Streamlining the invisible value chain
- reduction of losses within administrative processes: a case study

Effektivisering av den osynliga värdekedjan
- reducering av förluster inom administrativa processer: en fallstudie

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Abstract (in English)

Continuous improvement of various processes within a company is a necessity to remain competitive on the market. There are many different improvement methodologies to streamline work routines; however the different methodologies do not sufficiently embrace administrative processes or the employee motivation regarding changes. The purpose of this thesis has been to develop a model for streamlining administrative processes, while maintaining the employee motivation during the improvement projects implementation phases. The model has been developed theoretically through literature reviews including different improvement methodologies, such as Lean, TQM, Six Sigma, 5S, ISO 9000 and related subjects, while incorporating perspectives of the relations between quality, production and economy. Besides the aspect of continuous improvement, the methodology of Change management has permeated the model development and model outcome. The developed model for improving administrative processes should over time lead to shorter lead-times and streamlined high quality information flows. The first phases in the model have been implemented at Electrolux Laundry Systems providing the company a solid foundation for further implementation of the rest of the model. The results include several highlighted areas, which shall be further reviewed and improved to streamline the current routines at Electrolux Laundry Systems.

Key Words
Administrative processes, Administration, Continuous improvement, Case study, PDCA, Kaizen, Streamline, Information flow, Quality, Lean, TQM, Six Sigma, 5S, ISO 9000, Change Management, TQMain

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Viktor Gustafsson
Sara Davidsson
Definitions:

**Continuous improvement**: “Programmed, and an almost unbroken, flow of improvements realized under a scheme such as Kaizen, Lean production or Total Quality Management”, Businessdictionary (2011).

**Cost-effectiveness**: “Relationship between monetary inputs and the desired outcome, such as between the expenditure on an advertising campaign and increase in sales revenue”, Businessdictionary (2011).

**Information flow**: “The path information flows from its original settings to its end users”, Businessdictionary (2011).

**Lead-time**: “Number of minutes, hours or days that must be allowed for the completion of an operation or process”, Businessdictionary (2011).

**Model**: “Graphical, mathematical (symbolic), physical, or verbal representation or simplified version of a concept, phenomenon, relationship, structure, system or an aspect of the real world”, Businessdictionary (2011).

**Process**: “Sequence of interdependent and linked procedures which, at every stage, consume one or more resources (employee time, energy, machines, money) to convert inputs (data, material, parts, etc) into outputs. These outputs then serve as inputs for the next stage until a known goal or end result is reached”, Businessdictionary (2011).

**Quality**: “Is the ability of a product or service to satisfy and preferably exceed customer needs and expectations”, Bergman and Klefsjö (2007).

**Streamline**: “To improve the efficiency of a process, business or organization by simplifying or eliminating unnecessary steps, using modernizing techniques, or taking other approaches”, Businessdictionary (2011).

**Value Stream**: “Sequence of activities required to design, produce and provide a specific service and along which information, materials and worth flows”, Businessdictionary (2011).

**Value Chain**: “Interlinked value-adding activities that convert inputs to outputs which, in turn, add to the bottom line and help create competitive advantages”, Businessdictionary (2011).
**Abbreviations:**

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<tr>
<td>A.I.M.</td>
<td>Administration Improvement Model</td>
</tr>
<tr>
<td>CI</td>
<td>Continuous Improvement</td>
</tr>
<tr>
<td>DFSS</td>
<td>Design for Six Sigma</td>
</tr>
<tr>
<td>DMADV</td>
<td>Define Measure Analyze Design Verify</td>
</tr>
<tr>
<td>DMAIC</td>
<td>Define Measure Analyze Improve Control</td>
</tr>
<tr>
<td>ELS</td>
<td>Electrolux Laundry Systems</td>
</tr>
<tr>
<td>MCDM</td>
<td>Multi Criteria Decision Making</td>
</tr>
<tr>
<td>NNVA</td>
<td>Necessary non-value adding (time)</td>
</tr>
<tr>
<td>NVA</td>
<td>Non-value adding (time)</td>
</tr>
<tr>
<td>PDCA</td>
<td>Plan Do Check Act</td>
</tr>
<tr>
<td>SCD</td>
<td>Supplier Claims Department</td>
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<tr>
<td>TQM</td>
<td>Total Quality Management</td>
</tr>
<tr>
<td>TQMain</td>
<td>Total Quality Maintenance</td>
</tr>
<tr>
<td>VA</td>
<td>Value adding (time)</td>
</tr>
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<td>VSM</td>
<td>Value Stream Mapping</td>
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1 Introduction

This chapter will introduce this research for the reader. First, the background of the concept of continuous improvement will be stated, which will lead to a problem discussion, problem identification, to furthermore result in a problem formulation on the topic of improving administrative processes. The purpose, relevance, literature search, limitations and delimitations, as well as the timeframe, including a figure of the research design, are then stated to provide perspectives of the study.

1.1 Background

The idea of improving work routines, work environment, quality etcetera has more or less been present since mankind started to utilize different tools to ease their everyday life. Development of methods and techniques regarding improvement of industrial issues started to arise as a result of the industrial revolution in the late 18th century. At this time, when the agricultural society started to transform into the age of industrial society, the methodologies of improving different processes/routines were not especially highlighted and researched. Even though massive improvements were made, the need for further improvements in the industry was present. The new much more efficient and effective production of different goods were so much more profitable than the old way of craft-based expert manufacturing so the term “cost-effectiveness” had hardly even been invented yet, Pluta (2006).

One of the breaking points of potentiating industrial manufacturing was when Frederick Taylor released his work “The principles of Scientific Management” in 1911, Bergman and Klefsjö (2007). Taylor’s ideas about task optimization acted as foundation when Henry Ford started using assembly line methodology in his automotive industry in the early 20th century. This new technique made it possible to mass-produce different products to the market. The mass production methodology was not in any sense perfect and it was under constant developments, which leads to more and more efficient manufacturing. Henry Ford’s manufacturing strategy (later on called Fordism) was widely spread around the world when the benefits of the technique were recognized, Pietrykowski (1995).

Although the assembly line mass-production strategy did work there were several problems that were hard to solve in an economically justified way. In the 1950s, members from the Toyota Motor Company, in Japan, were sent to the United States to study the American manufacturing techniques. The study visit was a preparation preceding an implementation of mass-production at Toyota. At the time, the Japanese market did not have the prerequisites to enable Toyota to start manufacturing as the Ford Motor Company. This leads to a development of the assembly line approach where a young engineer named Taiichi Ohno argued about a somewhat “commonsense approach” to the manufacturing strategies which later on resulted in the Just-In-Time methodology. This approach became a fundamental part of the Toyota Production System, which has been proved very successful for Toyota, and many other companies, Holweg (2006).

One nowadays well-recognized manufacturing strategy/philosophy called Lean Production spawns from the Toyota Production System and aims, compactly, to streamline the supply chain (from customer order to delivery) through elimination of all non-value adding activities, as well as achieving perfect quality output from all processes within a company, Sullivan et al (2002). The Lean way of manufacturing has somewhat evolved since it was introduced in the early 1980s and today the concept withhold several different tools and measures but the core
idea is the same and should, outspoken in simple words, include quality control, inventory control, labor management, supplier-manufacturer practices, and industrial relations, Wu (2003).

During past three decades the amount of production optimization and improvement management tools and methodologies have increased to a vast amount of different approaches to utilize when improving processes within companies and development of competitive business. Some examples of improvement methods are: Lean Production, Six Sigma, 5S, Total Quality Management (including the Seven management tools), ISO9000 and ISO14000, Time Based Management, Continuous Quality Improvement, Kaizen, Total Productive Maintenance et cetera, Bergman and Klefsjö (2007); Magnusson, Kroslid and Bergman (2003).

One main aspect of these improvement methodologies is the focus of continuously improving processes and related problems that might arise. Continuous improvement is an aim, with the objective is to improve a situation/event/process by reviewing existing situations/events/processes and explore if the execution generates the optimal output. The work of continuously improving processes is not a tool utilized to solve problems; it is more like a philosophy, which should be incorporated into the managers’ minds and the employees’ working routines, Berger (1997); Bergman and Klefsjö (2007).

The different improvement methods (such as the ones stated above) have different objectives, mainly directly associated to manufacturing and/or task optimization. Just as there might be found several areas of improvement and many activities that are unnecessary and very cost-inefficient in a production department there can be found just as many areas of improvement when reviewing the administrative processes surrounding a production department. The office functions also include some kind of “storages” which can be overloaded with work/inventories/information, which will transparently increase the tied-up capital. Poor quality of the incoming information (goods) and the deliveries in-between the different office functions (internal customers) will demand rework and unnecessary time spent on work assignments that should have been done right in the first place, which also may result in unnecessary waiting, Keyte and Locher (2004).

An important aspect, which must not be undermined, is the fact that most changes (improvements) include human involvement. With this in mind it is very important for managers to be aware of the methodology of Change management when making changes. If the employees do not trust that the changes that are to be made will improve their current situation (disregarded that it might be beneficial for the company) the pending changes might be totally in vain, since the employees might be very unsatisfied with the new way of performing the task. All actions taken to make improvements must be very carefully examined and the consequences of making the choice of changing a process must be addressed and considered, Cameron and Green (2009).

Changes and improvements are inevitable for maintaining competitive business and the ones that manage their continuous improvements in the best way possible are the ones that will survive and be successful on the competitive global market, Shah and Ward (2003). Regardless the manufacturing approach and improvement management methodology a company chose to utilize, the work of continuous improvement must never stop, once companies stop improving its business they will most certainly be outperformed by competitors, Bergman and Klefsjö (2007).
1.2 Problem discussion

Companies worldwide are constantly working with continuous improvements and the ones that manage to best incorporate this philosophy into their corporate culture and their everyday routines are the ones that possess the greatest prerequisites for surviving on the global market. Improving company business and streamlining an organization’s value chain might be a struggling task for many companies, though the improvement work can be facilitated through utilization of different improvement methodologies, Bergman and Klefsjö (2007).

There may be found numerous different methods, which could be more or less appropriate and applicable to different businesses depending on the company itself. However, many of the different methodologies have a primary target of improving actual manufacturing, not the supporting (administrative) functions within the company. A production department in a company has several suppliers and several customers, both internal and external. When improving the manufacturing the supporting internal suppliers and customers (departments) are often not included. This can result in that potential areas of major improvements might be left unexplored and unexploited. These supporting functions, such as purchase, economy, marketing, quality et cetera, may be able to support improvements made within a manufacturing department, Ljung et al (2007); Helmrich et al (1994).

Different functions within a company differ in the level of interaction and support promoting improvements in a manufacturing department. The functions with low support to the manufacturing department should also be reviewed and investigated for improvements. To be able to really improve a company business all functions within the company must be integrated in the continuous improvement philosophy. To continuously improve all different functions/processes provides excellent prerequisites for staying competitive and still being cost-effective, as well as achieve perfect customer satisfaction, superior quality, and maximizing company profit, Helmrich et al (1994); Bergman and Klefsjö (2007).

Administrative losses could be defined as: all administrative activities that do not add any value for the customer(s), Keyte and Locher (2004). With the customer value in mind, there can be found several areas within a company’s administrative processes that include redundant activities. Some examples: overproduction which leads to information overload, or the opposite; work assignments that are not finished in time which leads to that the next function/activity have to wait until the preceding work is done. Information overload can also incorporate e-mail handling, example; how many of the incoming e-mails are really useful for the recipient? Too long physical distances between different departments within the company may result in unnecessary motion and unnecessary time spent on walking between these different departments. Poor quality output of the different functions will lead to rework and poor information quality et cetera, Keyte and Locher (2004); Larsson (2008).

There are many different activities within a company that are necessary for the company business, even though it does not add any value for the customers, such as accounting and human resource et cetera. These activities cannot be eliminated but the processes may be improved. The administrative value streams might be hard to see, measure, and comprehend, which might be one of the reasons why the administrative activities are excluded in the continuous improvement strategies in many companies.
1.3 **Problem identification**

No production line is flawless and can always be improved in some way. The actual production (from raw material to end customer) are influenced by several different functions within a company and if the administration is not synchronized with the production there will be unnecessary non-value adding (“bleeding”) gaps in the value stream. These gaps are the ones companies need to highlight, reduce and improve to be able to rationalize, reorganize, and fully make use of the resources available to maximize the company profit.

1.4 **Problem formulation**

The background, problem discussion, and problem identification stated leads to the problem formulation for this study, which is:

- How to identify and reduce losses in administrative processes for improving intercompany information flow and meeting production demand?

1.5 **Purpose**

The purpose for this study is to develop a model for reduction of losses in administrative processes, considering the human aspect regarding changes and the importance of continuous improvement. The model should, over time, lead to shorten lead times and streamlined high-quality information flow, which in return will reduce costs and create unified working routines within the value chain.

1.6 **Relevance**

The problem researched in this study is highly relevant due to the present corporate environment on the global market. Bergman and Klefsjö (2007) states that companies need to improve their processes, as many of the competitive companies do, however; the fact that there might be huge areas of improvement and cost savings in improving administrative processes seems to be suppressed by many companies. The costs of poor administrative routines are often hidden as a part of an overhead cost for the administrative processes and/or the manufacturing costs, Huls (2005); Bastl, Grubic, Templar, Harrison and Fan (2010). The past research that has been made regarding improvement methodologies often has the main focus of improving processes within a production department or areas that are directly incorporated to the manufacturing. The area of improving administrative processes has also been researched to some extent, but not nearly as much as improving production processes. This is why the problem stated in this research is relevant, since the theoretical foundation within this subject is not sufficient enough.

1.7 **Literature search**

The results of a literature search are shown in Table 1.1, where it can be seen that the area of “Improving administrative processes” does not generate many hits and relevant articles. The lack of relevant research within this field of interest supports further research, which is the objective of this study.

The article search regarding the different topics in the theory chapter will be made utilizing the same approach as the other literature search. The first search will only include the main keyword (topic) and the hits will be sorted according to relevancy, meaning the first displayed
hits are most relevant. If the search results generate more than 50 hits the search will be narrowed with additional search keywords. When the number of hits is below 50 the titles of the reports will be examined, as well as the keywords stated in the introduction and the report abstract. If the article search did not generate any good results additional search keywords will be added, such as “manufacturing company” or “continuous improvement”. After examining the most relevant hits the articles will be more thoroughly studied and thereafter used as theoretical references in the theory chapter.

<table>
<thead>
<tr>
<th>Search phrase/word</th>
<th>Database</th>
<th>Hits</th>
<th>Relevant Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving Administrative Processes</td>
<td>Web of Science</td>
<td>82</td>
<td>0</td>
</tr>
<tr>
<td>Improving Administrative Processes +</td>
<td>Web of Science</td>
<td>0</td>
<td>-</td>
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<tr>
<td>Manufacturing Company</td>
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<tr>
<td>Improving Administration</td>
<td>Web of Science</td>
<td>4815</td>
<td>-</td>
</tr>
<tr>
<td>Improving Administration + Manufacturing</td>
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<tr>
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<td>Business Source Premier</td>
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<td>1</td>
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<tr>
<td>Improving administration + Continuous</td>
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<tr>
<td>improvement</td>
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<td></td>
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<tr>
<td>Continuous improvement + Kaizen</td>
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<td>Routines + Continuous improvement</td>
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<tr>
<td>+ Routines + Continuous improvement +</td>
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<tr>
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</tr>
<tr>
<td>Manufacturing Company</td>
<td></td>
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</tbody>
</table>

Table 1.1 – Literature search

The relevant articles found in the literature search included some topics that are related to this research, such as lean implementation, lean information management, problem solving, continuous improvement, and systems analysis. However, none of the articles the authors have found and read provide any direct approach of how to improve administrative processes. Nevertheless, they have been useful for inspiration and ideas.
Literature search, including several different keywords (see Table 1.1) that should be incorporated and highlighted in a study of improving administrative processes, have preceded the choice of problem area for this study, where it was found that there were not any studies made embracing the main focus of this study, hence the objective of developing a model for improving administrative processes could be very useful for companies today.

1.8 Limitations / Delimitations
This study is limited to a timeframe, which will be utilized by the authors to develop a model and test/implement the first phases of the model at a case company. The outcome of the model implementation in this study will act as a suggestion for a starting point to improve the current state at the company.

The timeframe for this study limit the authors to be able to see any direct effects of the model implementation, nor any other results of the proposed changes. Another limitation that might affect this study is the data accessibility during the project work.

When mapping the holistic intercompany information flow the focus will be at the production department and the surrounding functions associated; from the view of customer order → product delivery. The directors of each department, shown in Figure 1.1, will be interviewed, not every department/function at the case company.

There are many different methods for improving business processes, which are not included in the evaluation made in this report. The methods of Lean Manufacturing, TQM, Six Sigma, 5S, and ISO9000 were chosen because they all include the focus of continuous improvement and they all include various tools for improvement. The methods are also well recognized and much theoretical information about the methods is accessible.

When evaluating the different methods, the cost of implementation, education et cetera will not be considered, since the costs are very hard for the authors to estimate and because all the methods shall be equal in the evaluation to support a fair judgment of the methods contents.

For model testing the authors will chose one department to be thoroughly mapped and analyzed for model implementation. All administrative processes within that department will not be comprehensively described and analyzed since there will not be enough time.
1.9 Timeframe
The timeframe for this study is shown in Figure 1.2. The project work is divided into different chapters which are given an approximate duration within the timeframe. The plan is stated as a supporting schedule for the authors, and if the schedule is followed to a fairly high extent; the report will be finished in time.

1.10 Thesis research design
Figure 1.3 illustrates a mind map of the research design for this thesis. This figure puts some perspectives into the timeframe making it visual how different tasks within the project are carried out simultaneously. This study was preceded with another (smaller) case study made by the authors in another course: Case Study I – 2SE020. The preceding case study will act as a pre-study for this thesis, mainly supporting the literature review and the empirical findings regarding the company holistically.
2 Research methodology

This chapter will describe the research methodologies utilized in this study. The research will be made as a case study, which demands utilization of certain research methodologies, which are described and motivated consistently throughout this chapter. The aspects of the reliability, validity and generalization regarding this study will also be addressed.

2.1 Research perspectives

In theory of science, there are two main perspectives of how to gain scientific knowledge: positivism and hermeneutics, Thurén (2007). Positivism is build upon natural science perceptions where knowledge is gained through observations made by our senses (empiricism) and through logical reasoning. The positivistic researcher relies on empirical observation and logic to attain facts through observing characteristics/phenomena, which shall act recurring over time, Thurén (2007). The hermeneutic perspective of knowledge is based upon human intentionality, meaning that all actions performed by humans have a motive. Facts are then attained through interpretations of human actions. The hermeneutic researcher utilizes these interpretations of human intentionality to understand different circumstances with respect to totality, meaning that one phenomenon in a chain of events cannot alone act as a foundation for facts, nor as base for generalization, Patel and Tebelius (1987).

Both the perspective of positivism and of hermeneutic will be necessary when making this case study. The positivistic viewpoint is necessary because the study is based on approved and published scientific literature and articles and the hermeneutic view will be needed because interpretations are unavoidable when making a study involving human behavior.

2.2 Research approach

The choice of scientific research approach depends on the presence of/or relations between theory and empirical observation, Wallén (1996).

There are mainly two approaches to consider when performing scientific research: Induction and Deduction, Rienecker et al (2002). Both approaches embrace the inner logical structure of scientific research, according to Patel and Tebelius (1987). Research originating from empirical studies, where reality and praxis acts as foundation, will utilize the inductive approach, which means that the researcher already have some empirical data and process this by making use of own theories, models, and/or concepts, Rienecker et al (2002). The inductive researcher can thereby totally dismiss common theory and draw own generalized conclusions from their own hypothesis based on their empirical findings. This approach demands quantifying since a whole “population” cannot be thoroughly observed. One more important aspect is that none of the observations are opposing the conclusions, Thurén (2007).

Deductive research starts with gathering theoretical knowledge and then formulating a theory/hypothesis, which will be tested on empirical data where it either will be confirmed or dismissed. The deductive researcher base their statements and conclusion upon already proven theories, Patel and Tebelius (1987).

An extension of the deductive research approach is called hypothetic-deduction, where the researcher make hypotheses from theories to furthermore test these on already gathered empirical observations, or other theoretical data, Patel and Tebelius (1987).
Abduction is roughly said a combination of induction and deduction, at the same time partly the opposite of the procedure of hypothetic-deductive approach. When induction relies on empiricism and the deduction relies on theory, the abductive approach is to draw conclusions about the underlying cause factors for the observation, using both the empirical observations and already proven theory, Wallén (1996).

The approach used in this study is mainly abduction. The study will contain a lot of empirical observations, gathered through a hermeneutic perspective (see paragraph 2.1), and the observations will demand support from theories to interpret the collected data, just as the abductive approach advocate. This is a necessity for making the research repeatable and because the authors have no interest in repeating someone else’s work. The authors will use the deductive approach in an early stage of this study to build up a solid foundation of theoretical knowledge before dealing with the stated problem formulation. The inductive approach will not be utilized in this study since the model will be developed with a theoretical foundation. To mix the model development with an inductive approach would compromise the generalizability of the model outcome.

2.3 Research data/information
Holme and Solvang (1997) states two types of research data/information: qualitative data and quantitative data. The qualitative data is based on interpretations and observations, while the quantitative data is more structured and its central point is statistics, measuring and figures. Backman (2008) describes the qualitative data collection instruments as the “traditional word”, meaning that this is based on verbal formulations. The quantitative data on the other hand is described as a mathematical approach and develops a numerical observation, Backman (2008).

These different data types utilize different guidelines such as analytical principles, systems, and performer principles. According to Holme and Solvang (1997) it is possible to combine the qualitative and quantitative data collection in the same study. Both types have their strengths and weaknesses. The qualitative data possess a high quality in displaying information in a specific situation, such as social processes, reference frames, and interpretations; all of these have the common factor that they cannot become numbers. Regarding qualitative data it is necessary to be flexible during the study.

The quantitative data, on the other hand, will convert information into numbers so it can be used for statistical analysis. The characteristics of the quantitative data are its structure, since it has a strict composition, for example questionnaires where the answers will follow the questions in a strict way, Holme and Solvang (1997).

Interviews and observations will be the main part when conducting this research (see paragraph 2.4), which results in a qualitative data collection. The authors will spend much time at a case company and a lot of informal conversation will be held during the study. Furthermore, this study will include aspects of human behavior, which cannot be properly translated into numerical data. Quantitative data (measurements) will not be included since the scope of this study does not allow the authors to collect sufficient material for quantitative analysis, and at the same time collect the qualitative data. Some measurements will be made but the information will not be translated into numbers, rather only act as input for general analysis.
2.4 Data collection methods

The data collection methods utilized for this study are described in the following sections: Interview, Observation, and literature review.

2.4.1 Interview

Interviews are a technique to gather data through questions. The interviews can be conducted through personal meetings or telephone interviews, but in scientific studies a questionnaire will also be considered as an interview. Interviews can be divided into different categories; standardized, semi-structured or unstructured, meaning that it depends on how much the interviewing person is allowed to change the questions, but also if the questions leave space for the respondent to answer the questions, Patel and Tebelius (1987).

Patel and Davidsson (2003) states that, the purpose of a qualitative interview is to identify and determine the condition and quality regarding something or someone. Qualitative interviews have a lower level of standardization, this since the interview questions are open and the respondent can answer with own words. The strength of the qualitative interview is that the situation will look like an ordinary situation or a daily conversation. According to Holme and Solvang (1997), the qualitative interview is the most time-consuming, and it has some limitations, such as: numbers of respondents, the way we choose people, and how we analyze the information. For interviews it is important for the researcher not only to register data, it is also to consider its interpretations during the interview. Holme and Solvang (1997) describe that this method is a good way to commute between gathering data and analyzing the data.

The interviews in this case study will be standardized (see Appendix I), semi-structured and unstructured. Since much time will be spent at the case company, meetings with informants will be both formal and informal. Some interviews will be well prepared and standardized, and some will be semi-structured due to follow-up questions and other unstructured conversation.

2.4.2 Observation

According to Patel and Davidsson (2003) an observation must be systematically planned and the data must be systematically collected. The observation is applicable when the study should collect information about behaviors and processes in natural situations. This can be performed through different observation approaches, structured and unstructured. In the structured observation the process is so well detailed that the observer knows the processes and the behaviors that shall be examined. The unstructured approach is often used when the research needs to collect as much data as possible in the topic. In this approach it is important to have the knowledge, both theoretical and empirical, regarding the problem situation. Patel and Tebelius (1987) states that the observation is often utilized to complement other techniques.

Patel and Davidsson (2003) states that, the observation method is time-consuming and that the observer needs to have knowledge about the observation process. Holme and Solvang (1997) separate observation to open and hidden approaches. In the open approach the participants know about the observation, and have agreed upon to participate in the study. They understand that the observer will map out certain factors in their behavior and situation. In the hidden approach the participants do not know about the observation. The observer is a part in
the team that is observed, meaning that the observer needs to be accepted and trusted by the team. Both of these observations will generate a social communion with the participants. The observer will influence and will be influenced by the environment. This can be a disadvantage for the study so the observer is required to act in such way so he/she does not affect the outcome of the observations, Holme and Solvang (2003).

The authors will gather data through more or less unstructured observation. The observations will be gradually performed to gain more information about the environment that is being observed. It will be an open approach to the observation, meaning that the participant will be aware of the study. The observations made at the case company will be documented consistently throughout the study by writing notes rigorously to gather the data needed for this study. Some observations/situations will be photographed to make sure that none of the data will be diminished.

2.4.3 Literature review
A literature review is important since the researcher needs to understand and have knowledge in the chosen subject, Bell (2006). In order to find the relevant information in an effective way the review requires a systematic way of work, both where and how the literature review is done, as to note various observation through the search. Bell (2000) states the importance to critical evaluate the reference list, to find relevant sources and information in the subject. Further, to formulate certain search parameters in an early stage makes it easier to conduct the literature review, Bell (2000).

The problem addressed in this study demands a thorough literature review since it will incorporate several different methods and topics, demanding deductive research approach. New topics and perspectives will arise and the need for further literature studies (abductive approach) will be needed during the research project.

2.5 Research strategy
Case study is research incorporating survey(s) conducted through empirical data collection throughout investigations on a smaller group, in one or two organizations or situations. The study should be made through a holistic perspective to cover a larger area of information, Patel and Davidsson (2003). The benefits with a case study are that the study is done in real situations/environments; it may also act as a pre-study for further research, Wallén (1996).

The design of a case study is of vital importance to be able to reach good results of the study. Realization of a case study requires a comprehensive theoretical foundation before any actual observations and/or measurements are made. All the different theoretical topics that are identified during the case study design and the problem formulation discussion have to have been studied by the researcher(s) in an early stage of the project. Additional need for further theoretical studies might arise during a case study and these must be studied as long as they are included in the case study problem formulation objective, Yin (2009).

Case study is often associated to qualitative research, since it utilizes qualitative methods (see paragraph 2.4), as these perceive an appropriate base for a detailed survey, Bryman (2002). According to Patel and Tebelius (1987) the case study method has became challenged and questioned regarding the generalizability from one situation to other.
The chosen strategy to deal with the problem formulation for this project is a case study. The case study will allow the authors to compare and evaluate theories from the literature to practical situations and draw conclusions simultaneously during the whole research. The study will start with a deductive approach (see paragraph 2.2) to the problem formulation, to furthermore be integrated to the case study strategy where the work continues with an abductive approach (see paragraph 2.2).

2.6 Reliability, Validity and Generalization

Reliability deals with how authentic a measurement turns out to be, meaning; if exactly the same objective are measured repeatedly the result(s) should be the same. Reliability is then an implication of that the measurements are properly made, Thurén (2007). When making observations the reliability can be controlled, and preferably secured, through some different measures, for example: “rater reliability” and “occurrence reliability”. Rater reliability raises the reliability of an observation through making use of two different observers, where the observers’ observations and interpretations are put in contrast to each other. This may also be called “parallel observations”, Patel and Tebelius (1987). The rater reliability can be further tested through examination of the occurrence reliability, which is a measurement where the two different observers’ notations, on the same questions asked during an interview, are divided to each other. Example: one of the observers made four notations and the other observer made five, which gives the calculation 4 / 5, which equals 0.8. A high occurrence reliability-number equals high reliability of the observation, Patel and Tebelius (1987).

Validity embody if the core objective of the research really has been researched, meaning that all measurements made through a study deal with the actual questions stated to solve a task, Thurén (2007). Patel and Tebelius (1987) explain validity as the level of accuracy a “measuring instrument” answers to the characteristics the researcher intends to measure/study. The validity of observations and interviews can be assured through comparing the answers/observations to official data or other direct observations. One additional approach to raise the validity is to ask several different questions about the same topic and explore if the answers differ; if the answers differ the validity (and reliability) is low, Patel and Tebelius (1987).

Generalization is a vital aspect to consider when conducting scientific studies, Wallén (1996). Bryman (2002) points out that quantitative research focus on reaching results that can be generalized to other situations other than the specific case. Generalization is often studied in theoretical and empirical generalizable terms. Empirical generalization can be affected since data collection can limit the research result, and the theoretical generalization is established through limitations and theoretical assumptions, Wallén (1996).

One important factor Bryman (2002) states is that the result of a case study could only be generalized through the case where the data is collected. Since a qualitative study implicates observations and/or unstructured interviews with few respondents, critics argue that the results cannot be generalized to other environments or situations.

To secure the reliability, validity and generalizability of the study the different research approaches, strategies and perspectives will be considered in an early stage. Some considerations regarding the reliability of the study that should be managed are that the authors might interpret different answers/situations/phenomena in different ways, as well as questions stated during interviews could be misunderstood by the interview objects. The
deductive approach raises the validity of the problem formulation since the authors will have theoretical knowledge about the important topics supporting the problem stated. It does also raise the validity of the whole theoretical framework stated in the report. Without the support from the theory the relevance of the study could vanish. The generalizability of the study might be compromised since the research strategy is case study and that the empirical observations will contain mainly qualitative data.

The data gathering for this study will include interviews, observations, and literature review. During the case study both of the authors will be present at the interviews and their notes, impressions, observations, and interpretations will be compared and discussed to raise the reliability of the empirical information gathering. The study will be very focused on the problem formulation and all statements presented in the research will be supported by a theoretical foundation retrieved through literature reviews to assure the validity of the study.

The case study approach might question the generalizability of a study since only one case is investigated; however the authors’ intention when approaching and dealing with the problem formulation will be to create a model for reducing administrative losses, which shall be applicable to any other company in similar situations/environments, which will raise the generalizability of the study.

### 2.7 Summary - research methodology

Figure 2.1 illustrates a summary of the different research methods utilized for this study.

![Figure 2.1 – Summary research methods](image)
3 Theoretical background

This chapter presents all theoretical topics needed for the reader to get an insight of the theoretical foundation for this thesis, as well as for the authors to gain comprehensive knowledge to support the model development, analysis of the empirical observations, and the model implementation.

Theoretical framework

The theoretical subjects presented in this report highlights all important topics needed to develop a proposed model for improving administrative processes. The theory chapter is divided into two sections: Part I and Part II. Part I include theory about the different improvement methods (Lean, TQM, Six Sigma, 5S, and ISO9000), which is necessary when comparing these approaches to each other. Part II includes other topics, such as Interaction, Information quality, Standardization, and Prioritization et cetera, which are important to comprehend when evaluating the current state at a company, and to be able to review the different methods to the present routines.

Other than the already mentioned topics, the methodology of Change Management is of vital importance when planning for changes in an organization, and the theory of Total Quality Maintenance are integrated since it emphasize the importance of having a holistic perspective of an organization when making changes.

All theory presented (see Figure 3.1) will be utilized in the model development and/or for the analysis, where the connection between theory and the current state will be much more visible.

Figure 3.1 – Theoretical framework
Theory Part I – Improvement methods

This section of the theory chapter will provide the theoretical foundation of the different improvement methods Lean, TQM, Six Sigma, 5S, and ISO 9000. Part I will end with a short theory discussions, made by the authors, about the different improvement methods regarding improving administrative processes.

3.1 Lean methodology

Lean Production is a manufacturing philosophy originating from the Japanese automotive industry. The concept of lean production was made famous worldwide through the release of the book “The machine that changes the world”, Womack, Jones and Roos (1990) which was the outcome of a five-year long study of the Toyota Production System. For that time, the Japanese manufacturing companies way of work differed fundamentally compared to the traditional manufacturing approach used in the rest of the world, Holweg (2006).

There are many definitions of what the concept of Lean Production incorporates. One interesting illustrative definition of the lean concept is:

“Lean production uses half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. It requires keeping half the needed inventory, results in many fewer defects, and produces a greater and ever growing variety of products”, Womack et al (1990, p.13).

Hopp and Spearman (2004) defines Lean as: “Production of goods or services is lean if it is accomplished with minimal buffering costs”.

One additional definition of Lean stated by Shah and Ward (2007) is as follows: “Lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability”.

These definitions might demand some explanations. The concept of lean aims at eliminating all non-value adding activities within a value chain (from customer order to delivered product). Many activities in and between different processes and sub-processes in a company do not add any value for the customer. It is these activities that are to be in focus when striving for lean manufacturing. Among these activities there have been identified seven different kinds of “waste”, which should be heavily reduced or preferably totally eliminated, Sullivan et al (2002).

Sullivan et al (2002) defines the seven wastes as:

- **Overproduction** – Producing too much goods resulting in either unnecessary large Work-In-Progress (WIP) inventory or that products are finished before they are needed. This counteracts the wanted production flow.
- **Waiting** – Inactivity in/or between the production processes, standstill information and/or personnel, which leads to long lead times and poor flow.
- **Excess inventory** – Unnecessary storage resulting in too much raw material or WIP, which only increase the tied up capital.
- **Improper processing** – Inappropriate use of tools, systems, or procedures leading to rework or cassation.
- **Defects** – Inferior quality of raw material and/or products leading to rework and poor delivery performance.
- **Unnecessary transportation** – Wasting time on excessive movement of people, information or material.
- **Excessive motion** – Poorly designed workplace, resulting in poor ergonomics and underutilization of the employee resource.

### 3.1.1 Value Stream Mapping (VSM)

Value Stream Mapping is considered a *lean* method since the centre of attention utilizing this tool aims to identifying all *non-value adding activities*, and *bottlenecks* within a company. The seven wastes might, on its original form, focus on manufacturing/operation processes, however; they can quite simply be interpreted to resemble wastes in administrative processes, see paragraph 3.1.2, Keyte and Locher (2008).

The purpose of the VSM is to map the value adding activities (VA), necessary but not value adding activities (NNVA), and the non-value adding activities (NVA) concerning the value chain in a company. NVA should be reduced or eliminated immediately. NNVA cannot be eliminated in the current state since they are necessary at this point, even though they do not add any value. The NNVA activities shall be prioritized along with the NVA activities when improving the current state. The VA activities should also be reviewed since even if an activity is value adding it does not mean that it cannot be improved, Hines and Rich (1997).

The first step when utilizing VSM is to map the *current state* of the activities in the company. The VSM method contains seven VSM tools which all contribute to a more detailed mapping of the current state. The seven tools are briefly explained below:

- **Process activity mapping** – is used to study the flow of processes, regarding information flow, physical flow, and the layout of the flow. It concerns waste identification and possible alternatives to the current state. Measurements and statistics are vital input when using this tool.
- **Supply chain response matrix** – is used to review lead times and kept inventory through the supply chain for a certain process. When having knowledge about the individual lead times and assigned inventory kept for the processes identified in the Process activity mapping improvement areas can be targeted.
- **Production variety funnel** – helps identifying how products are produced, by categorizing its associated manufacturing processes into different categories. The characteristics of the manufacturing processes help recognizing the supply chain functions, which may target common problem areas and facilitate decision making when planning for changes.
- **Quality filter mapping** – is an approach used to recognize where quality issues occur in the supply chain. The quality problems are categorized into: *product defects* (defects discovered after delivery), *internal scrap* (defects discovered before delivery), and *service defects* (defects that are not directly connected to the product). This tool is very useful when exploring where quality defects are present.
• **Demand amplification mapping** – is used to examine the supply chain to identify areas where variations in demand occur. By having knowledge about where variations are present a streamlined supply chain can be designed.

• **Decision point analysis** – is to identify where in the supply chain the production demand (pull) gives way for forecasted customer orders (push). By having knowledge about this point the production can be aligned to the manufacturing approach utilized (push or pull).

• **Physical structure mapping** – is a tool to visualize a broad overview of the supply chain. This tool identifies areas of insufficient development. The results from the physical structure mapping contribute with useful information when improving the Value Stream Map.


The correlation between the seven VSM tools and the seven wastes are shown in Table 3.1. Depending on the company/industry at focus a set of these tools are chosen, it might not be necessary to make use of all of them.

<table>
<thead>
<tr>
<th>Wastes/structure</th>
<th>Process activity mapping</th>
<th>Supply chain response matrix</th>
<th>Production variety funnel</th>
<th>Quality filter mapping</th>
<th>Demand amplification mapping</th>
<th>Decision point analysis</th>
<th>Physical structure (a) volume (b) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overproduction</td>
<td>L</td>
<td>M</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Waiting</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Transport</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Inappropriate processing</td>
<td>H</td>
<td></td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Unnecessary inventory</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Unnecessary motion</td>
<td>H</td>
<td></td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Defects</td>
<td>H</td>
<td></td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Overall structure</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>H</td>
</tr>
</tbody>
</table>

*Notes: H = High correlation and usefulness, M = Medium correlation and usefulness, L = Low correlation and usefulness*

Table 3.1 – Value stream mapping tools, Hines and Rich (1997, p.50)
After mapping the current state a proposed future state map should be developed. The proposed future state shall then be evaluated and an action plan of how to accomplish reaching the future state should be developed. After the action plan has been made a future state map is to be developed, including the strategies/measures of how to reach the new state, Sullivan et al (2002).

Sullivan et al (2002) propose a set of guiding questions when outlining the future state (shown in Table 3.2):

<table>
<thead>
<tr>
<th>Future State Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the takt time?</td>
</tr>
<tr>
<td>2. Will production produce to a finished goods supermarket or directly to shipping?</td>
</tr>
<tr>
<td>3. Where can continuous flow processing be utilized?</td>
</tr>
<tr>
<td>4. Is there a need for a supermarket pull system within the value stream?</td>
</tr>
<tr>
<td>5. What single point in the production chain will be used to schedule production?</td>
</tr>
<tr>
<td>6. How will the production mix be leveled at the pacemaker process?</td>
</tr>
<tr>
<td>7. Will increment of work be consistently released from the pacemaker process?</td>
</tr>
<tr>
<td>8. What process improvements will be necessary?</td>
</tr>
</tbody>
</table>

Table 3.2 – Future state questions, Sullivan et al (2002, p.259)

3.1.2 Lean – Administration application

The reduction of the seven wastes’ focused on in the value stream mapping, to become a lean manufacturer, are in its initial form stated out of the perspective of improving production processes. These seven non-value adding wastes (Overproduction, Waiting, Excess inventory, Improper processing, Defects, Unnecessary transportation, and Excessive motion) does not necessary have to resemble activities in a production department. All of these wastes can be identified in a service company as well, meaning that these wastes can be identified and reduced in administrative processes as well, Keyte and Locher (2008); Larsson (2008).

Keyte and Locher (2008) have translated the seven wastes into administrative non-value adding activities. The wastes are shortly described with some examples as:

- **Overproduction** – Producing too much or to fast than is required by the internal customers. Printing paperwork or purchasing items before they are needed. Writing too complex reports than necessary.
- **Waiting** – Inactivity in/or between different office functions, system downtime, and diffuse approval routines.
- **Excess inventory** – Unnecessary storage of office supplies and filled mailboxes (electronic and paper).
- **Improper processing** – Inappropriate use of a business system, extra copies, excessive reports and rework.
- **Defects** – Inferior quality of inputs and outputs to/from the different processes, invoice errors, order entry errors.
- **Unnecessary transportation** – Wasting time on excessive movement of people, information or material (documents), multiple approvals, excessive email attachments.
- **Excessive motion** – Poorly designed workplace, poor ergonomics, walking to/from copier or to/from other departments.

Keyte and Locher (2008) also identify an eight’ waste as: *Underutilized people*, meaning that utilization of the employee resources (knowledge, experience, motivation) could promote the value adding activities.
3.2 Total Quality Management (TQM)
Bergman and Klefsjö (2007) define total quality management as “continuously striving to fulfill, preferably overcome, customers’ needs and expectations to lowest cost through continuous improvement where everyone is committed and has focus on the organizations’ processes”.

The Swedish equivalent to TQM is called offensive quality development, and includes three cornerstones; actively prevent, reform and improve, where value assessment, operation methods and tools combines a wholeness to meet a higher internal/external customer satisfaction with less resources.

According to Kanji and Asher (1996) is TQM different from other management processes, since it focuses on continuous improvement. To improve the processes in the organization, people need to know what and how to do it, but also to have the right methods to accomplish it and be able to measure the process improvement.

Kanji and Asher (1996) encompasses four principles with eight core concepts (see Table 3.3):

<table>
<thead>
<tr>
<th>Principles</th>
<th>Core concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delight the customer</td>
<td>Customer satisfaction,</td>
</tr>
<tr>
<td></td>
<td>Internal customers are real</td>
</tr>
<tr>
<td>Management by fact</td>
<td>All work is process</td>
</tr>
<tr>
<td></td>
<td>Measurement</td>
</tr>
<tr>
<td>People-based management</td>
<td>Teamwork</td>
</tr>
<tr>
<td></td>
<td>People make quality</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>Continuous improvement cycle</td>
</tr>
<tr>
<td></td>
<td>Prevention</td>
</tr>
</tbody>
</table>


**Principles**
- **Delight the customers** – regard the external customers, how the organization could delight the customers. This principle requires knowledge and understanding of the product or service; agree requirements and fulfill them. Always satisfying the customer is a fundamental part of TQM.
- **Management by fact** – knowing the current quality is the first step to be able to improve, and through knowledge about the current state it will be possible to measure the improvements. By having the facts to manage all levels in the organization and to communicate all necessary information, the decisions will be based upon facts, which are a requirement for continuous improvement.
- **People-based management** – when people feel that they are more involved in their work their commitment to satisfy the customer needs will be much higher. Systems, standards and technology will not provide quality.
- **Continuous improvement** – is an incremental change, which should be the aim when initiating the total quality journey.

Kanji and Asher (1996)
Core Concepts

According to Kanji and Asher (1996) could these eight concepts be utilized to drive the processes and to develop a framework for continuous quality improvement:

- **Customer satisfaction** – through learning from customers demand the organization can measure their performance against customers’ expectations.
- **Internal customers are real** – it is important and necessary to successfully fulfill the internal relations in order to satisfy the needs of the external customers.
- **All work is process** – a process is a combination between methods, machines, manpower, and material and will result in a product or service.
- **Measurement** – the core concept of TQM proposes that in order to improve, you must first measure the present situation. In this way the focus will be on both internal customer satisfaction and external requirements.
- **Teamwork** – gathering people into teams with a common goal in quality improvement will support the communication between departments or functional activities. The teams will then work as a platform for changes.
- **People make quality** – a manager’s roll is to ensure that everything is in place to allow people to make quality work. This requires environments where the manpower is willing to take responsibility for their work quality.
- **Continuous improvement cycle** – by establish and meeting customer demands, measure success and keeping on improving both internal and external processes, will help to stimulate continuous improvement, a never-ending process.
- **Prevention** – meaning a continuously seeking process to ensure that failures do not occur. This concept is a central point in TQM, which provides methods to achieve continuous improvement.

3.2.1 The seven management tools

Kaoru Ishikawa developed the seven improvement tools for more than forty years ago, and they were created to manage and structure numerical data. In the 1970s the tools were compiled with the aim of structuring and analyzing verbal data/information. The common name for these tools became known as: “the seven management tools”. Today, these tools are considered as a part of the TQM methodology, Klefsjö, Eliasson, Kennerfalk, Lunbäck and Sandström (1999).

The seven management tools can be utilized independently; though if combinations will be utilized in a logical order the results will be enhanced. The purpose for these tools is to complement the already existing improvement work in the organization. Klefsjö *et al* (1999) point out how the seven management tools can be a good input for the planning phase in an improvement cycle (PDCA). By utilizing the tools in a logical combination/order it will be possible to plan actions to improve a situation where the root-cause of a problem is unknown.
Descriptions of the seven management tools, Klefsjö et al (1999):

- **1 & 2 – Affinity/Relationship diagram**: identifies the basic problem(s) and how these correlates.
- **3 – Tree diagram**: Breaks down the problem(s) into smaller parts. The starting-point can be the result from the relationship diagram. The diagram may also identify plans to meet the problem/s.
- **4 & 5 – Matrix/Data analysis (Prioritization) diagram**: Analyze the correlations between the identified problem(s) attributes and the suggested solutions. The left side of the matrix is “What’s” from the affinity/relationship diagram, and the above “boxes” is “How” from the tree diagram.
- **6 & 7 – Process decision chart/Activity Network diagram**: is used to analyze how the suggested improvement plans shall be implemented in the best way.

### 3.2.2 TQM – Administration application

TQM’s management philosophy and practice is more than just continuous improvement, the method also aims at dealing with reducing rework, long-range thinking, increases employee involvement, meeting customers’ demands et cetera, Powell (1995). Powell (1995), states that TQM have met some criticism during the years, these claim that TQM requires unnecessary costs for organizations, such as; consuming unreasonable management time, increased paperwork, unrealistic commitment levels for employees, and an extreme retraining costs et cetera.

Nevertheless, TQM has grown and has become a globally strategic strength for organizations’ economy. Powell (1995), states it has now become clear that some aspects of the TQM philosophy can be adapted to nonmanufacturing processes, such as product development, and purchase. Implementing TQM philosophy can create several benefits for an organization, for example: increased internal communication satisfaction, reduced waste, increased customer satisfaction and reduced errors et cetera.

Li, Markowski, Xu, and Markowski (2008) point out that the approach prefers a flattened organizational structure, meaning that everyone shall commit and support the philosophy. In every function/department shall a level team analyze activities and performance, this will need an amount of training, and as a result will those who are involved in the TQM have increased skills in communication, teamwork and customer knowledge, Smith, Oczkowski, Noble and Macklin (2003). However, by starting an implementation of TQM philosophy in an organization the result will not appear immediately, meaning that it will take time and require patience since the implementation could change the organizational culture and the employee motivation, Tanninena, Puumalainen and Sandström (2010).

Some suggestions to know if TQM really is giving results are stated by Joyce (1996):

- Scapegoats are eliminated, top-managers takes responsibility if they have done wrong.
- The key performance indicators and the own personal responsibility to achieve good quality are well known to everyone. Customer meetings are done continuously to see if demands/requirements are met.
- TQM is discussed between managers, and are discussed during meetings.
- Employees see internal customers and rearrange work to met demand.
- Everyone contribute to the continuous improvements, individually or in teams.
3.3 Six Sigma

The Six Sigma methodology originates from Motorola, USA, where it was developed and introduced in 1981. Motorola developed this program to improve their processes and to reduce unwanted variation in their production, which was given the name Six Sigma. The name of Six Sigma comes from mathematics and statistics where \( \sigma \) is the name of one standard deviation from an average value. In this context it means extremely high quality output. To achieve Six Sigma manufacturing there must not be a failure rate higher than 3.4 product defects (delivered to customer) out of 1,000,000 delivered products (“Defect per Million Opportunities” [DPMO]). In other words the quality rate should be at least 99.9997%, which is the average result when the target value shifts \( \pm 1.5\sigma \) from the mean value, see Figure 3.2, Bergman and Klefsjö (2007); Kwak and Anbari (2006).

![Six sigma curve](http://mvpprograms.com, 2011)

Figure 3.2 – Six \( \sigma \) curve (mvpprograms.com, 2011)

The Six Sigma methodology comprises both a statistical perspective and a business perspective. The statistical perspective cares for (as stated above) the failure rate or the quality rate. As for the business perspective it has been defined as a “business strategy used to improve business profitability, to improve the effectiveness and efficiency of all operations to meet or exceed customer’s needs and expectations”, Kwak and Anbari (2006).

Either viewpoint of the Six Sigma approach should result in a very streamlined customer-oriented manufacturing flow and organization, where all processes encompass minimum variation, correspond perfectly to each other, and deliver world-class quality output.

One very characteristic part of the Six Sigma program is the importance of commitment from the highest leader(s) in the company. The program will have difficulties achieving success without dedication and support from the top management. Six Sigma methodology contains a lot of tools and techniques which can be used separately from the Six Sigma program; however, the Six Sigma program (full scale implementation) demands a lot of resources which could be hard to convince a conservative management board to approve financially, Bergman and Klefsjö (2001); Magnusson et al (2003).
3.3.1 Design for Six Sigma (DFSS)

Successful Six Sigma implementation can be a very hard task for many companies since the marginal to the average manufacturing company’s current production quality output lie somewhere around 3σ (equals to approximately 34,000 defects per 1,000,000). This is why the Six Sigma design is so important when beginning Six Sigma transformation. Three important parts of the methodology are Process Improvement, Process Design/Redesign, and Process Management, Kwak and Anbari (2006).

The first part deals with process improvement, which is formed as project tasks, made with utilization of a tool called DMAIC (Define – Measure – Analyze – Improve – Control). The different steps are shortly described and shown in Figure 3.3, Magnusson et al (2003); Mehrjerdi (2011); Goel, Gupta, Jain and Tyagi (2005).

The DMAIC tool shall be used on already existing products and processes while a variant of this tool called DMADV (Define – Measure – Analyze – Design – Verify) are used on new products and processes for Process Design and Redesign. The DMAIC and DMADV are in its simplest form very much alike to the PDCA-cycle (described in paragraph 3.8.3); however the planning phase (Design phase) is much more comprehensive than in the PDCA, Magnusson et al (2003).

The improvement projects always include a project manager (also called the “black belt” or “master black belt”), which carries the responsibility for the project execution. The colored “belt”-system implies the level of Six Sigma education and work experience an employee possess. The grading starts as “white belt” which is the lowest rank (example: operators and team members) and the more education and experience an employee gather, the grade can raise to “green belt”, “black belt”, “master black belt”, and “champion”. To become a “black belt” the person must attain a “black belt”-certificate, through education and tests. For a “black belt” to keep its certificate he/she must carry out and realize at least four Six Sigma improvement projects each year, and deliver great results (and cost savings), Magnusson et al (2003); Martin (2008).
The third part cares for *Process Management* through *Statistical Process Control (SPC)* and *Process Capability* analysis. The SPC will monitor the DPMO through the supply chain and explore areas of possible improvements. The measurement system is a vital part since it gives important input about the improvement rate and its followed cost savings, Mehrjerdi (2011); Magnusson *et al* (2003).

Magnusson *et al* (2003) states the critical importance of integrating the supporting functions to the manufacturing department when implementing Six Sigma. The Six Sigma approach will not be successful if the whole organization is not integrated. To be able to reduce/minimize the variance of the output from the manufacturing department, the variance of the inputs from the supporting functions (example: purchase, human resources, sales et cetera) to the manufacturing department must also be minimized.

The Six Sigma methodology is very comprehensive and includes very many different tools and techniques, which will not be further explained in this report. However, one important aspect of the methodology, that has not yet been addressed, is the similarities between the Six Sigma way of work and *project management* in general. DMAIC/DMADV-processes resemble project tasks; so being great at project management will ease Six Sigma implementation, Magnusson *et al* (2003).

### 3.3.2 Six Sigma – Administration application

The Six Sigma methodology in its original appearance heavily encounters the importance of integrating the supporting functions in a company when implementing Six Sigma in a manufacturing department. The administrative functions within a company must deliver superior quality deliverables to the internal customers for the Six Sigma methodology to be successful in minimizing the variation of the output from every process, Magnusson *et al* (2003).

Regarding administrative processes the variation often depends on poor information quality and variation of human behavior. Six Sigma manufacturing demands tough discipline, comprehensive knowledge and thorough employee understanding regarding the fact that the administrative processes are vital parts of the company’s manufacturing, Magnusson *et al* (2003); Martin (2008). Process improvement projects in administrative processes are carried out in the same way as in a manufacturing department, including a project manager (“black belt”) and the DMAIC or DMADV methodology, Magnusson *et al* (2003).
3.4 5S

5S is a Japanese method, which leads to a more organized, cleaned and standardized workplace. This method can be implemented in the whole organization, in the factory as well as in the office, to complete a pure factory. The 5S is translated from Japanese words and stands for: Sort, Straighten, Scrub, Systematize, Sustain, Henderson and Larco (1999):

- **Sort** - refers to sorting all the components, tools, equipments on the work place and remove or relocate everything that is unnecessary for the daily work.
- **Straighten** - refers to straighten and organize the work areas. Meaning “a place for everything and everything in its place”. Everything should be neat and orderly, example: cables should be bundled sets and not in a jumble tangle. Moreover, should everything be clearly marked and identified.
- **Scrub** - refers to clean the work place thoroughly. All equipment, tools, work surfaces, floor areas et cetera should be as clean and neat as possible. While cleaning the work place it shall also be systematically inspected (looking for e.g. safety hazards). Everything shall be as near perfect condition as possible.
- **Systematize** - is the fourth “S” and refers to establish rules and guidelines for the first three S:s to make sure they are followed. In Brazil, organized, reviewed workplace cleanliness is called “SOL” (Safety, Orderliness, Limpeça [Cleanliness]), where they utilize a cross-functional team with a standardized checklist to evaluate the company’s departments. The result of each evaluation of the different departments is posted for all to see.
- **Sustain** - refers to making sure that the 5S implementation continue being followed by the personnel. Meaning that every employee needs to understand safety, order, and cleanliness, and take action every day to sustain this standard. This is usually the hardest of the five S:s, since “old” employees tend to go back into their old way of work.

Once 5S was called 4S system, the fifth “S” was added demonstrative to show the need for continued discipline to keep the other four “S” alive. Henderson and Larco (1999) claims that, the critical features with 5S are to incorporate the concepts of safety, order and cleanliness into the enterprise.

3.4.1 5S – Administration application

Traditionally 5S is very suitable for production, where many workers work in shifts and where people need to know where tools are placed. To convert the approach to the administrative processes i.e. office, can miscarry the work. Gonzalez-Rivas and Larsson (2011) extend the 5S:s with an i (5Si), where i (= information) is added, so the method could be more applicable to office/administrative processes. Since it will include file naming and storing conventions, easy to find electronic assets, visual management et cetera, to be valuable for organizations.

Larsson (2008) states that 5S is a good starting point to support a clean and virtuous work place. This demands discipline and motivation from the employees, and commitment to their work assignments. Larsson (2008) claims that, 5S will result in a more pleasant working environment with standardized routines and with stabile administrative sub-processes. This in turn will result in eliminating failures and improve quality, but also give systematic work routines with continuous improvement. 5S could be a useful tool to standardize, sort and to clean up e-mails.
The 5S translated for the administrative processes, Larsson (2008):

- **Sort** - Select an administrative function/department to start with. Inventory equipment and inspect working routines and assignments. Sort out items that will not be used in 6-12 months, throw these away, other than for example papers that are needed for juridical value.
- **Straighten** - arrange the remaining items to an easy way to find them. Mark where the equipment shall be placed.
- **Scrub** - Clean up and keep the working area clean and neat. Identify sources for a disorganized working place. Routines should be written down to maintain cleaning of the writing desk and work place. Necessary to not forget is to clean up information/data stored in computers.
- **Systematize/standardize** - Maintain the order through standardization. To take a picture before the method was implemented and after cleaning and straighten the desk/working area can be helpful to maintain the order.
- **Sustain** - Everyone in the administrative processes shall utilize 5S. Perform regular audits to verify the new order.

### 3.5 ISO 9000
ISO 9000 is a series of international standards that many organizations use today. One definition of standards is “How something should be”. This can include physical objects or services, all produced by national standards, industry groups and individual organizations. The standard shall be used to set criterions against the quality of an object or service that can be measured. The most known by International Organization for Standards is the ISO 9000 series, that work as a platform for quality management systems, Seaver (2001).

According to Poksi´nska (2006) many organizations are investing significant resources to obtain the certification of the quality standard ISO 9000. The ISO 9000 series have met some criticism, since the ISO 9000 requires a high amount of documentation of the organizations quality assurance. The certification, though, is a strong tool to stay competitive on international markets. Many companies recognize the importance of quality improvements and being certified with ISO 9000 is a good basis for quality management.

Poksi´nska (2006) claims that the most important aspect of ISO 9000 is its structure since the structure create an international common language for quality standards in the business community.

Kanji and Asher (1996) have created 13 steps associated with building a quality management system:

- Obtain management understanding of the quality management approach.
- Define the activities that shall be included in the system.
- Define organizational structure and users of the system.
- Review the present system and processes against the criterion/requirement of the standard.
- Develop a plan to write the necessary procedures.
- Train and educate users to write their own procedures.
Formulate the procedures and gain agreement to them.
Compile a draft quality manual.
Implement a test version.
Internal training of the systems applications.
Review the new operation processes of the system.
Apply for a third-party approval from an accredited firm.
Maintain the system by internal audit, using it for continuous improvement.

3.5.1 ISO 9000 – Administration application
ISO 9000 could easily become a pile of paper if the employees does not take responsibility and participate in the approach. Danielsson (1994) describes ISO 9000 as a model for organizations quality system. Through policies, work description, responsibilities and authorization descriptions/instructions it can be easier to control and lead in a documented way. The standards are involved in the whole organization. It demands process documentation of all processes to handle routines, deviations and methods.

If the processes from customer order to delivery are operating excellent in every function/department it will result in satisfied customers and a superior quality. Danielsson (1994), states “to create a quality culture in administrative processes requires management to total quality”, and that a well-implemented quality approach as ISO 9000 will provide tools to achieve great quality. As stated before, the methodology involves the whole organization and demands employees to document their processes. Through this it will be possible to map out processes and to create standardized working routines, which ease an implementation of continuous improvement methodology.

It is important that employees and managers work with the right assignments at the right time, and understand that next function/department is an important customer. This focus and awareness generates fewer problems; create efficiency, and the employees work as teams, Danielsson (1994). One very important aspect of successful implementation of the prerequisites for an ISO 9000 certification is a high support from the top management of the company and to have inspirational team leaders in the different departments. The ISO 9000 shall not be a goal of an organization, rather than a supporting function to achieve and remain great quality throughout the whole value chain, Danielsson (1994).
Improvement methods - theory discussion

In this section the authors will shortly discuss the different improvement methods strengths and weaknesses regarding improvement of administrative processes.

None of the methods are specifically designed for administrative processes. The main objectives perceived when studying these methods have been that they are mainly centered to production processes, improvement of production flow, and improvements regarding production organization. Some of the methods (for example Six Sigma) point out the importance of including the supporting administrative processes into the development of streamlined production; however most of the tools integrated within the methodologies are designed for production processes.

The methodology of Lean proclaims the importance of eliminating all non-value adding activities within a company, which does not add any value for the customer. This focus is most often discussed in a “production environment” however the methodology can directly be interpreted into incorporate administrative processes, which imply that Lean could be a useful tool for improving administrative processes. Nevertheless, there are difficulties with implementing Lean into office functions since the administrative value streams might be hard to see and comprehend.

The main element of Total Quality Management (TQM) is the “quality of work”-awareness and the reviews of the current way of work to explore weak areas where the quality suffers. This is also most often applied in “production environments” but the methodology could just as well be incorporated in the entire corporation. The quality awareness should be embraced in the same way in an office function as in a production department. The TQM methodology, in comparison to the other improvement methods stated in this report, rather resembles a philosophy than an actual applicable method. Other difficulties regarding TQM is that the quality input and output from the administrative processes are often not measured which could make the methodology hard to really incorporate in administrative processes.

Six Sigma might be the only method really embracing the fact that the supporting administrative processes should be incorporated when making improvements in a production department. The methodology is very process oriented and therefore highly applicable on administrative processes. However, Six Sigma is a very comprehensive method to implement and could demand radical changes in an organization, and depending on the company implementing Six Sigma the effort might not be sustainable or even profitable.

5S methodology’s core focus manages about standardization and discipline, which is just as applicable in a production department as in all various office functions. The difficulties regarding the 5S method is to sustain a new standardized working routine and these problems can be present regardless which function the methodology is incorporated to.

The ISO 9000 methodology mainly manages the aspect of reviewing and documentation of all various processes within a company. These processes incorporate the administrative functions as well; however as an improvement method it is not as strong as the other methods mentioned. ISO 9000 could be utilized as an improvement management method, but just as the problems with TQM, it does not provide the tools necessary in comparison to Lean, Six Sigma, and 5S.
3.6 Administrative processes

Bergman and Klefsjö (2010) define a process as “a network of interrelated activities that are repeated in time, whose objective is to create value to external or internal customers”.

A process can also be defined as: “Sequence of interdependent and linked procedures which, at every stage, consume one or more resources (employee time, energy, machines, money et cetera) to convert inputs (data, material, parts et cetera) into outputs. These outputs then serve as inputs for the next stage until a known goal or end result is reached”, Businessdictionary (2011).

In a manufacturing company there can be identified three kinds of processes: Main-, Support- and Management –processes, Bergman and Klefsjö (2010):

- **Main processes** – The main processes include all the operative processes, which shall fulfill the external customer’s demands.

- **Support processes** – The support processes shall supply the main processes (internal customers) with information and support for performing the main processes tasks, for example purchase and human resource management.

- **Management processes** – The tasks for the management processes includes decision-making (strategic planning), implementation of improvements in the main- and support – processes, and organizational changes.

Administrative processes (support/management processes) do not generally generate physical outputs/deliveries/products, rather than processed information and decisions. In a manufacturing department the different production processes (main processes) manage physical material to refine the material so it may be used in the next production process (or direct delivery to customer). Different processes always have some kind of supplier and some kind of customer, either internally or externally. For the administrative processes the suppliers deliver information in form of for example: a customer order, a blueprint/product specification, an invoice et cetera. The administrative processes within a manufacturing company are often located in different departments assigned specific work related tasks. Each department (administrative process) has a recipient for the output that is expected from the processes, Bergman and Klefsjö (2010); Keyte and Locher (2004).
3.7 Administrative losses
Administrative losses (waste) can be defined as all administrative activities that do not add any value for the customer(s), Keyte and Locher (2004). These customers are mainly internal customers, which often result in a lower level of respect for deadlines/deliveries. Administrative losses can often be found in gaps between different functions/departments which lead to a poor information flow which could counteract the administrative supply and demand, creating overlaps, poor information quality, rework and/or double work, Gonzalez-Rivas and Larsson (2011).

If the administrative functions (supplier) do not exactly know what the customers want (internal customers) the deliveries will not satisfy the customer needs/demands. If information is missing or is too complex it will generate unnecessary questions that could have been avoided, making the work inefficient, Larsson (2008); Gonzalez-Rivas and Larsson (2011).

The administrative (support processes) functions shall support the (main processes) production department (if it is a manufacturing company) with all information necessary for them to be able to work efficient and effective. If the different administrative functions deliveries to the production department overlaps, or is delivered to late, the work flow counteracts a streamlined production flow. This will prolong the production lead-times which can affect the production planning and delivery precision, Larsson (2008); Gonzalez-Rivas and Larsson (2011).

Administrative losses are usually not visible, however there can be found proof of visible waste such as: documents piling up on the desks (implying overproduction from the supplier(s), and/or inefficient working routines), reports not printed and read, and unopened e-mails (information overload). Poor department/office layout can also be considered as a visible waste; the layout can be obviously poorly structured (example: the printer is placed in a “printing room” on another floor in the building).

The non-visible waste might be hard to see if the meaning of administrative losses is not clarified, Larsson (2008). Gonzalez-Rivas and Larsson (2011) point out some examples, such as:

- Time spent on unnecessary work – Making reports and filling in templates that nobody ever reads or even open.
- Waiting – Such as time spent on waiting on delivery from the supplying function (department).
- Poor working routines – Lack of standardized routines and guidelines for prioritization
- Non-clarified responsibilities – Resulting in involvement of more people than necessary when problems arise.
- Miscommunication – Too complex reports, or for example: a very short answer to a long e-mail including several questions.

3.8 Continuous Improvement
Continuous Improvement (CI), Kaizen, and Plan-Do-Check-Act (PDCA) are different names for a common objective. The concept of continuous improvement is very interlinked to Total Quality Management (TQM, further explained in paragraph 3.2), however the core idea of continuing improving processes in companies can be made without any direct involvement of TQM. CI, Kaizen, and PDCA can all be parts of continuous improvement work. Some
preexisting conditions facilitate implementation of methods for continuous improvements of processes within a company, which should be examined before any actions are taken. These conditions are, among other things, the organizational structure, how a company measures performance, the learning situation, and the level of standardization within the processes.

The work of continuous improvement is not only concentrated to the staff and the processes itself; it is also heavily dependent on managerial skills of the managers. It also requires support from the top management in the company, Bergman and Klefsjö (2007); Chang (2005); Lillrank (2003).

After recognizing problem areas or areas in need of improvements, the root-cause of the problems must be identified so it may be managed. One simple, but yet very useful, method is called “The 5 Whys”. The method incorporates to ask the question “Why?” the identified problem is present. The question is repeated until the root-cause of the problem is discovered. Some problems might require more than five “whys” and some require less, Chen, Li and Shady (2010); Henderson and Larco (1999).

Regarding implementation of improvement projects incorporating changes Bergman and Klefsjö (2007) states some key points to be aware of to be able to carry out successful improvement projects:

- When initiating improvement projects: start in small scale. It raises the probability of project success and it maintains and/or raises employee motivation.
- Initiate real projects where the need of great results is prominent.
- Manage and finish all projects that are started.
- Do not initiate too many projects at once.

Customers’ demands change over time. To meet and fulfill these demands, and still being profitable, companies need to obtain cost awareness. Cost awareness incorporates the statement “time is money” and by reducing time-spent on/within various processes it promotes the value chain to become more cost-effective, Bergman and Klefsjö (2007).

Cost awareness, according to Ron (1998) means reducing waste in production, avoiding quality failure and avoiding waste of time et cetera. To manage to overcome these factors and become cost aware Ron (1998) argues the importance of an ambition of continuously improving processes in the whole organization, which will create possibilities for reducing these factors.

Bergman and Klefsjö (2010) states a basic rule about continuous improvements, which is “There is always a way to get improved quality using fewer resources”, meaning that processes, methodologies and products can always be improved to achieve higher quality to a lower cost. By improving processes continuously regardless the scope of the changes will in the end decrease the total cost. It is necessary to keep in mind the fact that to satisfy the customers it is required to change and continuously improve processes in the organization, Bergman and Klefsjö (2007).
3.8.1 Kaizen

Kaizen is a Japanese word created out of “kai” (change) and “zen” (good), where a simple translation would be “change for the better”. Kaizen is a philosophy of continuous improvement. It shall be a daily activity to improve all functions and involve all employees in an organization. Kaizen methodology includes learning from own experience, systematic problem solving, knowledge utilization and exploring new ideas. Some of the tools used for continuous improvement are Plan-Do-Check-Act (PDCA, explained below) and benchmarking which is internal/external comparison of different ways of solving a task or problem to find inspiration for own improvements, Berger (1997); Bergman and Klefsjö (2007).

![Kaizen, Kaizen blitz and Blitz-enabled kaizen](image.png)

Figure 3.4 – Kaizen blitzing, illustration replica from Gonzalez-Rivas and Larsson (2011, p.215)

3.8.2 Kaizen events

Kaizen event (or Kaizen blitz) is a method embodying the kaizen philosophy. The aim of the kaizen event is to achieve rapid improvements by making use of cross-functional teams. Problem areas at focus in a kaizen event could be obvious problem areas within a company, or it can be problem areas identified by the employees in the company. The cross-functional kaizen teams are assigned to a specific task, and the teams might not include the same employees every event, Montabon (2005). Gonzalez-Rivas and Larsson (2011) advocates that the kaizen event should be carried out on regular basis to achieve continuous learning and improvement of the business (see Figure 3.4).

The event usually last for two to five days, added to about two to four days when the kaizen team study the problem area (process) and discuss, brainstorm and plan, different solutions to improve the situation. The kaizen event encourages creativity and experiments, as long as it stays within a reasonable limit; the main objective is to make improvements, sometimes including new innovations, and make the employees feel involved, Montabon (2005); Farris, Van Aken, Doolen and Worley (2009).

The scope of an event can range from minor tasks to “medium” sized improvement projects, as long as the solution can be implemented within the timeframe. It might be seen as a waste of resources performing minor tasks that may interrupt the daily routines in the company, however many minor successful improvement tasks empower the personnel and make them feel useful and raise the employee motivation. The cross-functional teams also provide a great opportunity to learn more about the organization/company, Montabon (2005); Chen et al (2010).
Farris et al (2009) states some important factors for achieving successful kaizen events:

- Organizations should strive after establish a positive internal team dynamic. The dynamic should be achieved through structured mechanisms and facilitator coaching. Some examples of the mechanisms are the ground rules in the teams, training, and "ice breakers", furthermore; the most important mechanism is the progress of goal declaration preceding a kaizen event.
- To maintain and raise the employee motivation towards the events, the organization must preserve a strong and visible management supporting the events.
- The management must be aware of the fact that the cross-functional teams might possess some heterogeneity, which must be recognized when deploying the kaizen teams.
- High levels of autonomy for the teams often raise the team’s problem-solving capability development. Difficult tasks for the events could raise the team learning, although it might compromise the results.
- Complex tasks (events) may not promote the team learning.
- Great team leaders and well-functioning teams does not necessarily support the development of the team learning, thus less experienced personnel could lead to better improvements; both individually for the employees involved and for the whole organization.

The kaizen event can be applied on any process in all kinds of organizations/companies. It might be more visible to make use of the event on production processes but the methodology is just as applicable on service processes, Henderson and Larco (1999).

3.8.3 Plan-Do-Check-Act
PDCA is a continuous learning and improvement-cycle (also referred to as Plan-Do-Study-Act [PDSA]). The purpose of the PDCA-cycle is to carry out changes, short term or long term, to achieve continuous improvements within identified problem areas or areas where improvements can be made, e.g. in processes or in service tasks. The cycle (see Figure 3.5) is divided in four phases, Bergman and Klefsjö (2007):

- **Plan** – Identify a problem area and analyze the current situation and propose some alternatives for improvements. Evaluate the alternatives and plan for how to achieve the new state.
- **Do** – Implement proposed actions.
- **Check/Study** – Check if the implementation has been successful and if the new state is in line with the proposed.
- **Act** – Modify the plan (implementation) if it were not successful and learn from the whole process with the objective to avoid the same problem in the future.
3.9 Change Management

Changes/improvements and organizations are often viewed as counterparts. Jacobsen and Thorsvik (2009), states organizations are seen as stable and predictable and changes/improvements are seen as an annihilator of these factors. However, today’s environment creates a demand for organizations to make changes and improvements, and to enable or manage these changes in the organizations it requires vast management.

Change Management deals with initialize, control and follow up decisions in the work of change, Karlöf and Lövingsson (2007). Changes are often seen as threats and are faced by resistance from individuals/personnel in organizations. Karlöf and Lövingsson (2007), talk about a 20-60-20 rule, meaning 20 percent of the personnel are highly resisting for changes, 60 percent of the personnel await changes, and 20 percent of the personal are highly positive for changes. Therefore it is important to not spend too much time trying to convince the ones that are negative for the improvement work, instead devote time for those who are highly positive. Reasons why resistance is met in work of changes can for example depend upon, Karlöf and Lövingsson (2007):

- Radical changes.
- Unexpected changes.
- Changes where the purpose is ambiguous, which creates uncertainty.
- Negative experience from similar organizational changes.

For managers to meet this resistance, Karlöf and Lövingsson (2007) and Cameron and Green (2009) states it is important to create motivation through explaining what is going to change and why (the purpose) the improvements/changes are carried out. To be able to create positive attitude towards the changes and increase the employee motivation some methods are stated, such as:

- Create a clear improvement plan, where goals, activities and expected result are stated.
- Involve the employees in the work of change; pay attention to employee knowledge and experience.
- Embrace management skills of the team leaders and make them accountable for achieving outcomes.
- Identify the key figures; they need to be officially supporting and positive to the change/changes.
- Have a clear and positive vision of the result the change shall create.

Robbins and Coulter (2007) claims organizational changes can create employee stress and is one reason why managers need to be alert, listen and have knowledge about change management. Symptoms of stress can be shown in many different ways such as: employees become depressed, argumentative, and/or indecisive. The stress factors can be divided into three general categories: physical, psychological and behavioral, Robbins and Coulter (2007). By having the knowledge in these three categories managers can have an understanding and knowledge of the reaction that can be faced during organizational changes, and can in this way handle them in a better way, Cameron and Green (2009).
One model that has been presented to help managers in change management when dealing with improving work processes, to reduce redundancy, is the Noer’s model. The model is divided into four levels, where all levels are important to reach successful changes, Cameron and Green (2009).

- First level states the importance of making the management effective and efficient to a good level. A good start is communication; it is better with over-communication than lack of communication.
- Second stage is where emotions shall be handled; this could be done through team meetings or one-to-one meetings to allow time for employees to express their feelings.
- Third level states: focus on the future; involve the personnel to shape the organizations’ future. This could encourage a commitment, engagement and a higher degree of success.
- The last level emphasize: embedding the changes, meaning all changes made must be given the prerequisites necessary for the employees to sustain to the new working routines.

3.10 Total Quality Maintenance (TQMain)
Total Quality Maintenance is comprised with parts from a set of different methodologies spawned from maintenance management, for example Total Productive Maintenance (TPM), with the objective to become more effective in improving quality, production rate, and reliability of machinery and productivity. The concept support the operators roles as to be seen as competent work force which are able to, and shall, take over maintenance tasks from the maintenance staff. Through involving the operators in the maintenance work/tasks the stability of a production line can be strengthened and the productivity increase, Al-Najjar (1996).

In contrary, or along with, other maintenance philosophies and measures TQMain argues the importance of encompassing a holistic perspective of a company, rather than only focusing on a single production line, when making changes to improve reliability, quality and production rate. TQMain does not only care for maintaining machinery, it advocates the importance of maintaining the whole system (company/organization). This objective shall not be seen as exclusively intended for a production department; the “system” includes every function/department of a company, Al-Najjar and Alsyouf (2000). Al-Najjar (1996) states four factors that influence operator commitment:

- In general, people resist changes of any kind if benefits to themselves are not obvious.
- Training on how to perform tasks, e.g. collecting precise data.
- Procedures on how to perform tasks and their review.
- Training programs for the personnel about their important role in continuous improvement activities.

These factors are general for any process within a company, not only to operators in a production line. The data collection is of vital importance when working with continuous improvement and this collection shall be made by operators (the employees working within a process) and the measurements must be used in a visible manner for the employees otherwise the commitment to performing any data collection (measurements) will be diminished, Al-Najjar (1996); Al-Najjar and Alsyouf (2000).
The collected data shall be stored in a common database to avoid duplication of the data and to have fast and reliable access to the information needed. According to Al-Najjar (2006), “the common database provides a reliable foundation for mapping, analysis and control of deviations in the product quality, process and working conditions and production cost”. By having access to up-to-date reliable data analysis of the current state will be much more accurate and the work of continuous improvement will be greatly facilitated, Al-Najjar (2006).

3.11 Facility’s planning

Facility planning has been a topic that has been studied for many years and the facility planning organizations should strive for achieving is called Supply chain Excellence. This is a process in six steps:

- **Business as usual:** is about when the organization works to maximize its individual functions.
- **Link Excellence:** is when the organizations all functions works as one unit and the internal boundaries is turned down.
- **Visibility:** is when the organization has knowledge and understanding about their part in the supply chain, also other links in the chain.
- **Collaboration:** is when an organization can meet and fulfill the market demand through collaboration in the supply chain. With true partnership, the supply chain can work close to maximize customer satisfaction and minimize inventory.
- **Synthesis:** is achieved when all links in the supply chain are visible and collaborated.
- **Velocity:** is to meet the business environment demand there is a need for highest speed and degree between the partners in the supply chain.

Every step needs to be fully achieved before next step can continue. For the facility’s planner, it is very important to understand the concept of continuous improvement since not all steps can be carried out at once, and the results of changing layout might not be shown until later on, Tompkins *et al* (2003).

3.11.1 Departmental planning

The activity relationships and space requirements are important factors in the facilities planning. Flow relationship is one of the most important parts in the activity relationship, which is the movement of material, information and people. The flow needs to be analyzed; both qualitative and quantitative measures are to be considered to find the best solution of the facility layout. Effective flow within organizations departments is a hierarchical planning process and to reach an effective flow within the organization facility it is important to accomplish effective flow between departments, Tompkins *et al* (2003).

3.12 Interaction

According to Eriksson-Zetterquist, Kalling and Styhre (2008) a complex organization needs to decide in which degree the differentiation of the organization is possible and which level of differentiation or integration structure the organization should have.
Differentiation is defined as: “the difference in cognitive and emotional orientation among managers in different functional departments” and integration is defined as “the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment”, Eriksson-Zetterquist et al (2008).

With more specialized departments some level of integration and collaboration in the organization is required, meaning the organization needs to handle different conflicts. Eriksson-Zetterquist et al (2008) states the best way of designing organizations is to handle the complexity and variations in the environment through integration between specialized and differentiated departments.

3.13 Information quality (data)
Increasingly amount of information supervenes in the society, and with help of technology organizations can manage considerable amount of data. Once the data is achieved to the right user, who has the knowledge to use it, the data can become constructive information. Pure data has no value for an organization; it is when the data is available for the user and supplemented with the users’ knowledge it becomes valuable, meaning; when a user utilizes the accessible data in a meaningful way, it can become value-adding information.

The process has certain risks:
- The information/data is not right and information/data is not available when needed.
- The information/data reaches unauthorized user.
- The information/data reaches wrong person.
- Important information/data is not saved properly.

Moreover, the value adding information and knowledge disappears if an administrator ends its employment, meaning it is important for documentation of competence, knowledge and experience, so the organization has the valuable information even if the administrator quits, Kurtén (2009).

3.14 Prioritization
Decisions are made every day in organizations, which will have consequences for personnel, customers, suppliers and other cooperative partners. Often are these decisions selections between different alternatives, Jacobsen and Thorsvik (2008).

One definition of decision is: “a choice between different alternatives, where the selections implicate a commitment to act”, Jacobsen and Thorsvik (2008). This means that the result of the decision is a practical arrangement and acts to complete the intentions the choice includes. The decision can be the result from a decision process that is composed by three phases (see Figure 3.6).

![Figure 3.6 – Phases in decision process, Jacobsen and Thorsvik (2008, p.329)](image-url)
The central term in the decision theory is that the human/individual acts in a rational way. The rational concept specifies how to decide what shall be done when facing a problem.

1. Evaluate situation, problem characterized and challenges, and deciding goals.
2. Search information and mapping out different alternative solutions.
3. Consequences of the alternative solutions are evaluated.
4. Comparing the different solutions and consequences.
5. Selecting alternative with best consequence.

Jacobsen and Thorsvik (2008)

3.15 Standardization
Standardization is the ideal to achieve control and economic efficiency. Hence, this is not suitable if the processes are too complex with large amount of variation and variety, which cannot be reduced. A complex process is although often a combination of sub-processes, which can be standard, routines or non-routines. These three sub-processes differ in how they are structured in terms of variations and variety, Lillrank (2003).

Standard processes have some advantages in high asset specificity; routines and non-routines may always possess some level of nonconformity. Lillrank (2003) states if a process is identified as a standard, the future improvement should be to focus on the process and reduce variation in the output that might come from the input. If the process is a routine the future improvement should be to develop a large amount of classification criterions. For the non-routine processes the need is to create awareness of the limited knowledge and to improve capabilities for feedback and double-loop learning, which means that the employee performing a non-routine task are given the possibility to reflect and analyze how the task is performed and question the procedure to improve the task operation over time, Ljung et al (2007).

3.16 Multi Criteria Decision Making (MCDM)
A definition of “Multi Criteria Decision Making” could be: the study of methods and procedures concerning multiple conflicting criterions, which can be formally incorporated into the management planning process. MCDM aims at highlighting these conflicts and deriving a way to come to a compromise in a transparent process.

One of the decision-making techniques helpful when analyzing different alternatives is a decision matrix, which is a table where the different criterions are evaluated and rated to different alternatives. The criterions can be weighted to make the analysis more accurate/reliable. The rating of the different alternatives is then multiplied to the weighting of the criterions, and the alternative with the highest score is probably the best solution.

\[ \text{Score} = \text{Rating} \times \text{Weight} \]

where:

- **Rating** – measurement of how the given alternative fulfills different criterions.
- **Weight** – measurement showing the importance of different criterions.

Kornyshova and Salinesi (2007)
4 Model development
This chapter includes the authors proposed model for improving administrative processes. The model is divided into three interlinked parts providing a step-by-step approach of how to start improving administrative processes, how to improve individual administrative work performance, as well as maintaining continuous improvement regarding the administrative processes (see illustration: Figure 4.1).

Figure 4.1 – Model Overview Illustration

The model have been created by the authors to facilitate improvement project initiation and continuous improvement using theoretical knowledge related to this subject inspired by several different improvement methodologies (as stated in the theory chapter). The theoretical foundation for this model can be traced back to parts of all methods stated in Theory Part I, Change management, TQMMain, and the other supporting topics, such as Kaizen, Continuous improvement et cetera, addressed in this report.

- The first model, Administration Improvement Model (A.I.M.) stage I, provides a foundation about how to start initiating improvement projects in administrative processes. This part combines change management methodology and a combination of the improvement methodologies to involve and motivate employees in the improvement work at the same time as changes are implemented, see paragraph 4.3.

- The second model, Administration Improvement Model (A.I.M.) stage II, shall be initiated after (successful) implementation of A.I.M. – stage I, and shall act reoccurring over time to promote continuous improvement, see paragraph 4.5.

- The third model, Individual work reinforcement model, can be implemented individually or parallel to the A.I.M. - stage I improvement project initiation, and is created to act reinforcing on individual work performance, see paragraph 4.7. The models have common touching points but in different levels, which is why they can be implemented simultaneously.
Note: The model for improving administrative processes starts with evaluating different improvement methodologies. Then an evaluation of the methodologies applicability in an organization is to be made. These first steps are a part of the pre-phase in stage I of the Administration Improvement Model (see paragraph 4.3) where the main goal is to explore which improvement methodology that possess the highest probability of successful implementation in an organization.

4.1 Improvement method evaluation
An evaluation of different improvement methods has been made with utilization of MCDM methodology, described in paragraph 3.16. This evaluation (see Table 4.3) has been performed through an objective theoretical perspective, firmly established upon a theoretical foundation, which consequently raises the reliability and validity of the evaluation. The research method utilized for this analysis is the hypothetic-deductive approach. Weightings and ratings in the evaluation matrix are described in Table 4.1 & 4.2.

<table>
<thead>
<tr>
<th>Explanations of the weightings</th>
<th>Weightings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolutely Important</td>
<td>1</td>
</tr>
<tr>
<td>Very important</td>
<td>0.9</td>
</tr>
<tr>
<td>Important</td>
<td>0.8</td>
</tr>
<tr>
<td>Needed but not very important</td>
<td>0.7</td>
</tr>
<tr>
<td>Not very important</td>
<td>0.6</td>
</tr>
<tr>
<td>Not important</td>
<td>0.5</td>
</tr>
<tr>
<td>*Not required</td>
<td>&lt; 0.5</td>
</tr>
</tbody>
</table>

The weightings have been established out of a systematic approach, considering the methods content (core focus) in comparison to improving administrative processes, when evaluating the methods to each other. The criterion “administration application” have been included since the methods needs to be applicable on administrative processes. The criterion of “holistic perspective” have been included to evaluate the perspective of the methods.

This weighting imply that the criterion is of highest priority and extremely important in the evaluation matrix.

This weighting imply that the criterion is of high priority and very important in the evaluation matrix.

This weighting imply that the criterion is important in the evaluation matrix.

This weighting imply that the criterion is needed but not very important.

This weighting imply that the criterion is desirable, but not very important, nor very needed.

This weighting imply that the criterion is desirable, but not important, nor needed.

Weightings below 0.5 does not figure in the evaluation matrix.

Table 4.1 – Explanations of the weightings (1)
The ratings have been set with an objective perspective when comparing and evaluating the different criterions to the different improvement methods. The rating have been set to a number between 1 and 5.

<table>
<thead>
<tr>
<th>Explanations of the ratings</th>
<th>The ratings imply a very strong connection between the criterion and the improvement method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Total connection</td>
</tr>
<tr>
<td>4</td>
<td>Strong connection</td>
</tr>
<tr>
<td>3</td>
<td>Connection</td>
</tr>
<tr>
<td>2</td>
<td>Low connection</td>
</tr>
<tr>
<td>1</td>
<td>No connection</td>
</tr>
</tbody>
</table>

Table 4.2 – Explanations of the ratings (1)

The different methods chosen for this evaluation are all overlapping each other, regarding for example the continuous improvement perspective; consequently the criterions also overlap. However, the different methods all possess slightly different objectives, even though they all have common parameters in the methodology/philosophy.

Table 4.3 illustrates the improvement Method evaluation matrix were the five different improvement methods (Lean, TQM, Six Sigma, 5S, and ISO 9000) are compared to the “core focus” of the different methods. The “core focus” is stated as criterions to be able to make a thorough comparison between the methods. The criterion “Administration application” has been added since it is the main objective of this evaluation, and the “Holistic organizational perspective” has been added since it is important to consider when improving administrative processes.

The ratings of the different improvement methods when comparing to the seven criterions have been established through assessing the theoretical content of the methods identifying which method that achieve highest fulfillment of the criterions, and then comparing the other methods to the one with the highest criterion fulfillment, as well as the criterion itself. If some methods have common theoretical parts regarding a criterion, the same rating will be given in the evaluation matrix, and if a method has low criterion fulfillment it will be given a low rating. The following points provide descriptions of the different criterions stated in the Method evaluation matrix (see Table 4.3):

- **Minimizing waste** – is associated to lean production. The waste reduction is a part of all the different methods; however Lean has a stronger emphasis. To improve administrative processes the administrative losses (wastes) must be recognized and minimized. The weight of 0.9 is supported by the fact that it is very cost-inefficient not to examine and handle the non-value adding activities within a company, Keyte and Locher (2008).

- **Continuous improvement** – is associated to all the different methods, but TQM states the continuous improvement as the main objective of this approach. Continuous improvement gets highest weight (1) since it is vital for companies to improve their business processes to become and/or stay competitive on the market, Bergman and Klefsjö (2007).
• **Minimizing variation** – is the main objective of the Six Sigma methodology. To reduce variation of the input and output from all various processes within a company will result in reducing waste and promote continuous improvement, however the focus is different. Minimize variation is important for improving business and to assure world-class quality products and to optimize the production lead-times, Magnusson *et al* (2003). Reducing variation in administrative processes is harder than when focusing on a production line, which is why it gets the weighting of 0.5.

• **Standardization and discipline** – is heavily related to the 5S methodology, however not exclusive to only the 5S method in this evaluation. The theory states that standardization is a key factor for continuous improvement, Lillrank (2003). Standardization and discipline get the weight of 0.9 since it is very important for future continuous improvements.

• **Documentation** – is a key part of the ISO 9000 series and the documentation aspect is very important when establishing routines and standardized way of work. The documentation can also be of vital importance to preserve knowledge and experience within a company. The ISO 9000 certification can raise a company’s competitiveness on the market, Danielsson (1994). The weighting of 0.8 since it is important to document the administrative processes to control, be able to monitor and improve the current routines.

• **Administration application** – have been included in the evaluation since the evaluation of improvement methods should state which method(s) that is most applicable on administrative processes, which also promote the highest weighting of 1.

• **Holistic organizational perspective** – is an important consideration when improving administrative processes since many different functions/processes enclose many internal suppliers and customers. TQM alludes to the importance of maintaining the whole system, Al-Najjar (1996), which is an important aspect when reviewing and improving the administrative processes within a company. This criterion has been given the weight of 0.7 since the holistic perspective of the methods is needed to consider when evaluating the different methods. Though the importance of a holistic perspective is more important on the individual level than in a method itself. The perspective within a method can always be customized in some sense, hence the weighting of 0.7.

The results of the Method evaluation matrix have been calculated through multiplying the ratings to the weightings of every criterion and then summarize the scores of each criterion to the specific improvement method. This evaluation states Lean and Six Sigma as the most suitable methods for improving administrative processes, closely followed by 5S. TQM and ISO 9000 proved not as useful for improving administrative processes as the other methods.
4.1.1 Method evaluation matrix

Table 4.3 states the comparison of the different improvement methods.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
<th>Lean</th>
<th>TQM</th>
<th>Six Sigma</th>
<th>5S</th>
<th>ISO 9000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimizing waste</td>
<td>0.9</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Minimizing variation</td>
<td>0.5</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Standardization &amp; discipline</td>
<td>0.9</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Documentation</td>
<td>0.8</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Administration application</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Holistic organizational perspective</td>
<td>0.7</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SUM</td>
<td>26.5</td>
<td>17.1</td>
<td>27.2</td>
<td>23.1</td>
<td>21.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 – Method evaluation matrix

4.1.2 Results of the Method evaluation matrix

When evaluating the different improvement methods objectively in the Method evaluation matrix the results state Six Sigma as the best method for improving administrative processes. However, the scores of the methods Lean, 5S, and ISO 9000 is not far behind Six Sigma which imply that they all have useful content for improving administration. TQM gets the lowest score in the evaluation because the TQM methodology is not as firm method as the other ones in the matrix.

Note: Just because Six Sigma gets the highest score it does not mean the Six Sigma methodology is the most suitable method for any company. Any of the other methods could generate the same results depending of the method applicability in an organization. The method application shall also be evaluated before any decisions are made. The next step after reflecting on the Method evaluation matrix is to complete the Method application evaluation matrix (Table 4.6), and compare the results.
4.2 Method application evaluation

Six different criterions have been identified to evaluate different methods applicability in a company (see Table 4.6). This evaluation builds its foundation on theoretical basis mainly identified within the methodology of change management. When making changes in different processes or different functions within a company it is of vital importance to create a positive attitude towards the changes and to maintain or preferably increase the employee motivation. Including the methodology of change management when evaluating different improvement methods can make a huge different regarding the implementation outcome, Karlöf and Lövingsson (2007); Cameron and Green (2009).

The weightings of the different criterions have been established through the perspective of how important the different criterions are in comparison to successful method implementation (see Table 4.4 & 4.5 for weighting and rating descriptions).

<table>
<thead>
<tr>
<th>Explanations of the weightings</th>
<th>The weightings have been established out of a systematic approach, considering the methodology of change management, and comparison of the different criterions to each other. All methods are equal to the weightings of the criterions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Absolutely Important</td>
</tr>
<tr>
<td>0.9</td>
<td>Very important</td>
</tr>
<tr>
<td>0.8</td>
<td>Important</td>
</tr>
<tr>
<td>0.7</td>
<td>Needed but not very important</td>
</tr>
<tr>
<td>0.6</td>
<td>Not very important</td>
</tr>
<tr>
<td>0.5</td>
<td>Not important</td>
</tr>
<tr>
<td>&lt; 0.5</td>
<td>*Not required</td>
</tr>
</tbody>
</table>

Table 4.4 – Explanations of the weightings (2)

<table>
<thead>
<tr>
<th>Explanations of the ratings</th>
<th>The ratings shall be set with both an objective perspective and a subjective perspective when comparing and evaluating the different criterions to the different improvement methods. The subjective perspective rating shall be established out of the current state in a company. The rating shall be set to a number between 1 and 5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Total connection</td>
</tr>
<tr>
<td>4</td>
<td>Strong connection</td>
</tr>
<tr>
<td>3</td>
<td>Connection</td>
</tr>
<tr>
<td>2</td>
<td>Low connection</td>
</tr>
<tr>
<td>1</td>
<td>No connection</td>
</tr>
</tbody>
</table>

Table 4.5 – Explanations of the ratings (2)
The following points provide descriptions of the different criterions stated in the Method application evaluation matrix (see Table 4.6):

- **Motivation** – cares for the employee motivation for the improvement methods. The Motivation criterion has been weighted to 0.9 since it is a very important criterion for successful implementation. Change management theory profoundly points out the importance of employee motivation when making changes in an organization; see for example Cameron and Green (2009).

- **Previous knowledge** – meaning employee’s previous knowledge and experience about the different methods. Previous knowledge has been weighted to 0.8 since the criterion is important but not as important as Motivation. To utilize the previous knowledge and experience of the employee’s can be very facilitating when making changes. It will also increase the employee motivation since the workers feel valuable, Karlöf and Lövingsson (2007).

- **Education** – is related to the Previous knowledge, meaning the necessary amount of education for the staff when implementing a method. A low rating in the matrix equals a high degree of education necessary. The weighting of Education has been set to 0.6 since if the employees are motivated the education about an improvement method will not generate such negative effect. The education does not necessary affect all employees at a company to a higher extent, rather mainly the team leaders and the managers. It is important to have knowledge about the improvement methods when making organizational changes to secure that the “new” method are provided the right prerequisites and that the goal and vision of the changes are clarified and understood, Cameron and Green (2009).

- **Implementation (complexity)** – means how comprehensive the method is and how difficult it can be to achieve a successful implementation. A low rating in the matrix equals high complexity for the company making the evaluation. This criterion has been given the weight of 0.7 since it is necessary to consider but not a key factor in the decision-making. A method can always be customized to some extent. The complexity in the method implementation might be concerned an old organizational structure and the implementation may be facilitated by a new organizational design. These changes must be made in collaboration with the employees to maintain the motivation, as well as the management shall emphasize the employees’ previous knowledge, Karlöf and Lövingsson (2007).

- **Organizational effects** – meaning the impact of the improvement method towards the organization. The effects shall be viewed from a positive perspective, which means a high rating in the matrix implies that the changes related to the method provide high positive organizational effects. These positive effects can be to raise the teamwork spirit within the company, more efficient work routines, making all the employees work toward a common goal, and pleasing the stakeholders, Cameron and Green (2009). The Organizational effects have been given the weight of 0.7 since it is necessary to consider when evaluating the different methods.
• **Evident tools** – meaning tools suitable for improving administrative processes. If the method includes visual and comprehensible tools/or measures to improving administrative processes the employees will build up confidence in the method, henceforth the motivation will be increased, as well as the output from the method implementation. If the method includes evident tools the implementation of the method could be less stressful for the employees since they will know how to use the “tools”, Robbins and Coulter (2007). **Evident tools** have been given the weight of 0.9 since it is very important for the method to include tools for improving administrative processes.

The six criterions are all related to change management and the purpose of the *Method application evaluation matrix* is to explore how applicable a method is to an organization. The five improvement methods are not exclusive for this kind of evaluation; they can all be replaced with other improvement methods since all methods included in the matrix are equal to the weightings of the criterions. As one of the delimitations for this report states (see paragraph 1.8) the costs of the different methods will not be considered. The main objective of this evaluation is to explore which method a company is most “ready” to implement; which when explored provides a stronger foundation for decision making and for successful method implementation.

### 4.2.1 Method application evaluation matrix

*Table 4.6 (which also can be found in Appendix IV) shall be completed with ratings set based upon the current situation in an organization. Explanations of the weightings and rating can be found in Table 4.4 and 4.5.*

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>0.9</td>
</tr>
<tr>
<td>Previous knowledge</td>
<td>0.8</td>
</tr>
<tr>
<td>Education</td>
<td>0.6</td>
</tr>
<tr>
<td>Implementation (complexity)</td>
<td>0.7</td>
</tr>
<tr>
<td>Organizational effects</td>
<td>0.7</td>
</tr>
<tr>
<td>Evident tools</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>∑</strong></td>
<td><strong>0.9</strong></td>
</tr>
</tbody>
</table>

Table 4.6 – Method application evaluation matrix
4.3 Administration Improvement Model (A.I.M. - stage I)

Figure 4.2 illustrates stage I of the Administration Improvement Model.

- Pre-Phase
  - Recognize potential areas of improvement within administrative processes
  - Evaluate different improvement methods
  - Focus on one department

- Phase 1
  - Make the employees aware of the approaching improvement projects
  - Make the employees participate by suggesting improvement areas

- Phase 2
  - Map the current state, including all routines and information transference
  - Define holistic tangible goals for the improvement work

- Phase 3
  - Define minor achievable goals to get the improvement work started
  - Communicate cross-functionally integrating the internal customers and suppliers
  - Plan the project

- Phase 4
  - Initiate project
  - Implement changes and make the involved employees participate

- Phase 5
  - Follow up all improvement work regardless the scope of the projects
  - Visualize the present progress of the improvement projects

- Phase 6
  - Empower employees who commit to the tasks
  - Review the teamwork and the cross-functional collaboration

- Phase 7
  - Map the new current state and determine if the goals have been achieved
  - Review the finished projects in cooperation with the employees

Figure 4.2 – A.I.M. – stage I

4.4 A.I.M. stage I – Descriptions of the phases

The following section provides specified descriptions of the different phases in the A.I.M. - stage I. After the descriptions of the phases a short specification of the underlying theory will be presented.

4.4.1 Pre-phase – Investigation

Recognize that there are potential areas of improvement in the administrative processes. The need of improvement does not have to be obvious. A mapping of the current state (holistically) might reveal improvement areas, or visualize possibilities to make minor changes to improve certain processes.

Complete the Method application evaluation matrix (Table 4.6) to explore which improvement method that suits your company. Thereafter, narrow down the method alternatives and review your ratings for further evaluation. Depending on your ratings; the
best choice might not be the one with the highest score. Compare your results to the Method evaluation matrix (Table 4.3).

Chose one department where improvements will be apparent in the whole organization, preferably one of the departments which daily interacts and affects the manufacturing department. Identify the department’s suppliers and customers (internal and/or external) and map the information flow thoroughly.

The core content of the Pre-phase of the A.I.M. – stage I can be derived from Change Management methodology incorporating the important perspectives of the human aspect regarding changes. The theory about Continuous improvement, Six Sigma (DMAIC) as well as TQM has also influenced the development of the Pre-phase. The theory behind the Method evaluation matrix can, as mentioned earlier, be traced to all the methods in Theory Part I, Change management, and TQMain.

4.4.2 Phase 1 – Employee involvement
Involve employees from day one and make them participate and be able to influence the improvement projects. Make sure the employees know the predefined goal set by their managers. To involve the employees from start raises the probability for successful implementation of various changes.

The reasoning underlying the Phase 1 can be traced to Change Management, TQM and Lean, which state the importance of employee involvement.

4.4.3 Phase 2 – Current state mapping
Map the current state of the administration organization; visualize the information flow and the internal value streams (using for example VSM). Start with identifying the key processes within the departments and identify their main suppliers and customers (internally and/or externally), and the expected output from the processes. Review how the employees in the different departments prioritize their work assignments. Establish standardized routines for how they should prioritize their work so all departments prioritize the same way.

Review the Method application evaluation matrix (Table 4.6) thoroughly and choose one or two methods that fulfill the requirements and possess the prerequisites to be implemented in the organization.

Define holistic tangible goals for the improvement work in the company. When initiating changes in a company it is important to start in a small scale to make the first projects manageable in a rather easy manner.

The content within Phase 2 can be derived from all the methods described in Theory Part I, mainly from the Lean methodology (see VSM). Aspects from TQMain, Continuous improvement and Change Management have also been integrated.
4.4.4 **Phase 3 – Plan project**

Define minor achievable goals (short-term improvement projects), for the chosen department, in the early phase of the improvement work, which can be easily realized.

Communicate cross-functionally and be honest, clear and informative regarding the current information flows within the departments as well as the whole company. Involve the department’s internal suppliers and customers when planning the improvement projects. Changes in one department might affect other departments, which is why they should be integrated in the projects.

Plan the project. Utilize all employee input to design the project. Visualize the current state and develop a proposed future state. Use the employees experience to explore if any processes can be standardized (and/or improved). Integration of the employees raises the probability of successful implementation of changes since the employee motivation will be increased if they feel like they are important for the projects. Furthermore, they also have the real knowledge about the present working routines, which might be different from the present work descriptions.

*Phase 3 can be derived from all the methods described in Theory Part I regarding the importance of proper planning of improvement projects. Other aspects incorporated can be traced to Continuous improvement (see Kaizen), Change Management, and the holistic perspective within TQMain. Phase 3, 4, 5, and 7 can be directly derived from the PDCA-cycle.*

4.4.5 **Phase 4 – Project implementation**

Initiate project, meaning the proposed changes shall be implemented. Secure that all employees involved are aware of the changes and that they have made their voice heard. If someone is dissatisfied with the changes within a certain processes, make a thorough explanation of why and how the changes will affect and improve the department’s current situation, as well as their working routines.

*Phase 4 can be derived from Change Management, as well as from all the methods described in Theory Part I.*

4.4.6 **Phase 5 – Follow-up**

Follow up all improvement work regardless the scope of the projects. This follow-up is a great platform for feedback to and from the employees. It is important to let the employees become aware of the project progress, positively and negatively. If problems have raised these must be highlighted and dealt with, in collaboration with the employees.

Visualize the current situation by clear illustrations of the present progress of the improvement projects and state the future goals promoting the ongoing changes.

*This phase can be traced to Lean, TQM, Change Management, TQMain, 5S and Continuous improvement in general. The follow-up is very important for monitoring of the ongoing progress, and to learn from mistakes/problems.*
4.4.7 Phase 6 – Empowerment
Empower the employees who commit to the tasks. Assign responsible project managers for each project and make them accountable for the improvement work, provide them feedback about their progress and let them enlighten their employees about the advancements. Review the teamwork and the cross-functional collaboration to assure they are aware of the progress and that they are working towards the same goal. Internal customers and suppliers must be patient regarding the changes. Everything might not be fully functioning directly.

Phase 6 can be traced to Kaizen, Change Management, TQM and ISO 9000. Employee empowerment raises the employee motivation, which will provide better results.

4.4.8 Phase 7 – Map new current state
Map the new current state and evaluate if the goals have been achieved. Review the finished projects in cooperation with the employees and use the input to improve future projects. Evaluate and highlight what has gone really well and what parts that can be improved.

A.I.M. – stage I can act reoccurring a few cycles to get the employees motivated to continue working with improvement projects. Then, after finishing Phase 7, start over again at Phase 1.

After the improvement projects initiation (stage I) is carried out; A.I.M. - stage II will continue (see paragraph 4.4).

This phase can be derived from Lean (see VSM), TQM, Six Sigma (DMAIC), ISO 9000, Continuous improvement and Change Management.

Note: During the A.I.M. - stage I implementation the department shall start carry out weekly meetings to monitor the ongoing progress within the projects. Start every week (Monday morning) with a quick meeting (10 minutes) where the upcoming week’s tasks are highlighted. End every week (Friday afternoon) with a follow-up of the past week’s progress, positively and negatively. Document the thoughts from employees regarding the past week’s work and utilize the information for improving the next week’s tasks. This cycle is a high level PDCA where the experiences of the workers enhance the company knowledge and continuously improve the routines within the improvement projects and processes.
4.5 Continuous Administration Improvement Model (A.I.M. - stage II)

*A.I.M.* - stage II is created with a PDCA backbone and should act reoccurring over time.

**Figure 4.3** – A.I.M. – stage II

<table>
<thead>
<tr>
<th>Pre-phase</th>
<th>Complete the first <em>Administration Improvement Model</em> (A.I.M. - stage I)</th>
<th>Evaluate the outcome and apply the experience gathered through the first projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Define goals (short/long-term) for the improvement work within the department</td>
<td>Involve the management, managers and the employees when defining the goals</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Establish Kaizen-teams for Kaizen-events, assign Kaizen-managers accountable for the improvement projects</td>
<td></td>
</tr>
<tr>
<td>Phase 3</td>
<td>Map the current state within the scope of the chosen improvement area. Be specific and visualize the current state and be clear about the wanted future state</td>
<td></td>
</tr>
<tr>
<td>Phase 4</td>
<td>Plan the improvement project. Involve all employees the changes concern. Use their thoughts and ideas for improving the project execution plan</td>
<td></td>
</tr>
<tr>
<td>Phase 5</td>
<td>Implement proposed changes</td>
<td></td>
</tr>
<tr>
<td>Phase 6</td>
<td>Evaluate the project outcome in collaboration with all involved employees</td>
<td></td>
</tr>
<tr>
<td>Phase 7</td>
<td>Map the new current state</td>
<td>Evaluate the outcome and document all employee input to improve future projects</td>
</tr>
</tbody>
</table>

4.6 A.I.M. - stage II – Descriptions of the phases

The following section provides more specified descriptions (if it is needed) of the different phases in the A.I.M. stage II model. After the descriptions of the phases a short specification of the underlying theory will be presented.

4.6.1 Pre-phase – Implement A.I.M. – stage I

Complete the first *Administration Improvement Model* (A.I.M. - stage I, see paragraph 4.3). After experiencing the effects after the initiation of improvement projects the employees will (if the previous projects were successful) be motivated to carry out more changes. Evaluate the outcome from A.I.M. - stage I and apply the experience gathered through the first improvement projects.

*Through implementation of A.I.M. – stage I the methodology of Change Management have been introduced and the employee motivation towards improvement projects should be increased to be ready for continuous improvements.*
4.6.2 **Phase 1 – Define goals**
Define goals (short/long-term) for the improvement work within the department. Since A.I.M. stage II shall act as a PDCA cycle; short-term goals for the department will be necessary to evaluate the overall progress of reaching the long-term goals. Involve the management, managers and the employees when defining the goals to avoid misunderstandings.

*This phase can be derived from the methods described in Theory Part I. Aspects from TQMain, Continuous Improvement and Change Management has also been integrated.*

4.6.3 **Phase 2 – Establish Kaizen-teams**
Establish Kaizen-teams for Kaizen-events; assign Kaizen-managers accountable for the improvement projects. The cross-functional Kaizen-teams will have greater effect on the improvement projects holistically seen on the company and the value streams, than establishing project teams internally in a department. These Kaizen-events will have effects on many interested parties since the voice of different suppliers and customers will be heard and deliberated. The Kaizen-manager shall preferably be a key person from the department in focus.

*Phase 2 can be directly traced to Continuous Improvement and Kaizen (see Kaizen events), and partly from TQM and Lean.*

4.6.4 **Phase 3 – Current state mapping**
Map the current state within the scope of the chosen improvement area. Review if any process can be standardized. Be specific and visualize the current state and be clear about the wanted future state. Try to see if any of the short-term goals can be fulfilled.

*Phase 3 can be traced to all the methods described in Theory Part I, mainly from the Lean methodology (see VSM). Aspects from TQMain, Continuous Improvement and Change Management have also been integrated.*

4.6.5 **Plan-Do-Check-Act**
The following four points are directly derived from the PDCA-cycle (see paragraph 3.8.3), integrating aspects of Change Management, TQM and TQMain.

- **Phase 4 – Plan project**
Plan the improvement project. Involve all employees the changes concern. Use their thoughts and ideas for improving the project execution plan; if the employees feel involved the probability for successful implementation of changes increase.

- **Phase 5 – Project implementation**
Implement proposed changes. Monitor the ongoing progress.

- **Phase 6 – Evaluation**
Evaluate the project outcome in collaboration with all involved employees.
• **Phase 7 – Map new current state**

Map the new current state. Document the new improved standardized routines. Document all employee inputs and use it as follow-up parameters for future projects.

The improvement projects of A.I.M. – stage II should not be carried out continuously directly after project closure, even though the higher-level mentality of continuous improvement shall be present at all time. Effects of making changes might not be visible directly and the employees must be given time to adapt to new routines and procedures. When next cycle of the A.I.M. – stage II begin it starts over from Phase 1.

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**Note:** The Kaizen events are short-term projects, which shall provide fast results. The more experience the employees working in the Kaizen-teams obtain; the project success probability increases. The members of the Kaizen-teams can and shall be replaced between different projects to increase the overall employee knowledge and provide the staff a holistic perspective on the organization. These events also raise the team spirit and the collaboration in-between the different departments.
4.7 Individual work reinforcement model

This model (shown in Figure 4.4) shall act reinforcing for improvement and rationalization of the individual work performance regarding administrative processes.

Figure 4.4 – Individual work reinforcement model

4.7.1 Description of the Individual work reinforcement model

The following section provides more specified descriptions of the different parts in the Individual work reinforcement model.

Define work assignments & the department’s customers and suppliers

To be able to improve a process it is necessary to know exactly what work assignments actually are included in the process. The internal/external suppliers and customers are essential to identify to be able to explore what kinds of requirements the department at focus has from their suppliers and customers. To satisfy the suppliers and customers’ one must know their requirements and expectations, and when making changes within the department’s processes these shall be considered and included in the design/redesign of a process. If these requirements are included in the design the outcome of the improvements will raise the team spirit in-between the interacting departments and might improve processes at the suppliers and customers departments’ as well.

This reasoning can be found in TQM (core concepts) and Six Sigma (DFSS) methodologies, as well as in Change Management. The holistic system perspective found in TQM is also integrated.
Information gathering
To be able to perform and carry out work assignments it is vital to have the right information accessible. This information can be data input from a supplier or a customer, or it can be information already present in the department, stored in file folders or in a computer database. To carry out different administrative tasks it is of vital importance that all information necessary to perform the task is available.

This reasoning can be traced to 5S (structure) and Lean (unnecessary time spent on searching for information), and partly to ISO 9000. Fast and easy access to the needed information can really facilitate administrative tasks.

Standardization & prioritization
Once a procedure is standardized it shall be performed the same way every time. When a procedure is carried out in the same way repeatedly the employee performing the task will over time become superior in this exact task execution. A standardized routine also provides an excellent foundation for improvement of that particular routine.

It is important to review how employees at the department prioritize. If the prioritization differs between different employees it can create gaps to the interacting departments (internal suppliers and customers), leading to unnecessary waiting or information overload (excess information not needed at the moment).

The reasoning about standardization and prioritization can be derived from different parts of all improvement methods described in this report (see Theory Part I). Standardization is the foundation for improvements, which over time, shall be reviewed, redesigned and lead to more efficient task executions. Prioritization is necessary to review to be able to streamline the value chain. Prioritization is often arbitrary which can make the value chain unbalanced. By this reason the prioritization should also be standardized.

E-mail handling
Regarding administrative processes, a lot of input to the processes is often delivered through e-mails. If one does not apply an effective e-mail handling the information gathering when carrying out certain tasks can be very time-consuming and sometimes the information will be lost. Many e-mails are received by employees who do not really need the information. This leads to an information overload and inefficient routines.

This reasoning can be found in 5S and Lean methodology. The 5S method can just as well be integrated interactively as in the office itself. Structuring the inbox and standardize how to handle your e-mails can really facilitate the workflow. Application of the so-called “Three-way rule” (authors suggestion, see next page) will most certainly improve your e-mail handling and streamline your daily work.
Three-way rule:
- **Do it directly** - Read the e-mail directly and handle its content. Answer to questions and/or deal with a problem.
- **Save and schedule** – Read the e-mail and if you cannot deal with it directly; save it and schedule when to handle it.
- **Delete** – If an e-mail is not important or interesting to you; delete it directly.

Workload
Effective time planning is of great importance when establishing a streamlined workflow. The employees must create routines for how to plan their work to satisfy the internal customers and suppliers needs. It might be heavy workloads from time to time and therefore it is important to know exactly how to prioritize. Standardized routines for prioritization and time planning provide a good foundation to achieve an effective workflow. However, the employees must be aware of their limitations and not promise to do tasks they cannot finish in time. If an employee regularly have too much unfinished work at the end of the working day he/she will not be satisfied, which leads to decreased motivation towards the work assignments. The employee motivation is of high importance when making changes in the daily routines.

*Time-planning and streamlined workflow can be derived to all the improvement methods in Theory Part I, though Lean and Six Sigma have higher emphasis on these points. The motivation factor in connection to the workload can be traced to the Change Management methodology.*

Note: The Individual work reinforcement model can be implemented totally separately from the Administration Improvement Model. The purpose of the model is to review and reflect upon how work assignments are carried out individually. By utilizing this model it will facilitate suggestions for improving current routines continuously. This is why it is suitable to implement this model simultaneously to the A.I.M. – stage I since it will support initiation of improvement projects.
4.8 Expected outcomes from the model implementation

This section will point out expected outcomes from implementation of the A.I.M. stage I & stage II models, as well as of the Individual work reinforcement model.

The A.I.M. – stage I & II and the Individual work reinforcement model all includes parts that can be derived from the different improvement methodologies, which consequently results in that the outcomes of the Administration Improvement Model correspond to several of the outcomes from the improvement methodologies. The expected outcomes of the model (full implementation) are:

- Improved work routines
- Improved teamwork
- Improved cross-functional relations
- Improved working environments
- Improved employee creativity
- Improved information flow and communication
- Improved production flow
- Improved quality (data/information/products et cetera)
- Increased employee satisfaction
- Increased productivity
- Streamlined value stream making processes more cost-effective

⇒ Increased customer satisfaction (internal and external)
EMPIRICAL OBSERVATIONS Part I

5 Empirical observations
This chapter will state the empirical observations gathered in this study. The chapter is divided into two parts, Part I and Part II, where Part I includes an holistic view of the company providing a foundation for an high level analysis of the company and Part II states in-depth empirical observations of a chosen department where the proposed model for improving administrative processes will be tested.

All the information stated in this chapter has been gathered through interviews and observations. All gathered information have been discussed by the authors and confirmed by employees at ELS.

Empirical observations Part I – Holistic perspective
The empirical observations in Part I is focused on providing a holistic view of the case company to manage the pre-phase in A.I.M. – stage I.

Part I provide descriptions about the company itself and its organizational structure. Additional areas of interest have also been stated, such as information flow, information quality, interaction, and standardization et cetera. The empirical information/data collection in Part I have been gathered through semi-structured interviews following a similar form, see Appendix I for a selection of the most common questions during the interviews. Additional information for Part I have been complemented through observations. Both of the authors have been present at all interviews and observations. All data have been discussed to raise the validity and reliability of the study.

5.1 Company description
Electrolux is one of the world’s leading international appliance companies. They produce products that are a part of the daily life for families, such as washing machines, fridges, ovens, and tumble driers. The name is a combination between two companies, Electromekaniska and Lux.

Electrolux has a long history. It started in the beginning of 1900, The Lux-company started to produce lamps and vacuum cleaners. In 1919 the two companies signed the name Electrolux for the company and have since then grown into a global company at the market. In 1973 Electrolux bought another laundry machine manufacturer Wascator, and in 2004 they changed the company name Wascator to Electrolux Laundry Systems. Nowadays all products from Electrolux Laundry Systems carry the global brand name Electrolux. The company today focuses on developing and providing innovative products that are thoughtfully designed which shall meet the real needs of their customers.

The empirical findings are gathered at Electrolux Laundry Systems (ELS) in Ljungby, Sweden. ELS produce ordinary and professional washing machines, dryers, drying cabinet et cetera, and they are also developing booking/paying systems for real estate owners’ laundry rooms. The company has 1,108 employees around the world and has manufacturing plants in Troyes (France), Rayong (Thailand) and Ljungby (Sweden). The total net sales in 2009 were approximately 2.3 billion SEK.
ELS mission is to “globally market a complete professional laundry- and textile processing system primarily using its own R & D and production resources” with the vision “Electrolux Laundry Systems shall be the world leader providing its customers the best total solutions for their laundry needs”. ELS have a “green approach” meaning that all factories are ISO 14001-certified, and the products are environmental friendly designed for a low water and energy consumption (Electrolux, 2010).

5.2 Organizational structure
The structure of the organization will be described through a starting-point at the production department. The focus will be to describe the production department and its surrounding functions necessary for the manufacturing.

The organizational structure at ELS is very comprehensive with a large hierarchical scale. The head office of ELS is situated in Italy. The production department is divided into different production units where team leaders, production managers and technicians are assigned. These shall report to one of the three workshop managers who are responsible for assigned parts of the production department. These three workshop managers, in return, report to the production manager who reports directly to the plant manager. The plant manager for Ljungby is a part of ELS global matrix organization for ELS Industrial Operations Supply Chain (see appendix II) which is a part of ELS Professional Sector Management Team. The plant manager reports to several different directors in the matrix organization.

The surrounding functions to the production have all assigned managers who are responsible for their departments. Other than the plant manager who is manager of the whole factory, there is Controlling/finance, EPS Office, Human Resource (HR), Purchase, Engineering, Quality, and Facility management.

At ELS in Ljungby, every manager has a director whom they report to, besides the Human Resource responsible (Business Partner). The Business Partner responsible at ELS organization in Ljungby is a part of the Human Resource function for the entire corporation, where the head office is situated in Krakow, Poland. The business partner in Ljungby reports to several different directors in the hierarchy.

5.3 Departmental structure
The office department structure at ELS is not strategically designed. The departments for the office functions are spread over three floors in the building, with stairs and one elevator in the centre of the building. The location of the departments has been placed out of the space requirements. There are not many possibilities for expansion within the current facility. The office functions are located on one side of the building and the production department in the other. The interaction between different office functions, and the production and the office functions, have not been especially considered in the facilities planning, for example the controlling/finance department and the purchase department are located on different floors.

Regarding the production department ELS recently redesigned and rebuilt many parts of the manufacturing department to be lean production and have established many standards and routines for improving the production flow, incorporating Kaizen-philosophy and PDCA into every process possible.
The flow of material has been designed to be able to deliver one finished product (ready for customer delivery) every fourth minute. The implementation has been successful and the material flow and information around the actual manufacturing works fine.

5.4 Information flow

The information flow within and between different functions, departments, production units, and managers is carried out in different forms, utilizing various resources; such as direct communication (vocally), physical documentation, e-mail, telephone, through their business system (PRMS), or through other IT systems.

Figure 5.1 illustrates a general view of information transference in and around the production department. The picture does not include all information flows because it would be too blurry. This illustration of the information flow starts with a customer order where information about the order and the customer are registered in the business system. When the order is registered the manufacturing specification is verified to the current inventory levels of all components needed for the ordered products. This verification is made automatically by the system. If some components are low in stock, or out-of-stock, someone from the purchase department must order in new materials to ensure upcoming production and assembly.

When problems occur, such as delays, quality issues, or machine failure, the responsible for that area/unit informs their superiors, which, in return informs their superiors (if they believe it is necessary). Depending on the severity of the problems the information flow differs. Sometimes, after repeated attempts to inform about different problems, and if nothing happens, the information flow might exclude people in the ordinary flow to ensure that the information is delivered. This does not always make any difference either, other than a detour. Several times a week meetings are held with the team-leaders and their staff to inform the personnel about the current situation and the present (short-term) goals for the production department.

The respondents from our interviews perceive some flaws in the information flow between production and the purchase department. They also say that the information flow regarding the facility and maintenance department could be improved.
The purchase department is divided in two sections; strategic purchasing and operative purchasing. The operative purchasing department is the one that actual order in the materials, to secure the planned production. The strategic purchase department mainly handles supplier contracts, prices, and such business. Furthermore, the purchase department base large parts of the purchase routines on forecasts made out of historical information. This base for decisions has not nearly well enough accuracy, which makes the production planning and manufacturing suffer.

The purchase department also exchanges much information with the Research and Development department and the collaboration between them is currently not very well functioning. They are disagreeing on several key points and they do not work as a team.

The production department register information during the manufacturing processes into the business system where the information are stored for further analysis to later on be used by (among others) the controlling to calculate different Key Performance Indicator’s (KPI). These numbers will be utilized for different decision making processes and for measuring various parameters regarding the company. One problem they have currently is the procedure of time reporting into the system is backlogging which makes it difficult to accurately calculate the manufacturing productivity.

5.5 Information quality
The respondents do not perceive the information quality as any problem. The business system is well integrated in their working routines, which makes the input to the system more reliable since the users know how to manage it. They can obtain the information they are seeking and they have the knowledge to utilize the information.

The other information flow, such as e-mail and to communicate with the “right” person (regarding for example problems), might suffer the quality level. Regarding the e-mails; some information are sorted out as waste because of information overload. Sometimes if an e-mail is not returned directly it might be forgotten and obsolete. Concerning the communication; it is not always clear who to talk to when certain situations arise. This leads to information reaching employees that should not have to be involved.

5.6 Lead times
Regarding the manufacturing they have different target lead times depending on the type of product they are producing. The products are divided into: A-products which are standard machines, B-products which is nonstandard machines where they keep all components in storage and the machines can be slightly customized, and C-products which is totally customized products. The target lead times for A-products is 3 days, 10 days for B-products, and since C-products is customized products the lead time can vary from a few weeks to several months. Regarding lead times within different office functions it differs a lot and sometimes it is impossible to calculate an accurate figure for the lead-time, for example concerning the business partner (HR) the lead-time can vary from a single minute to a year. Some lead times are restricted from the company head quarters. This mainly cares for the controlling/finance department when they make quarterly and annually accounts.
5.7 Prioritization & Standardization

None of the respondents has any restriction and/or documentation regarding how they should prioritize work and work assignments. They said the main objective when prioritizing should care for the customer perspective/business perspective. Prioritization is not regulated; hence standardization of prioritization could make difference.

Regarding the production department, in the areas where they are working *lean*, they have standardized many parts of their processes. These standards are necessary to achieve their current productivity, and they are very good at developing new standards and improving already existing ones. Production administration standards are currently being implemented in the production department.

In the office functions the level of standardization is at a different level. Some formulary is standard within different departments though. The controlling/finance department is regulated not only by company restrictions but also through governmental laws and fair accounting custom.

The quality department utilizes several standard formularies for evaluating suppliers and other quality related issues within the products and the manufacturing. ELS is ISO 9001-certified and this certificate demands a lot of documentation of various processes and this documentation follow a standard execution and formularies. The office functions at ELS work according to many different standardized routines; however the respondents perceive the level of standardization as quite low and believe that more standard routines could improve their business and their way of work.
Empirical observations Part II – Supplier Claims Department

The empirical observations in Part II is focused on providing a detailed mapping of the SCD to manage the first phases in A.I.M. – stage I, and to initiate parts of the Individual work reinforcement model. The model implementation at SCD can be found in Chapter 6.

The supplier claims department has been chosen by the authors for an in depth mapping to furthermore act as the testing department for the proposed model. The supplier claims department is a part of the quality department. The supplier claims is a very suitable department for testing of the model since they have many internal suppliers and customers and they spend many hours per day working with administrative work assignments. The supplier claims department will be abbreviated into SCD in the text.

The empirical information/data collection for Part II has been made trough semi-structured interviews and direct observations. Both of the authors have been present at all interviews and all observations have been discussed to raise the validity and reliability of the study.

ELS have a factory in Thailand, which also acts as an internal customer to ELS and to the SCD. ELS Ljungby supplies the factory in Thailand with some self-manufactured components and some purchased components. Some of the components that are sent from ELS to the Thailand factory are exclusive for the Thailand factory making the factory in Ljungby an indirect warehouse and a supplier. The claim procedures regarding these components are very complex and will not be investigated in this thesis.

5.8 Department structure

At Electrolux Laundry Systems, there are two full-time employees at the SCD, and they have 20, respective 5, years of experience working at the department, and they have even longer experience of working in the company. During the past years there have been carried out many changes (of various scale) within the company and therefore consequently there have been some changes within the SCD since they have been forced to adapt to the surrounding changes in the company. The SCD have several internal customers and suppliers, shown in Figure 5.2. The two employees at the SCD report directly to the quality manager.

![Diagram of the structure between the departments](image-url)
5.8.1 Department planning
The SCD is placed in connection to the goods reception and goods departure departments, which is placed near the central storage and not too far away from the production lines. When certain problems are not visible ocular components are sent to the testing laboratory placed on the other side of the facility.

Components reserved for the production lines are stored in a so-called “supermarket”-warehouse, which is located on the other side of the production lines (from the SCD location). Blocked components kept in inventory must be investigated making the distance between the SCD and the supermarket time-consuming.

5.9 Information flow
*When mapping the information flows and the procedures for a standard claim case the authors’ main questioning sentence asked to the employees at the SCD was to “Describe exactly how a standard claim case is carried out”.*

The intercompany information flow to the SCD depends on the kind of problems/failures different claims (articles/components) possess. A standard claim reporting process does not include a large amount of information transference, hence not demanding the same attention as a more problematic case. A more detailed mapping of the process can be found in Appendix III.

**Standard claim procedure** (see Appendix V for the claim report formulary):

1. Problem received from production department, description of nonconformity included.
2. Component reviewed, blueprints of the component checked, problem identified, if the problem is visible the component will be photographed.
3. The claimed component will be blocked in the system immediately, both in PRMS (WF) and in VMS (CF). The stock balance will be transferred to a virtual warehouse (OW) meanwhile the components are investigated. Depending on the severity of the problem and the demand for the components from the production planning the components can be unblocked directly after being reviewed and approved.
4. Claim report written and sent (e-mail or fax) to the supplier (photos attached to the report). Report also sent to responsible purchaser for the specific supplier, and (if needed) to production manager and/or other process owners.
5. The SCD writes an invoice including the costs for the components and a penalty fee for the administration of the claim case. The invoice is sent to the supplier through e-mail and with ordinary physical mail.
6. The claimed components are sent back to the supplier in connection to the report being sent. The pallet/packages of components are handed over to the departure goods department with a copy of the claim report including the supplier information and the invoice.
7. Within 24 hours the supplier shall return the claim report including a confirmation about the case and a short-term action plan to manage the quality issues. This report is also sent to the responsible purchaser at the (operational) purchase department.
8. Within 14 days the supplier shall send a long-term action plan to minimize the risk of the same problem occurring again. This report is also sent to the responsible purchasers at the operational and strategic purchase department.
9. The future deliveries from the same supplier will undergo outturn sample audits the following three deliveries to assure the delivered components possess high quality and that the problems have been handled. The supplier block will be removed when the SCD believes the future deliveries will be reliable. Some suppliers have a constant lock of their deliveries since they have been proved too unreliable.

10. When the outturn sample audits have been carried out and the supplier seems reliable the supplier and the component will be unblocked in PRMS and VMS, and the claim case will be closed.

The SCD regularly receives information from the production department (assembly lines), regarding article/component claims, which include physical delivery of goods, and orally/or documented information/communication about the reason for the claim. Depending on the current stock of an article/component, and how important it is for the production planning, the article/component will be blocked in the IT system so they cannot be used in the production.

Recently the SCD have become a part of PDCA meetings, held every second week, at the production department, where they address and highlight ongoing progress and problem areas in the production department. Employees from the purchase departments are also present at these meetings. The PDCA meetings shall act as an information channel for direct communication highlighting problems and remind employees of different tasks that should be solved. The SCD shall use these meetings to inform the involved departments about the current claim cases, blocked components, and the ongoing progress. Unreliable suppliers shall also be addressed so the staff can be cautious about certain components.

5.10 Claim process procedures

A new supplier to ELS will undergo a thorough control of the first delivery. SCD composes an outturn sample protocol (see Appendix VI), which has information about the construction design, material/lab tests, article numbers, supplier, and judgments et cetera. All information is put in a file folder (see Appendix VII) along with a sample of the component, to be stored in one place. This procedure is also done if ELS research and development department creates a new blueprint, or the supplier utilizes new material. When a nonconforming product is received from the production department the employees at the SCD checks PRMS for which blueprint audit number that applies. When they know which audit number it shall be manufactured after the blueprint is downloaded and printed from PDMLink (short descriptions about their IT systems can be found in paragraph 5.11). When the blueprint is printed they can review the nonconforming component.

The supplier quality will be documented and saved. If the components quality will be noticed and a claim is reported the next three deliveries from the supplier will be blocked in the systems since the components must be thoroughly controlled/inspected before ELS accept the delivery. The supplier block will be unblocked after these three times if the supplier’s deliveries have been reliable. Some suppliers are classified as “unreliable” and will be kept blocked and all deliveries from them will be controlled, as a result of repeating not being able to sustain reliable high quality deliveries.

In some cases ELS can rework, test or sort out nonconforming components. In these special cases SCD will contact the supplier to agree to a rework plan. The supplier will be given the possibility to do the rework himself. The rework can be a solution in urgent cases, when the demand for the components is in a high level. Urgent cases may also create a highlighted
attention to certain components that might be blocked in the system. If this occurs SCD can approve “unreliable” parts in stock after a thorough inspection.

When a claim report is sent to the supplier ELS/SCD shall receive a temporary action plan within 24 hours, if this is not received a reminder shall be sent after 48 hours, and if this is not received within the next 48 hours the escalation will, after the second reminder, be handed over to the strategic purchase department for further actions towards the supplier. A long-term action plan shall be received within 14 days, if this is not received SCD shall send a reminder to the supplier, and shall receive the long-term plan within 7 days, if this is not accomplished SCD will hand over the case to the strategic purchase department for further investigation and actions towards the supplier.

All reports and reminders sent to different suppliers are also sent to the responsible people at the operational and the strategic purchase departments, the production manager and various other process owners. The information about which purchaser that is responsible for the different suppliers can be found in PRMS or in a physical document stored in their office. The document in their office is often used since it is faster, however the list is not sufficiently updated and the wrong purchaser is often involved which results in an unnecessary information flow detour making the process consume more time than necessary.

Besides a written claim report, an invoice will be sent to the supplier. This invoice is created by the SCD and manually enveloped, but also scanned to a pdf and e-mailed to the supplier. The pdf-invoice is deleted directly after being e-mailed to the supplier. The invoice has an extra administrative cost (penalty fee) for the claim case; other costs related to the claim (for example downtime) are to be specified in the invoice as agreed with the supplier. After SCD has created and mailed the invoice, they will not be concerned about if the invoice is paid or not, this will be handled by the ELS financial department.

All documentation is stored in their databases and in file folders (see Appendix VII).

5.11 Information systems
The SCD utilize several different IT systems. The following section states the different systems and a short description of the system’s purpose.

- **PRMS** – is the main IT system at ELS. It is in its original form a production system, and it is within this system the SCD find the main information about the production planning and the component’s inventory levels reserved for the production. It is also within PRMS they block articles/suppliers when a claim process arises. All information in PRMS shall be up-to-date, therefore reliable for decision-making. However, this is not always the case. PRMS is a very old system, which makes it difficult to integrate more modern systems into their present routines. Though, the system acts as an information provider for utilization of other systems, for example when needing audit numbers for blueprints.

Within the different systems there are different “warehouses”. **WF** – which is the “supermarket warehouse” where the components reserved for the production is placed, **CF** – is the main central storage (though monitored in another system: VMS), **OW** – is a virtual warehouse where the stock balance of components under investigation are registered.
• **VMS** – is the system they use for the CF (the main central storage). This system is not integrated to PRMS which means that if the employees want to secure that no blocked articles reaches the production lines they must block the articles in both PRMS and in VMS.

• **Focus** – is the system where all general documentation is being stored. All work instructions and process descriptions, guidelines and operational instructions that have been established can be found in Focus.

• **Excel** – is used for different calculations, for example PPM, as well as for other various reporting managing for examples reviews of electrical component claims.

• **Access database** – is used for reporting and storing of supplier information and other various data such as photos on the claimed components.

• **PDMLink** – Is a part of the intranet at ELS and it is in PDMLink all blueprints for all different components/articles/products are stored.

• **Lotus notes** – is utilized for their e-mail handling. They also make use of different databases within the Lotus Notes system.

None of the systems are integrated to any larger extent. The employees at the SCD are spending much time looking for information in one system needed to be able to know what to search for in another system. A lot of information is typed twice, once manually on a paper report and (at least) once in one of the systems. Much information is stored in many different databases, which sometimes makes information searches very time-consuming.

The SCD address some other minor problems with their systems, such as the SCD cannot block components manufactured by ELS themselves. Sometimes their own manufactured components suffer poor quality then it would be required to be able to block those articles in the system. Though the article cannot be blocked they can block the palletID in the system.

Another problem addressed is when articles/components are being transferred from CF, to WF and the production lines; the traceability of the goods/batch is weakened. Different batches are sometimes mixed which makes it very hard to separate the different batches when quality issues rise.

The spare parts inventory utilizes an additional system that the employees at the SCD does not have access to, which means that when a component is blocked in PRMS the employees at SCD must call and send e-mails about the blocked component so they are aware of the present problems.
5.12 Information quality (data)
The quality of the information to the SCD can vary, but overall it is of good quality. Sometimes the claims are not specified which results in lack of data and some more effort must be put in investigating the component at the SCD. The quality of the information in their IT systems is overall of good quality as well even though there are some minor flaws. Different audits of blueprints regarding a certain component stored in PDMLink are not always updated to the audit number stated in PRMS.

5.13 Lead times
The target lead-time for a supplier claim process is two weeks. This lead-time can only be achieved if nothing unexpected occur, and is totally depending on if the suppliers are following the predetermined claim process delivering both the short-term action plan and the long-term action plan in time. However, the claim process lead-times are not much monitored, mainly because of that the escalation procedure is not followed properly. Some suppliers are very slow of answering to the claims and even slower of sending ELS/SCD a long-term action plan to assure that the quality issues are solved. The variations in the claim process execution results in that the lead-times can vary from two weeks to several months.

5.14 Prioritization & Standardization
The employees at SCD do not have any restrictions or instructions about how they shall prioritize work, though they realize they need to prioritize claims that are vital for the production planning. Other than the production demand the prioritization is not regulated.

There are many standardized routines at the SCD, such as all the reporting and documentation of various claim cases. Almost all documentation of every claim case is stored in file folders either on shelves in the small office or in cabinets just outside the office. Much of the documentation is also stored in databases, in PRMS, and/or in other places in their computers. All documentation about certain processes and work procedures are available on ELS intranet.

The reporting follow a standard routine, which can be adapted to nonstandard claim events. Regarding the escalation procedure SCD have an escalation instruction they shall work after, and all the suppliers are aware of this procedure.

One of the employees calculates PPM numbers for the suppliers so they can follow up the suppliers’ reliability regarding delivering high quality components. The PPM number states a number implying the number of defect components delivered per million delivered components. The calculation is made according to a standardized procedure; however the numbers are typed in manually.

Every week one of the employees creates a “list of deviations” where all claim cases and the associated suppliers are stated. This list is sent to 27 managers and process owners in the company. The SCD use this list to follow up the escalation procedures, however the list is only renewed once a week, which could make the escalation backlog if any of the escalation cases are forgotten.
6 Model implementation of A.I.M. – stage I
This chapter states a summary of the implementation of the pre-phase and the first two phases in the A.I.M. – stage I, after being implemented at the case company. The different phases will be referred to different sections in the analysis chapter as well as parts of the empirical observations. The first phases that have been carried out by the authors will provide the SCD and the quality manager a good foundation that will facilitate initiation of improvement projects in the department.

6.1 Pre-phase - Investigation

- Recognize potential areas of improvement within administrative processes

Reviewing the current state recognizes that there might be many areas of improvement regarding the administrative processes, since the administrative processes have not been reviewed earlier and there can be found obvious weaknesses where improvements can be made. Interviews made with several employees from different departments at ELS (see Figure 1.1) clearly states that the company recognizes that the administration and internal information flow and value stream has not been investigated and reviewed, which imply that they believe improvements can be made. In paragraph 7.5 (Continuous Improvement) the analysis states that the organization is positive to changes and that they seem ready for improving administrative work routines. A more descriptive analysis of the company holistically can be found in Chapter 7 – Analysis.

- Evaluate different improvement methods

Method application evaluation matrix
The matrix has been completed in collaboration between company representatives and the authors of this research.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
<th>Lean</th>
<th>TQM</th>
<th>Six Sigma</th>
<th>SS</th>
<th>ISO 9000</th>
</tr>
</thead>
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<td>4</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
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<td>3</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
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<td>3</td>
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<td>2</td>
<td>5</td>
</tr>
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<td>4</td>
<td>2</td>
<td>5</td>
<td>4</td>
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<td>3</td>
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<td>4</td>
<td>3</td>
</tr>
<tr>
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<td>16.3</td>
<td>10.8</td>
<td>18</td>
<td>16.4</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.1 – Method application evaluation (ELS)
Explanations of the ratings in Table 6.1

The ratings in the *Method application evaluation matrix* have been determined through interpretations from the interviews made during this research, and discussions with several different employees from several different positions within ELS. The reasoning regarding how to rate the different methods toward the different criterions included discussions regarding the improvement methods and the current state at the company holistically. All ratings were determined through the exact same procedure.

Some examples: the criterions of *Motivation*, *Previous knowledge*, and *Education* were discussed toward the different improvement methods, where it was found that the *Motivation* and *Previous knowledge* were prominent for *Lean* in comparison to the other methods, hence the ratings of 5. Regarding *Education* the employees at ELS feels like they will need some education if Lean is to be implemented in the administrative processes at the company, however they do have some knowledge and experience about *Lean* which is why the rating is set to 4.

Regarding *TQM* the employees at ELS are positive, they already have several integrated quality policies, though they do not have very much previous knowledge regarding *TQM* as a method, meaning some education will be demanded, resulting in the rating of 4 for *Motivation* and the rating of 3 for *Previous knowledge* and *Education*.

Comparing Lean and/or *TQM*, to Six Sigma it is very clear that the employees at ELS does not have any previous knowledge, no motivation, and that it would demand a lot of education for the employees to implement Six Sigma, which is the reason for the ratings of 1.

5S have been implemented in parts of the manufacturing department at ELS and some of the employees working with administrative processes already apply some parts of the 5S methodology, resulting in the rating of 4 for the *Motivation* criterion. Regarding *Previous knowledge* and *Education* they feel like they do have moderate knowledge about 5S and that they would need education if the method is to be implemented, hence the ratings of 3, respective 2.

ELS is already ISO 9000-certified which means that they have previous knowledge and that they would not need very much education, which is the reason for the rating of 5 for both *Previous knowledge* and *Education*. Although the employees have experience about ISO 9000 they do not feel that the ISO 9000 could be very helpful regarding improving the administrative processes, thus the rating of 3 for *Motivation*.

Results of the Method application evaluation matrix

The results of the *Method application evaluation matrix* state Lean, with the score of 20.1, as the most suitable method to implement in the administrative processes at Electrolux Laundry Systems. 5S gets the score 18 which imply the 5S methodology would also be suitable for the company. The overall employee perception about the methods implies that they do not believe an implementation of the methods would give the same results as implementation of Lean. ELS is already ISO 9001-certified but they do not see how that method could improve the administrative processes in the company. Six Sigma get the lowest score due to that the employees at the company do not have any experience and previous knowledge to the method. Due to the lack of previous knowledge and the need of education and the method’s implementation complexity the motivation towards the method is low.
When comparing the finished *Method application evaluation matrix* to the *Method evaluation matrix* the results state that the method the organization is most ready for and have the highest motivation towards is the Lean methodology. Even though Six Sigma got the highest score in the *Method evaluation matrix* the *Method application evaluation matrix* clearly shows an implementation of Six Sigma in the organization does not have the same prerequisites for successful implementation in the organization as Lean or 5S. These results evidently show that the “best” method might not always be the most suitable for a company.

- **Focus on one department**

The chosen department for model implementation is the *Supplier Claims Department* at ELS. The SCD is a part of the Quality Department and is interacting with several different departments (see paragraph 5.9 & Figure 5.2). The main supplier to the SCD is the production department, and since the SCD shall handle quality issues of components from the production department it is a very important part of the quality assurance of the finished products. The work performed at SCD is vital for the production planning and they handle a lot of the operative supplier relations. Improvements in the SCD’s administrative processes would influence several of the internal/external customers and suppliers.

### 6.2 Phase 1 – Employee involvement

- Make the employees aware of the approaching changes and improvement projects
- Make the employees participate by suggesting improvement areas within their processes

At the first visit to the SCD the employees, the authors, and the quality manager had an informal unstructured meeting where the authors introduced themselves, their background and the purpose of their attendance at the department. The authors made it very clear from the beginning that they would not just suggest changes based upon their knowledge and their theoretical background. The objective was to gather the employees’ thoughts, experience, and knowledge to review how they perform their work assignments and what kind of changes they would implement if they were in charge.

The employees were involved and were very much participating from the very beginning, making them motivated and cooperative to answer all the authors’ questions, as well as give suggestions about improvements.

*In phase 1 the authors have also introduced the Individual Work Reinforcement Model, through making the employees think about how they carry out tasks and why they do as they do.*
6.3 Phase 2 – Current state mapping

- Map the current state, including all routines and information transference

The authors have mapped the processes included in a standard claim reporting routine. All the information gathered could be found in Chapter 5 - Empirical observation Part I & II, and a process map can be found in Appendix III. A thorough analysis of the current state can be found in Chapter 7 – Analysis.

*As stated earlier in this report, the mapping will not include all routines within the SCD. The standard claim process has been chosen because initially improving the standard routines will affect other task executions made in the department.*

- Define holistic tangible goals for the improvement work

The authors’ states some suggestions for holistic tangible goals based upon the current state map made of the present routines.

- Reduce document handling and file storing by 20% in the coming 6 months
- Minimize the backlog of the escalation process

*Chapter 10 states the authors’ recommendations, including measures that could facilitate the work of reaching the suggested goals for the department.*

6.4 Partial results of model implementation

*The following points shortly describes the results from the implementation of the pre-phase and phase 1 & 2 of the Administration Improvement Model.*

- The analysis of ELS administrative processes holistically recognize that the administrative processes have not been reviewed earlier, which implies that it can most certainly be found several areas of possible improvement.

- When reviewing the different improvement methods it has been found that the methodologies of Lean and 5S got the highest scores in the *Method application evaluation matrix*, which means that those are the ones with the highest probability of successful implementation within the administrative processes at ELS.

- The department at focus for initiating improvement projects within administrative processes is the *Supplier Claims Department*, which is a part of the quality department at ELS. It is a suitable department for the model implementation because they have several internal customers and suppliers, which will be affected when making changes in the SCD.
• The employees at the SCD have been involved from the very beginning making them participating and very helpful when discussing different areas of improvement.

• The mapping of the current state has discovered several areas of improvement, shown in the analysis chapter and shortly stated in the results chapter.

• The defining of short-term tangible holistic goals have been suggested by the authors and confirmed as achievable goals by the quality manager at ELS. New goals will be stated when the improvement projects will start.

The authors’ comments: Implementation of the pre-phase and phase 1 & 2 provide the SCD a solid foundation when continuing the application of the remaining phases in the Administration Improvement Model. The time restriction for this thesis makes it impossible to see and measure any results of the model implementation; however the authors believes the model will definitely improve their current situation. The Individual work reinforcement model was initiated informally when initiating the Administration Improvement Model, where the main idea is to reflect upon how a task is performed and to recognize the importance of the perspective of internal customers and suppliers. The model has been printed, handed over to the employees at SCD and described so they understand the main idea about the model.
7 Analysis

This chapter states the analysis made when comparing the theoretical base to the empirical observations. The analysis will be divided into a holistically analysis of the current state at ELS and a specifically analysis of the Supplier Claims Department, which will be more detailed described.

7.1 Facility’s planning

The production department have a very thought out design for the material flow in the essential parts to correspond to the lean manufacturing philosophy. However, the facility’s planning regarding administrative processes has not been considered. The information flow and the physical flow in-between the different office functions currently involves unnecessary movement and detouring information transference.

Thompkins et al (2003) states that an organization should endeavor to achieve Supply chain Excellence. Through the steps in the process it appears that ELS is positioned in the beginning. The interactions between some departments have flaws and to achieve Link Excellence all the company’s functions shall work as one unit, without internal boundaries. According to Tompkins et al (2003) the understanding of continuous improvement is an important factor to be able to carry out and achieve the different steps in the supply chain excellence.

Supplier Claims Department: The SCD is located in close connection to the goods reception and goods departure departments which is a strategically decision since they are interacting a lot with each other. The close distance to the goods reception facilitates the outturn sample control the SCD makes on certain “unreliable” supplier deliveries.

However, the long distance to the testing laboratory and the supermarket make some claim cases much more time-consuming than necessary. Though, some distances are unavoidable without restructuring and rebuilding the whole facility.

7.2 Departmental planning and Interaction

According to Eriksson-Zetterquist et al (2008) there is a best way to design an organization, this to handle the complexity and variations in the environment through integration between specialized and differentiated departments. The departmental planning at ELS has not been very considered when placing the different departments in the facility. The purchase department should for example be in close connection to the controlling/finance since they exchange much information, not only interactively. If the distances and interactions between different functions would be monitored and analyzed one would most certainly explore a lot of unnecessary resource consuming activities not adding any actual value.

Supplier Claims Department: Since the SCD have several interacting departments it would be impossible to be located in close connection to all of them. The physical flow of material through the SCD is working fine since the near distance to the goods reception and goods departure departments, and the main central storage. The distance to the supermarket warehouse does not promote the flow of material and is contributing to the non-value adding activity of excess motion; however this distance cannot be changed at the moment without compromising the current flow.
7.3 Information quality (data)
As Kurtén (2009) claims, the data is only value adding when the user utilizes the available data in a meaningful way, resulting in the data is converted into value adding information. The information quality does not seem to be an issue for ELS at this moment, rather than the problems with information overload and poor communication regarding whom to get in contact with when to transfer information about different problems. Routines for e-mail handling might facilitate the workflow to some extent. The business system they are using seems to supply good information to the right people.

Supplier Claims Department: The SCD utilizes several different systems daily to gather information, print documents, and register information, manage e-mail handling, and all other activities involved in the supplier claim processes. The information quality is overall good quality; however some numbers, lists, and figures are not updated regularly. This makes some routines unnecessary time-consuming when the employees must search for updated information in several different systems.

None of the systems is integrated to any larger extent forcing the employees make double-work. In along with the complex and time-consuming utilization of the IT systems almost all documentation typed into their systems are printed on physical papers and stored in file folders.

All reports sent to a supplier during a claim process are also sent to the responsible purchasers (both operational and strategic), to the production manager, and other involved process owners. If a claim case is problematic there will be many e-mails sent promoting an information overload. This information transference should be thoroughly investigated to review if everyone really read the e-mails.

7.4 Prioritization and Standardization
Jacobsen and Thorsvik (2008) states, human/individuals acts rational in prioritization situations, meaning he/she will evaluate, search information, review and compare the consequences and select the best alternative. By having standardized routines are ideal to achieve control and cost-efficiency. This could though be complicated if the routines are too complex with too large variations, Lillrank (2003).

There are not any clear standards or routines regarding how to prioritize work at ELS. The controlling/finance department has deadlines for their quarterly and annually accounting, but this is regulated from the head quarters and by governmental laws.

The level of standardization is high in the production department but at a fairly low level in the office functions. The ISO9000 certification demands standards it does not focus at the actual administration work.

Supplier Claims Department: The SCD has no clear guidelines for prioritization. Problems with the highest consequence for the production lines and production planning are the once that are at focus if they are forced to prioritize.

There are many standardized routines at the SCD. Many of the routines are well documented and stored in different databases and file folders. Though, the standardized routines are not always properly followed, for example the escalation routine. Sometimes it seems that the
documents are more standardized than the actual work task execution. The two employees have similar work assignments but they do not carry out task in the exact same way, as the routine standardization proclaim.

7.5 Continuous improvement
The lean implementation made in the production department and its on-going work with continuous improvements have made the staff in the company see “real-life” proof that the kaizen-work they perform with help of the PDCA-cycle actually gives great results. All of the respondents were positive to changes (improvements) so the company seems ready for some changes regarding the administrative processes. The administration has not been at any focus when improving the production department so there might be found several areas of potentially (great) improvements. As Bergman and Klefsjö (2007) states, shall an organization start improvement processes in small scale and with few projects simultaneously, which shall be easily achievable and show great results; this to raise the employees motivation.

Supplier Claims Department: The SCD does not include any integrated routines for continuous improvement in the department. Changes in the surrounding departments (internal customers and suppliers) will subsequently affect the SCD but they rather adapt to the changes than trying to make other improvements. The employees have recently been assigned to attend PDCA meetings on the production line. These meetings will provide an information channel to receive a current state overview of the production department holistically. It might facilitate some work routines at the SCD; however the SCD are not the main focus of these meetings. Internal PDCA meetings with the employees at SCD, the quality department, and their internal customers and suppliers might raise larger opportunities to make improvements.

Note: This first part of the analysis chapter provide a good foundation to the pre-phase in A.I.M. – stage I. It also present an overview of the analysis of the company holistically and the department at focus, which show different perspectives of the current situation.
7.6 In-depth empirical analysis of a supplier claim process
This analysis is based upon reflections of the empirical observations from the SCD and the process map (see Appendix III), integrating the authors’ theoretical knowledge and critical thinking. The section will provide an in-depth analysis of parts of the supplier claim processes identifying areas of unnecessary complex task executions and non-value adding activities, exploring the current losses in the administrative processes in a standard claim case.

7.6.1 IT system utilization
The employees at the SCD utilize several different IT systems for the standard daily claim process routines. The poor integration in-between the different systems result in time-consuming information searches that should be easily found without much effort.

An example: The blueprint confirmation – When a claim process starts the claimed component must be reviewed towards the blueprint. Then they must identify the blueprint audit number in PRMS to see which one that applies. After identifying the audit number they print the right blueprint from PDMLink. After printing the blueprint the claimed component can be reviewed. Sometimes the blueprint database in PDMLink is not updated which makes the process even more complex since the construction department must be involved.

When a claim is received by the SCD the claimed component and its associated supplier will be blocked in PRMS and VMS directly, making the components unavailable for the production department. The block can be temporarily released for the component, but not for the supplier, if the component demands from the production planning is urgent, but then must all components be thoroughly reviewed so the quality of the end product will not be compromised. Otherwise the block will be kept the following three deliveries from that supplier to assure they have solved the causes for the poor quality.

7.6.2 Information quality
All claimed components from the production department do not include sufficient information about the problems, making the component review more time-consuming than necessary. However, sometimes the employees at SCD will recognize the problem out of their previous knowledge and experiences. The information quality regarding their IT systems is overall at a good level, but when some figures, lists or numbers are not updated it often results in an information detour delaying the information flow and making it inefficient.

7.6.3 E-mail handling / Information flow
The e-mail lists used by the SCD should be reviewed because currently the lists are only growing and no one really knows if the information sent is interesting for, or even read at all by, the recipients. Reviewing and making the e-mail lists updated will not affect the SCD to any larger extent, however it will altogether save a lot of time in other departments since they do not need to spend time on reading/handling information that is not necessary for their work assignments.

In the beginning of every week one of the employees at SCD prints a “list of deviations”, including the last weeks claim cases, the supplier information and the articles. This list is then used by the SCD to follow up if the suppliers have responded to the claim reports. If not,
reminders will be sent to them, and a copy of the reminder to the responsible purchasers, the production manager, and the other process owners.

The routine for follow up of the different claim cases can result in that the escalation of certain cases can backlog up to a week. When the supplier does not properly handle a supplier claim process it is a direct violation to the contract between ELS and the supplier. However, the poor routines for following up the escalation of various cases may cause additional consequences such as weakened supplier relations, decreased quality, problematic production planning, and ELS can lose their respect as a customer to the supplier when not properly handling their own instructions stated in their contract.

The list of deviations is sent to 27 different employees at ELS, though the employees at SCD do not know if everyone of the recipients of the list needs the information.

7.6.4 Internal customers and suppliers
The perspective of that the other departments at ELS are all internal customers and suppliers have not been very reflected upon regarding the SCD. Some fragments can be identified though, such as the prioritization of components required to be able to manufacture according to the production planning. The production department is the main internal supplier and an internal customer to the SCD. The PDCA meetings at the production department will hopefully increase the collaboration and teamwork in-between the different departments.

7.6.5 Supplier communication
The communication between the SCD and the suppliers is carried out through e-mail, fax, and/or phone. The main communication is through e-mail. All claim reports and claim report reminders are sent by e-mail.

SCD creates an invoice to every claim case including the costs for the components and an administrative cost for handling the claim reporting. The invoice is created and printed from PRMS, and then the hardcopy invoice document is scanned into the computer and sent to the supplier. The hardcopy invoice is also sent to the supplier by ordinary mail, including the claim report. The scanned invoice is deleted from the computer when the e-mail has been sent. A copy of the invoice is also stored in the file folder containing the claim report.

7.6.6 Lead-times
The target lead-time for an ordinary claim case is 14 days. Depending on the nature of the case and the supplier involved a case could last for several months. The variation of the lead-times can be the result of poor routines regarding the escalation process and follow-up from the strategic purchase department.

The lead-times for the production lines is of high priority which makes cases that could affect the manufacturing processes very important and these cases are better monitored and followed up.
7.6.7 Physical material handling
Claimed components from the production department are handed over randomly to the SCD, sometimes only a few components and sometimes a whole cart full. The claimed components shall be attached with a “deviation/cassation”-report describing the problem; the employee handing over the claim shall sign the report.

The SCD are in close connection to the goods departure department, which makes the physical material flow when returning components to suppliers very efficient. The SCD prints the claim report and attach to the pallet. They also print supplier information so the goods departure knows where to send the pallet. When the pallet is transferred to the goods departure the SCD hands over the responsibility for the pallet.

7.6.8 Traceability
PRMS allows traceability of components/batches as long as the components are kept in the main central storage. When the components are transferred to the supermarket and/or the production lines the traceability is weakened. Lost traceability can be problematic if two batches are mixed together on one pallet, since if a component from one of the batches are claimed then the different deliveries/batches might be impossible to separate, leading to that unnecessary amount of components are forced to be returned to the supplier, or that a vast amount of components must be reviewed by the SCD to be able to use them in the manufacturing, which is time-consuming and non-value adding.

When blocking components and suppliers in PRMS the employees at SCD must leave a signature. This makes the traceability of the component claim cases visible. However, they cannot leave a signature when a block is released, which could aggravate the traceability of closed claim cases.

7.6.9 Documentation
The routines for documentation in the SCD include a vast amount of physical documentation handling. Almost all the reporting typed into their IT systems is printed and stored in file folders in their office or in cabinets just outside the office (see Appendix VII). Much of the documentation and reporting performed at the SCD are manually handled at least twice. For example: The first claim reporting is written by hand on the deviation/cassation-report. The information is then typed into their access database and the claim report can be sent to the supplier by e-mail. If the supplier does not have e-mail the claim report formulary will be printed and faxed or physically mailed to the supplier. The report is then printed in three copies, one for the return pallet/package of components, one to be sent attached to the invoice, and one to keep in a file folder where they keep all documents of the ongoing claim processes. When a claim process is finished and closed the documents will be moved to another file folder for storage.

When problems with the claimed components are visible they will photograph the components. The photos are stored in their database and printed to be stored attached to the original claim report in the ongoing claim processes file folder. The photos are also attached to the claim report e-mail sent to the supplier.
8 Results
In this section the results of this study are presented. The results will be presented under different headings, making the results of this study more visible. The results will be divided into Literature review / Model development, and Empirical study / Analysis, which is separated under General results (of the holistic analysis), and Supplier Claims Department (detailed analysis).

8.1 Literature review / Model development
This paragraph states some key points including topics that have been prominent when developing the model.

- The literature review of the different improvement methods explored that the content of Change Management methodology is not highlighted sufficiently regarding implementation of the different methodologies.
- Many of the different improvement methodologies include many different parameters overlapping in-between the different methods.
- The holistically organizational perspective, which can be found in TQMain, will provide a more solid foundation when mapping the current state of various administrative processes.
- Standardization provides great prerequisites for improvements.
- Prioritization facilitates synchronization between internal suppliers and customers.
- Continuous improvement is very dependent on employee participation.
- Employee involvement is a necessity when improving administrative processes.
- Small changes in a single process can have huge affect on the internal suppliers and customers.
- All changes (improvements) will have consequences, which might not be visible where the change (improvement) is carried out/implemented.
8.2 Empirical study / Analysis

This paragraph states the results of the analysis of the empirical observations. This section will be divided into two parts, one where the results of the holistic company analysis will be declared shortly, and one part specifying the results of the empirical analysis of the Supplier Claims Department.

8.2.1 General results

The following section shortly describes the results of the holistic analysis of the company.

- **Facility’s planning** - The facility’s planning regarding the administrative processes surrounding the production department has not been considered; hence many improvement areas can be found.

- **Departmental planning and interaction** - The departmental planning is hard to restructure, and because of the size of the company and the company facilities the departmental planning cannot be changed to any larger extent. However, the IT system utilization could be improved to a higher extent to streamline the interaction in-between certain departments.

- **Information quality** - The information/data quality within the company and the business system they are using are working properly. They do not have any major problems regarding the systems information quality. However some information quality issues have been identified, such as poor routines for the e-mail handling and poor communication about how to contact when problems arise.

- **Prioritization and standardization** - There are no clear guidelines for prioritization within the administrative processes in the company. The level of standardization in the office functions is at a quite low level, which means a higher level of standardization could improve the workflow.

- **Continuous Improvement** - The production department have successfully implemented the Kaizen philosophy and integrated the PDCA-cycle in their daily routines. The company employees are generally positive towards changes and since the implementation of PDCA have been so successful in the production department; the employees have real-life proof that the method gives great results.

8.2.2 Supplier Claims Department

The following section states the results of the detailed empirical analysis of the SCD.

- **IT systems utilization** - The SCD utilizes several different IT systems when carrying out a claim case process. PRMS is the production system where all information about different suppliers, components, and blueprint audit numbers are stored. Besides PRMS they use Lotus Notes for the e-mail handling, an Access database for the claim case reporting filing, PDMLink for printing blueprints, Excel for making certain calculations (for example PPM KPIs), and VMS for handling the main central storage, which is not integrated to PRMS. The employees do not fully utilize the systems they are working in; many functions are dismissed even though it might facilitate some work routines.
• **Information quality** - The information quality is overall in proper condition; however employees from other departments must become better on updating certain lists utilized in the SCD. When the lists are not updated it prolongs the working routines with unnecessary time spent on searching for information.

• **E-mail handling / information flow** - The e-mail handling at the SCD could be improved. They send a lot of information to several different departments and process owners at the company. This information flow has not been reviewed regarding which of the recipients really utilizing the information. Better routines at SCD could save time at other departments spent on reading unnecessary information.

• **Internal customers and suppliers** - SCD has several internal customers and suppliers; some of them daily interacting with the SCD. The demand from the different customers and suppliers have not been firmly outspoken which results in that the SCD does not know for sure exactly their needs.

• **Supplier communication** - The SCD has direct supplier communication when claim cases arise. The communication is carried out through telephone, e-mail, ordinary mail, and fax. Much of the documentation sent to various suppliers is sent both interactively through e-mails, and physically with ordinary mail. Better routines could streamline some work task executions.

• **Lead-times** - The target lead-time for a claim case is 14 days, but when suppliers do not respond in time to the claims the lead-times can be heavily prolonged since the escalation routine regarding the claim reporting is not working properly at the SCD, and that the follow-up of the escalation is backlogging.

• **Physical material handling** - The SCD get claimed components directly from the production line. If more components are kept in storage they will check the other components kept in inventory. When returning claimed components to the suppliers the goods handling is handed over to the goods departure department with supplier information that has been printed at the SCD so the employees at the goods departure knows where to send the goods.

• **Traceability** - The traceability in PRMS works as long at the components is in the main central storage. It is lost when the goods is transferred to the production lines or to the supermarket warehouse.

• **Documentation** - The documentation of various reports and other documents are rigorously stored in file folders in the department. Even if all information about a certain claim case is stored in the computers the employees still print copies of the reports and store as physical documents in file folders.
9 Conclusions

This section of the report will present the authors’ conclusions, including a discussion about “How to answer the problem formulation” and “Answer to the problem formulation”. It will also include general conclusions about this study and about the Administration Improvement Model. The chapter ends with a critical review of this thesis.

9.1 How to answer the problem formulation
The research question stated for this thesis:

- How to identify and reduce losses in administrative processes for improving intercompany information flow and meeting production demand?

To start, when approaching the problem formulation a thorough literature search was made to explore if any past research have been made regarding the problem. The search was then expanded to include a review of some of the improvement methodologies available in the literature. All the improvement methods described in Theory Part I (Lean, TQM, Six Sigma, 5S, and ISO 9000) can be useful for improving administrative processes, reduce administrative losses, and improve the intercompany information flow; however some of them are more suitable for administration and might provide better apparent results. The different methodologies have different main objectives, mainly focused on production processes. The methods have been analyzed in the Method evaluation matrix (Table 4.3) to explore which method that possess the best content for improving administration, where it was found that Six Sigma is the best methodology (of the methods in the evaluation) for improving administrative processes.

The literature review of the different methods explored that the content of Change Management methodology is not highlighted sufficiently regarding implementation of the different methods. Employee participation and motivation towards changes is vital to consider when implementing improvements within certain processes. This finding must be considered when implementing a new method in an organization because it will affect the desirable results. Table 4.6 – Method application evaluation matrix provides a tool to evaluate and reflect upon methods applicability in an organization. The “best” alternative (see: Method evaluation matrix, Table 4.3) might not be the best solution for any company (as seen in this study).

The model development of the Administration Improvement Model is influenced and created out of combining ideas, perspectives, and objectives applicable for administrative processes, inspired from all of the methods described in the theoretical chapter.

9.2 Answer to the problem formulation
First, one must know how to identify losses within administrative process. The theoretical chapter in this thesis states several different improvement methods and all the different methods have also been described through the perspective of improving administrative processes. A theory discussion regarding the improvement methods has also been made discussing the methods strengths and weaknesses regarding improvement of administrative processes. The method that has the most thorough definitions about administrative losses is the Lean methodology, which defines different areas of administrative losses (waste).
CONCLUSIONS

When the areas of improvement have been distinguished; measures for improving the situation and initiation of improvement projects can start. However, regarding administrative processes one must analyze the current state holistically to explore the internal customers and suppliers, to investigate the impact of certain changes within various processes, otherwise changes might be ineffective for the company holistically.

One way to solve the problem formulation for this thesis could be through implementation and utilization of the proposed model for improving administrative processes (see Chapter 4) developed in this research. The combination of different parts of the different improvement methodologies have resulted in a customized model with the objective of improving administrative processes, improving individual work performance, and promoting a continuous improvement of various administrative processes.

Implementation of the model will highlight administrative losses in the current state and explore the current information flows and value streams, which provide a foundation of knowledge and awareness promoting improvements of the present routines. By applying the Individual work reinforcement model the employees will be well integrated in the ongoing improvement project initiations, which will make the employees more involved and motivated.

By improving the administrative processes through utilization of the Administration Improvement Model, integrating the internal customers and suppliers, will streamline the intercompany information flows, which consequently streamline the interaction and synchronization between various administrative processes and the manufacturing department, facilitating meeting production demand.

Utilization of the Administration Improvement Model should over time lead to shorten lead times and streamlined high-quality information flow, which in return will reduce costs within the administrative processes and create unified working routines within the value chain. Successful implementation of the Administration Improvement Model should lead to increased customer satisfaction, both internally and externally.

9.3 General conclusions

The following points shortly states the authors general conclusions about the company holistically and the model implementation in the SCD.

- Electrolux Laundry Systems

Based upon the empirical findings from the interviews at ELS it was found that the company seems ready to start making changes regarding the administrative processes within the organization. This implies that the probability for successful implementation of improvement projects is at a high level and the employees are motivated.

If the Administration Improvement Model is carried out in the various administrative processes within the company it will promote streamlined information flows and value streams. Changes might not be apparent immediately but when the employees have learned and adapted to the new routines the changes made will be visible.
• **Supplier Claims Department**
  The employees at the SCD were made aware of the authors’ purpose in their first meeting together and it was made clear that the employees’ thoughts, knowledge, experience, and suggestions would be the foundation of the authors’ suggestions/recommendations for improvements.

The mapping of the information flows and working routines regarding a standard claim case showed several areas within their routines that are non-value adding and could be streamlined. Since the SCD interacts a lot with the production department, changes within the SCD would positively affect the flows in the production department. If the SCD can manage their claim processes more efficient the reliability of the supplier deliveries and the component quality will increase. Reduction of the physical document handling (storing) and better utilization of their IT systems could make a huge difference in their daily working routines.

9.4 **Evaluation of the Administration Improvement Model**
The development of the Administration Improvement Model was preceded by a thorough literature review of several different improvement methodologies and related topics, raising the generalizability of the model. The model shall be applicable on any administrative process in any manufacturing company.

The *Method evaluation matrix* (see Table 4.3) provides a visual comparison between different improvement methods regarding improving administrative processes. The matrix shows different grading of the methods compared to the different criterions, which makes it easy to see how well a method fulfills a criterion, or not.

The *Method application evaluation matrix* (see Table 4.6) shows methods applicability in an organization. The evaluation will state which method that hold the highest probability of successful implementation. The Administration Improvement Model can be utilized regardless which improvement method an organization choose to implement. The most important outcome of the application evaluation is the knowledge about what kind of method the organization strives for. Knowledge about the predefined goals included in an improvement methodology is necessary to be able to achieve successful implementation, which is why it is important to know which method that is most applicable in an organization.

The aspect of *Change Management* included in the model will provide better prerequisites for successful implementation of various changes. The employees’ holistic perspective of the organization, including its associated internal customer and suppliers, will give them a better understanding of the prioritization choices they will face. All choices have a consequence, and if the employees are aware of the consequences they might act differently.

The model will provide prerequisites for more standardized routines promoting an ongoing progress of continuously improving different processes. Standardized routines provide an excellent foundation for improvements.

The *Individual work reinforcement model* could on its own streamline processes, since it can act reinforcing on already present routines. Combining the A.I.M. – stage I & II to this model will ease the total implementation of improving administrative processes within a company, because the different parts of the Administration Improvement Model are all affecting each other.
The expected outcomes of the model include improvements within several different areas among the processes present at a company. Example: streamlining the information flow will raise the quality of the information, which consequently will raise the overall productivity in a company, which in return will increase the profit margin. The model does not demand any larger investments other than time at the company.

9.5 Critical review of the thesis
The improvement methodologies in the Method evaluation matrix and the Method application evaluation matrix could be replaced with other improvement methods, which also might have affected the model development. Though, the main objective when choosing the improvement methods was that they should all include the perspective of continuous improvement, which would mean that replacing some of the methods in the evaluations, would not affect the model development to any larger extent since the objective of continuous improvement was a prerequisite.

Since the proposed model for improving administrative processes stated in this thesis have not been fully implemented the actual outcome of full implementation have not been explored. It might not provide such results as expected. However, the model is developed out of several different well-tested improvement methods that evidently give positive results, which logically would provide the model a foundation possessing prerequisites to affect administrative processes positively.

The cost for implementation and employee education has not been considered, which leaves those aspects unexplored. These costs might affect decision making regarding improvement method/model implementation for companies. Although, the Administration Improvement Model does not cover all areas for improvement within a company, it is especially developed to improve administrative processes so the costs for implementation and education will most certainly be less than implementation of for example ISO 9000 or Six Sigma. The proposed model relies to a high extent on the knowledge and experience of the employees, which results in utilization of resources already available in a company.

The data collection during the model implementation could be reflected upon since the data were gathered through interviews and observations. The competence, experience and knowledge of the people involved could affect the quality of the gathered data. However, the interviewed managers and employees were carefully selected so the authors would get as reliable information as possible. Furthermore, the authors spent much time at the SCD, which made the two employees working there feel comfortable for honest conversation.
10 Recommendations
This chapter states the authors’ recommendations to the case company. The recommendations are based on the implementation of the first phases in A.I.M. – stage I, where several areas of improvement were found. Managing to adapt some of the suggestions should provide more streamlined working routines. Future research within the topic of this thesis will also be stated.

10.1 Recommendations to the case company
The analysis of the current state at ELS affirms several areas of potential improvement within the administrative processes at the company. The recommendations will be mainly focused to the Supplier Claims Department. The goals stated in Chapter 7 can be facilitated considering some of the recommendations in this chapter.

- **Review the document handling** - There is no need to print documents and store them in file folders if the information is easily accessible in the IT systems. Utilize the systems and its associated applications. For example: Keep a copy of the invoices in the database instead of in a file folder. It will save time, space, and money.

  Monitor how much time you spend on manual document handling. To be able to reach the goal of reducing the document handling and file storing with 20%, the current time spent on document handling must be measured. Monitor for example how many reports/paper that is printed and stored in file folders.

- **Review the e-mail lists** - There is no need to send information to someone who does not need and/or utilize the information. Make sure the recipients of the e-mails use the information, otherwise: remove them from the e-mail list. It might not save any time and/or resources at the SCD but it will save time in other departments when they do not need to read information they do not use. Information overload is a big contributor to stress; so reviewing the e-mail list is a great first move to ease the workload for your co-workers.

- **Invoice handling** - Contact all suppliers and review if they need the physical invoice sent to them by ordinary mail. If it is enough with the invoice e-mailed to the suppliers the enveloping and sending of the paper invoice is only non-value adding.

- **Escalation process** - The escalation processes are currently backlogging because of unclear routines for how to monitor the process. The IT systems could be helpful, for example the e-mail handling applications in Lotus Notes. Improving the escalation routine would decrease the amount of document handling and improve the quality of the information flow.

  All reports sent to the suppliers are also sent to responsible purchasers (operational and strategic). If the responsible purchasers do not use the information the SCD send every time they send, for example, reminders to the suppliers it will also contribute to an information overload.
One suggestion of how to easily follow the ongoing escalation processes is to utilize the follow-up function in Lotus Notes. The follow-up function can be set to alert when an e-mail has not been answered/responded. Using this function will facilitate monitoring of escalation processes as well as it will get easier to follow up old cases when all the information is stored on the same place.

10.2 Recommendations for future improvements at SCD

This section states improvements that might take more time to implement and succeed with the changes. Furthermore, for some of the following suggestions, there is a need of involving additional personnel, such as for example IT technicians.

- **Returning goods to supplier** - The current routine for returning goods to supplier could be improved by for example printing supplier delivery information / label / delivery instructions at SCD when printing the documents attached to the goods returned to suppliers. It would not take much more time than the current routine, but it will save time at the goods departure department.

- **IT systems integration and utilization** - The current IT systems utilization involves several different systems, and by integrating some of them would definitely streamline some routines at the SCD. Preferably should only one system be needed, were all functions necessary are integrated. However, replacing all their systems with one new system might be a huge investment and might demand much time and effort, which is why this recommendation is stated as a future improvement. Integrating some of their present systems would be a more achievable goal (short-term). The authors’ suggestion is to develop a supplier profile (see next point) were all the necessary information needed for the claim reporting is accessible in one interface.

- **Supplier profile** - This supplier profile should be integrated to their present systems, which would result in that they only need to use one system. The profile should incorporate all functions needed to carry out a standard claim case. It should include for example Supplier information (contact information, e-mail, phone numbers et cetera), Supplier claim history (documentation), Purchase responsible (operational and strategic), E-mail handling, Blueprints (including all updated audit numbers), Claim follow-up, and PPM (auto-calculations and diagrams).

- **Invoice** - All invoices should be sent electronically (e-invoice) which would reduce the invoice document handling significantly.

- **Component/batch traceability** - The employees should be able to leave a signature when unblocking a component/supplier in their system. Furthermore, the traceability of components when transferred from the main central storage to the supermarket should be handled. Improving the traceability of components in PRMS would facilitate some claim cases handled at the SCD.
10.3 Future research
The proposed model for improving administrative processes stated in this thesis should be fully implemented and followed up to explore the real impact and results of utilizing the model. Full implementation and utilization of the model is a long-term project, and the A.I.M – stage II should be carried out continuously, which shall result in a continuous improvement of administrative processes.

Future research regarding improving administrative processes could include a thorough review of how much money manufacturing companies really spend on administrative processes. It should also include development of tools and measures for measuring efficiency and effectiveness of administrative processes. Being able to monitor administrative processes in a more detailed way would provide better data for analysis and more accurate follow-up of the money company spends on administration.

Note: According to Statistics Sweden (SCB, 2011), most of the manufacturing companies in Sweden often declare costs for administrative processes as External costs and as an indirect overhead cost for manufacturing stated as Operating expenses and Selling expenses in the declaration. The External costs also incorporate costs for (among others) facilities, electricity, and extra staff hired, making it very hard to derive the actual costs for administration.

A declaration can be made as a “Function-based Income Statement” (sv. Funktionsindelad resultaträkning), where costs for administration are stated. Though, the Administration expenses also include the costs for (among others) facilities, articles of consumption, information technology, and depreciation costs. Many companies choose to make their declaration as “Type of cost Income Statement” (sv. Kostnadsslagsindelad resultaträkning), where costs for administration are not specified. Neither of the different income statements provide any accurate costs for the administrative processes.

The employee at Statistics Sweden (SCB), the authors’ was in contact with, said that it would be very interesting to be able to follow up how much money companies is spending on administrative processes. This statement adds additional weight to the authors’ suggestion of future research about reviewing how much money companies really spend on administrative processes. An additional conclusion is therefore that companies probably spend unnecessary much money on administration since it is not measured accurately and not followed up in the same way as manufacturing costs.
References
The reference list is divided into different categories, which provide a structure of the different sources utilized in this research.

Literature


Gonzalez-Rivas G, Larsson L, 2011, Far from the factory - Lean for the Information Age, CRC Press Taylor & Francis Group, USA.


Joyce E M, 1996, Långsiktig framgång med TQM, Utbildningshuset/Studentlitteratur, Lund


Scientific articles


**REFERENCES**

**Internet sources**


**Pictures**

Six σ curve: http://mvpprograms.com/help/images/six_sigma_diagram.png (accessed 2011-03-11, 10.30)
Appendix I – Interview questionnaire (in Swedish)

Frågor kartläggning – Electrolux (administration)

Intervjufrågor vid kartläggning av avdelningarna på Electrolux, vi behöver mycket information om flödena, inkl. informationsflödena.

1. Organisationsstruktur - Hur ser organisationen ut? Vilka avdelningar ligger nära varandra etc.? 

2. Avdelningsstruktur - Hur är det organiserat, uppbyggt, etc?

   - Arbetsprocesser
   - Mål, vision, mission på avdelningen
   - Vad påverkar målen?
   - Kan medarbetarna påverka målen?
   - Uppfylls målen?
   - Handlingsplaner och uppföljning

3. Informationsflöde inom avdelningen, Hur framförs information, kommunikation på avdelningen? Systemstöd?

   - Återkommande arbetsuppgifter?
   - Vilka leveranser har avdelningen? Till vem?
   - Var ifrån kommer input/uppgifter till leveranserna?
   - Vem styr leveranserna?
   - Skickas månadsvis/veckovis information till någon?

4. Interaktion mellan avdelningarna, vilka avdelningar interagerar ni (mest) med?

   - Gemensamma mål för avdelningarna?
   - Hur anser du att samarbetet är mellan avdelningarna?

5. Orderflödets ledtid (med hänseende) till leveransens omfattning/typ?

   - Target leadtime?

6. Kvalitet på informationen? (Ex. hur mycket behöver göras om, order som saknar faktorer)
7. Finns det möjlighet till standardiserade arbetsuppgifter på avdelningen?
   - Vilka processer finns standardiserade?
   - Vilka arbetsuppgifter finns standardiserade?
   - Finns dessa dokumenterade?
   - Hur dokumenteras dessa?
   - Vad återfinns dokumentationen i så fall?
   - Standardisering i Projekt och löpande arbete? Skillnad mellan dessa?

8. Hur prioriteras order/arbete på avdelningen?
   - Vem ansvarar för prioritering?
   - Gemensam prioritering inom avdelningen?
   - Finns instruktioner för prioritering?
   - Synkroniseras av avdelnings prioritering med anslutande avdelning?

9. Vad fungerar riktigt bra inom avdelnings arbetsprocesser? Varför?
   - Vad fungerar mindre bra?
   - Återkommande brister i arbetsrutiner? Vad beror detta på?
   - Vilka förändringar tror ni skulle ge störst effekt?

10. Hur är din syn till förändring och förändringsarbete?
    - Skiljer din syn sig från medarbetarnas?
    - På vilket sätt?

11. Utbildning och Kompetens?
    - Nya medarbetare, hur och var sker upplärning?
    - Finns dokumentation om införsel och upplärning av nya medarbetare?

12. Tror du att till exempel Lean skulle göra någon skillnad på flödet inom er avdelning, inom organisationen? Effekter?

13. Någonting annat som du anser är en viktig fråga som vi ska ta med oss?
Appendix II – Industrial Operations Supply Chain Matrix
Appendix IV – Method application evaluation matrix

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
<th>Lean</th>
<th>TQM</th>
<th>Six Sigma</th>
<th>5S</th>
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Appendix V – Inspection report

KONTROLLPLAN/HISTORIK ARTIKELKONTROLL FÖR ANKOMSTKONTROLL

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<th>Art.nr:</th>
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Mätresultat registreras endast vid avvikelse. Se vidare avvikelse-rutin

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<th>Ankomst datum</th>
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### Appendix VI – Outturn sample protocol

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<th>Pos.</th>
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<th>Result</th>
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- **Quality** (dimension, material)
- **Production** (assembly)
- **Design** (nonconformities, lab test, changes)
- **Dispensation** (design resp.)
- **Final judgment**

- **Approved**
- **OK / Not OK**
- **Sign**
- **Date**

**Note**

- **ECR**
- **Disp arris date**
- **Part change**

---

- **Orderer:**
- **Order no.:**
- **EC-no:**
- **Arrived date:**

- **Article no:**
- **Drawing no:**
- **Issue. No.:**
- **Page no.:**

- **Description:**
- **Supplier:**

(Appendix)

- **Dimension...**
- **Material tests...**
- **Lab tests...**
- **External reports...**

- **New part**
- ** Changed part**
- ** New supplier**
- **Process change**

---

~ VII ~
Appendix VII – Pictures of the Supplier Claims Department

Big picture: SCD office, Small picture: Claim reports 2011

Stored claim reports

Outturn sample protocols