be taken as a reference for all types of services. However, Womack & Jones (2005) have introduced the concept of the "Lean Consumption", where the idea is

that customer gets the service with less effort and disruption. The six principles of Lean Consumption are (Womack & Jones 2005):

1. "Solve the customer's problem completely by insuring that all the goods and services work, and work together.
2. Don't waste the customer's time.
3. Provide exactly what the customer wants.
4. Provide what's wanted exactly where it's wanted.
5. Provide what's wanted where it's wanted, exactly when it's wanted.
6. Continually aggregate solutions to reduce the customer's time and hassle."

To solve customer's problem completely means that instead of repetitively solving the same problem all over again put effort on finding out the root cause for the problem and once found, solve that. By minimizing the customer waste of time, the service process should be designed so that every point where customer is spending their own time for getting the service is minimized. Providing exactly what customer wants follows up one of the main lean principles i.e. pull. Do not try to forecast the customer needs but react and deliver the service based on customer order. (Womack & Jones 2005)

By providing customer the service exactly where it is needed means that there must be several delivery models for the service. It is sort of a one stop shop for services which fulfills all customer needs from one desk. The combination of two previous consumption principles means that the customer is given a chance to plan and customize his need together with provider so that he gets benefits from early ordering. The last principle's idea is to promote evaluation of the service to customer in order reach common understanding of the required service and provide all needed services as a service package. To make these Lean Consumption principles work, service provider must see the total need of a customer, full fill that need with lower total cost compared to the providing single separate services with higher cost. (Womack & Jones 2005)

3.1 Value stream mapping

As described earlier, the elimination of waste from customers perspective is the main priority of the Lean thinking. By understanding what is the value for the customer and what he is willing to pay for it, helps the service provider determine the most efficient process to service the customer. To help determining the most efficient process, Lean has a tool called Value Stream Mapping (VSM), which visualizes the process flow and reveals the waste, allowing the service provider to make it more efficient.

VSM is a visual representation of the material, work and information flow, which shows also the time when customer wanted value is created versus the total time of the process. The time spent for creating value for the customer is called Value-added (VA) time, while rest of the time is called as Non Value-added time (NVA). (Sperl, Todd & Ptacek, Rob. 2012)

According to Sperl and Ptacek, there are five steps how to do the value stream mapping. First you should determine what to map and then collect the data about the target process. Once this is done you should be able to create current state VSM. After you have a good visualization about current state you should brainstorm with the key stakeholders for the improvements. Finally, as a last step you should be able to create the future state VSM.

Determining what to map may be difficult. You should not select too high-level processes of the organization since it may be difficult then to determine where the waste lies. Instead, you should find out what processes might have problems on meeting their goals or customer dissatisfaction is high. By selecting the process this way, you will most likely improve a process which provide more value for the customer. (Sperl, Todd & Ptacek, Rob. 2012)

Data collection can happen either before you create the VSM or after creating it. Why both ways are OK, is that VSM creation need several cycles to collect all the data and you just need to do it the way you find most comfortable. The collection of data should be as accurate as possible and no estimates be used, since it compromises the accuracy of the VSM. (Sperl, Todd & Ptacek, Rob. 2012)

Current state VSM represents visually how the information and work flow presently in the process. It is recommended that initial exercises for VSM creation are done using pen & paper and posted on the wall by team members. This helps on involving all members of the team and allows easier visualization of the VSM. (Sperl, Todd & Ptacek, Rob. 2012)

Womack & Jones describe in their article the VSM as Lean Consumption Map. They have an example of Portuguese automobile dealer group car repair process. The current state process VSM starts from customer searching the repair shop, placing the repair order to the actual repair workshop and delivery of the repaired car for the customer. They marked down customer spent time and both repair shops VA and NVA times. It turned out that the repair process steps took 207 minutes of paid time, out of which only 27% was VA time for the customer. In turn, the customer was spending 120 minutes in the process of which only 53% was VA time. Figure 5 is an example of the current state VSM for this process.

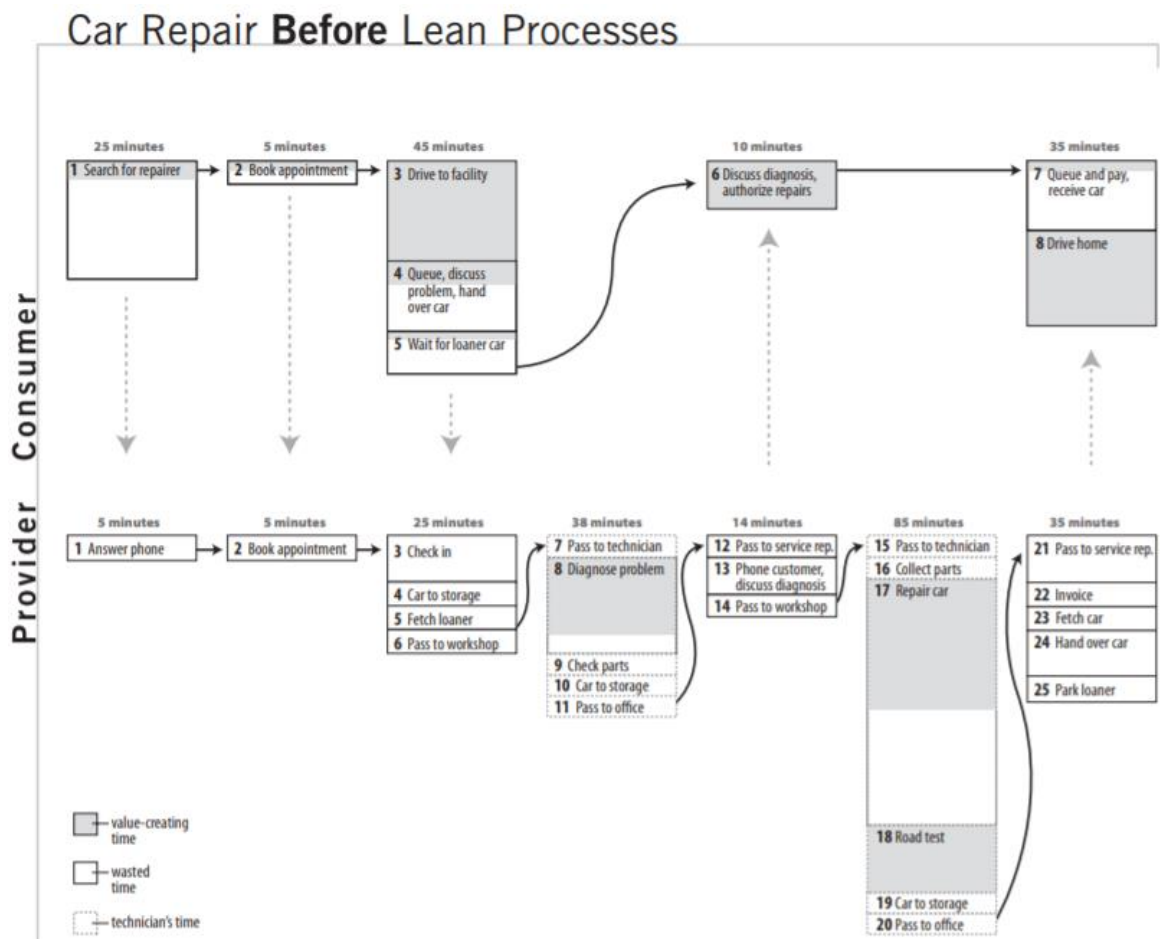


Figure 5. Car repair Current State VSM. (Womack & Jones 2005)

After you have a clear vision of the current state and the waste, the next phase is to brainstorm to eliminate the wastes identified. Each process stage should be analyzed and the waste identified should be brought down to the absolute minimum. This phase takes typically some time and most likely several iteration cycles are needed. Plan-Do-Check-Act (PDCA) process is a quite typical tool to split the topic into small pieces and then by performing several iteration cycles the preferred result is realized. (Sperl, Todd & Ptacek, Rob. 2012)

As a result from earlier steps the Future state VSM can be created. It is using the same visualization as the earlier created current state VSM, but including the improvements and waste reduced or fully eliminated. Typically, this VSM is a result of couple months work, but as one of the Lean principle is the continuous improvement, the development could continue resulting in a significantly different future state VSM over the years. (Sperl, Todd & Ptacek, Rob. 2012)

Womack & Jones present also the future state VSM for their example car repair process. In the example, the initial search for the repair shop was fully eliminated by keeping in

contact with their customers proactively. Once repair need arises the client s contacted before the repair starts so that the diagnosis and repair need is determined before the customer arrives at the repair shop. Additionally, the repair processes are standardized making the process more efficient. As a result, customer spent time was reduced from 120 min to 69 minutes, while 94% was VA time. The repair shop process time was reduced from 207 minutes to 101 minutes with 59% being VA time. An example of the future state VSM can be seen in Figure 6:

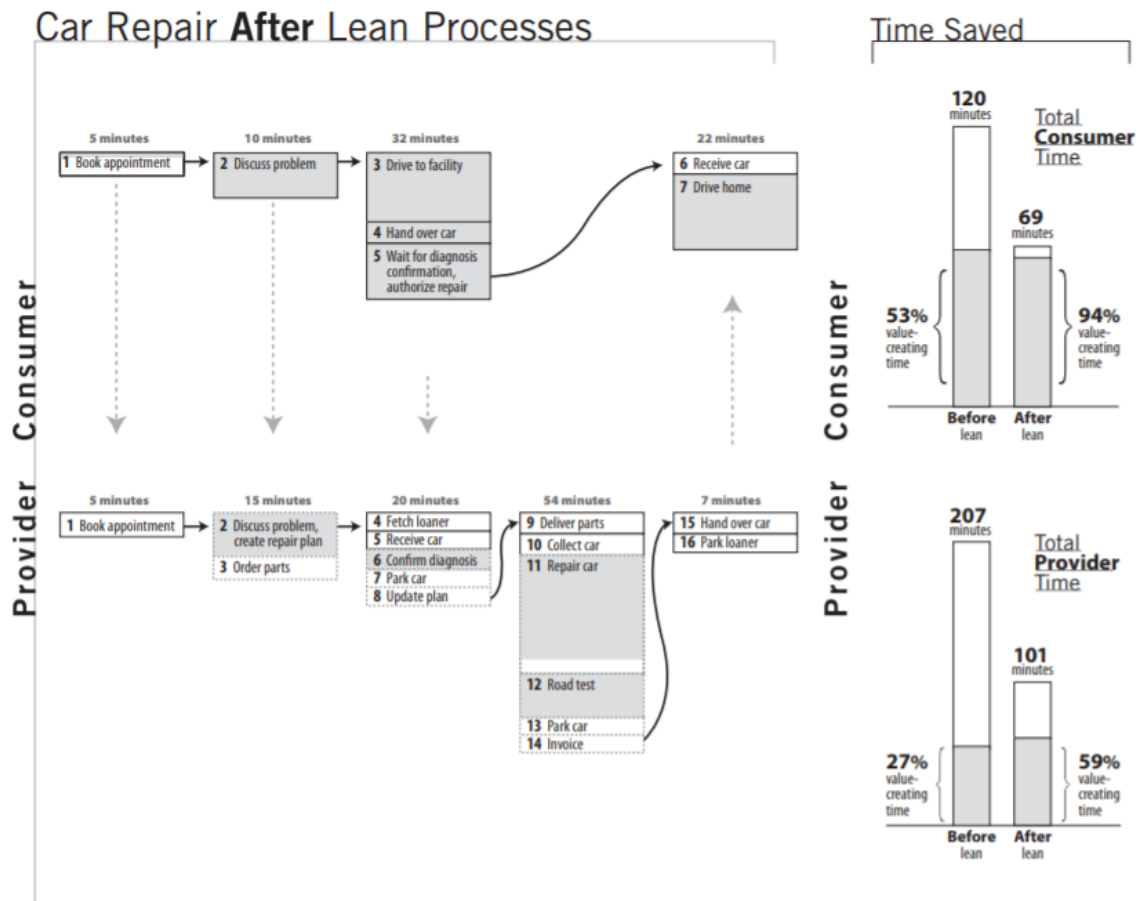


Figure 6. Car repair Future State VSM. (Womack & Jones 2005)

4 Results and analysis

4.1 Present state of ERP

The present state described here is collected from company's process descriptions and from writer's personal knowledge about the processes. As of today, the ERP process is fragmented into many different legacy systems, which of some are interfaced with each other, but not comprehensively. Additionally, a lot of manual processes are still in use as for example different types of approval processes. Therefore, it is obvious that there lies a lot of waste in the process as defined by Lean principles i.e. waiting, manual data entry, errors in data etc.

TUPA is the current ERP system, which is interfaced with many internally developed tools. TUPA has been initially developed for company about 20 years ago and it is now considered as a legacy system, where maintenance and development is becoming a challenge. SONET is the company's financial system, which is developed and maintained by CGI Finland. Figure 7 describes the overall picture of the systems in use and processes covered

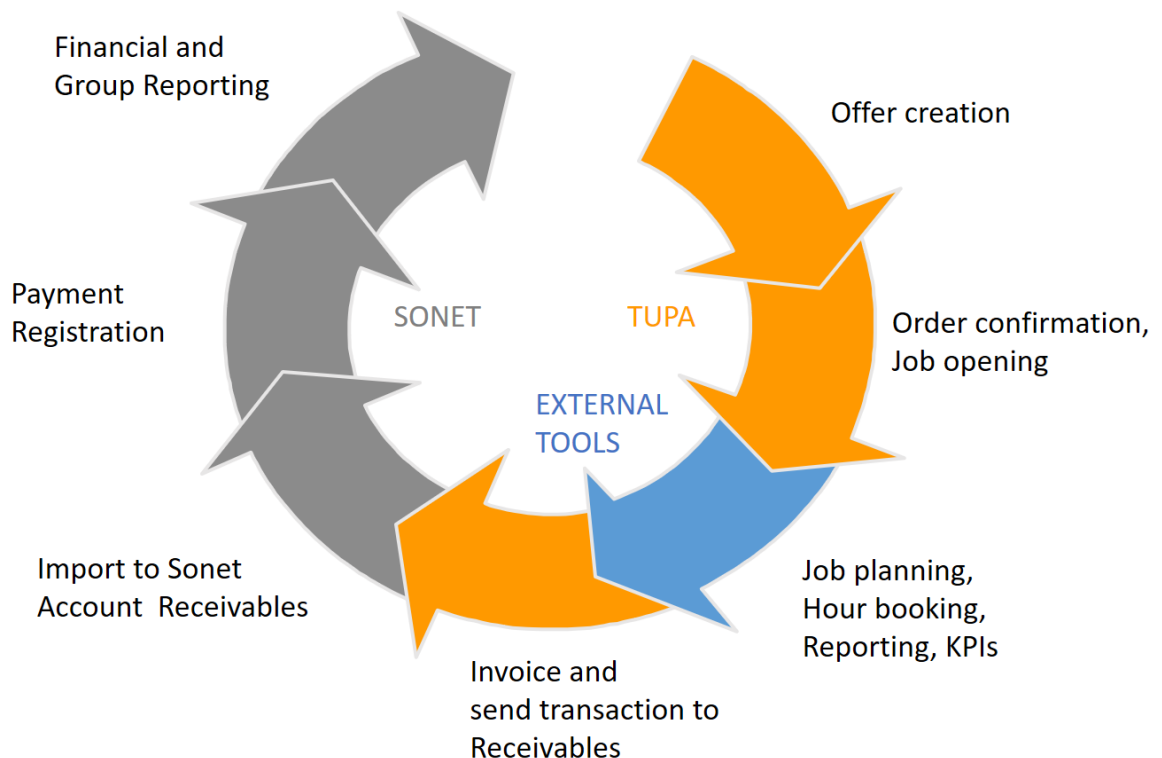


Figure 7. Current state of the systems and processes

Offers are created by entering key data about the offer request into TUPA system. Based on this data an offer document is created based on a template, but only little data is transferred from TUPA to offer. Majority of the offer data is typed in manually into document. Orders are managed by project managers. If the offer is accepted, based on the order review, the job is opened, order confirmation is sent and execution is started according the process described in Figure 8.

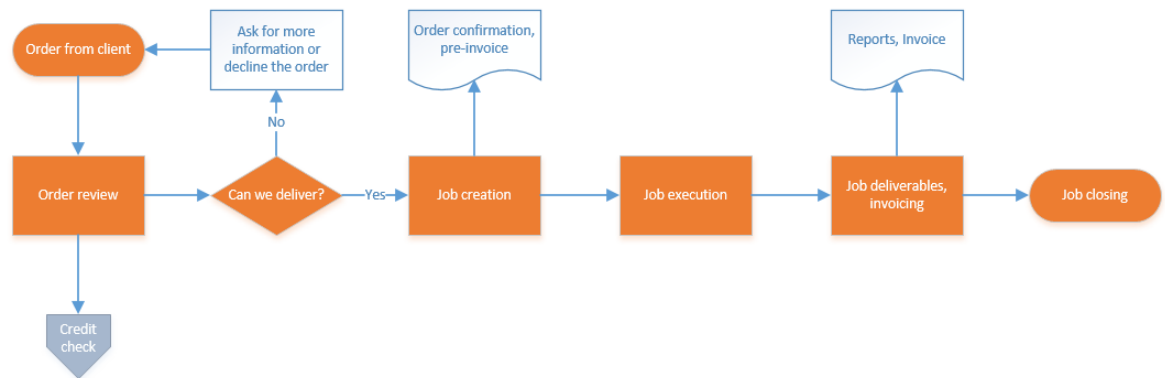


Figure 8. Current execution process (SGS FINLAND, 2018. Toimintajärjestelmä: Service Delivery Process)

Once the job is opened it is put into applicable testing laboratory's job queue. Depending on the product category there are number of project managers who will coordinate the testing of the product. Resource allocation and scheduling is performed outside the TUPA system using MS Office based tool, which it is reading and updating the TUPA system database. Based on this tool project managers get a clear view about resource allocation and an estimate whether jobs will be finished on schedule or not.

The resources i.e. testing engineers report daily basis their time usage for each job, which acts as a progress indication of the job. Time reporting is performed using a legacy system time sheets application interfaced with TUPA. Once the testing is done, testing engineer creates a testing report which is delivered to the customer by project manager. If the customer has not ordered certification for the product the project manager issues invoicing instructions, signs them off and delivers it to back-office coordinator for invoicing. Coordinator issues the invoices for the customer and closes and archives the job.

Company's internal controls require visibility, traceability and segregation of duties for the different key decisions done during the ERP process. Decisions like this are offer calculation and approval, testing report approval and invoicing issuance approval. At the moment, all of these workflows are performed manually by signing off the associated paper

documents. There is a big room for improvement by using Lean principles to remove waste from these workflows.

If customer orders also certification for the tested product then the certification process starts. For the moment, this process is not comprehensively controlled by TUPA system, but the new ES already covers this process. This system module deployment is planned to happen together with new ES deployment. Certification service related to testing is invoiced together with testing as described earlier.

Certification includes also annual certificate maintenance fee collection. This process is done on annual basis at the beginning of the year and there is specific module to maintain certificate validity and fee collection in the TUPA system. On a yearly basis, there are about 3500 jobs opened and about 5000 invoices issued from the TUPA system.

Last step in the ERP process is the job closing. During this it is ensured that all job data is stored with the job file, including documents, invoices, raw data, pictures etc. After a certain time, this physical file is archived in company archives in a file cabinet. Due to external requirements, all archives are kept for 15 years, some even longer. Having physical archives does not follow Lean principles either. It includes moving of physical files, scanning, signing, checking and printing of them into physical file cabinet, which is not definitely adding any value for the customer. By looking how this could be archived and stored electronically, would add value and make the process more efficient.

4.2 Future Execution System process

Based on the present state analysis done back in 2017, it was decided redesign part of the business processes and to get rid of as many external tools as possible, which are used in current ERP process. The reason for this was that as such they produce a lot of extra work, which in Lean terms means waste, waiting, defects etc. To be able to follow up Lean consumption principles these tools are yet required but implementing them as part of the new ES process would result into better VA / NVA ratio and cycle time.

Additionally, the corporate governance did not allow to include OTC process in the ES being developed. As a result, the corporate OTC system called BOSS will be deployed for the case company. BOSS is widely used within the corporation covering over 90% of the corporation revenue reporting countries. In other words, we could draw an analogy that if the corporation 2018 revenue was about 6000 mEUR, almost 5400 mEUR is going through that process.

However, the need to interface the BOSS and new ES started growing to avoid additional waste in the form of reentering the information stored in ES again into BOSS for invoice issuance. At the end of 2017 a requirement to interface these two systems was presented to the BOSS OTC process owner. We were quite lucky with the timing since there were similar request presented from other business line's ES process owners as well. The pressure from these multiple requests resulted into decision to build a new generic interface between different ES and BOSS. For us this was a critical success since now we would be able to synchronize the data between two systems and not enter them manually into two different systems. The finance process remains intact and SONET will be also used in the future. The Figure 9 shows the future state of systems and processes:

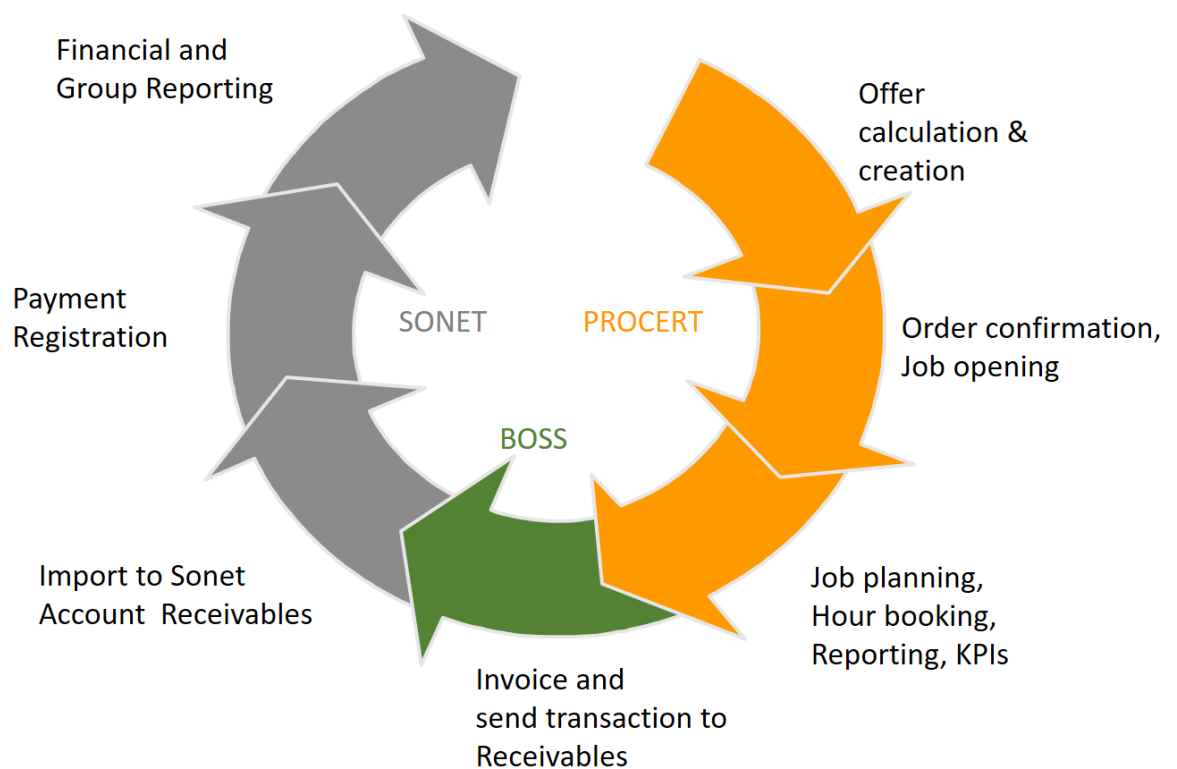


Figure 9. Future state of the systems and processes

The Execution Process on high level shown in Figure 8 remains the same. However, many adjustments are done within the parts of the process. All case company's services are now stored in the new ES as reference data. This enables automation of different sub-processes, which reduce the overall cycle time. Earlier the offer calculation was done using a separate Excel sheet. Now this is done inside ES and service data contains required information for the basis of the calculations. The final offer is also automatically generated based on the selected services and in the optimal case no additional editing of the offer is anymore required. Offer approval workflow is also integrated into ES, which full fills the requirement for the traceability and segregation of duties required by internal controls.

If client orders the offered service, the formal order review process is now also included in the ES. During the order review the offer data is complemented, jobs are opened and confirmed for the customer directly from the ES. Offers and new jobs are automatically shown in job planning tool now integrated in the new ES. Earlier these were shown in a separate Excel based tool.

Engineers performing the actual testing are now entering the hour bookings directly into ES instead of separate hour booking application. Data about invoicing is also pushed from the offer calculation into job and project managers can create invoicing instructions for coordinators within ES. Eventually the data is pushed into BOSS from where the final invoices are created. Before invoice is issued, it is approved in BOSS invoice approval workflow, again required by internal controls.

ES platform supports the execution process by sending task assignments for the concerned people. It is also able to send notifications for the users. These tasks and notifications are visible on "Personal Working Platform". Instead of receiving tons of emails about different tasks, it was decided to use this platform for personal task management.

All job data, including attachments are now stored within ES. Earlier this was done by saving them into work folders on the file server. From there it was collected, possibly printed and archived in paper format in the physical archives. The new process now allows the handling of different documents electronically since the ES supports approval workflows with electronic signatures. This minimizes the paper handling and scanning into electronic format. New electronic archiving system is also deployed and data is read directly into archive from ES after job closing. This process minimizes the wastes like moving, extra processing, manual work and so on significantly.

4.3 Interview results

The results of the interviews were recorded in memos, which help, together with the recordings, me to analyze the collected data. In total, there is about 195 minutes of recordings available from interviews. I tried to keep the interview sessions relaxed and get every interviewee to freely express their opinions and perceptions on how they feel the discussed project has been executed.

The person identified as no. 1 background is a process owner for the certification process. He was involved as a business representative during the ES certification module development back in 2014-15. Persons 2,3, and 5 have had a role of Superuser in different systems deployments for local business in Finland. The person 4 is responsible of the ES

certification module deployment globally, and she has been involved in deploying it in 15 different countries.

Based on each interview I created a Mindmap, which highlights the most important topics discussed. These Mindmaps can be seen in Appendixes 5 – 9. Based on these individual Mindmaps I created also a summary table, which is presented on chapter “Interview analysis”

4.4 Interview analysis

By this interview analysis, I will try to find the answer for my first research question (RQ1) regarding good practices and problems. The data collection was done, as already mentioned, using qualitative methods. I interviewed five company employees who had been participating in earlier similar projects where new systems were deployed in the organization. One of the interviewed were from our Chinese organization where they have been deploying internally developed application to different countries. Four people were from our local organization in Finland and they have participated as super user or business process owner for their respective business when deploying new systems.

All participants found it as a good practice to nominate superusers who will help the target organization in the new process deployment. There was a comment from one interviewee: *“The most important is to find correct Superuser or Key user”*. This comment was from Global implementation manager of a certification system implemented in 15 countries.

Superuser task is to learn how new process works and then transfer the knowledge into their own organization. They could be also called as change agents, who will support the change in organization processes, while helping on the testing and troubleshooting as well. Eventually they will assist on getting the approval for delivery, by testing the new process and verify that everything works as planned.

Additional comment from same person was that *“We require 80% of the superuser working time during UAT”*. In practice, this means that super users should have a clear job description, which allows them to use their time to learn and test the new solution. However, there is also a risk related to this if they are not properly authorized.

If the super user is still buried with his ordinary tasks, it may affect the deployment of the new process. She also mentioned that *“Currently in China the key users cannot spent enough time for the testing”*, which delays the deployment phase significantly due to lack of proper resource. This should be noted as a risk for any deployment project and should be avoided with proper authorization from the managers for the key users.

Another pre-deployment phase, which was found as a good practice, was to collect enough information about target organization and its processes before deployment. Interviewees noted this useful, since it also helped them to structure the information about their own organization. In two previous projects an initial questionnaire document was sent to the super users, where they had to describe their organization. This collection was described by a Person 3: *“Before CRP I collected information about use and business cases from my areas of responsibility”* An example of such document’s table of contents can be seen in Table 2.

Table 2. Questionnaire document contents example

Contents of Questionnaire document
Purpose of Document
1. Your Country
2. Your Team
3. Your Accounting
4. Migration of old accounting system
5. Management of Customers/Prospects
6. Management of Orders and Invoices
7. Output Documents – Layout and Reports
8. Management of Payments
9. Infrastructure
10. Other Information Systems
11. Support

Documents were divided into background part where organization key figures and organization was described. Next, the key processes are described in detail, including outputs of each process and interfaces to other systems in use. Finally, the infrastructure and support organization is described.

On top of the collection document itself there was some additional spreadsheets, example forms etc. supporting documents collected. Additionally, this type of data collection was found to be useful for the deployment team itself, since this way the current state data is structured same way in each target organization making the deployment easier next time it is done.

In each of the interviewees responses deployment process included at least User Acceptance Testing (UAT) phase. UAT was understood as phase where target organization would verify that the application being deployed would meet the requirements raised by the them. As a result, a Go / No Go decision is given.

Additionally, in some projects before UAT, a formal Conference Room Pilot (CRP) session was also arranged. The idea for CRP was to give overall description of the system being deployed for the target organization. During this process, the additional requirements raised by target organization was also collected and a solution for these was presented before following UAT. In some cases, the CRP was limited to several conference calls, but in general a face to face meeting for CRP was preferred.

On the lessons learned part of the interviews some topics were raised. In general, it was commonly noted that the deployment should be done using a proper project organization and model. Otherwise there are too many risks related to the outcome of the change. With proper planning and authorization of the project resources, the organization mitigates the risks related to the deployment.

Person 5 has been participating in two different deployments as a Superuser, where in the one there was a proper project plan and organization in place, while in another the deployment was left out for the business to deploy by themselves. The latter turned out to be an deployment where progress was very slow and there was very little commitment from the business. Eventually the deployment took over two years and was finally completed this year.

In almost all interviews it was also emphasized not to underestimate the change resistance, which application deployment like this causes. There was comment from Person 2 that *“Some end-users attitude was really negative towards to the change”*. New system will unavoidably change the processes and the way people are used to work, which will make them uncomfortable and force them to learn new things. Therefore, it was suggested to have a proper change management processes in place.

This includes sufficient communication to the organization about progress of the change and involvement of the middle management so that they are in favor of the change. Middle management involvement is critical in the change process since they are on a daily basis in contact with the employees and if they are having a favorable opinion about the change, typically the employees adopt that attitude as well.

One technical method raised as a positive tool for the deployment was the use of the training videos for the end users. They were even preferred over the user manuals and considered to be more informative and easier to understand than other documentation. Actually, a comment from Person 3 was *“We were thinking, should we make written instructions for the end-users, but decided not to make them since instructional videos were so good and informative”*. The suggested approach was to divide the instruction videos

into small parts and save them into video library where end users could search and watch them as required.

As a summary following information was highlighted from Mindmaps collected from the interviews:

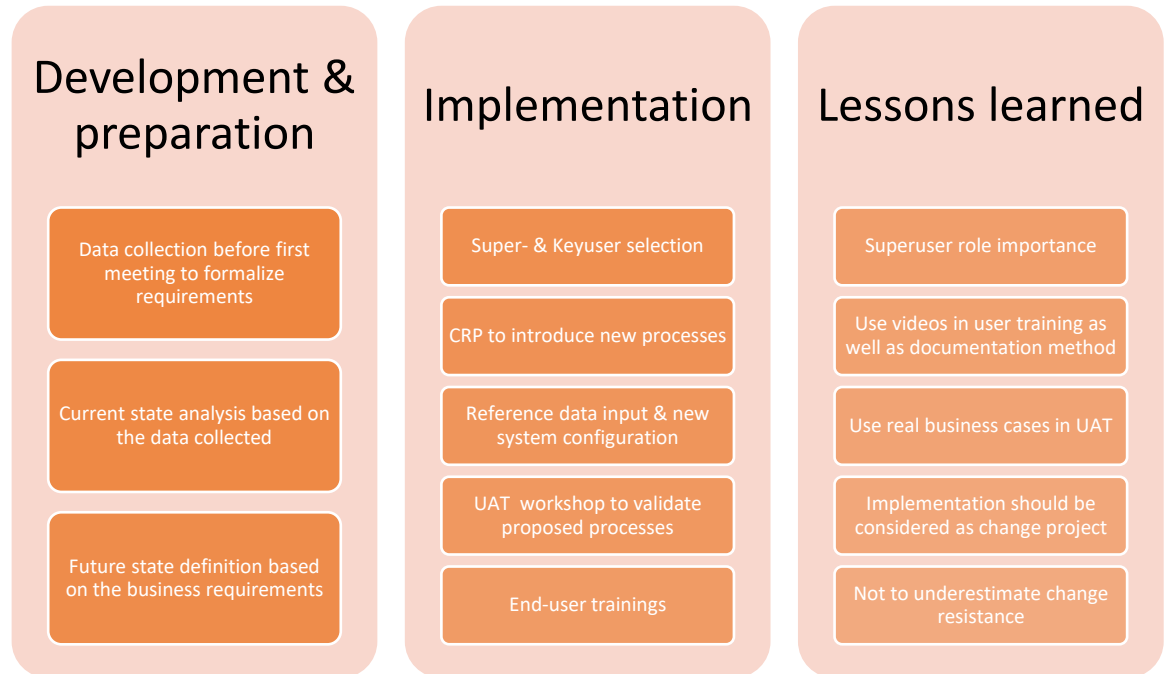


Figure 10. Interview summary

4.5 The Offer process evaluation

The second research question (RQ2) is to compare current and the future Offer process using Lean tool called Value Stream Mapping. Most of the offer requests are a result of the sales efforts of company's sales resources. As a consequence, from these efforts clients contact our sales persons with a request to deliver service for them. Once company receives the request, it is evaluated whether we are able deliver the service requested.

4.5.1 The current offer process

The offer process starts from positive decision to offer the service for the client. Offer is registered in the ERP system at this point with some basic data and an offer number is allocated. As a basis for the offer, a detailed calculation about the service concerned is created. This is done using a simple Excel based worksheet. It includes e.g. the resource usage in hours, subcontracting costs and other external costs related. This is not definitely according to Lean principles since the data cannot be transferred automatically later to the ERP system, generating waste i.e. duplicate data entry.

If the client is requesting for certification, then a test plan is should be created as part of the offer calculation. Test plan is a document which contains a detailed description of the tests required by the standards of the certification applied. Additionally, if there are multiple models requested for certification, only part of them are tested and those are specified in the plan.

Depending on the service requested and the offer value, this calculation is reviewed and approved one or more persons. The approval workflow is done manually by sending the calculation document together with technical documentation for the approver who manually signs off the document. If a test plan is required it is approved by certifier to ensure the testing fulfills the requirement laid out by the applied certification scheme. Again, this printing of worksheets on paper and approving them is not according to Lean.

Once offer calculation is approved the actual offer document creation starts. ERP system creates a generic offer document including all possible service- and terms descriptions. It is then the offer creators task to modify manually the document to comply with the service being offered. Once he/she is happy with the document, he signs it off. This process is not controlled by the system and may lead into wrong information, i.e. defects, in the offer. The obvious Lean waste here are the possible defects and manual editing of the offer consuming extra time.

The final offer document together with all service terms & condition attachments are typically delivered to the client using email. The collection of service terms is again a manual task for the offer creator and there is a possibility to forgot to include something. Once everything is included the offer is emailed to the client. The current offer process is described in the Figure 11.

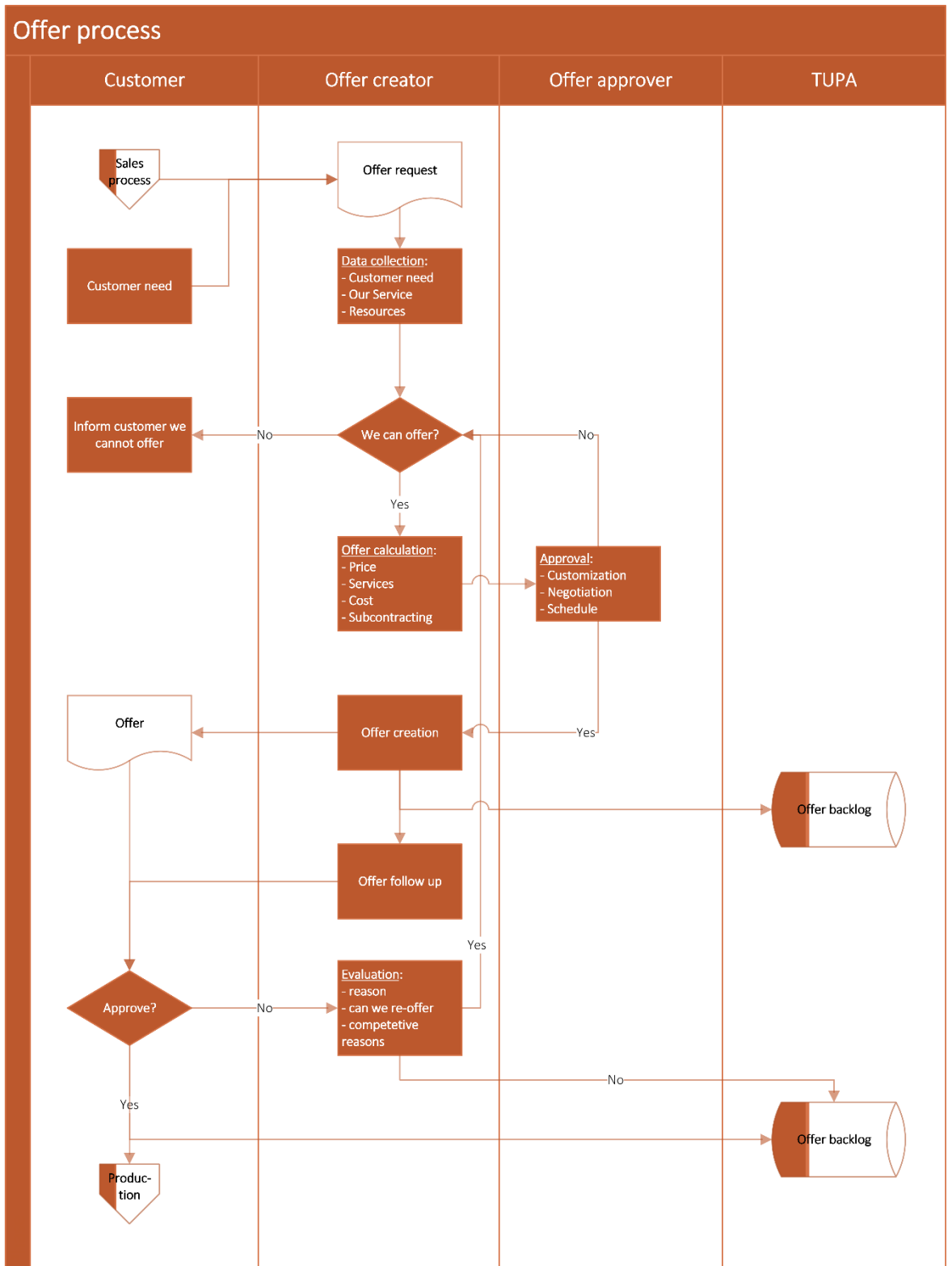


Figure 11. (SGS FINLAND, 2018. Toimintajärjestelmä: Tarjousprosessi)

4.5.2 The future Offer process

The future state offer process is affected by both BPR and Lean practices. It was identified during current system review and data collection phase that there many wastes and defects. From on these findings the process was re-engineered based on Lean principles.

For the moment, the beginning of the process remains the same until we get the customer offer request and decide to offer. There were some wastes identified already on earlier stages, but this process was decided not to be touched for the moment. The wastes identified were mainly related to the customer ordering and there is a plan to re-engineer that process in the future as well to allow customer “pull” the service directly from our future Customer Portal.

In the old process, the offer calculation was a separate, out of the ERP system, Excel document prepared by the offer creator. As a result, in the BPR before development it was decided to implement the creation of the calculation within the new ES. By doing it this way, we tackled many wastes, which could exist in using a separate spreadsheet when doing the calculation. At least it will lead in less defects in the offer- and following job creation, since now all the services, prices etc. are configured within the ES reference data and information is flowing from the calculation to later phases.

Another improvement included, as a result of BPR, was to add a possibility for the customer to define the exact date for the start of delivering the service. Until now, customers were offered a service with a fixed delivery time in working days if they provided all the documentation and sample products by agreed date. However, they were not given a possibility to define that date, but we decided it based on the order backlog. After discussing this with key customers it was decided that we should offer a possibility for a customer to reserve certain time slot when we will provide the service they are requesting.

Third big change in the offer process is the offer document creation and approval of it. Earlier the offer calculation was approved in a manual workflow, which after a generic offer document was generated based on a document template. To minimize defects and make the process more efficient, the offer is now generated based on the reference data within the system. In optimal cases this means that offer creator is getting a ready offer document with minimal or no changes required before sending it for approval workflow.

In offers where certification is being offered test plan creation and approval by certifier is still required. At this stage, it was decided not to touch on that part of process. However, it is possible to include the test plan in the offer documents and add certifier as a technical approver for the test plan, which removes the need for manual approval of the plan.

Once the offer creator is happy with the document he/she can now send it into automated approval workflow. As a result, from approval in this workflow, he/she is getting a PDF document, signed both digitally and personally with signature image, ready to be sent to the customer. The sending is done automatically from the ES, which generates an email message. Additionally, based on the service, several terms & conditions descriptions need to be included. Since the reference data about the services is now within the ES, these important attachments are automatically included in the email. Earlier they were easily forgotten or wrong documents were attached, which is considered as a defect in our process also increasing the liabilities of the company.

Finally, once the offer is approved by offer approver, we now include offer in our Job planning. This helps us to estimate the possible workload for our resources, if the customer comes back and orders the service. Additionally, the Job planner now has the possibility to show the offered services and their promised delivery times, which visibility we did not have in the past, allowing more efficient planning of the offered services. The new offer process described above, can be seen in process chart in Figure 12.

When I think about Womack & Jones Lean Consumption principles, described in theory chapter, I can make following mapping Table 3, where I map the improvements in the offer process into the related Consumption principles.

Table 3. Lean Consumption principles vs. improvements in future process

Principle	Order calculation	Services as reference data	Service delivery timeslot	Automated offer creation	Automated approval workflow	Offer signing	Automatic terms & conditions	Offer visible in Job planner
<i>Solve the customer's problem completely by insuring that all the goods and services work, and work together</i>	X	X	X					X
<i>Don't waste the customer's time</i>	X		X	X	X	X	X	
<i>Provide exactly what the customer wants</i>	X	X	X					
<i>Provide what's wanted exactly where it's wanted</i>			X					X
<i>Provide what's wanted where it's wanted, exactly when it's wanted</i>			X					X
<i>Continually aggregate solutions to reduce the customer's time and hassle</i>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

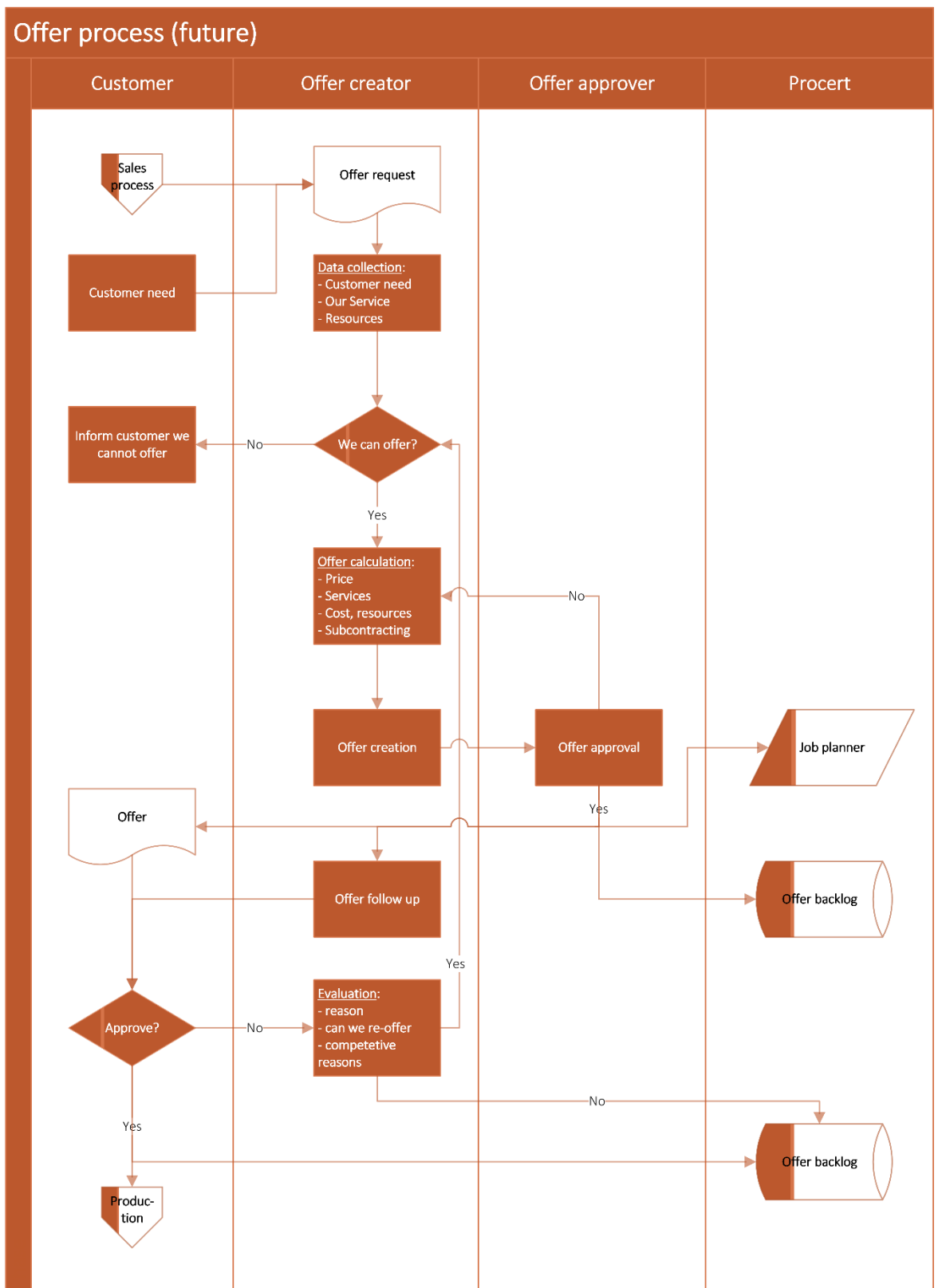


Figure 12. The future offer process

Third RQ (RQ3) is to compare current and future offer process using Lean tool Value Stream Map. I did a limited proof of concept comparison of the processes together with one of our project manager, who is creating offers for clients as part of his job. During the one week period, he created three offers for customers using the current process and noted down the VA, NVA and wait times of different steps. After that we used the future process and used the same customer cases to create offers from new ES.

As a result, from current process following data was collected. Typically, the whole process with wait times takes from two to four days. The value adding time consists of creation of test plan & offer and sending of the offer to the client. All the rest time consumed, like data entry into ERP, calculations and approvals are not VA time. Based on the average times recorded from different steps of three case offers, the average cycle time of the current process is 102 minutes (without waiting). The average NVA time of this is 46 minutes, while respective VA time is 56 minutes representing 55% of the cycle time. The VSM for current offer process can be seen in Figure 13:

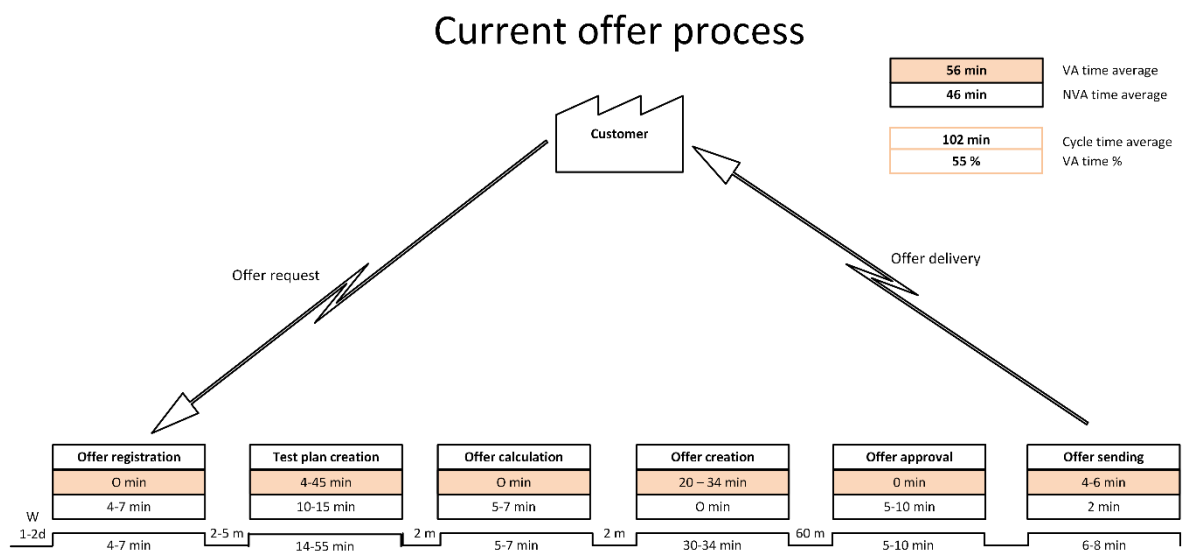


Figure 13. Current offer process VSM

The future VSM looks the same since the main process steps remain the same as well. The average cycle time is reduced to 49 minutes, VA time to 29 and NVA time to 20 minutes. The future offer process VSM can be seen in Figure 14:

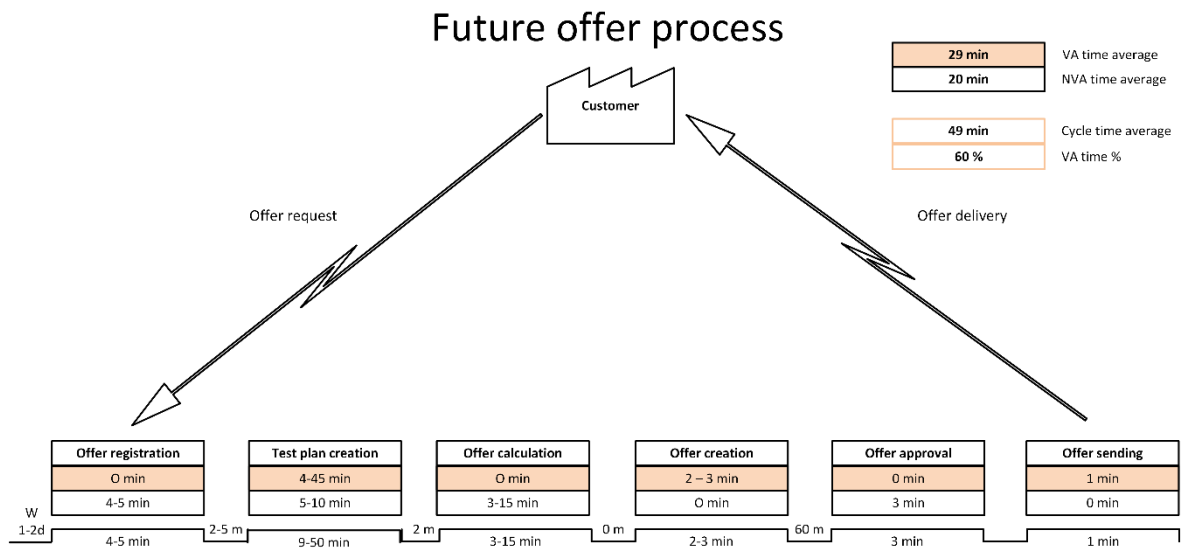


Figure 14. Future offer process VSM

The average cycle time reduction by 52 %, from 102 to 49 minutes, can mainly be explained with the automated offer creation. This is now possible because all services are included as a reference data within the new ES, allowing to map offer contents into them and automatically create the offer based on these mappings. Also, the approval workflow and offer sending automation reduce the cycle time. In the study by Erkan (2009) described in theory chapter, he found out that the average improvement in the cycle time was 28%, when BRP is done before ERP implementation. This is supporting our finding from the offer process evaluation. There is also reduction in both VA and NVA times, which are 48% and 56% respectively i.e. in time this means 29 and 20 minutes reduction. The VA time proportion of the cycle time is also slightly increased from 55% to 60%.

As I explained earlier the offer calculation was included as a part of the ES. It is now possible to enter both invoicing related data and progress tracking related data into the calculation. This does not improve offer process cycle time, but will improve both job opening and invoicing cycle times later, since that data can be used as such to reduce data entry on those related processes at later stage. I wanted to point out this as an example of a possible NVA time reduction in another process at later stage based on improvements done at earlier stages, which increase cycle time at early stage but decrease it later.

Our case project manager, after doing this VSM exercise, was positively surprised about the outcome. He had practiced the new ES process earlier, but doing the comparison of

the processes this way enlightened and emphasized the differences between them. He commented the new process: *"I knew that by adding the services into the ES as a reference data would save a lot of time in offer creation, but was really surprised of this big improvement"*

5 Suggested Deployment process

Based on the interviews from the people who have been involved in the similar projects following model for deployment is suggested. This chapter will give the answer for the re-search question 3 (RQ3).

Deployment should be done using a project organization and such project should be started. Company has standardized project management methodology, which should be used. Project has a sponsor, whose role is to enable the project by setting the target, authorize concerned people to participate and ensure sufficient funding for the project. To initiate the project, project charter document is to be created. An example of project charter document can be seen on Appendix 1. (SGS PMO 2018) Project organization roles are show in Figure 15:

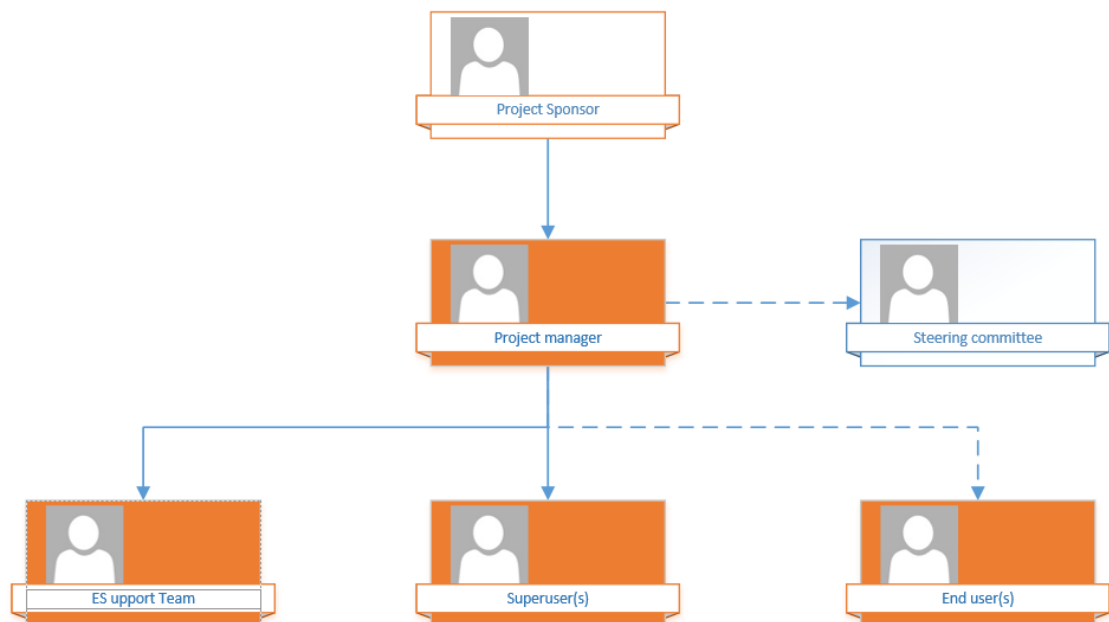


Figure 15. Project organization

Project Steering committee responsibilities are to specify and monitor project goals, objectives, milestones and priorities. It should allocate the resources for the project. Project monitoring should be done on a regular basis, e.g. every two weeks, by having a project update meeting. Project status and progress against the plan should be reviewed, as well as follow up of issues encountered. Since ES deployment is a major change for the organization processes it should also ensure proper change management measures are in place.

Project leader is responsible for the project management and reporting of the project progress for the steering committee. He/She should do the detailed project planning and control & monitor the project progress against milestones. Examples of planning document and project status report can be seen on Appendixes 2 and 3. (SGS PMO 2018)

Management of project staffing and resources is also under his/her responsibility. Project communication is one of critical success factor enabling the success of the ES implementation. Project manager should create a communication plan, which is used to inform organization about the project progress. Throughout the project possible risks and issues should be assessed and managed proactively. Project manager is also responsible about project documentation.

ES Support team will be responsible for ES functional expertise throughout the project. It will provide the training and guidance for the company appointed superusers. ES support will also do the system configuration based on the agreed business requirements and provides system tools, templates and methods for the proper system usage.

Superusers will apply ES best practices for their own business organization. They will provide the first level support for the end users and if required investigate and report found errors for the ES support team. Superusers will participate in the deployment process from the beginning and do the final testing and user acceptance of the new ES process. It is up to the business management to ensure these people have time to perform their role.

The ES deployment should be implemented in 3 months period. Detailed project planning needs to be done, but overall implementation schedule is suggested as in Figure 16:

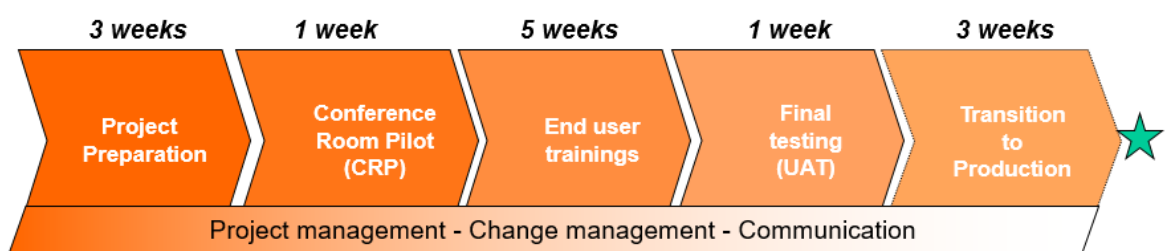


Figure 16. Implementation approach

Project organization should be appointed during the project preparation phase and kick-off meeting is held. ES support team will prepare data gathering questionnaire, where all reference data is collected from the company superusers. Based on this, the ES system will be configured in order it to be able to match the company's initial requirements. According to the interviews I performed, this was found to be the company standard approach in similar projects earlier. It was found as a good practice to give overall idea about target business features for both ES support team and target organization.

CRP phase lasts for one week and the prime objective of this session is to understand the company business requirements in relation to the ES process to be deployed and eventually address the gaps between ES and company business processes.

According to Grijzenhout, there are some best practices for CRP. He recommends to start from high level and gradually drill down to the details. Also 80/20 rule implies i.e. cover the processes that affect 80% of the business and only dig into the remaining 20% if there is time.

Gap should be defined as anything vanilla ES doesn't do and the company process cannot change. Finally, the solving of the gaps should not be discussed in detail during CRP, for the process to be efficient. During the CRP, superuser training will start as well, with the aim to train them to be prepared to pass the knowledge about ES for the end-users.

After CRP, starts the end user trainings. During this phase, the users who use the ES only for limited purposes need to get trained by the superusers. One of the best practices found from the interviews performed was the use of training videos. They were found to be a very efficient tool to deliver information about various specific tasks and allow the end user to look for help by themselves when it is needed. Naturally, traditional class room training is also required since it allow participants fully to concentrate on the topic, while the help is also available directly from the superuser. Meanwhile, the ES support team is fixing the gaps agreed to be fixed in CRP. The aim is to have as many as possible gaps fixed before the next phase.

Next step for the deployment is the UAT phase. There are different types of UAT tests. In Business Scenario testing the user can assess if the system can meet the requirements in one or two different business scenarios. In the target company, this means that testing should be done by the different business units, which needs are different.

Another type of testing is Business Process Testing, where user determines if system supports the business process e.g. offer process. The third type of user testing is High Risk Transactional Test, in which one or two critical transactions are verified to be processed correctly by the system. An example of this type of testing in the company could be e.g. testing of invoice data interface or financial data reporting. (Kohlman, Ronald. 2011)

The defects found during the implementation process must be reported to the ES Support team. ES Support should track these defects statuses and handle them in a formal process. The number of open or fixed defects is reasonable good indicator of the readiness of the system being tested. Defect Management Lifecycle Process is described on a high

level on Appendix 4, but it is up to the ES Support team to decide the process for defect management (Kohlman, Ronald. 2011).

As result from UAT phase, a Testing Assessment Report should be produced. In the report, the testing work should be described together with result. It should contain the variances and status of the unfixed defects identified and asses the risks related to these if not fixed. As a result, there should be final approval decision of the testing based against the predefined criteria. (Kohlman, Ronald. 2011). In our case this acts as a final Go/No go decision for the Go Live phase.

If the decision after UAT is to Go Live with the system, then a final phase is started. During this phase, all the trainings should be finished, data e.g. customers, should be loaded into production system and exact date for Go Live is confirmed.

6 Verification and further development

When I started writing this case study, the deployment phase had not been started. In the beginning of the case study I made a research within a target group to make a proposal for deployment model and schedule. This research was done by interviewing key stakeholders who have been participating in similar deployment projects earlier. Based on the key findings from these interviews, I made a proposal for deployment model and schedule. This is presented as part of this study in chapter 5.

As of today, the deployment project is running as I proposed. During the CRP workshop and training sessions after it, over 250 requests for improvement or bugs were collected. These have been logged into case tracking system where they are classified and evaluation to fix/no fix has been applied to them.

The overall feedback from the business has been positive and no change resistance has been noticed for the moment. The improvements made to include as many as possible processes within the ES, has been considered as a welcomed change, allowing the ES to control the service process automating many tasks.

Most of the improvement requests defined as gaps are related to the invoicing process. Mainly the reason for this is that the data from ES is fed into the OTC system using a recently developed interface. This interface development team is not exclusively dedicated for our ES project, so we had to match both team schedules to get the gaps solved. Thanks to this, we were forced to postpone the go live date by one month.

We have already identified some further development needs to be developed after the ES is running in production. One of the biggest further developments identified is the integration into the corporate standard customer portal. This portal has been developed to offer extranet functionalities for our customers, into which we would like to interface from our ES. It allows customers to request offers and place orders directly into our ES i.e. in Lean terms allows customers to pull the service required from us.

Other main development needs are the certificate annual fee collection module, laboratory reporting automation and streamlining of existing factory inspection module. These developments are scheduled to be started right after the initial version of ES has been found to be running stable.

7 Conclusions

I wanted to make my thesis about some actual case, which I am somehow involved as part of my responsibilities at my work. Since I have been working closely in the development of a new ES for one of our main businesses, the case study about this project was a natural choice. The aim of the project was both to re-engineer the processes and develop a system to support these new processes.

The research question two (RQ2) in this study is related to the BRP and Lean. I selected offer process as an example to verify if we have successfully streamlined the process and made it more efficient. The verification was done using a Lean tool Value Stream Map by comparing old and future process. As result I found that the main improvement was related to the cycle time of the process, requiring less time to provide the customer what they want with less effort from our resources. We have followed similar re-engineering it other processes as well. Based on this I could make assumption that the ES deployment will improve the cycle times on other processes as well.

The successful implementation is one of the key success factors of a change project like this. The RQ1 and RQ3 are related for enabling the best deployment approach. The RQ1 purpose was to find out best practices and biggest hindrances for the deployment. The best practices discovered from these interviews are the nomination and authorization of proper superusers to support the deployment. Another discovery from these interviews was that deployment should be considered as a change project. The change resistance should not be underestimated since new systems means also new processes and that way effect on how people are working. There is more detailed analysis about the interviews in the chapter 4.4 Interview analysis.

The interviews answered partly also for the RQ3, which was about suggesting methodology and deployment schedule for the ES. The biggest mistake about implementing something is to do it unplanned without proper resources. One of the interviewees had faced such situation which lead into almost never-ending project. The opposite for this, discovered from the interviews, was to form a proper project organization and plan progress as any other project. Workshops were considered as a good practice, allowing the superusers to concentrate on the new processes and think throughout how to implement them in their own businesses.

Formal UAT phase is also critical, in order to allow the acceptance of the new system into use. The UAT should do proper business case and processes testing to verify the results are as expected. If it is found that system does not fulfill the requirements and cannot be accepted, then system should not be taken into production. The length of the deployment project could vary from 3 to 6 months, depending the complexity of the new system being deployed. The suggested deployment methodology and schedule is introduced in more detail in Chapter 5.

Abbreviations

Abbreviation	Meaning
B2B	Business to Business is commerce between businesses, such as between a manufacturer and a wholesaler, or between a service provider and another company requesting for a service
BOSS	Case company corporation's standard OTC system based on Oracle eBusiness Suite
BPR	Business Process Reengineering is a business process redesign, business transformation, or business process change management.
CRP	Conference Room Pilot is a workshop to present system processes. The CRP process documents business processes with gaps and identify the strategies to cover these gaps
ERP	Enterprise Resource Planning is a comprehensive system to cover majority of company production- or service processes from Offer- to Accounting.
ES	Execution System is a system, which supports the service delivery process, but does not include invoicing. It may contain the initial offer & order registration.
NVA	Non-Value-Added time is the opposite for Value-Added time i.e. time which is used for tasks not directly providing value for the customer like archiving of the work files or registering the job to the system
OTC	Order to Cash is a process, which starts from offering and ends at invoicing
PDCA	Plan-Do-Check-Act is iterative process for continuous improvement
Procert	Name of the case company's new ES system
RQ	Research question

SONET	Case company's financial system
TUPA	Name of the case company's current legacy ERP system
UAT	User Acceptance Testing is a workshop, where system processes are tested and eventually accepted. According to Kohlman: "The purpose of testing is to prove a system, software, or software configuration doesn't work, not that it does".
VA	The time spent for creating value for the customer is called Value-added time e.g. doing a customer ordered test or writing a report out of it
VSM	Value Stream Mapping visualizes the process flow and reveals the waste, allowing the service provider to make it more efficient. VSM is a visual representation of the material, work and information flow, which shows also the time when customer wanted value is created versus the total time of the process

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1.1 PROJECT CHARTER



Opportunity Statement & Project Objectives

1. Placeholder. Why is this project needed?

Expected Business Value & Budget (Capex/Opex/Assumptions)

- How does this project generate value?
- Does the project require capital expenses (capex)?
- What are the assumptions made for submitted business value?
- Who is funding this project? To whom are costs charged?

Milestones & Deliverables

Deliverable	Due date
Placeholder deliverable 1-01	08.04.2019
Placeholder deliverable 1-02	22.04.2019

Project Scope

Scope Item	Description
Process	What process or processes will be supported wholly, or in part by the system?
Organisation	What regions / lines of business will be impacted?
Location	Where will users be physically located? Will the data be hosted in-house or outsourced (e.g. a cloud solution)?
Data	What data will be managed by the system?
Application	What are the key functions to be carried out by the system?
Technology	What technology is planned to be used? What integrations are needed?

Project Plan

2019	March	April	May	June	July	Aug.
Placeholder deliverable 1-01						
Placeholder deliverable 1-02						

Project Team & Governance

- Core Team
 - Person1 (Project Sponsor)
 - Person2 (Project Manager)
 - Person3 (SME)
 - Person4 (Developer)
- Examples of governance approach (update as necessary and delete this text):
 - Alignment on team level is done weekly.
 - Stakeholders are kept informed monthly.

Appendixes

Appendix 1. Project Charter

Appendix 2. Project plan

Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
	Standard Project Plan	1 day	Wed 8/30/17	Thu 8/31/17		
	Initiating	1 day	Wed 8/30/17	Thu 8/31/17		
	Define vision, objectives and scope					
	Create High Level WBS					
	Create business case / financials					
	Create Project Charter					
	Create project budget and resource profile					
	Gain approvals	1 day?	Wed 8/30/17	Wed 8/30/17		
	Project Approved	0 days	Thu 8/31/17	Thu 8/31/17	8	
	Planning	1 day	Wed 8/30/17	Thu 8/31/17		
	Refine requirements (business & technical)					
	Refine WBS					
	Create Project Plan / schedule					
	Identify and assign resources					
	Define organisation change management plan					
	Define High Level Design					
	Define test specifications	1 day?	Wed 8/30/17	Wed 8/30/17		
	Planning Complete	0 days	Thu 8/31/17	Thu 8/31/17	17	
	Executing	1 day	Wed 8/30/17	Wed 8/30/17		
	Kick-off	0 days				
	Development / configuration					
	Testing					
	Training					
	Prepare handover to operations / maintenance					
	Go-live	0 days				
	Post go-live support					
	Closing	1 day	Wed 8/30/17	Thu 8/31/17		
	Handover to operations / maintenance					
	Create Project Closing Report	1 day?	Wed 8/30/17	Wed 8/30/17		
	Project Closed	0 days	Thu 8/31/17	Thu 8/31/17	29	

The Gantt chart displays the project schedule from August 27, 2017, to September 3, 2017. Key milestones are marked with diamonds and labeled: 'Project Approved' on 8/31, 'Planning Complete' on 8/31, and 'Project Closed' on 8/31. The chart shows task bars for various activities, with some tasks spanning multiple days or weeks.



3.1 PROJECT STATUS REPORT



Scope 🟢
 Time 🟢
 Cost 🟢
 Team changes
(mention any core team changes here)

Project: XYZ

Project ID: 12345

Project lead: Name

Status date: Date

Key achievements

• Key achievement or deliverable during period

Date

Planned activities

• Planned activity for next period

Due

11.04.

Key milestones

Due

Progress

Comment on status

Milestone 1

08.04
13.04

80%

Delayed, finished on 13.04.

Milestone 2

22.05

0%

Key risks & issues

Key risks:

• Identified risks and impact

Action / Mitigation

• Who needs to do what to mitigate the risk?

Issues:

• What are issues that have occurred?

Action / Mitigation

• What can be done to solve this issue? Who needs to take action to solve the issue?

Project cost summary

In scope: external CAPEX and OPEX

• Original Budget

• Approved Changes

Total Approved Budget

• Cost of Work (to date)

• Est. to Completion (ETC)

Est. Total Project Cost (EAC)

Project Cost Variance

<Total Approved Budget – Est. Total Project Cost>

Reference for project status:

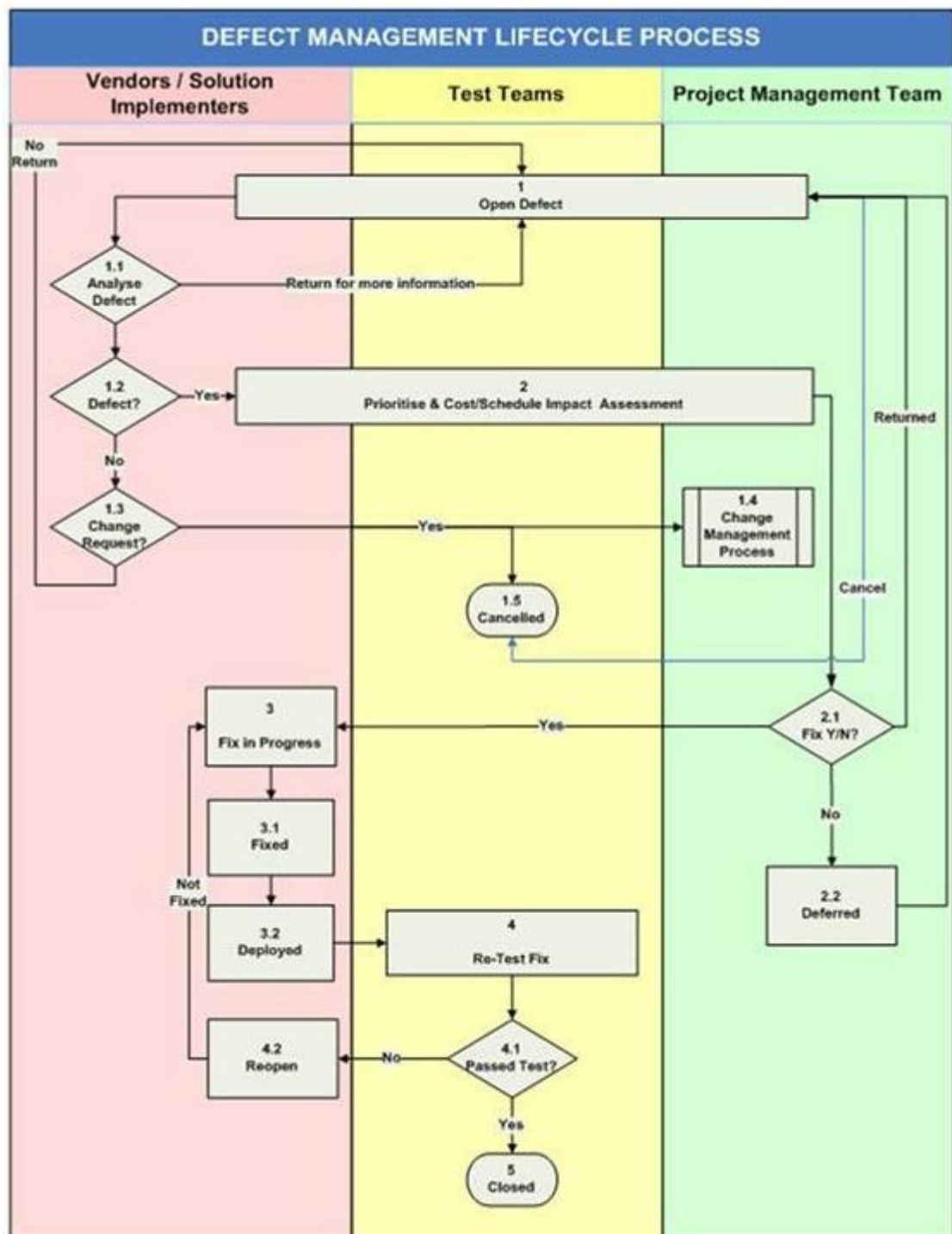
🟢 On target.

🟡 Actions in-place to deal with risk/issue

🔴 Project in crisis mode – help needed

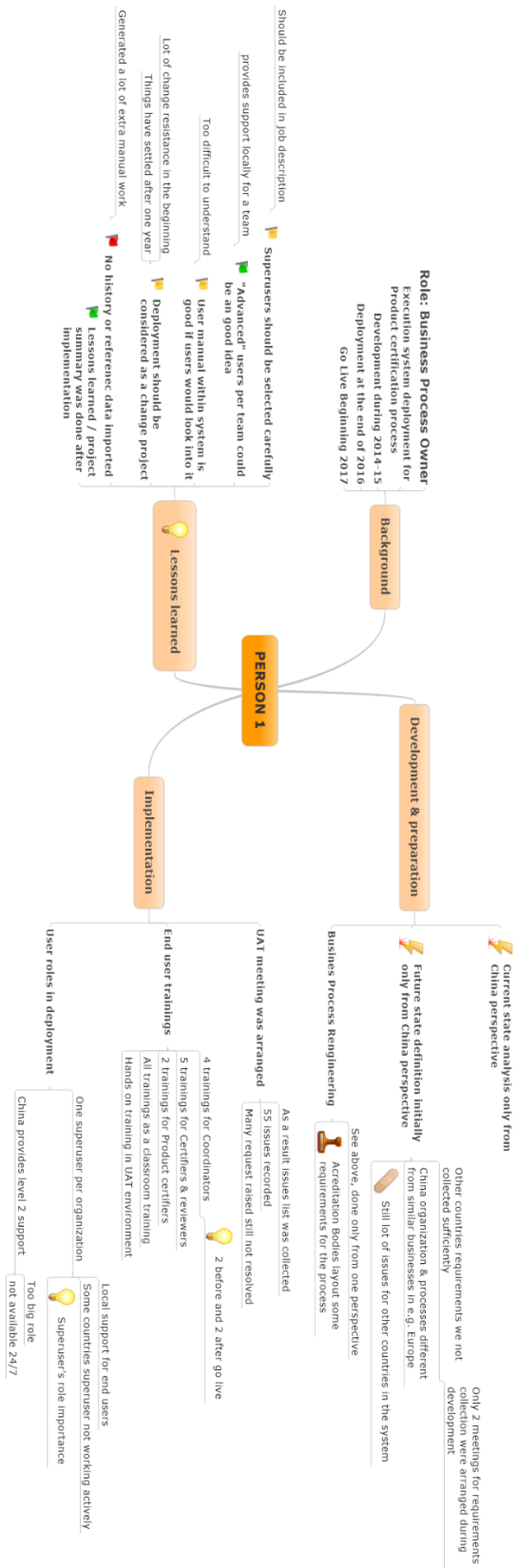
→ Overall status = red, in case that at least one sub-elements is red.

Appendix 4. Defect Management Lifecycle Process

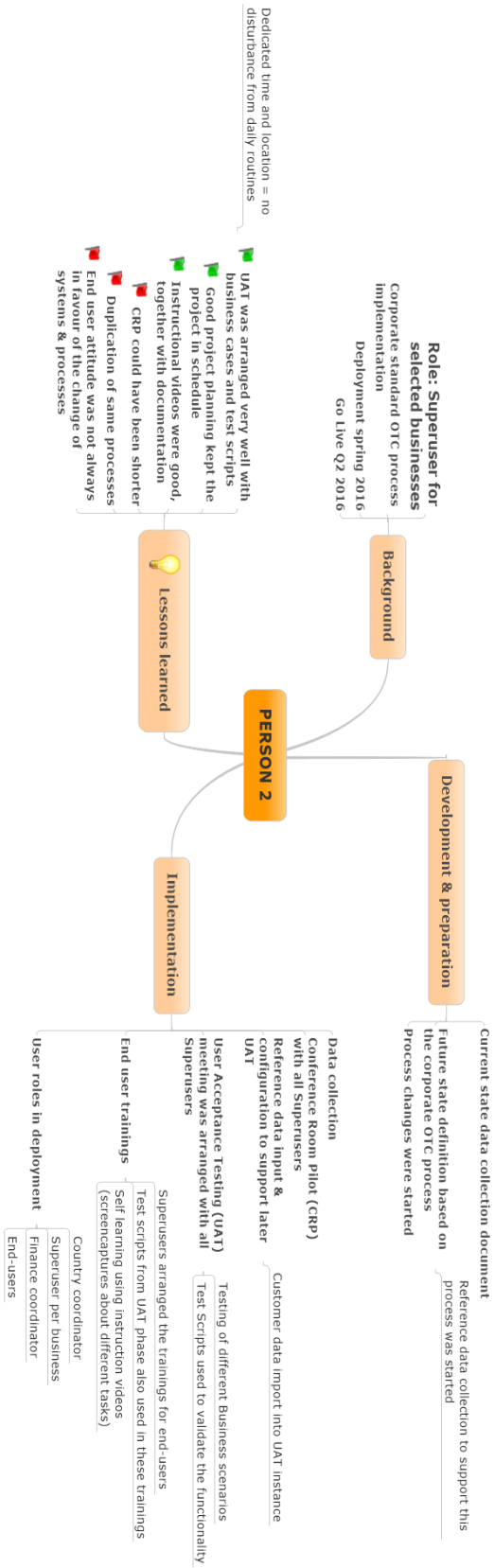


Kohlman, Ronald. 2011.

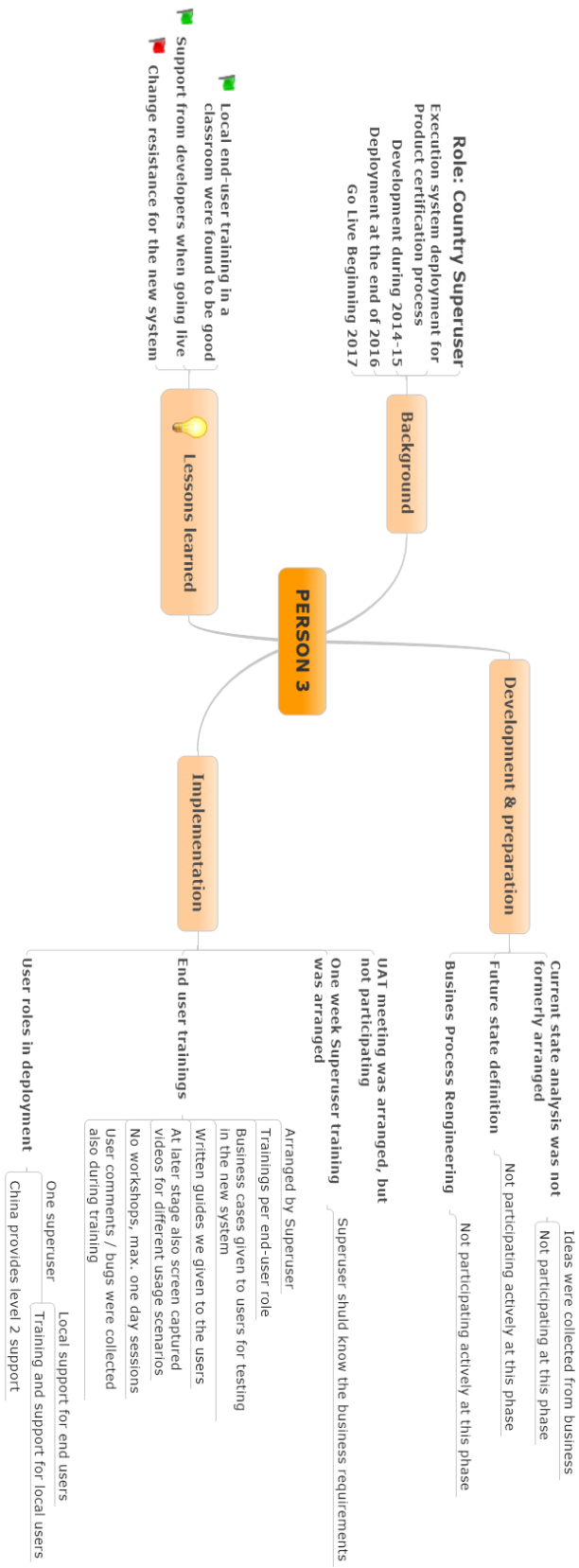
Appendix 5. Person 1 interview Mindmap



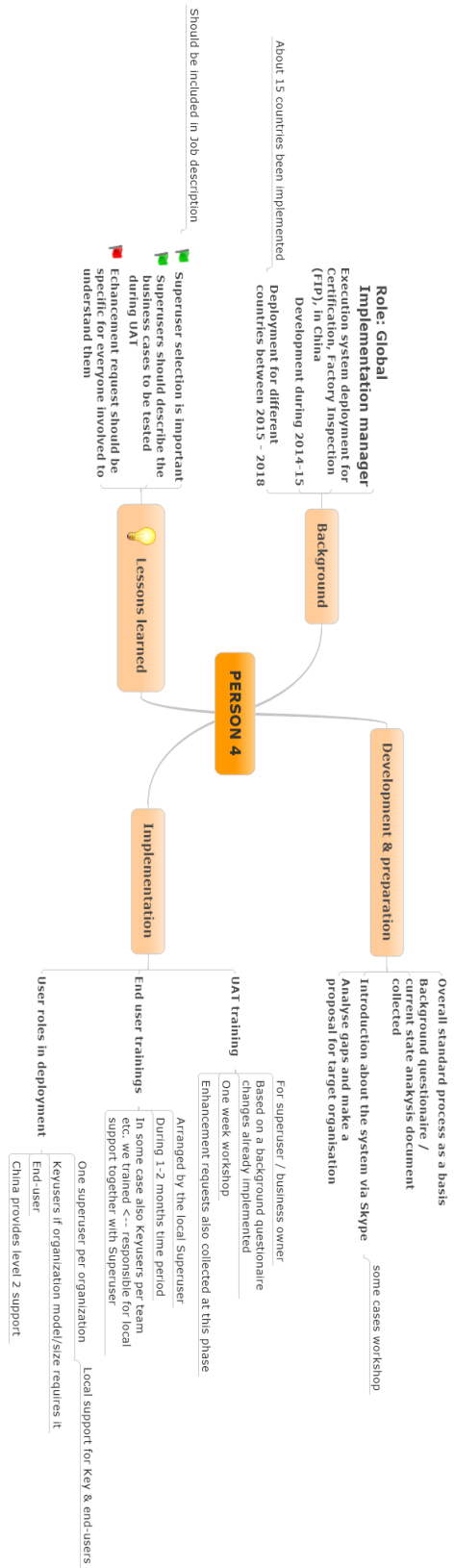
Appendix 6. Person 2 interview Mindmap



Appendix 7. Person 3 interview Mindmap



Appendix 8. Person 4 interview Mindmap



Appendix 9. Person 5 interview Mindmap

