

IMPROVING AN ORDER-DELIVERY
PROCESS WITH PROCESS MANAGEMENT
AND LEAN METHODOLOGY

Case: Startex Oy

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ABSTRACT

Office work processes have developed in the recent years at a fast rate, and with the help of information technology the pace of business operations has increased even more. It is therefore important to examine office work processes more closely and evaluate their performance. By paying more attention to the daily actions taking place at the office, companies can improve their internal efficiency, and thus improve their external effectiveness.

The purpose of this thesis is to examine Lean methodology and process management, and to find out how the ideas of these two could work in the office environment. The main objective of the study is to present Lean improvement suggestions to a company called Startex Oy for their order-delivery process.

Startex Oy is chosen as the case company because of their innovative approach to their business field and for their international contacts around the world. The research questions strive to model the order-delivery process of the case company, and to suggest ideas for improvement from the point of view of Lean.

The theoretical part of the thesis introduces office work on a more general level and it also examines both process management and Lean methodology in more detail. The empirical part puts theory into practice by improving the modelled process with Lean methodology. Ideas for improvement derive also from making a comparison between the case company's and one domestic private company's parallel processes.

The study offers practical ideas for improvement from the Lean point of view to implement within the order-delivery process. The study results are gathered by making use of both interviews and observation in the case company and by comparing the order-delivery process with a parallel process of one other domestic private company. The main results of the study show that the order-delivery process can be both shortened and simplified with the help of Lean methodology and process management.

Key words: Lean methodology, process management, order-delivery process, Startex Oy

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TIIVISTELMÄ

Toimistoprosessit ovat kehittyneet viime vuosina nopeasti, ja tietotekniikan avulla liiketoiminta on nopeutunut entisestään. Tämän vuoksi on tärkeää tutkia toimistoprosesseja lähemmin ja niiden suorituskykyä tulee arvioida kehittämistä varten. Kun toimistoprosessien nykytilaan kiinnitetään enemmän huomiota, yritykset voivat parantaa sekä sisäistä että ulkoista tehokkuuttaan.

Tämän opinnäytetyön tavoite on tutkia Lean-metodologiaa ja prosessien hallintaa sekä selvittää, kuinka näitä kahta voidaan soveltaa yhteen toimistoprosessiin. Työn päätavoite on tehdä kehitysehdotuksia Lean-metodologian näkökulmasta kohdeyritys Startex Oy:n tilaus-toimitusprosessille.

Startex Oy on valittu kohdeyritykseksi sen innovatiivisuuden ja kansainvälisyyden takia. Tutkimusongelmat käsittelevät valitun prosessin mallintamista kohdeyrityksessä ja parannusehdotusten esittämistä Lean-metodologian näkökulmasta.

Työn teoreettinen osuus esittelee toimistotyötä yleisemmällä tasolla ja käsittelee prosessien hallintaa ja Lean-metodologiaa laaja-alaisesti. Empiirinen osuus soveltaa teoriaa käytäntöön esittämällä käytännöllisiä Lean-parannusideoita kohdeyrityksen tilaus-toimitusprosessille. Parannusideoita saadaan myös prosessin vertaamisesta toisen kotimaisen yrityksen vastaavaan prosessiin.

Työ tarjoaa kohdeyritykselle käytännöllisiä tilaus-toimitusprosessin Lean-parannusehdotuksia. Työn tulokset on koottu hyödyntämällä sekä haastatteluja että havainnointia kohdeyrityksessä sekä hyödyntämällä tilaus-toimitusprosessin vertaamista toisen kotimaisen yrityksen vastaavaan prosessiin. Tulokset osoittavat, että tilaus-toimitusprosessia voi parantaa sekä lyhentämällä että yksinkertaistamalla sitä Lean-metodologian ja prosessien hallinnan avulla.

Asiasanat: Lean-metodologia, prosessien hallinta, tilaus-toimitusprosessi, Startex Oy

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1 INTRODUCTION

1.1 Objectives and limitations of the thesis

The main objective of this thesis is to find practical ways of improving an office work process, namely the order-delivery process of the case company Startex Oy, to be more efficient and less time consuming by implementing Lean methodology in the process. This company is a Finnish corporation and was founded in 1981. The company specializes in ski wax and roller skis production and sales. Startex Oy co-operates at present with 25 countries around the world. The company has developed a wide range of different ski waxes, ski products and roller skis and is very successful in its field. (Startex Oy 2009.)

This thesis will discuss the key aspects of the order-delivery process, which is one of the most significant office work processes of the company. The process was chosen in co-operation with the contact person of the case company. The case company is only used as an example of an international company and therefore information supplied by it will remain at a more general level, rather than giving specific details of its operations. Hence, the study offers ideas for improvement from the point of view of Lean methodology to the case company on how it could improve the internal efficiency of their order-delivery process.

With the purpose of providing practical guidelines for the case company's order-delivery process, a comparison will be drawn between the order-delivery processes of the case company and one domestic private company. Although the companies are very different from each other, the comparison is presumed to provide considerable benefit to both companies, though the main focus is on the case company's process.

1.2 Theoretical framework and research questions

The figure 1 below presents the research plan of this thesis. The theoretical framework of the study covers topics relating to office work, process management and Lean methodology. As process management and Lean methodology go hand in hand, both subjects are to be studied in detail. Office work is examined on a more general level, and after it process management and Lean methodology are examined in greater detail. Seeing that the improvement suggestions are to be presented from the point of view of Lean methodology, the three topics must be understood thoroughly.

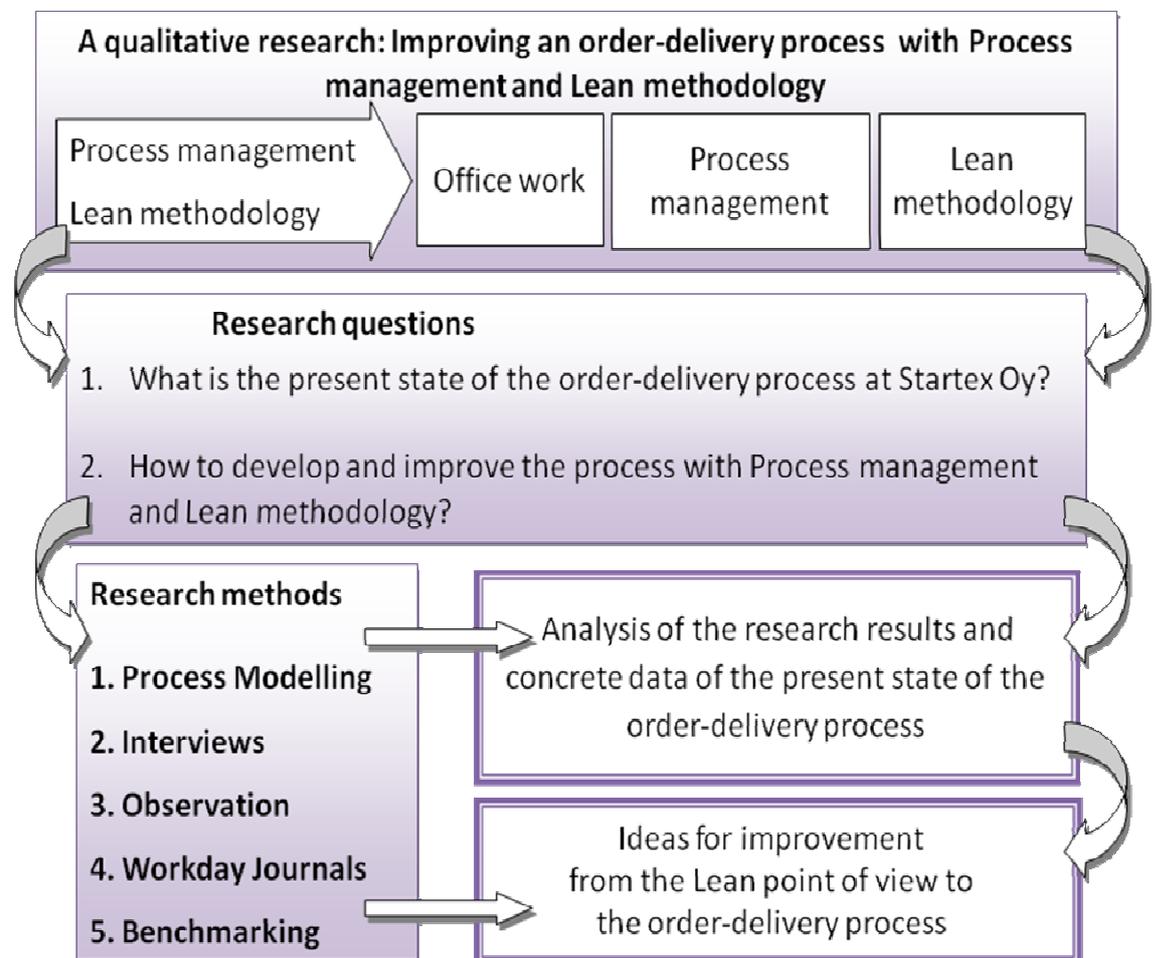


FIGURE 1. The research plan of the thesis

Moving on in figure 1, the key research questions are illustrated. The aim of the first research question is to find out the present state of the order-delivery process at Startex Oy by modelling it with the help of present state mapping. The goal of the second research question is to examine that process fully and to outline the key areas in need for improvement. Improvement suggestions derive from the analysis of the research results. Co-operation with the case company's personnel at all times during the thesis process is crucial and it will impact the outcome of the research.

1.3 Research material and research methods

All material regarding the case company will be provided by the case company's personnel. All other materials required in the study are acquired from publications in both written and electronic forms.

This research is carried out as a qualitative study, and the following research methods are chosen to collect primary information to help the analysis of the results. With the help of the chosen research methods; observation, poly-structured interviews, unstructured interviews, workday journals and benchmarking, a detailed viewpoint of the present state of the order-delivery process can be reached and possible improvement ideas can be perceived.

Observation

Observation as a research method can be divided into two parts: systematic observation and participative observation. Since systematic observation method requires a professional researcher to take the full advantage of it, focus will be on the participative observation method. (Hirsjärvi, Remes & Sajavaara, 2007, 186-215).

Participative observation is very useful in gathering primary information, and in this study primary information is crucial in order to gather an authentic view of the

case company's order-delivery process. In this thesis, participative observation is used on many occasions so that a more realistic picture of the current situation can be observed. In this study, participative observation is carried out so that the author is acting as an observer, working in the background and asking questions.

Interviews

Interview as a research method will help when an inside outlook on the work processes is wanted. This method will not, however, provide a fully realistic picture. Interviews tend to give information of what people think about their work, rather than providing an authentic picture of what people actually do in their work. (Hirsjärvi et al. 2007, 207.)

Both unstructured and semi-structured interviews are to be used in the modelling phase of the order-delivery process to give a better understanding of the possible problem areas. Interviews will be carried out later on in the process, since they need a lot of planning in advance. The interviews will be completed as individual and group interviews. All interviews will be recorded so no information is lost.

Workday journals

Workday journal as a research method can be seen as a type of a questionnaire where employees write down their different tasks and activities during the working days. Therefore the preparation process of the workday journals is just as important as creating of a normal questionnaire. Workday journals can be put into practice in many ways, but nowadays the electronic workday journal forms are much more efficient and much faster than non-electronic forms because the electronic journals can be analysed without the conversion from paper form to electronic. A modified, non-electronic, workday journal example is attached in the appendix 1.

Benchmarking

This research method is essentially a comparative research, and it is a valuable tool in process analysis. A company's processes can be compared to another one's parallel processes. The aim of making a comparison is to improve both companies' processes. Benchmarking is generally divided into three groups; internal, external and operational. (Hölttä & Savonen 1997, 21; Lecklin, 2006, 161-163.)

In this thesis, benchmarking will be conducted as a comparison between the case company's order-delivery process and a domestic service-oriented private company's parallel process. The comparison of the processes aims to provide an additional viewpoint to the analysis of the case company's process and to help in the idea generation of the improvement suggestions.

1.4 Structure of the thesis

The theoretical part of the study consists of four elements. The first chapter of the study is an introduction and it outlines the research plan of the thesis in more detail. The second part presents office work in general, concentrating on the fast development of it. The third part of the study concentrates on process management, examining the subject on a more general level. The fourth part of the study introduces Lean methodology in greater detail, as it is the focal point of the study.

In the empirical part of the study, the case company is presented in the fifth chapter, focusing on the present state of the order-delivery process. Moving on, in chapter six, Lean improvement recommendations are presented to the modelled process; the chapter also describes the comparison of the case company's process to another domestic private company's parallel process and concludes by presenting expert opinions about the suggested improvement recommendations to the order-delivery process. Chapter seven presents the author's conclusions of the thesis and a summary of the whole study.

2 OFFICE WORK

2.1 A brief history of office work

Office work has developed greatly in the industrial age through the introduction of automation, specifically when the typewriter and the adding machine were introduced in the 19th century. Later, the addition of computers and IT-systems affected the organization of office work. The automation of work has, though, resulted in fewer jobs as no longer are machine operators needed and many clerk tasks are redundant, which again cuts costs. (Encyclopaedia Britannica, 2008.)

The fast development of office work in the computer age led to the rise of virtual offices, because with the help of telecommunications and computers office workers would not have to leave home for work. Virtual offices have, however, not materialized for the benefit coming from interactions with other fellow employees at the office. Work efficiency, on the other hand, has been improved because automation lets managers to monitor their employees' work efficiency. To give an example of monitoring, managers can find out the number and times of a worker's telephone calls and track the number and nature of web sites an employee accesses. (Encyclopaedia Britannica, 2008.)

As industrial production increased, new methods were introduced to office work as well. One of the most significant new office work approaches was Taylorism. Aalto & Westermarck, (1997, 17) have discussed the main characteristic of Taylorism, the scientific management. This approach was based on a thorough analysis of work flows with the intention of optimising the work tasks.

Now, in the 21st century, office work has become more important and efficient in many ways and office environments are now seen as just as important as the work force itself. As a result of the development of information technology, the storing and protection of information is becoming more and more crucial for the company in order to be successful and to stay on track of its operations. But with the new

technology comes a need for quality and efficiency controls (Aalto & Westermarck, 1997, 135). Fortunately there are various methods to help with this need, such as the ISO 9000-standards and certificates.

2.2 General characteristics

Office work in a nutshell is all about supporting the business operations and helping in the recording process of those actions and decisions. Office work is the invisible strength of the company, which maintains all of the incoming and outgoing data and refines it for different uses. (Aalto & Westermarck, 1993, 17.)

Aalto & Westermarck, (1993) have divided office work into two parts. The first part is about information processing and is by nature very repetitive, for example accounting and invoicing. The second part is about gathering information and adjusting documents for different situations, for example different kinds of meetings and negotiation situations.

When looking at the general information flow within an office in figure 2, previously charted by Aalto & Westermarck, (1993, 17), certain observations can be made. The goals of office work are to gather necessary information, process the information, register and store it and finally, to be able to work in an up-to-date fashion. Information needs also to flow with ease between different departments.

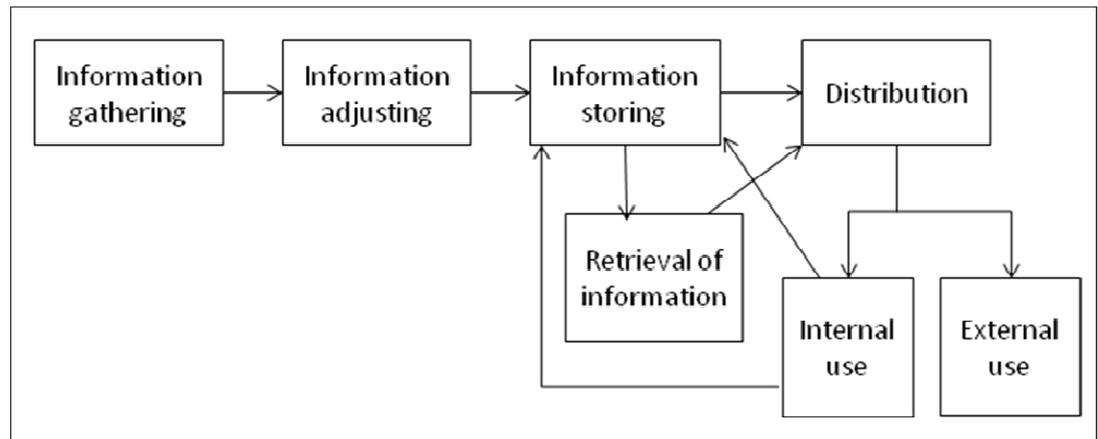


FIGURE 2. Information flow in the office (Aalto & Westermarck, 1993, 17.

Translated by the author of the thesis)

As presented in figure 2, in an office information is gathered with the help of different kinds of reports and documents. After this, it can be adjusted and altered before it is stored, either in paper or electronic forms, preferably in both forms when dealing with important documents. At this stage it is easy to retrieve information by other employees, who can, for instance, distribute the document to other departments for internal use or to have it available for external use. (Aalto & Westermarck, 1993, 17-18.)

In order to achieve that, various types of equipment and expertise are needed. These include the necessary word processing programmes, spreadsheet software programmes and presentation software and also the industry-specialised software designed for the particular company. Both high quality equipment and specialised expertise is required in order to be able to operate in a quick and efficient way. (Aalto & Westermarck, 1993, 19.)

2.3 The various opportunities of an enterprise resource planning (ERP) system

As presented in figure 3, an enterprise resource planning (ERP) system is an information system used to connect different areas of a company's administrative work. Generally, an ERP system integrates finance, production planning, customer

relationship management and human resources into one system. ERP systems support the value chain, allowing the company to add value to its goods and services. (Encyclopaedia Britannica, 2009.)



FIGURE 3. An ERP system

To get the maximum benefit of an ERP system, all parties who have access to the system need to be able to use the system to the fullest. Also, it needs to be made sure that all sections of the system are interacting with each other coherently and that information is available on all of the computers in the company. (Aalto, Peltonmäki & Westermarck, 2007, 16.)

An example of an ERP system is software called Visma, also presently utilized in the case company for more than one year. This software assists in creating value to the supply chain by tracking different areas of, for instance, production, storage and financial management. The software is user-friendly, and the software company provides also a helpdesk to its customers. (Visma Software Oyj. 2008.)

2.4 Office work standards

In the office environment, standards come in handy when the same types of documents are used consistently. The aim of document and template standards is to increase the rate of processing, for example by using the document standard SFS 2485 or SFS 3172 for domestic trade. (SFS-Käsikirja 76, 2000.) Standards are nowadays made to be international, but since they are merely guidelines, they remain voluntary. (SFS, 2009.)

ISO 9000-standards

ISO 9000-standards, which are a series of quality management standards, were accepted in 1987 by International Standard Organization (ISO). The development of internationally recognized quality management standards was stimulated by the increase in international trade and because of the fear of a variety of different national standards would complicate the international trade. (Lecklin, 2006, 309; ISO, 2009.)

In year 2000, a new, updated version of ISO 9000 was published, the ISO 9000:2000 standard with the ISO 9004:2000 standard, providing instructions and guidelines. The significance of ISO 9001 standard is so substantial that in specific businesses companies are obliged to acquire the certificate in order to even receive orders. (Lecklin, 2006, 310.)

3 PROCESS MANAGEMENT

3.1 History of process management

Process management dates back to the times of Frederick Taylor, who was responsible of developing process improvement. Process management developed greatly when Shewart, Deming, Juran and others combined the Taylorist process improvement to statistical process control. The development involved measuring and limiting process variation, making improvements continuous and allowing workers to improve their own processes. (Jeston & Nelis, 2006, xiv.)

Toyota then realized the opportunities of process management and turned it into a distinctive advance in their operations. The widely known Toyota Production System (TPS) combined statistical process control with ongoing learning in teams, adopting both waste and inventory control. (Jeston & Nelis, 2006, xiv.)

The basis of TPS is the elimination of different kinds of waste, the same as with Lean methodology. This was accomplished by introducing two fundamental approaches: Just-in-time (JIT) production and Autonomation. JIT in practice means that material, data and information flow to a workstation in only the amount needed, allowing the system to minimize the amount of “work-in-process”. Autonomation, then again, means the automation with human intelligence, focusing on improving quality within a process. (Venegas, 2007, x.)

3.2 Process concepts

Process definition

There are quite a few definitions given for a process, but basically a process can be defined as a group of related actions and tasks that together produce a valuable

outcome. A process is also defined as a repetitive sequence of tasks, which can be defined and measured. (Lecklin, 2006, 123; Moisio, 07/2005.)

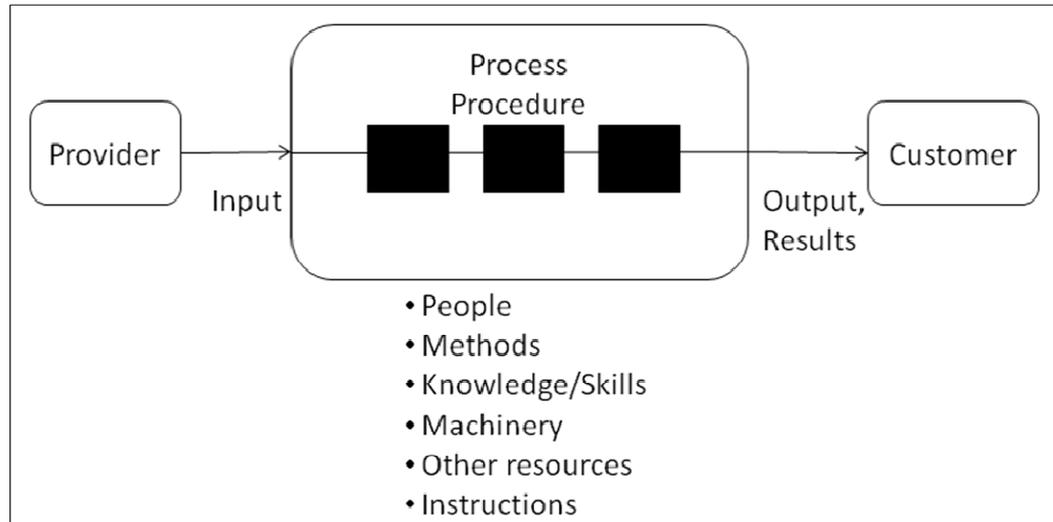


FIGURE 4. Simplified business process (Lecklin, 2006, 124. Translated by the author of the thesis)

In figure 4 above, the basic business process is presented. A process has inputs, such as information or materials, coming from either an internal or external provider. The result of a process is an output that a customer, internal or external, has wanted. The process procedure looks like a series of black boxes, in which the inputs are transformed into outputs with the help of people, methods and techniques, knowledge and skills and other resources. (Lecklin, 2006, 124.)

Process management

Process management is based on the basic question of how value is created for the customer in an organization. (Laamanen & Tinnilä, 2009, 52.) Process management is basically a management style striving towards improving not only the results, but also the processes, which create value for the customer. These processes are for example process development, marketing and order-delivery processes.

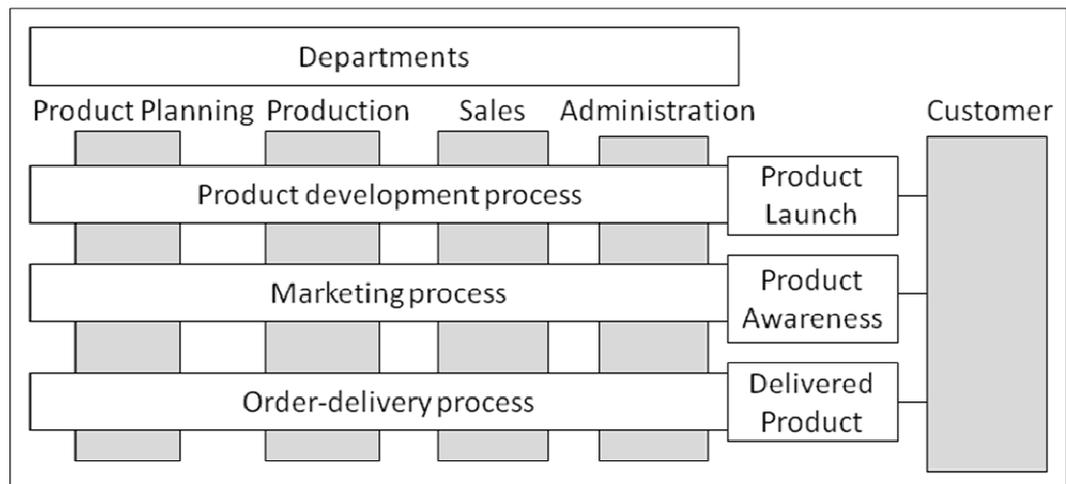


FIGURE 5. Process management (Lecklin, 2006, 126. Translated by the author of the thesis)

In figure 5 above, process management is illustrated. Process management does demand the abandonment of functional organization, where different departments do not interact with each other. Process owners are then the upper management, and all processes are seen as a network, where core processes are joined together from the end results of each of them.

Process owner

A process always has an owner and a customer. The process owner has many roles and responsibilities:

- Understand customer needs
- Identify opportunities for improvement
- Implement and sustain improvements
- Transfer process knowledge

(Gathered by Moio, 06/2009.)

A process owner can be compared to a department manager in a traditional organisation. It is the process owner's responsibility to guarantee the success of the end result of the process. The process owner is also responsible for the planning

and defining of the process and for acquiring the human resources required in the process. The process owner ought to be chosen on the basis of several aspects. The end customers of the process are to be defined first and the person responsible for the critical factors in the process need to be known, as the process owner is often regarded as a mentor for the process. (Lecklin, 2006, 131.)

Process map

A process map is the big picture of the whole company illustrating the core processes of the company with all of the connections between the different support processes. A process map can be broken into smaller pieces, which then present the core processes one by one. The idea behind the process map is to help the whole personnel of the company to “stay on the map” when process management is first introduced in the company. (Leckin 2007, 136; Moisio, 08/2005.)

Process flowchart

A process flowchart is drawn when the process flow is to be illustrated in detail. In a process flowchart all process steps are visible and process roles are identified. A process flowchart is also the first step in improving the process, and is followed by process analysis. (Moisio, 08/2005.)

3.2.1 Business process types

Business processes are categorised typically into four main categories. These categories are core, support, key and sub processes. A core process serves the customer, has an immediate contact to the customer and creates value for the customer. Examples of core processes are customer service, product and service development and order-delivery process. (Moisio, 08/2005.)

Support processes enable core processes to function, and usually have only internal customers, who are the other people involved in the process. Examples of

these types of processes are human resource management, financial administration and material flow management. Support processes can be found within one core process and they include many tasks and activities. (Moisio, 08/2005.)

Key processes are vital for the success of the organization. Key processes are the most important processes of the company and therefore are the primary development areas. Usually they are core or support processes, for example, future planning and co-operation with customers. (Lecklin, 2006, 130.)

Sub processes are smaller processes within the bigger ones, but nevertheless are important to model and understand, for instance daily accounting tasks; paying bills, checking accounts receivables ledgers etc. Sub processes can be cut into smaller pieces, resulting in tasks. Tasks, however, cannot be divided into smaller parts. (Lecklin, 2006, 130.)

3.2.2 Process hierarchy

The concept of process hierarchy can be examined with the help of an example, (see figure 6). A process can be broken into smaller pieces, so that each individual task can be identified within that process. The further the process is examined, the more tasks can be found in it. (Moisio, 08/2005.)

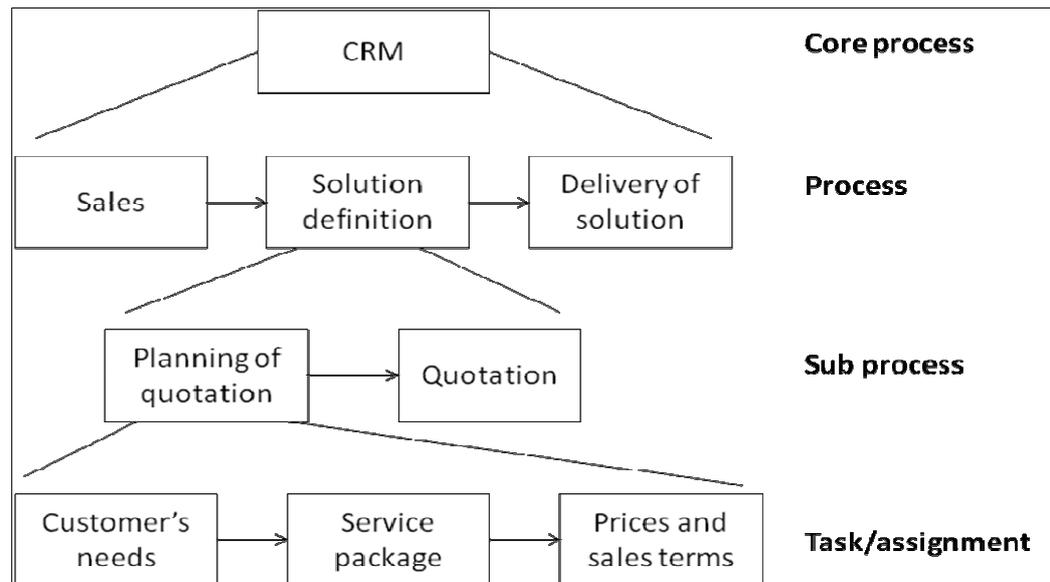


FIGURE 6. Process hierarchy (Lecklin, 2006, 133. Translated by the author of the thesis)

In figure 6 above, a typical core process, customer relationships management (CRM) is illustrated as a hierarchy of processes. The core process consists of three processes within itself. Solution definition includes two sub processes. Planning of quotation, a sub process of solution definition has three tasks. To compile a process hierarchy is demanding, but it helps to understand the structure of each core process in detail, making it that much easier to start business process management. A good process hierarchy has two or three levels in it, and therefore in the example the sub process of planning a quotation could be lifted to the upper level. In order to the process hierarchy to function properly, the limitations of different levels' processes must be precise and accurate. One task can belong only to one process. (Lecklin, 2006, 134.)

3.2.3 Continuous process development

Continuous process development consists of three phases. In figure 7 process development is illustrated. In present state mapping of a process, the process is be modelled in detail, as it is at the moment.

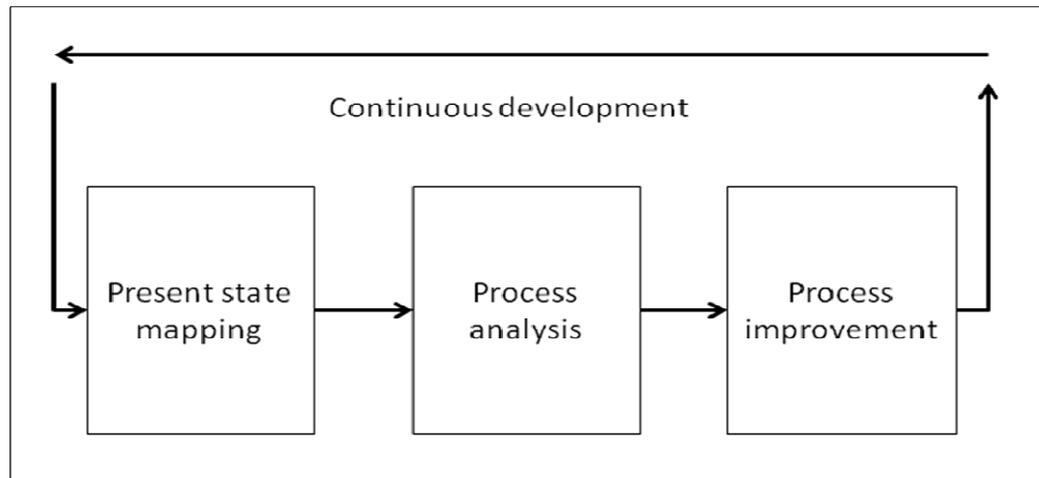


FIGURE 7. Continuous process development (Leckin, 2007, 134. Translated by the author of the thesis)

After modelling, a thorough process analysis is carried out to help outline the problem areas in the process. Then, with the information gathered from the process analysis, the development process can take a more tangible form in process improvement. According to the problem areas, wants and needs of the process steps, the process can either be modified slightly or even reengineered completely. After the process has been modified, the functionality of the new process model is to be regularly assessed. Continuous attention to the state of the process can be carried out by making benchmark estimations and with the help of customer satisfaction surveys for example. It is also important to bear in mind the importance of developing the personnel and see to it that the staff is developing with the process. (Lecklin, 2006, 134-136.)

3.3 Present state mapping i.e. process modelling

Before starting to map out the present state of a process, the most important processes of the company ought to be identified and placed on a process map, where the relationships between the core processes are illustrated. The process owner is

to be named and the team involved in the sub processes of the core processes need to have responsibility areas. (Lecklin, 2006, 136.)

Present state mapping, or process modelling, is carried out to understand the activities that are critical factors in creating value. If process modelling is successful, the customer feels that they have received a better service, i.e. received better value for their money. Secondly, the personnel have a clearer understanding of the whole value creation and therefore motivation and co-operation throughout the organization can improve. Finally, the customer needs are better understood within the company and their impact on development decisions increases, resulting in even better products and services. (Laamanen & Tinnilä, 2009, 52-53.)

3.3.1 Process description

A process description outlines the resources used in the process, for example personnel, work methods and tools, the output of the process and an environmental description with the boundaries with other processes. A process description or a process flowchart also includes a graphic presentation of all the activities and information flows in the process with explanations. (Laamanen & Tinnilä, 2009, 123-124.)

A process flowchart illustrates the process steps clearly. The parties involved in the process are on the left hand side, in the order of appearance. In figure 8, the quotation process begins from the left top corner, moving to the right ending to the submit of the quotation. If there are several participants involved in one step of the process, an arrow combines them and the person in responsibility can be marked with a specific colour. It is important to put the customer on top, so that the critical moments are easy to perceive from the figure. (Lecklin, 2006, 140-141.) A critical moment is a situation, where the chosen actions have a crucial impact on the process and where the customer is involved. (Laamanen & Tinnilä, 2009, 97).

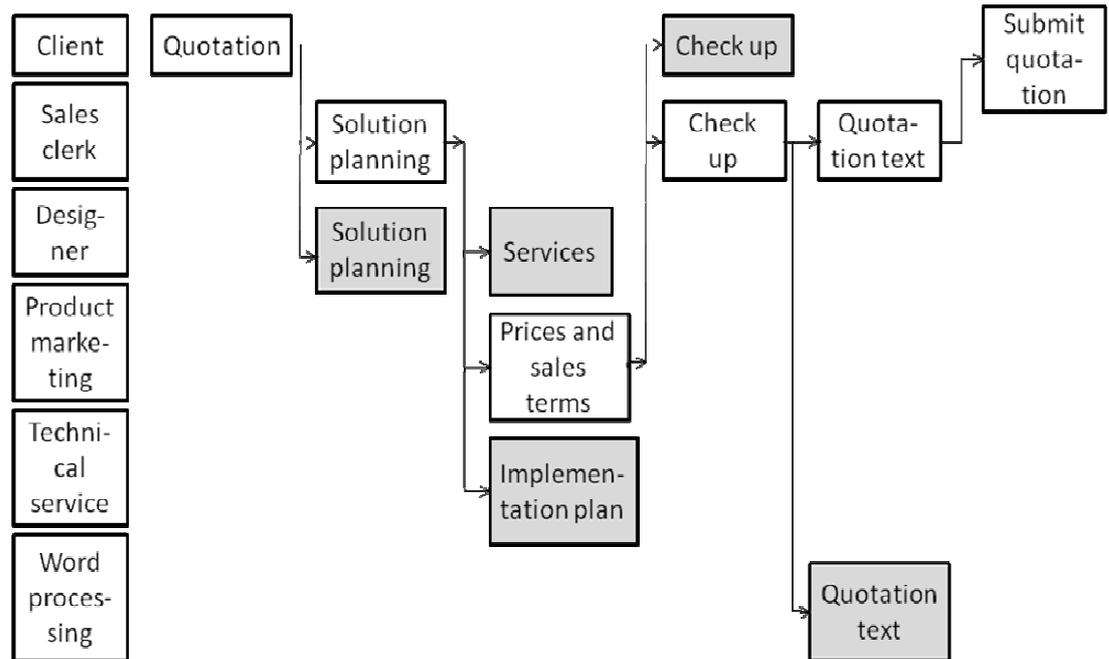


FIGURE 8. Example process flowchart of a quotation process (Lecklin, 2006, 140. Translated by the author of the thesis)

Besides the graphic presentation, a process description ought to have a verbal overview of it too. This can be outlined on an A4-document or straight to computer, naming all elements included in the process; process mission, process owner, input, output, performance measurements, customers and providers involved. (Lecklin, 2006, 140.)

3.4 Process analysis

A process analysis is where the gathered information of the present state mapping is analysed in detail with the help of a development team, gathered from the personnel. The purpose of a development team is to bring up as many improvement ideas to develop the process as possible. Afterwards, the ideas are prioritized and assessed. (Lecklin, 2006, 148-149.)

Process analysis tools need not to be complex, even the process description with both a graphic and verbal overviews can work as such tools. From the process

descriptions the wasteful steps can be spotted easily and areas that could be simplified and shortened are visible. (Lecklin, 2006, 149.)

3.4.1 Benchmarking

Benchmarking, which essentially is a comparative research, is a valuable tool in process analysis. A company's processes can be compared to another one's parallel processes, making it more straightforward to improve the company's own processes. Benchmarking starts at the planning stage of what processes are examined and how the actual assessment is carried out. The aim of benchmarking is to gain such results that both companies benefit from it. (Hölttä & Savonen, 1997, 21.)

There are two ways to carry out benchmarking, either by comparing results and achievement levels or by comparing procedures, namely the contents of processes and work steps. The two ways can also be used at the same time. (Lecklin, 2006, 161.)

Benchmarking is generally divided into three groups; internal, external and operational. The threshold to performing internal benchmarking is low and therefore it is recommended to start with it before moving on to other ways of implementing benchmarking. The purpose of internal benchmarking is to learn about the company's strongest units and processes. (Lecklin, 2006, 161-162.)

External benchmarking, then again, involves two companies from the same business in the comparison and operational benchmarking extends the concept further by comparing a company's operations to another company's operations from a different business. In operational benchmarking, the company of comparison is chosen for its excellent process functionality and efficiency. Operational benchmarking might be the most challenging type of benchmarking, but if the process development target is aimed high, then operational benchmarking is worth the effort. (Lecklin, 2006, 161-163.)

3.4.2 8-field SWOT-analysis

When trying to identify problem areas in the process analysis phase, a SWOT-analysis can be of advantage in pinpointing problems areas and in suggesting strategies for coping with them. The SWOT-technique includes specifying and relating both organizational strengths and weaknesses and environmental opportunities and threats. (Proctor, 1995, 56.) Mr. Tony Proctor introduced the 8-field SWOT-analysis to help identify factors which give rise to problem solutions.

An 8-field SWOT-analysis takes the traditional SWOT-analysis of a company's internal strengths and weaknesses and external opportunities and threats, a step further. It adds four more aspects to the table, which derive from the four original parts. (Hölttä & Savonen, 1997, 53.)

TABLE 1. The structure of an 8-field SWOT-analysis (Hölttä & Savonen, 1997, 54. Translated by the author of the thesis)

Current, Internal	1. Functional Strengths	2. Functional Weaknesses
Future, External	3. Opportunities and Profits	4. Threats and Losses
	5. Success Factors (1+3)	6. Weaknesses into Strengths (3+2)
	7. Threats into Profits (1+4)	8. Crisis Solutions (4+2)

As table 1 above shows the structure of an 8-field SWOT-analysis, the four new sections are the following. Success factors, which combine sectors 1 and 3, are

defined by examining how a company's external opportunities and profits are achieved with the internal functional strengths. The weaknesses into strengths-section, combining sectors 3 and 2, is defined by searching for the means for transforming company's internal weaknesses into strengths with the help of external opportunities and profits. (Hölttä & Savonen, 1997, 53.)

Moving on in table 1, section 7, that is threats into profits, combines sections 1 and 4. Threats are modified in such ways that profits can be obtained, with the help of studying various ways of striving to reach the company's visions. Lastly, crisis solutions-section 8 is classified as risks, which can be caused by external threats or by internal functional weaknesses and as finding ways for preparing for crises. (Hölttä & Savonen, 1997, 54.)

3.5 Process performance control

Performance control is an essential part of process management. It is said that if a process cannot be measured for its performance, it cannot be controlled. There are numerous types of performance control tools available. A good performance control tool is reliable, affordable, precise and straightforward. In general, performance control tools are divided into two types; result controls and internal quality controls. Result controls, which evaluate the quality of end products, focus on the external features of the end product, for instance durability, performance and weight. Internal quality controls provide information of the current processes and are more often statistical measures, such as reports and financial statements. (Lecklin, 2006, 151-152.)

In production and delivery processes good examples of performance controls are for instance;

- delivery time in days
- number of returns, also %
- duration of production process in days
- number of faulty products, also %

- incomplete work €

(Lecklin, 2006, 154.)

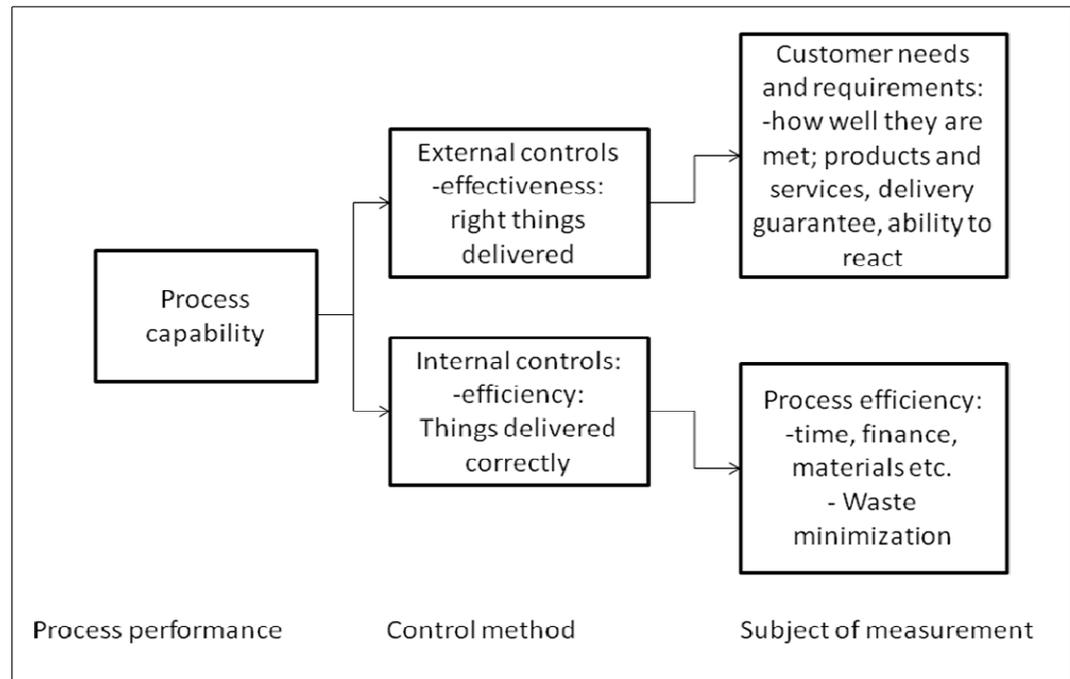


FIGURE 9. Process assessment (Qualitas Fennica, 2008. Translated by the author of the thesis)

Figure 9 presents an example of a process assessment. Process performance is controlled for its internal efficiency and external effectiveness with different subjects of measurements. Process measurement tools are such that the real efficiency of the process can be measured. Processing time, process costs and delivery guarantee are examples of measuring the efficiency of an order-delivery process.

Process improvement

Defining solutions to improve a process is the next phase in process development. There are a number of different solutions available for different situations. The modelled process can be renewed, the process flow and work steps can be altered,

the management style can be revised to be more process-centred or, lastly, the solutions can all be adapted at the same time. (Lecklin, 2006, 187-188.)

When choosing the way of how to improve a modelled process, there are three common evaluation criteria; process performance, customer satisfaction and the prospect of implementing a change. Process performance improvement is the most common motive in developing a process, for with it mistakes decrease and performance indexes increase. Personnel are responsible for creating better performance, and because of that personnel must feel comfortable with changes and be ready to make changes. (Lecklin, 2006, 188-189.)

4 LEAN METHODOLOGY

4.1 A brief history of Lean methodology

The very first person to introduce an entire production process was Mr. Henry Ford in 1913. He introduced moving assembly lines with standard work, and called it flow production. The only problem with Ford's system was the lack of variety in the finished cars. In 1930, and especially after World War II, Kiichiro Toyoda, Taiichi Ohno and others at Toyota looked at Ford's system. They thought that a series of simple innovations might just improve the continuity in the process flow and provide more variety in product offerings. After revisiting Ford's original thinking, they invented Toyota Production System (TPS), which is also the basis of Lean methodology. (Lean Enterprise Institute, 2009.)

Lean methodology evolved from TPS. The principles of TPS and Lean are thus similar, but are organized in a different manner. In order to understand the strategies of Lean, it is imperative to understand the principles of TPS. TPS builds on operational stability, which means the attention distributed to all factors affecting the flow of work, for example, timetables, material flow, information flow and qualified staff. One other principle of TPS is the Just-in-time method, i.e. producing only what is needed, when it is needed and the exact amount that is needed. (Sayer & Williams, 2007, 35.)

Lean methodology, on the other hand, is an operational strategy and a business philosophy. Although it emphasizes the elimination of waste, reducing costs, improving customer satisfaction, respecting the work force and reducing cycle times, it also focuses on Just-in-time and other common TPS methods. The main goal of Lean methodology is to add to the competitiveness of the company by enhancing its efficiency, productivity and quality. (Venegas, 2007, xi.)

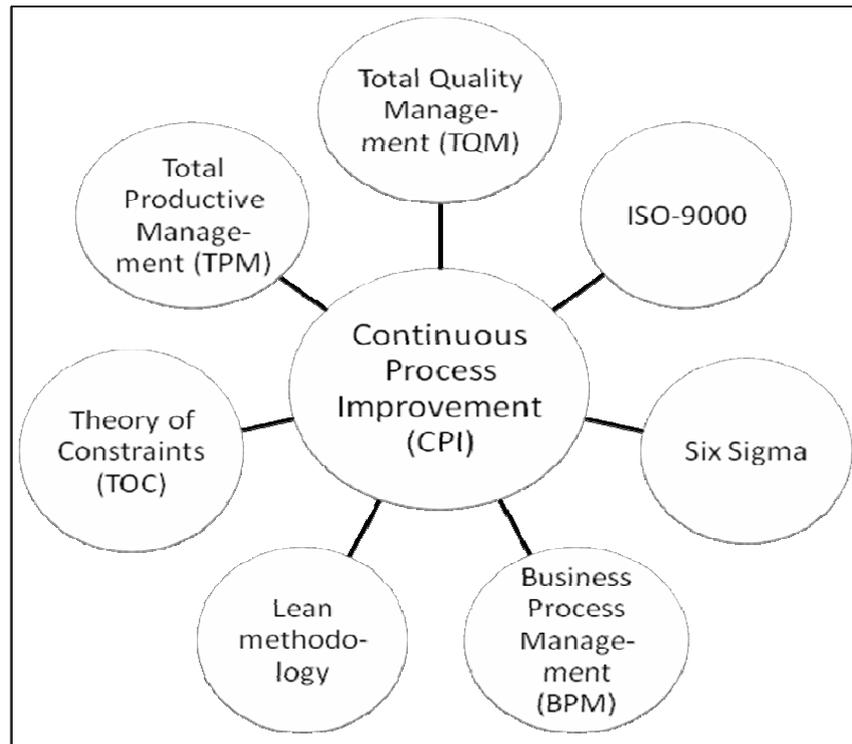


FIGURE 10. Relatives of CPI

There are quite a few “cousins” to Lean methodology, which share the same “gene pool” as Lean. As presented in figure 10 above, all relatives of Lean methodology, including Lean methodology itself, are parts of Continuous Process Improvement (CPI). The cousins are Total Quality Management (TQM), Six Sigma, Theory of Constraints (TOC), Total Productive Maintenance, Business Process Management (BPM) and ISO-9000. These methodologies focus on the same aspects of the company, share some of the same tools and techniques and claim similar results. The most significant differences to these relatives are found in the scope, investment level and application of them. (Sayer & Williams, 2007, 22-23.)

Adapting Lean methodology

The general concepts of Lean are the adaptation of a philosophy of continuous improvement, maintaining a constant focus on providing customer value, using various different techniques for reducing variation and eliminating waste of different types and finally, taking a long-term view on business processes. Lean meth-

odology has been adopted by a wide range of different industries, for example, automotive, banking, construction, healthcare, and government. This goes to show just how adaptable Lean methodology is. It is for that reason why Lean methodology can also be adopted to office work, meaning the internal functions of a company, supplier networks and customer value chains. (Sayer & Williams, 2007, 11-12.)

“Lean can be summarised as the systematic pursuit of perfect value through the elimination of waste in all aspects of the organisation’s business processes” (Bendell 2006). The pursuit for perfectionism involves a thorough understanding of all products and services and of the business processes, this being the value stream of the business. (Bendell 2006.)

4.2 Value stream

Value stream in Lean thinking means the way through which products and services are provided to the market. A value stream, or the process flow, consists of activities that are both value-added and non-value-added. Value-added activities have three criteria; they need to be something that the customer is willing to pay for; the activity must transform the product or service some how and the activity must be done correctly the first time. Non-value-added activities, also known as the three Ms-muda, mura and muri, are activities, which use resources without adding value for the customer, activities that do not run smoothly or consistently, or lastly, activities, which unnecessary burden people, equipment or systems. (Sayer & Williams, 2007, 51-53.)

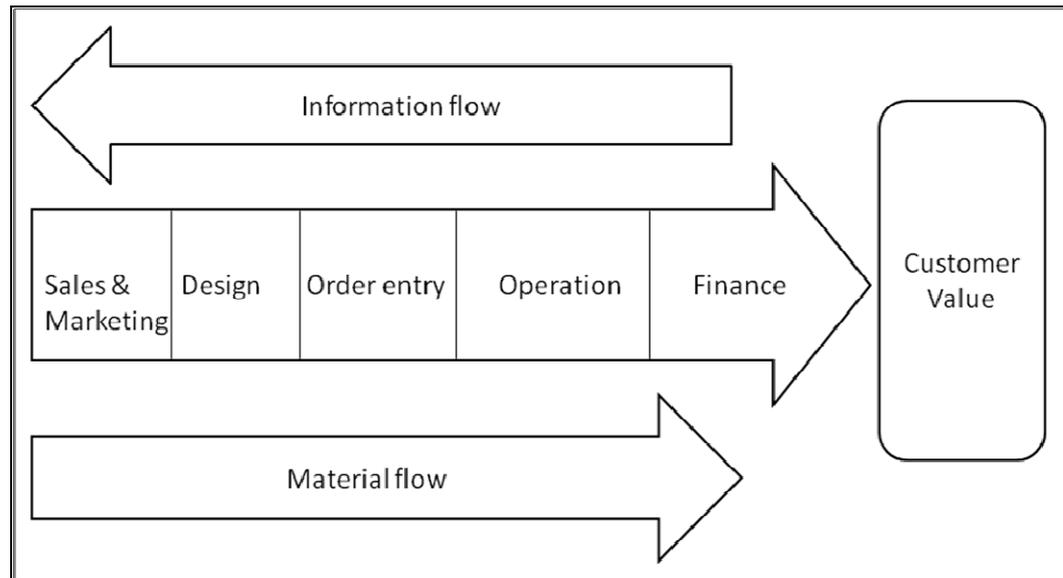


FIGURE 11. Value stream (Moisio, 12/2008. Translated by the author of the thesis)

Figure 11 above illustrates the value stream of creating customer value. Information flow starts with the needs of the customer, working backwards the production chain. Material flow, on the other hand, starts with the sales and marketing department with product planning, working toward the customer at the end of the value chain. In order to provide real customer value through the value stream, all departments involved in the customer value creation chain must co-operate with each other.

4.3 Different kinds of waste

In Lean thinking, waste can be defined as anything that does not add value to a product or a service from the customer's point of view. Waste can be tangible or intangible, both in production and in office environment. In production, waste can be identified and spotted quite easily, but in office processes it is much more subtle and complex. Waste, in definition, either adds friction or completely blocks the flow of value. (Venegas, 2007, 9.) There are seven types of waste that first were identified by Mr. Taiichi Ohno, after he had visited a Ford factory in Detroit repeatedly. (Womack, Jones, & Roos, 1990.)

Waste can be found everywhere; here are just a few examples of different kinds of waste in production:

- Using more raw material than necessary; buying, transporting, storing and disposing of excess raw materials not only costs a lot, but also takes more time and space.
- Spending more time to produce a product or a service; customers wait unnecessary long periods of time and energy and facilities are thus used needlessly.
- Making mistakes; mistakes slow down the flow of value, as it takes time and more materials to correct them.
- Having incomplete information or instructions; this results in mistakes, lost time and missed deadlines.
- Having people work improperly; this is the most wasteful of all. It is a direct waste of time and effort, and will harm the employees' psyche and morale. Plus, it can be hazardous.

Adopting Lean is all about trying to avoid these kinds of waste and adding value to the processes from the customer's point of view, while having a long-term view on the process. (Sayer & Williams, 2007, 13-14.)

The seven types of waste in the office environment

The seven types of waste are one of the key points in carrying out a Lean implementation. In the office environment the seven types of waste are somewhat different. A list of typical office waste is for example;

- unnecessary print-outs
- difficulties with information technology
- multiple checkups of travel bills
- mistakes in invoicing
- high employee turnover

(Moisio, 09/2008.)

As there are seven different types of waste found in production, there are seven types of waste in the office environment as well. These seven types of waste are presented in the following table 2 with definitions in relation to office surroundings. (Sayer & Williams, 2007, 44; Gemba Research, 2007.) The table 2 helps to identify office waste, which can be quite similar to production waste, but is easily put aside and forgotten. For example erroneous print-outs are often just disposed of, when they could be, if nothing more, used again. Reuse would then again, minimize paper waste.

TABLE 2. The seven types of waste in the office environment (Sayer & Williams, 2007, 44; Gemba Research, 2007.)

THE 7 TYPES OF WASTE	DEFINITION	IN THE OFFICE
Overproduction	Producing more than the customer wants, causing more waste in inventory, consumption of raw materials and manpower.	More information is provided than necessary, for example unnecessary reports and extra copies.
Transportation	Unnecessary movement of products. The more products are moved, the bigger is the chance of damaging them.	Unnecessary movement of information, for instance taking files to another person and getting signatures.
Motion	People's movement that does not add value, for example walking, lifting and reaching.	Searching for files and other equipment, adjusting work equipment.
Waiting	Time is wasted while waiting for anything, for example materials, information, people or equipment.	Waiting for faxes, the computer to work or the copy machine to print.
Extra Processing	Production of unnecessary elements from the customer's point of view.	Use of outdated forms, repeated manual entry of data, unnecessary paper-work.
Inventory	Excess products or information is available, creating risks of spoilage, damage, and quality. Extra inventory takes away financial resources.	Examples are open projects, e-mails waiting to be dealt with and excess office supplies.
Defects	Work that has defects, or lacks something important. Any process, product or service that does not meet the set requirements.	Data entry errors, printing errors, missing information and lost records.

As Venegas, (2007, 10) reminds, new and different elements of waste occur in individual offices, and the ability of spotting them is the essence of a successful Lean implementation. It is therefore good to study the different types of waste well to reach a solid Lean understanding.

Table 2 above gives an overlook of how the traditional manufacturing wastes can be adapted to the office surroundings. There are, however, different ways of portraying these wastes and one of these ways has been presented by Mr Carlos Venegas (2007). In the following, a different style of allocation of the seven types of waste is presented by examining the four most common types of office waste; information waste, process waste, physical environment waste and people waste. The same allocation of different types of wastes has also been presented by Mr. Moisis. (Moisis, 09/2008.)

“Information is to office and management functions what raw material is to manufacturing” (Venegas 2007, 11). When information is poorly managed, it results in erosion and obstructions in the flow of value, also known as information waste. Information waste includes different types of sub wastes, of which the four most common are presented below:

- Incompatible information systems: occurs when two or more systems are used in the same process, but cannot share data. This type of waste causes mistakes and takes up valuable time when data is transformed to another form.
- Manual check-ups of electronic data: manual checking defeats the purpose of automation and paperless office and could be regarded as a case of effort redundancy.

(Venegas, 2007, 12-13.)

These types of information waste could be avoided by taking an advantage of a single comprehensive database, an ERP system. Examples of such systems are the Visma products. (Visma Software, 2009.)

Venegas, 2007, also speaks about process waste, physical environment waste and people waste. Process waste comprises all of the seven main types of waste, but has been adjusted to better suit different business environments. Elements, such as

checking, approvals and incomplete data are examples of such additions to the traditional “seven types of waste” list. (Venegas, 2007, 21.)

Process waste can also be described as strategic waste, i.e. when processes are not focused on the customer value. Process waste includes not only inspections and rework of different documents but also corrections of unpredictable process outcomes. (Moisio, 09/2008.)

Physical environment waste is divided into two sub categories. The first one comprises waste related to safety, and the other one relates to the movement of people or objects. These types of waste can be eliminated by taking care of, for instance, proper ventilation, sufficient lighting and suitable office furniture in the office environment. (Venegas, 2007, 29-30.)

People waste i.e. inefficiencies in how people work, can be divided into several smaller kinds of waste, for example, lack of training, multitasking and work interruptions. People waste can prove costly to the business, because human capital is the most important asset of any business. (Venegas, 2007, 31.)

Moreover, people waste, also known as human energy waste, can be seen as ownership and control waste. This type of waste occurs when people need to wait for approvals, there is no clear ownership of different issues and when people are working on unnecessary or inappropriate tasks. (Moisio, 09/2008.)

4.4 The key Lean concepts in the office environment

When bringing Lean methodology into the office environment, the differences of the operational settings have to be cared for. For in the office circumstances, the concepts of value and waste are hidden in intangible processes. (Venegas, 2007, 9.) Lean in the service environment can help in, for instance, reducing time spent performing business activities, increasing customer satisfaction by improving the timeliness and quality of deliverables and reducing the total cost of doing business

by eliminating wasted time and effort. In the office setting, where service businesses are more labour intensive, the respect for people in the value chain is ever more important. (Sayer & Williams, 2007, 301-304.)

Improving service processes with Lean methodology can be executed in many ways. The 5 Ss method, continuous flow, Jidoka (mistake proofing) and having standard operations are just a few examples of making a difference. (Venegas, 2007, 39.) In the following the four methods are examined in more detail.

4.4.1 The 5 Ss

In services 5 Ss means Sort, Straighten, Scrub, Systematize and Standardize. The aim of this method is to clear up the clutter and create an organized workplace that has a smooth value chain. This method is recommended as the first step in implementing Lean methodology as it clarifies the task at hand, making it easier to implement further improvements. (Venegas, 2007, 40.)

TABLE 3. The 5 Ss in the office (Venegas, 2007, 40.)

ACTIVITY	DESCRIPTION
Sort	Identify and separate elements required for the task
Simplify	Simplify the process and workspace
Sweep	Remove unnecessary items
Standardize	Document the process
Sustain	Maintain the changes

As presented in table 3, the 5 Ss method has five phases to clear up the workspace. The first phase Sort in practise means the separating of the necessary from the unnecessary elements within the process. In the end of sorting, there ought to be only the essentials and imperatives left to complete the job. (Venegas, 2007, 41.)

In the next phase, Simplify, ways to simplify the office processes and the workspace are searched for. The easier the correct information, template or document can be found, the more time is saved to add value (Markovitz, 2008). Simplify also means straightening of tools of services to allow easy access, including the simplifying of information, i.e. the file and system names ought to be consistent. (Sayer & Williams, 2007, 305).

The third phase, Sweep, involves eliminating or archiving things into systematically labelled files. The focus is put on maintaining the workspace, equipment and processes in a ready-to-use condition. (Venegas, 2007, 41.) It also stands for maintaining service tools in a clean condition (Sayer & Williams, 2007, 305).

In the following phase, Standardise, the process is standardized and documented in order to define what is normal and expected. It is crucial to standardize and to document the improved processes; otherwise it is possible to revert back to old ways of working. (Venegas, 2007, 41.)

The last phase of the 5 Ss method is Sustain. It means that the first four phases are pursued persistently with discipline. In practise this acquires training all employees in implementing the changes, monitoring the improvements and transforming the organizational mindset so that it cannot revert back to the old ways. (Venegas, 2007, 42.)

In practise, 5 Ss method can be implemented for instance as follows: Sorting through the files can be carried out by using a three-tiered electronic structure of 1. Working, 2. Reference, and 3. Archive files. (Markovitz, 2008.) As Markovitz presents, the first file "Working" contains all files that are used regularly, for instance agendas and the current budget. The second file "Reference" contains documents that are used on occasion, such as templates and old budgets. Finally, the third file "Archive" contains everything that is old and worthless, for example tax returns and files on ex-employees. The aim of Markowitz's three-tiered electronic structure is to avoid mixing the high value "working" items with the low value "reference" and "archive" items. (Markovitz, 2008.)

4.4.2 Continuous flow

Continuous flow or Single-Piece-Flow method is the situation where a product or a service progresses through the value stream without any interruption (Venegas, 2007, 43). It can also be defined as carrying out one-piece-at-a-time process, which aims at eliminating stagnation of work between each process steps. (Moisio, 12/2008.)

In the office environment this means completing each process accurately and without interruptions, which can be a real challenge. This because interruption is an inherent part of office work. Phone calls, e-mails and other employees constantly interrupt the work at hand. (Venegas, 2007, 43-44.) Some of the interruptions cannot be changed or eliminated, but striving for continuous flow can still be beneficial. A good practical example of eliminating interruptions in the office is to set a specific time for answering e-mail and phone calls. (Venegas, 2007, 44.)

In order to establish successful continuous flow, effective communication and cooperation between processes and departments are needed. This can be enabled by highlighting the symbiotic aspect of the relationship between different departments. (Venegas, 2007, 45.) After all, the different departments depend on each other.

4.4.3 Jidoka

Jidoka by definition means the transference of human intelligence to machines by using automation. The automation makes sure that defects are detected by stopping the machine in order for someone to come and fix the problem. By detecting the mistakes when they happen, the quality of the product in the value stream can be better guaranteed. (Sayer & Williams, 2007, 339.)

Jidoka means built-in quality at the source, and it can be used with techniques such as mistake proofing (poka-yoke) and just-in-time (Sayer & Williams, 2007, 37). Jidoka is not used purely for correcting mistakes, for it is more useful when it is used for tracing and eliminating the root cause of the mistake. This method will add valuable time, cut costs and improve overall productivity of the process. (Venegas, 2007, 45).

In the office environment, Jidoka and its techniques are particularly useful, because of the high attention required in performing repetitive tasks. A good way of using Jidoka in these kinds of tasks is to make use of web documents, which do not allow the user to continue if the fields of the document are left blank or are filled in with unexpected data. (Venegas, 2007, 45.)

4.5 Lean leadership

In order to implement Lean management in an organization, it is crucial that all executives develop a thorough understanding of the Lean management system. This because most executives are more interested in micro-evolutionary department-specific improvements, rather than revolutionary improvement across the company and Lean methodology can therefore seem too challenging. (Emiliani, 2007, 25 & 41-45.)

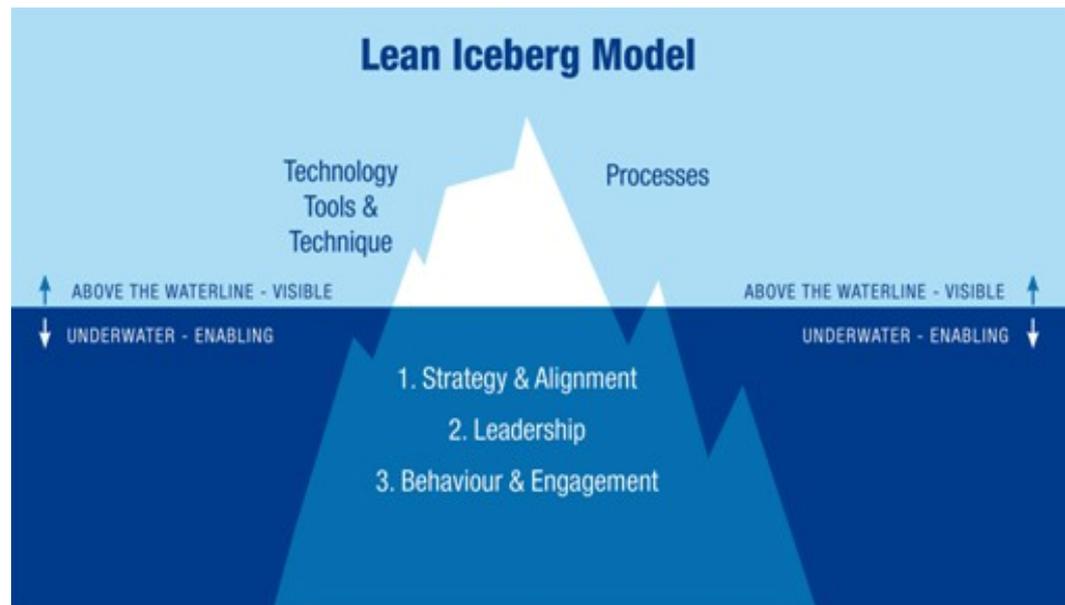


FIGURE 12. Lean Iceberg Model (Lean Enterprise Research Centre, 2008.)

Figure 12 illustrates the Lean Iceberg Model, where the division of visible Lean methodology applications of tools and techniques and process management are separated from the invisible, hard to copy, enabling elements of successful Lean implementations of strategy and alignment, leadership and engagement (LERC, 2008.)

The significance of making sure the managerial level is committed to implementing Lean methodology throughout the organization is absolutely crucial as they enable the change by providing the needed resources. If the managerial level is not engaged to the change, the likelihood of failing the implementation is very high. (LERC, 2008.)

4.6 Implementing Lean in a nutshell

Implementing Lean methodology within an organization consists of a five-step-thought process. This five-step-thought process can be illustrated with a cycle, presented in figure 13.

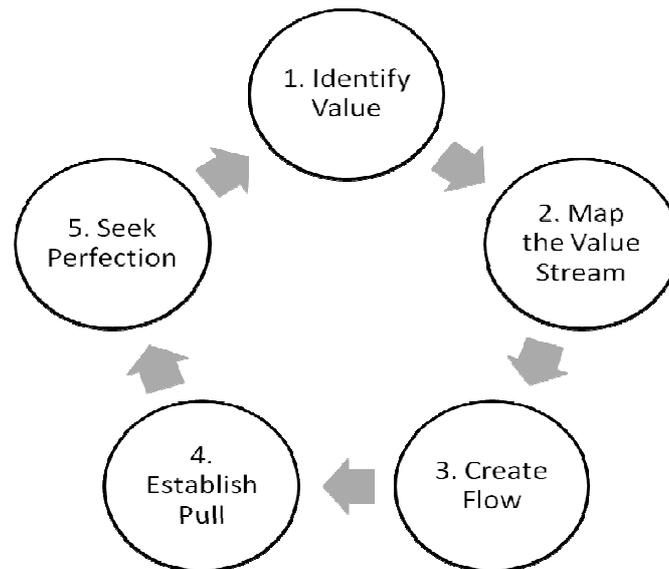


FIGURE 13. Principles of Lean (Lean Enterprise Institute, 2009.)

As presented in figure 13, the first thing to do is to identify and specify what is regarded as value in that organization, from the customer's point of view. The second step is to identify all steps involved in the value stream for each product family, remembering to eliminate all unnecessary steps that do not create value. Then flow is introduced by making sure that the value-creating steps take place in tight sequence, both space and time wise. Next, "Pull" is established when customers can pull value from the next upstream activity by making orders. The last step is to begin the process again, finding more things to improve, step by step. Perfection is the goal, where perfect value is created with no waste. (Lean Enterprise Institute, 2009.)

5 PRESENT STATE MAPPING OF THE ORDER-DELIVERY PROCESS AT STARTEX OY

5.1 Startex Oy overview

Startex Oy is an international company providing high quality ski waxes and roller skis for all skiers from beginners to the world cup winners. The company, in operation since 1981, is well-known for its active development and innovative ski wax solutions. (Startex Oy, 2006.)

This mostly family-owned company, located in Hollola, Finland, has experienced continuous success due to its many strategic business decisions, innovative product developments and co-operations with different stakeholders. As the company specializes in producing and selling of various ski waxes and other similar products, it has chosen to compete with high quality, rather than competitive pricing and it relies on its customer loyalty. (Salmi, H. 2009.)

The most valuable asset of Startex Oy is the START-brand. START-brand is highly valued in the market and has been chosen as the most appreciated winter sports brand by Taloustutkimus, Sport, years 2003-2007. (Salmi, 2009.)

The organizational chart of the case company, in appendix 2, shows how responsibility is divided in the company. The product development and research, for example, is the responsibility of the Chief Executive Officer, upper level Production Manager and Export Manager although these persons are also responsible for other aspects as well. (Salmi, 2009.)

5.2 An ERP system at Startex Oy

Startex Oy is currently applying an enterprise resource planning system, called Visma L7, in their business operations. This programme has been in use for one and a half years now, and it has been seen as a very good and valuable asset. At present, Startex Oy has combined its financial administration, procurement, accounting, storage administration and production planning into this one ERP system. (Salmi, 2009.)

The system provides assistance in several different business operation fields, for example, payroll and quality control functions are still available in the system. Visma L7 also provides a helpdesk-service over the phone. (Visma Software Oyj 2008; Visma L7 brochure.)

5.3 The most important processes at Startex Oy

The most important processes in Startex Oy are the production process of both regular and specialized products, order-delivery process and project processes, for example campaign projects, which are all taken into consideration in Visma L7's functions. However, when the processes are examined more thoroughly, room for improvement can be noticed. The functionality of these core processes have a direct impact on the profit ratio of the company and must be well taken care of to guarantee success in the future too. (Salmi, 2009.)

The order-delivery process has not been modelled before in the case company, but the estimated time of processing an average size order ready for delivery is some 30 minutes, depending on the size of the delivery. Larger shipments naturally take more time, and if there are not enough products in the stock, the process can take more than one day to go through. (Salmi, 2009.)

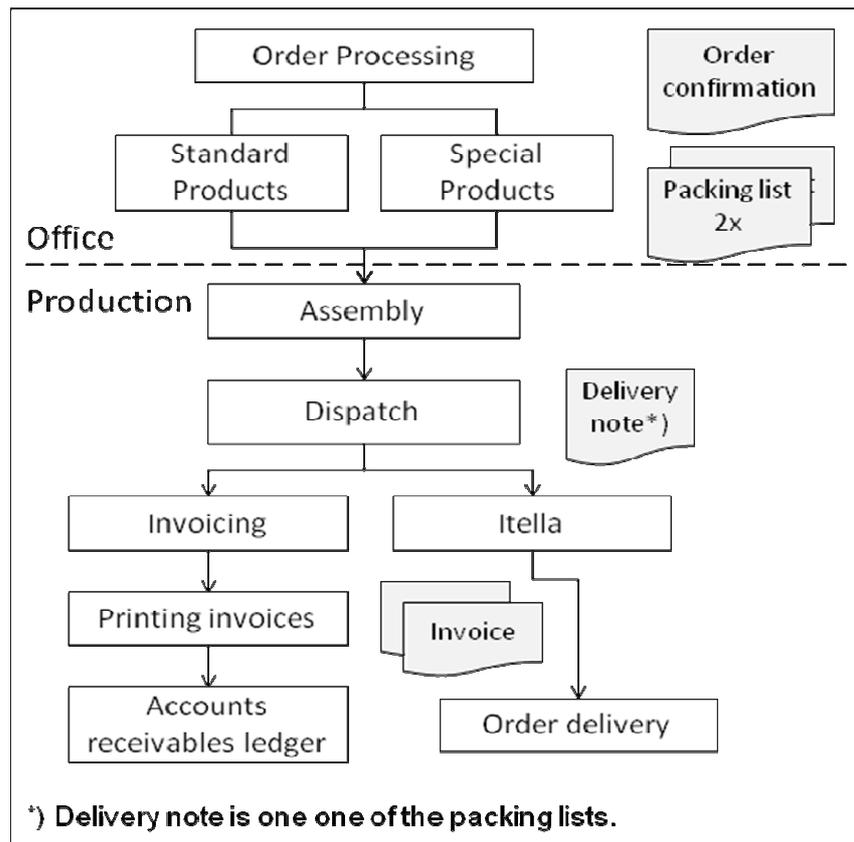


FIGURE 14. A simplified order-delivery process at Startex Oy (Salmi, 2009; Visma L7 brochure.)

Presented in figure 14 above is the simplified order-delivery process at Startex Oy, showing also the required paper documents in the process. An order is accepted and confirmed by the sales department, document of the order confirmation is made and information of the order is taken to the assembly and production facilities in the form of packing lists. Two copies of the packing lists are made, for the other copy will be used as a delivery note. The products are collected, packed and documented in the packing lists. The information is later on used in the invoicing of the order. An address note is printed out at the dispatch department, from software Prinetti. From the dispatch department products are shipped by using a delivery company Itella, to the main distribution channels i.e. special winter sports shops and large markets, who are the most common customers of the process. (Järvinen, & Salmi, 2009.)

5.4 The present state of the order-delivery process at Startex Oy

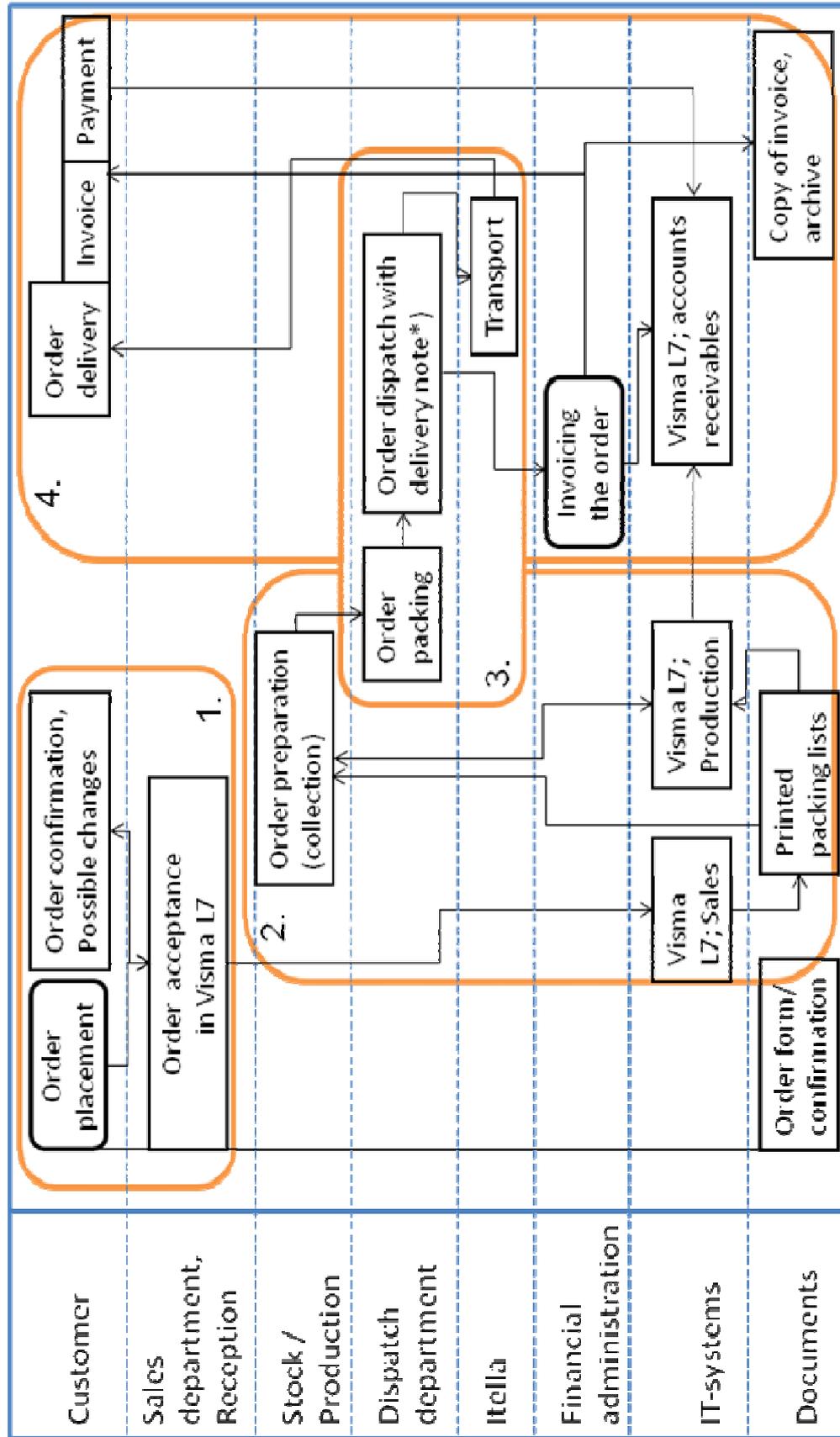
The present state of the order-delivery process at the case company is modelled based on the observations made in the company's premises and on the several interviews with the Financial Manager and Executive Vice President during the thesis writing process. The author's observations of the physical office surroundings and of the production department's layouts helped considerably in the understanding of the process steps of the order-delivery process. A process walk with the Financial Manager was carried out at the case company, when the process flow chart was formulated.

TABLE 4. Process cover page of the present state of the order-delivery process

<p>Name of the process: Order-delivery process at Startex Oy</p> <ol style="list-style-type: none"> 1. Process mission and objectives: To be able to deliver products to the process customers as fast and efficiently as possible with minimal costs 2. Process Owner: Upper level Production Manager 3. Customers: Main distribution channels, special winter sports shops and large markets 4. Customer requirements: Correct products delivered to right places at the right time 5. Essential input information: Order details 6. Process outputs: Order shipment 7. Essential participants: Reception, Financial Administration, Production, Stock and Dispatch Departments 8. First step: An order is received 9. Last step: An order is shipped to the customer
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10. Process critical success factors: Order details are correct and correct products are shipped to right recipients
11. Process units of measurement: No units of measurements
12. Process assessment procedures: No assessment procedures
13. Process connections to other processes: Product Planning and Development processes, based on customer satisfaction

As the present state of the order-delivery process is modelled, the key elements within the process are to be identified first. Table 4 presents the key points of the process. The customers of the process are the main distribution channels, special winter sports shops and large markets. The upper level Production Manager is the process owner, and the responsibility of the physical work included in the order-delivery is divided between him and the lower level Production Manager. These persons are therefore responsible for all production related processes. The upper level Production Manager is also involved in the production planning process, though is not the process owner in that. At present, no other process roles have been defined in the process.



*) Delivery note is printed out in the dispatch dep. (Software:Prinetti)

FIGURE 15. The present state of the order-delivery process at Startex Oy

The order-delivery process can be divided into four main parts; order acceptance, order preparation, order dispatch and order invoicing, see figure 15; four numbered, rounded rectangles in orange. Order acceptance is completed in the office, and this sub process has two tasks in it. The order placement by the customer has to be accepted and checked to make sure no mistakes are made and then the order details are entered into the ERP system, from where the packing lists can be printed out and taken to the stock and production departments. The packing list can also be seen from the computer in the stock and dispatch departments, where the employees have a limited access to the ERP system. The packing list states details of the shipment, for example the gross and net weight, volume and contents of each parcel. Two copies of the packing list are printed out; one copy works as a delivery note, which is included in the shipment and the other one stays in, and the customer is invoiced based on that remaining packing list.

The next phase in the process is order preparation, which includes order collection and product packing. Based on the packing list, specific products are collected from the stock. If there are no available products, they must first be produced by the production department's employees, who also have access to the packing list. Completed products are entered into the ERP system. Once collected, the products are packed to plastic protective materials and then fitted in a cardboard box. The box is then sealed. After that an address note, printed out from Prinetti, software provided by Itella, which assists in printing out address cards, is attached to each parcel.

Next, in the third part of the process, the order is dispatched. The cardboard boxes are moved to the dispatch department with the copy of the packing list and the lower level Production Manager is responsible to check that correct products are dispatched.

As the last part of the order-delivery process, the order is invoiced. According to the packing list, after the order has been shipped, the order dispatch is entered to the ERP system. Then Financial Administration compiles the invoice. The com-

pleted invoice is then sent to the buyer, who then makes the payment, after which the Financial Administration checks the payment in the accounts receivables as received. Itella also sends a monthly invoice to the case company for providing the transportation service, according to the number of shipments made with the company's customer number.

5.5 Problem areas within the process at Startex Oy

There are a few issues within the order-delivery process at Startex Oy. The most significant problem areas of the process are illustrated in the following figure 16.

ERP system- order acceptance and order preparation	Process roles- whole process	Paper invoices- order invoicing
<ul style="list-style-type: none"> • Packing lists are printed out needlessly • Causes overlapping of work, paper waste and unnecessary movement 	<ul style="list-style-type: none"> • No specific process roles are defined, only two persons have roles with substantial responsibility • Causes incoherence and work stress 	<ul style="list-style-type: none"> • No value for the end customer • Causes paper waste and slows the process down

FIGURE 16. Problem areas of the order-delivery process at Startex Oy

First and foremost, the ERP system could be used more efficiently. Based on the interviews with the Financial Manager, the packing list could be accessed from both the stock and dispatch departments' computers, but is at present, printed out in two copies and moved by hand to the departments' employees. This action causes not only unnecessary paper waste, but also overlapping of work and unnecessary movement.

The reason for using the paper version of the packing list is that it is regarded as a more convenient way of dealing with the matter. This reasoning might be because the use of the ERP system is seen as a more complicated way of dealing with the simple task. By training the work staff involved with the ERP system, the use of it could increase, thus improving the processes incorporated in the ERP system.

Another problem area visible in the order-delivery process is the lack of specified process owners in it. At the moment, the responsibility of the order-delivery process is divided between the upper level Production Manager and the lower level Production Manager. The amount of responsibility on just two employees seems to be substantial. This uneven distribution of responsibility can cause problems of two kinds.

On the short-term, problems can arise when one of the Production Managers is on a sick leave or unable for other reasons to be present at the work site. On the long-term, problems will come when the upper level Production Manager retires and someone else has to take up the responsibilities. Not only will it take a lot of time to train a new employee, the new person might not be able to take up the work tasks the same way as the former employee, therefore causing smaller issues within the process. For example, mistakes, overlapping and rework of different tasks can come up.

One more problem area in the order-delivery process is the use of paper invoices. Electronic invoices not only save paper, but also speed up the invoice process. Invoices are now sent afterwards separately to the buyers. If e-invoices were implemented with the help of the currently used ERP system, the invoice process would get faster and the sellers would be able to make the payments with more ease.

6 IMPROVEMENT SUGGESTIONS TO THE ORDER-DELIVERY PROCESS AT STARTEX OY

6.1 Lean into the process

When suggesting improvement ideas from the point of view of Lean methodology, focus is on the elimination of different kinds of waste and on the creation of value for the process customers, both internal and external. By searching for the seven different kinds of waste in the order-delivery process, the process could be shortened and simplified. The case company's current order-delivery process has overproduction, unnecessary movement, possible waiting, and extra processing of the seven types of waste within it. The following figure 17 presents the improvement suggestions on a more general level.

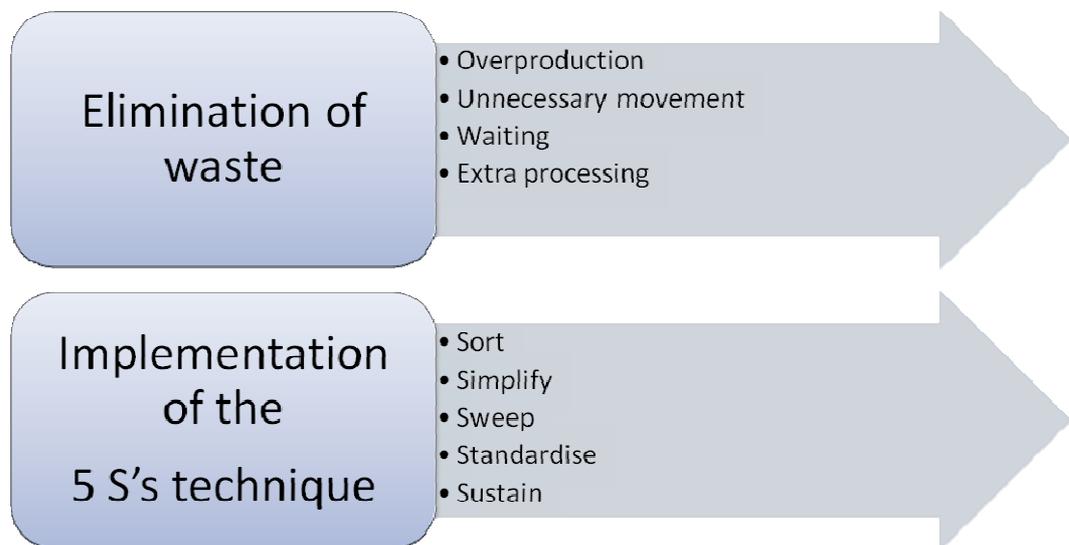


FIGURE 17. Improvement suggestions from the point of view of Lean methodology

Overproduction and extra processing could be removed from the process by making more use of the current ERP system. In practice, the packing list would be accessed from the shipment and stock departments' computers as soon as the or-

der is entered to the system. The paper version does not add value for the external customer, but at the moment, is seen as creation of value for the internal process customers, because the paper version is seen as a more convenient and easier way of dealing with the task.

Waiting can occur in the process, when the computers or the printing machine does not work properly or the personnel do not master all of the basic functions of the ERP system, and people have to wait unnecessarily for them to function. Waiting can also occur in the production and stock departments, if there is no available stock. Reasons for the lack of completed products are numerous, but the most significant reason is the possible failure of market forecasting.

TABLE 5. Explanation table of the order-delivery process at Startex Oy

Step	Who	Critical factors	Methods, data programs and surveillance	Input data	Output
Order placement	Reception	Order details are received correctly.	Order details are written down on an order form.	Order details; what products, amount, how soon, where to, who ordered.	Order confirmation
Order confirmation	Sales department	Order information is correct and there is no need for modifications.	Order is entered to Visma L7 system and a packing list is printed out.	Order details	Two printed packing lists
Order preparation	Stock	Correct products are collected.	Order details are available on the computer in the stock, and on the printed packing lists.	Available stock, order details	Order ready for packing
Order packing	Dispatch department	Products are packed carefully and correctly.	PM is responsible for checking the shipments.*)	Packing list	Order ready for shipment

Step	Who	Critical factors	Methods, data programs and surveillance	Input data	Output
Order shipment	Dispatch department	Address note is correct.	Date of the shipment is entered to ERP.	Packing list, which also works as a delivery note	Order delivered
Order invoicing	Financial administration	Order is approved.	According to the packing list the invoice is created.	Packing list	Invoice

*) PM= Lower level Production Manager

The process could be improved also by simplifying some of the process steps, see table 5. This could be implemented by applying the 5 Ss method in the process. By identifying the essential process tasks and steps, the first S, Sort, of the method can be carried out. The next phase, Simplify, could be completed by searching for the easiest possible templates to use, hence saving the more time for other time consuming tasks in the process. For instance, by entering the order details straight into the ERP system when salesmen receive orders, overlapping can be avoided and the process would therefore be that much shorter. In the case company, orders are entered straight in the ERP system, when a customer calls in the order, but overlapping takes place, when sales persons deliver paper forms of orders to the office.

Sweep and Standardise, the next phases of the 5 Ss method, include archiving files systematically to enable ready-to-use condition. These phases also mean that both the office surroundings and the production department are to be cleaned of unnecessary objects and papers. Standardize includes also the very important task of documenting the process, which helps to define the expectations of the process.

Lastly, to maintain what can be achieved by implementing the 5 Ss method, the last S, Sustain, means the pursuit of maintaining the changes with discipline. This phase can be eased by making sure the employees are trained and there is a set

monitoring system available. It is also crucial that the managerial level is committed to the improvement process.

6.2 Benchmarking the case company's order-delivery process

Figure 18 presents the simplified order-delivery process at T:mi Sisäsiisti, a domestic private company providing different kinds of household cleaning services (Nieminen, 2009). Although the case company's parallel process has a product as the outcome, the processes do have some similarities. In both cases, the customer is only responsible for starting the process and receiving something, tangible or intangible, in the end of the process in both companies' order-delivery processes.

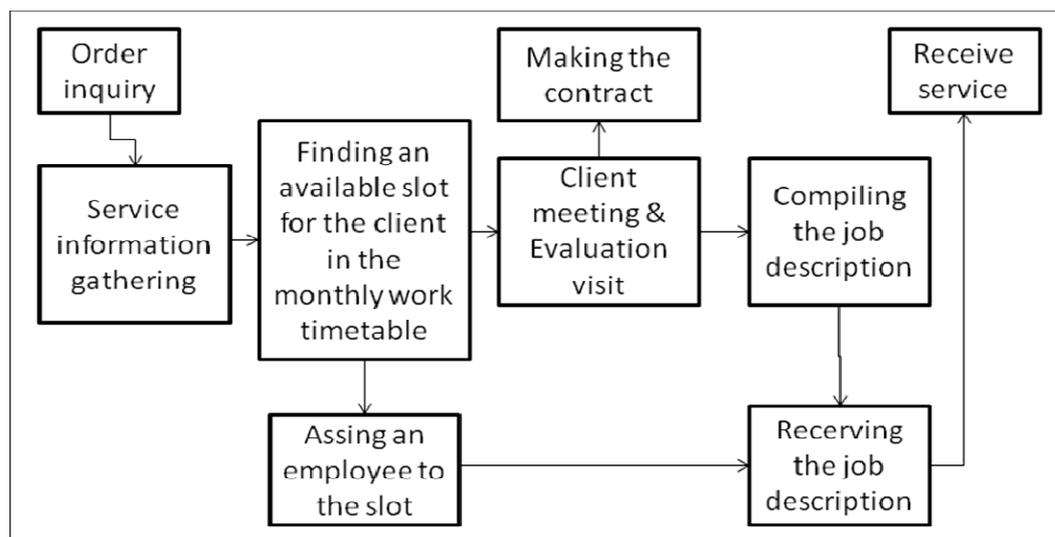


FIGURE 18. Simplified order-delivery process at T:mi Sisäsiisti (Nieminen, 2009.)

Figure 19 presents the workflow chart of the order-delivery process at T:mi Sisäsiisti. There are both pros and cons found within it. What is good with the process is that there are only four persons involved in the process, although one of the persons only acts as an enabler to the process, by signing the contract with the customer. The process owner, the Sales Executive Manager, has a set plan of what he needs to do in order to go through the process. On the other hand, the process

Another positive aspect to the process at T:mi Sisäsiisti is the limited number of process steps. Order acceptance and finding of the available slot in the work timetable can be performed during one phone call, providing that the order details are gathered correctly. The contract is combined during the evaluation visit, which takes place at the potential customer's home, or where the service is needed.

Negatives about the order-delivery process at T:mi Sisäsiisti is the lack of use of IT-systems. Order inquiries could be delivered electronically with the help of order forms. The company has, however, started to use simple computerized models of the monthly work timetables, which can be updated easily. Also the job description could be compiled electronically, which would ensure a clear document for the employee, although the document needs to be printed out for the employee.

6.2.1 The comparison between the order-delivery processes

When comparing the order-delivery process at T:mi Sisäsiisti with the case company's parallel process, there are a few issues to notice. The case company is taking a considerable advantage by utilizing the ERP system, which saves time and makes processes more standardized. The scope of the order-delivery process at T:mi Sisäsiisti is though much smaller than that of Startex Oy, so that the same advantage of an ERP system is not applicable to the parallel process at T:mi Sisäsiisti. On the other hand, Startex Oy, which has a larger scope in its order-delivery process, could expand the use of its ERP system. The most considerable differences between the two parallel processes are illustrated in the following figure 20.

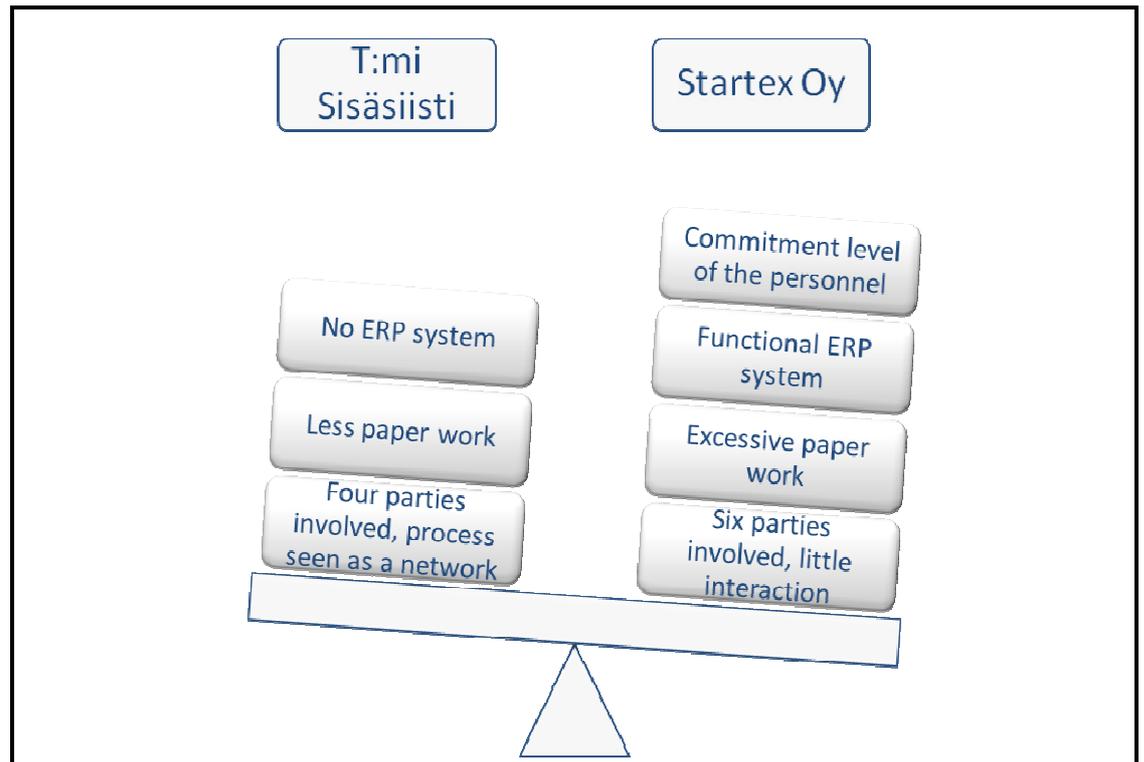


FIGURE 20. Main differences between the parallel processes

In the process at Startex Oy, there are six different parties involved in the process, whereas in the parallel process at T:mi Sisäsiisti have only four parties involved. At T:mi Sisäsiisti the different parties interact consistently with each other, whereas in the process at Startex Oy, the parties do not interact on a daily basis with each other. If the communication between the parties was improved, possible problems could be solved more easily and other departments would be more aware of the needs of other departments, hence the needs of the internal customers would better be met.

Moreover, the amount of paper work has to be mentioned. In the order-delivery process at Startex Oy, paper documents are used in the order forms, brought in by the sales men, in the packing lists, which are printed out at the office, in address notes, which are printed out at the dispatch department and in invoices, which are sent out from the office. At T:mi Sisäsiisti paper documents are used in the order forms, when a potential customer calls in the company, in the contract making sub process, which is obligatory to obtain a solid contract, in the job description,

which is compiled electronically but printed out for the employee and in invoices, which are sent out from the office. In both companies, some of the paper documents could be removed from the process.

At the case company, order forms, packing lists and invoices could be easily done electronically with the help of the ERP system already adopted in the company. This would save paper and make the overall process that much faster. In the parallel process at T:mi Sisäsiisti, the situation is not entirely the same. Because a large number of the customers of the company are elderly people who do not have access to internet or are not capable of making payments electronically, the invoices must be printed out for that customer segment. For other customers, e-invoices would work, and therefore a part of the paper invoices could be transformed into e-invoices.

Last but not least, the importance of an overall commitment of the company's personnel must be mentioned. In order to succeed in making any kinds of changes, the managerial level has to be convinced of the benefits of what focusing on process management and Lean methodology can bring to the company. It is therefore crucial to properly validate the development plan to the management and to make sure responsibility areas are evenly distributed between the people involved in the process by identifying process roles.

6.3 8-field SWOT-analysis

In the following table 6, the 8-field SWOT-analysis of the order-delivery process at Startex Oy is illustrated. Boxes one to four belong to the traditional SWOT-analysis and boxes five to eight are the different combinations of boxes one to four.

Table 5 examines the order-delivery process by scanning it with four things in mind; how to create success factors, transform weaknesses into strengths, alter external threats into profits and lastly, to create crisis solutions. Strengthening the

SWOT-analysis with practical improvement suggestions, the whole analysis expands, thus providing more detailed information of the order-delivery process.

TABLE 6. 8-field SWOT-analysis of the order-delivery process at Startex Oy

<p style="text-align: center;">Current, Internal</p> <p style="text-align: center;">Future, External</p>	<p>1.Functional Strengths</p> <ul style="list-style-type: none"> - fast processing rate - adaptive - reliable - end customers are well-known 	<p>2.Functional Weaknesses</p> <ul style="list-style-type: none"> - no clear process roles or responsibilities - no clear performance measurements - no daily contact with other process members
<p>3.Opportunities and Profits</p> <ul style="list-style-type: none"> - market leader in their field - ability to react quickly to market changes 	<p>5. Success Factors (1+3)</p> <ul style="list-style-type: none"> - focus on employee training is enhanced - the process is customer-oriented - changes are made easy and possible to execute 	<p>6. Weaknesses into Strengths (3+2)</p> <ul style="list-style-type: none"> - clear and definitive process roles and responsibilities are set - customer feedback is gathered consistently - communication between departments is improved
<p>4.Threats and Losses</p> <ul style="list-style-type: none"> - maximum benefit is not gained from the ERP system - market forecasting fails - personnel does not commit itself to the change 	<p>7. Threats into Profits (1+4)</p> <ul style="list-style-type: none"> - ERP system is adapted to the fullest to gain more speed and standards - market forecasting is successfully executed - personnel is fully committed 	<p>8. Crisis solutions (4+2)</p> <ul style="list-style-type: none"> - burn out-crisis: work load is evened out, employee wellbeing is cared for - massive market changes are turned into advantages

Boxes one and two present the internal strengths and weaknesses of the order-delivery process at the case company. At present, the process is reliable, fast, easily adapted and the end customers are known. These strengths create value to both the end customers and the internal customers. But as the internal weaknesses show, the lack of definitive process roles and responsibilities, clear performance measurements and the lack of daily contact between the different departments can give rise to problems.

Boxes three and four are the external opportunities and threats of the process. The ability to quickly react to the possible market changes, even during the season, is a great opportunity of truly becoming the market leader in the case company's business field. On the other hand, if the market forecasting fails, it can be challenging to succeed. Also loss can be caused if the ERP system is not used to the fullest or if the personnel are not committed to making a change in their daily actions.

Moving on in table 6, the success factors in box five are created from combining internal strengths and external opportunities. Within the order-delivery process in the case company, success factors can be created by concentrating more on training the employees of how to obtain the greatest benefit from the current ERP system. Also, by making sure that the process is customer-oriented, the creation of customer value is put first. Lastly, success can be guaranteed if the changes are made easy and possible to execute from the personnel's point of view by making sure that the whole company is committed to the changes.

Box six transforms internal weaknesses into internal strengths. In the order-delivery process this can be carried out by setting clear and definitive process roles and responsibilities to all employees involved in the process, by improving the possibility of communicating between the different departments and by gathering customer feedback consistently from the main distribution channels. Next, box seven, transforms external threats into profits. In the order-delivery process this can be done by utilizing more of the functions offered by the ERP system Visma L7. Profits can also be created if the market forecasting is executed to the fullest

benefit for the case company and if the whole personnel are engaged in the process.

Finally, box eight suggests crisis solutions to issues related to the process in question. The possibility of a burn out-crisis could be avoided by balancing the workload between the other employees involved in the process and by caring for the employee well-being more. Although semi-annual conversations with the employees are held, the levelling of the responsibility could improve the overall work morale. In addition, by transforming potential market changes into advantages, the company can avoid financial losses, for example by expanding the product range to cover more market segments.

6.4 Expert opinions about the improvement ideas for the order-delivery process

When the ideas for improvement from the point of view of Lean methodology were reviewed with the contact person of the case company, a few notions were made. The importance of receiving feedback of the modelling process is essential. After the feedback and comments are given, adjustment can be made, which will further benefit the case company. The process modelling and recommendation ideas were seen as practical and such that additional value for the end customer could be created, although there were two matters that needed adjusting. (Salmi, 2009.)

The order-delivery process had been modelled to represent the actual flow of the process, and although all of the process modelling tools were not used, the process was modelled accurately. Only a few small alterations were made to the analysis of the order-delivery process after the feedback from the contact person of the case company was given. There were two copies of the packing list used in the process and one of the copies worked as the delivery note, whereas the other one worked as the basis of the invoice. (Salmi, 2009.) This mistake could have been noticed by the author of the thesis, if the process was modelled with all of the process members present.

Another alteration, which was made to the process analysis after the feedback, was that the responsibility of the production was actually divided between four persons. This mistake was made because the organizational chart of the case company, provided by the case company, was a little confusing. Nevertheless, the main responsibility of the order-delivery process remains on the shoulders of two persons, the upper and lower level Production Managers. The upper level Production Manager has his attention more on the managerial aspects of the process, and the lower level Production Manager is responsible for the actual, physical implementation of the order-delivery process. (Salmi, 2009.)

7 SUMMARY

This study was conducted for the author's personal interest towards the subjects of process management and Lean methodology. The case company had not modelled its order-delivery process beforehand, and the personnel were also interested to find out how the process flows in reality. For those reasons the order-delivery process was chosen as the main centre of attention for the study. The process was also chosen because it consisted of many phases including paper work of many sort. The elimination of unnecessary paper work was also one of the author's interests.

The most significant goal of the study was to provide an example of how process management and Lean methodology could be combined into one office work process in order to question the everyday, seemingly simple, processes taking place at the office surroundings. The study also demonstrated how many different phases were included in one business process. By improving the everyday processes, companies can improve their internal efficiency; hence create additional value for the customer.

The order-delivery process of the case company could have been examined in more detail by incorporating more process modelling techniques and by the utilization of the workday journals, see example in appendix 1. The more thorough examination of the process with all of the people involved in the process could have resulted in more accurate and detailed conclusions.

The most important aim of the study was to understand all of the steps involved in the order-delivery process and to find out practical, cost-effective ways of improving that process by implementing Lean methodology, which traditionally is employed in the production surrounding, in the process.

The ideas for improvement from Lean point of view remain as such, for the lack of time and interest from the case company's viewpoint to the matter. The case

company might have had different areas of interest than concentrating on the improvement of its office work processes, because it would require different kinds of resources to implement the changes and this might have seemed to be all too time consuming and demanding for the case company's personnel.

Despite the fact that the case company is innovative and well-known for its expertise in its field, by putting continuous improvement into practice within their daily office work processes, an even better representation of the high quality of the case company could have been perceived.

As the research methods and the whole research plan were assessed by the author, some aspects came up. The research plan could have worked better, if all of the research methods could have been utilized. The reason why some of the methods were set aside was that the case company was not able to provide the required human resources to model the chosen process. The lack of human resources might have derived from the inefficient presentation of the goals of the study.

The results of the study do provide enough information to form a basis for continuous process improvement within the case company. The main challenge that the case company face are the sufficient supply of training to the personnel and the commitment from the managerial level to the implementation of making changes. In order to enable the change, the whole organization needs to be convinced of the benefits that arise from continuous process improvement with the help of Lean methodology.

The purpose of the study was to examine and model in detail one office work process, i.e. the order-delivery process in the case company Startex Oy, and to distinguish different ways of improving that process with the help of process management and Lean methodology. The main goal of the improvement ideas from the Lean methodology point of view was to raise awareness of the importance of modelling core processes to gain maximum benefits from them. Lean methodology viewpoint suggests a new perspective to the overall improvement of the process.

At first, the study introduced office work and process management on a general level, though still examining the relevant aspects of the subjects, regarding the improvement of office processes. Process management was examined thoroughly to assist in obtaining a more in depth outlook of the idea of process modelling and process analysis.

Secondly, the study examined Lean methodology in greater detail for it was chosen as the focal point of the study. Lean methodology was applied to the improvement suggestions. The suggestions stressed the importance of leveling the amount of responsibility between the people involved in the process by identifying process roles and the value of the currently underestimated ERP system's assistance in the case company.

Lastly, the study compared the case company's order-delivery process between a different domestic private company's parallel processes in order to find possible improvement areas in the case company's process. Expert opinions about the improvement suggestions to the order-delivery process were also discussed. Finally, the study assessed the research plan as a whole, covering both pros and cons of the plan and examining what could have done differently.

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APPENDICES

APPENDIX 1

An example workday journal (Gleeson Kerry 2000, 101). Modified by the author of the thesis.

Time	Work task	Employee			Task details
		Person in charge	People involved	Goal	
8.00 .30					
9.00 .30					
10.00 .30					
11.00 .30					
12.00 .30					
13.00 .30					
14.00 .30					
15.00 .30					
16.00 .30					

APPENDIX 2

Organizational chart of Startex Oy (Salmi, Hanna 2009.)

