The role for IT-support in Lean concepts
- A qualitative study of municipalities

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— A qualitative study of municipalities

Abstract
This thesis have the intention of to create a deeper understanding around IT-supports role in Lean concepts, and has been done with a hermeneutic approach and a theory creating approach as a case study with qualitative method, semi-structured interviews has been used as data collecting technique. The interview respondents were one IT-manager and one department manager from 4 municipalities. The data has then been analyzed by part- and comprehensive analysis with a hermeneutic approach and presented in the 4 different cases, that the municipalities used represent, and in one where all is combined. The results show massive use of computers but not any use of IT-support for Lean according to the respondents. Conclusions that where made was that programs like the business system in use in the organization and Microsoft Office package not is seen as a IT-support for Lean despite that several of the respondents use it to do Lean things like processes and that this is more or less considered as an obvious package to have. They have a tendency to think it has to be a separate IT-system or program especially made for Lean for it to be important and be interpreted as an IT-support for Lean.

Keywords: Lean, IT-support, Lean concepts, LeanIT,
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Introduction

The first chapter includes the background to this thesis. It also includes the problem area/research question, purpose, objectives, target audience and expected results. The chapter ends with a disposition over the thesis.

A little background

IT-support all over the place

In communities today the use of IT and IT-support exists in almost everything, it is not just in the office environment, it is being integrated into most work situations in some way, almost to the point that people barely sees them as IT-support anymore. My use or what I mean with the word IT-support is a program or software that in any way involves IT, it could be on a local machine (computer, telephone, iPad etc.) or out on the Internet. An example of IT and IT-support, my father works as “a telephoner” as he always calls it, in the rural part of Jamtland which is up north in Sweden (setting poles, connecting stations and households, and so forth) and have done so since the time when the company was governmental and was called Televerket (FredrikT et al, 2011). He has done his reports, work time lists; drive journals etc. by writing these by hands, this until just a time ago. Then a GPS (global position system) was installed in the lorry so that instead of writing the drive journals by hand so the company could get at print at any time of the driven km’s and what position the lorry both had and have. Furthermore they have been assigned laptops to do all the things they use to do on papers and by doing them directly on a computer the company can put them in the document management system without having to be processed before. On an earlier work and in an earlier thesis (Eriksson, 2010) I have gained knowledge around document management and document management systems, or perhaps one should call them content management systems given that Meier & Sprague (Towards a better understanding of electronic document management, 1996) says regarding that the technology today allows more than just text in the document (all kinds of multimedia for example movies, pictures, sound etc.). If we consider that the most of the work in offices are done by computers and computer from document handling to connections between workers and customers etc. etc., in brief words is the use of IT-support very widespread both in public and in private sectors.

As an example, in the paper Offentliga Affärer (Ulfvarson, 2011), that means public business in English, there are a new IT-support for the social service that have been given a scholarship. They have got it because of Upplands Väsby, Nacka and Täby municipalities has collaborated (Anna-project) to purchase a new IT-support for safe communication between the citizen, performer and the government, where the whole support application can be followed and there is also a possibility to get relevant information from it by the citizen, but even a possibility to give the same rights to a relative (Ulfvarson, 2011).

To tell the truth, not all implementations of IT-support have happy endings, so to say that they will adapt well to the existing IT solutions and become well used by the personnel. One important aspect in this is that the IT-support is adapted to the actual workplace and processes, that the people that
are supposed to use the IT-support will see it as a support and not as a burden. Technology cannot be an obstacle (Robertson, Sörensen and Swan, 2001: p.15). To refer back to the introduction of GPS in the workers trucks, a lot of the employees thought that this was just a way for the company to monitor the workers. According to some not provable rumors was the technology sabotaged by means of a simple aluminum foil which disturbed the transmission of the GPS information. This may be due to that this people cannot see the full use of the IT-support, which they don’t have complete information about how it will be used. As Flensburg & Friis (Mänskligare datasystem - utveckling, användning och principer, 1999: p. 142) point out about information flow, that information shall be distributed directly to those who are concerned, and then not just the absolutely most necessarily to do the work, but instead all the information.

**The origin of Lean**

Lean has become a familiar word in most organizations especially in private ones but is on the march even in public. It is often used as a merit when organizations search for employees. It has become a sort of a “fashion word”. But where from does it come?

One thing that comes to mind on many people when mention the word Lean is Toyota and that this in some way is connected. This is partly true, Lean is inspired by Toyotas system, but at Toyota they call it the Toyota production system (TPS) and not Lean, this might originally to have descended from USA in some form (Houy, 2005). However some people thinks that Lean is just a further development of JIT (Just In Time) and that they share the same fundamental approach and also that a similar new method will probably soon be promoted (Näslund, 2008: p.28).

Taichi Ohnos (ledged founder and developer of the TPS (Womack and Jones, 2003: p.15)), fundamental idea was that thru the philosophy/system change the way of keeping stock. To go from a big stock to change it towards, at its best produce things when they are needed (or keep a minimal stock), meaning no producing in advance. Always strive towards improvements on every level and in every process and never stop working with the job to get better, get rid of wastes (Womack and Jones, 2003: pp.15-28).

“People, like nails, lose their effectiveness when they lose direction and begin to bend”

(Walter Savage Landor see BrainyQuote, 2011)

You could say that Lean is a sort of a way (system or philosophy) to try to avoid “the nails to bend”, that you keep focus on the right things and not loose direction. That you systematical go thru all processes to see if something isn’t as they supposed to. But if “the nails” anyway will bend then Lean is also a sort of way to deal with the “straightening of the nails”.

The private sector has for a long time used the concept of Lean for producing things, for example the car industry where it is more or less obligatory to use Lean concepts to compete.

**Making entrance into the public sector**

In later year even the public sector, organizations, has start to looking at Lean more and more. A lot of the public sectors areas are in and around service. The book, Lean handbook för service och tjänster (Bicheno, Anhede and Hillberg, 2009: p.2) it says that many have ignored the system aspect of Lean and jumped right to tools and methods, with bad result. This is something Radnor & Walley (Learning to walk before we try to run: Adapting Lean for the public sector, 2008: p.14) also warn
from when talking about Lean and public sectors. When it comes to use Lean in service situations the thought is to use the more basic and the in-depth systems ideas. That Lean is not at technical system, it is a system for learning. TPS stands for Toyota Production System but in a service oriented environment, TPS might (even be more appropriate) also stand for Thinking People System (Bicheno, Anhede and Hillberg, 2009: p.2). A There are many of public sector organizations that have started using Lean concepts, ex. Landstingen doing it for healthcare, more and more municipalities (Teknologisk Institut, 2009: p.2) and some also advertise it on their websites, for example Mellerud (Mellerud kommun, 2010) (Kungsbacka kommun, 2009), or on conferences, (Teknologisk Institut, 2009).

**Problem area**

**Problem area of the thesis**

The problem area for my thesis is the role of IT-support for Lean concept for organizations in the public sector and specific municipalities. Which are the possibilities to enhance the effectiveness of the Lean concepts with IT-support? The Lean concept is well-known and well-written about but there is not as known and written about the role IT-support has when working with Lean concepts and even less when it is specified to the public sector.

**Research question**

Which role does IT-support have for Lean concepts?

**Purpose, objectives and target audience**

Purpose of this thesis is to get a deeper understanding around IT-support role in Lean concepts and this could make it easier to determine what kind of needs there is in this area. The objective is to make a hypothesis of the role that IT-support have for Lean concepts. One target audience for this thesis may be persons in organizations that are about to introduce Lean concept in their organization. The thesis is although focused on the public sector however it can still be interesting for the private sector. Another audience might be researchers and students away from their special area who might use this thesis as an idea or as an example of a “case” (Backman, 2008: pp.65-67).

**Delimitations**

The delimitations in this thesis are that I am only focusing on the public sector and more specifically the municipalities. The focus has been on municipalities that use Lean in some department. Another delimitation, the thesis have is that it only address IT-managers and department managers in the thesis.

**Disposition of the thesis**

This thesis has a hermeneutic approach and qualitative method has been used. The report is written in a linear disposition (Backman, 2008: pp. 64-67). The appearance and headlines are based on Backman (Rapporter och uppsatser, 2008: pp. 49-50) there he states that “Don’t use number- or letter markings in the headlines! They don’t have any informative function and should be reserved for formals”. I have used the Exeter variant for Word2007 of the Harvard system as reference system (Microsoft BibWord, 2010).
<table>
<thead>
<tr>
<th>Chapter:</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>• Background, problem area, research question, purpose, objectives, target audience, expected result, delimitations and disposition.</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>• Different research methods, the choice of the used methods and scientific quality.</td>
</tr>
<tr>
<td><strong>Theoretical framework</strong></td>
<td>• Taxonomy and definitions within Lean. Theories in and around Lean.</td>
</tr>
<tr>
<td><strong>Result</strong></td>
<td>• The result of my interviews. Short discussion about the validity of the result.</td>
</tr>
<tr>
<td><strong>Analysis &amp; discussion</strong></td>
<td>• Discussion and analysis of the result compared with my reviewed literature, problem area, research question, benefits and shortcomings of methods.</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td>• A try to answer to the research question, reflections and suggestion of further studies.</td>
</tr>
</tbody>
</table>

**Figure 1: Disposition of the thesis**
Method

This chapter will include different research methods and describe my choice of methods with a motivation why I used them, both regarding to the literature review and the interview. The chapter ends with a discussion of the scientific quality of the thesis.

Method of choice

Why the method of investigation is important

A method is a tool, a tool to solve problem and to gain new knowledge. Some basic demands have to be fulfilled for a method to work as a social science research method. There has to be coherence with the searched reality. Systematic selections of the information have to be made. Result should be presented so they can be checked upon and verified by others. Two “methodological approaches”, inductive and hypothetic-deductive, is very common used. Inductive methods can also be described as “the path of discovery” and deductive as “the path of evidence” (Holme and Krohn-Solvang, 1997: p. 51). An inductive approach means you start from the empirical material and make general and theoretical conclusions just from it. In this approach it is hard to be unbiased. In the hypothetic-deductive approach the theory play a big part and goes beyond the known knowledge and are to be tested empirical (Wallén, 1996: pp. 47-48).

There is always a certain kind of theoretical consideration in every study (Järvinen, 2004: p. 9). A choice of method or methods has to be made and some methods are so called quantitative methods; those methods are done with quantification and measurements with help of mathematics and statistics (although measurements can be qualitative also if they are presented in another way then numbers). Numeric observations or things that can be formulated like, for example as a questionnaire etc. . Another group of methods that don’t use these numeric values in the same extinct are qualitative methods. Methods where the spoken word is the key factor or result and the instrument that are used are just “words” (qualitative information can sometimes be quantified during analysis, (Holme and Krohn-Solvang, 1997: p. 87)). But keep in mind that this is just the methods not the perspectives. Because a quantitative perspective is not necessarily the same as a quantitative method and the same goes for qualitative methods contra qualitative perspectives (Backman, 2008: p.33)

Choice of research method

Due to the fact that my problem area do not includes a specific artifact that neither shall be created nor evaluated. Which mean that the Innovation –building approaches and Innovation-evaluating approaches under the branch Researches stressing utility of innovations in Järvinens & Järvinens taxonomy of research methods (Figure 2, page6) will not be suited as methods.
By excluding branch after branch of the Järvinen taxonomy (Figure 2), the conclusion boils down to the box of Approaches for empirical studies and its two branches, Theory-testing approaches and Theory-creating approaches. And as Järvinen (Järvinen, 2004: p. 36) write, “...do our experiments, field or case studies confirm or falsify our theory, model or framework?” it means that there has to be a theory to start with, which this thesis won’t have. Therefore the only logical choice of approach is the Theory-creating approach (Figure 2).

**Theory-creating approach**

Why theory-creating is a good choice for this thesis is because it works well when there is no or little knowledge of a phenomenon (Järvinen, 2004: p. 66).

**General features in theory-creating approaches**

(Järvinen, 2004: p.68);

**Raw data is often text**

**Transcribed data to text**

(Video, voice recordings, images)

**First level facts data**

(Ex. the number of decrees in the last year)

**First level conceptions/opinions**

(Ex. Students reviews)

**Second level conception**

(Ex. Researchers interpretations about students review)

New theory is “compressed” from raw data (Figure 3)
One thing that talks against the theory-creating approach in this thesis is that there are not as much collected data to be assumed when trying to create a theory, so a theory might not be possible to establish but a hypothesis’ may be possible to determine with my limited material.

Case study and Theory build

The thesis will be a case study with a hermeneutic approach, were the “cases” are the different municipalities offices. Each “case” will have two different types of manager views, one IT-manager and one department manager. Four different municipalities will be four different “cases”. The different “cases” will first and foremost be studied within their own municipality, but then compared with the other municipalities in the material. The benefit with case study is that it is a study of a concrete case, under real conditions (Wallén, 1996: p.115).

How to build a theory from a case study research is very well described by the Process of building theory from case study research (Figure 4, page 8) by Eisenhardt (Building theories from Case study research, 1989: p. 533).
<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Getting started</strong></td>
<td>Definition of research question</td>
<td>Focuses efforts</td>
</tr>
<tr>
<td></td>
<td>Possibly a priori constructs</td>
<td>Provides better grounding of constructs measures</td>
</tr>
<tr>
<td></td>
<td>Neither theory nor hypotheses</td>
<td>Retains theoretical flexibility</td>
</tr>
<tr>
<td><strong>Selecting cases</strong></td>
<td>Specified population</td>
<td>Constrains extraneous variation and sharpens external validity</td>
</tr>
<tr>
<td></td>
<td>Theoretical, not random, sampling</td>
<td>Focuses efforts on theoretically useful cases</td>
</tr>
<tr>
<td><strong>Crafting instruments and protocol</strong></td>
<td>Multiple data collection methods</td>
<td>Strengthens grounding of theory by triangulation of evidence</td>
</tr>
<tr>
<td></td>
<td>Qualitative and quantitative data combined</td>
<td>Synergistic view of evidence</td>
</tr>
<tr>
<td></td>
<td>Multiple investigators</td>
<td>Fosters divergent perspectives and strengthens grounding</td>
</tr>
<tr>
<td><strong>Entering the field</strong></td>
<td>Overlap data collection and analysis, including field notes</td>
<td>Speeds analyses and reveals helpful adjustments to data collection</td>
</tr>
<tr>
<td></td>
<td>Flexible and opportunistic data collection methods</td>
<td>Allows investigators to take advantage of emergent themes and unique case features</td>
</tr>
<tr>
<td><strong>Analyzing data</strong></td>
<td>Within-case analysis</td>
<td>Gains familiarity with data and preliminary theory generation</td>
</tr>
<tr>
<td></td>
<td>Cross-case pattern search using divergent techniques</td>
<td>Forces investigators to look beyond initial impressions and see evidence thru multiple lenses</td>
</tr>
<tr>
<td><strong>Shaping hypotheses</strong></td>
<td>Iterative tabulation of evidence for each construct</td>
<td>Sharpens construct definition, validity, and measurability</td>
</tr>
<tr>
<td></td>
<td>Replication, not sampling, logic across cases</td>
<td>Confirms, extends, and sharpens theory</td>
</tr>
<tr>
<td></td>
<td>Search evidence for “why” behind relationships</td>
<td>Builds internal validity</td>
</tr>
<tr>
<td><strong>Enfolding literature</strong></td>
<td>Comparison with conflicting literature</td>
<td>Builds internal validity, raises theoretical level, and sharpens construct definitions</td>
</tr>
<tr>
<td></td>
<td>Comparison with similar literature</td>
<td>Sharpens generalizability, improves construct definition, and raises theoretical level</td>
</tr>
<tr>
<td><strong>Reaching closure</strong></td>
<td>Theoretical saturation when possible</td>
<td>Ends process when marginal improvement becomes small</td>
</tr>
</tbody>
</table>

*Figure 4: Process of building theory from case study research (Eisenhardt, 1989: p. 533)*
This study is as I earlier mentioned too limited in order to be able to create a theory, but hopefully it is possible despite the size to set a hypothesis. I have as a start a lot of flexibility because I have neither theory nor hypotheses to begin from.

Data collecting method

I have chosen a semi-structured qualitative interview as my data collection technique, this because it is a suitable method for theory-creating approaches.

This method of interview, with only support questions (Appendix 1) for me to reed, and have as a support so all my subjects are discussed, will allow the questions going in different directions in the interview depending on what the answers are. Furthermore it will I have an opportunity to make follow up questions if needed. When qualitative interviewing respondents’ flexibility is an important requirement (King and Horrocks, 2010: p.35).

I will also search the municipalities’ websites for sites or documents about their Lean work. This is because I want to get as many different sources of material as possible to use for the analysis.

Interviews

Why these interview respondents

The choice of interview respondents was first based on a tip of a suitable respondent, an IT-manager. This respondent gave me then a tip of a possible respondent in the same municipal organization but of the other type (department manager) of respondent that I was interested of for this study. The same respondent gave me furthermore two tips of respondents in another municipal organization these persons also fitted in my choice of respondents for this study (IT manager & department manager). This is what King & Horrocks (Interviews in qualitative research, 2010: p.34) calls “snowball sampling”.

The other respondents were sorted out by searching the Internet and mailing and calling municipal organizations that have stated that they have used or using Lean concepts in their work.

Interview situations

The interviews will be conducted on each respondent’s workplace (their territory) if possible because of the strong influence the physical spaces have on an interview and especially factors like: privacy, comfort and quiet (King and Horrocks, 2010: pp.42-44). If not this is possible then I and the respondent have to find an alternative place to conduct the interview. The interviews will be approximately 45 minutes long.

All interviews will be recorded, and as they say in the book, Interviews in qualitative research (King and Horrocks, 2010: p.45) it is almost essential to have a full record of each interview. The recording will be done on a Smartphone, Samsung Omnia i900 (Samsung, 1995-2011), with an extern microphone and captured by a special program for audio notes, Audio Notes Touch (VITO Technology, 2001-2009). I will do field notes during the interviews both because then I have the respondents body language as an input and might interpret things combined with the body language and the actual words. Another reason is safety, in case that the technique might fail and then I would just have my memory of the interview to use for the thesis.

Another thing with the interviews is that they will be conducted in Swedish and then consequently my support material/questions (Appendix 1) for the interviews are also in Swedish.
**Interview questions/guide**

The first I did was to try to order the different areas that my research problem consists of, IT-support, Lean, IT-support & Lean, and municipality. Secondly I tried to decide how broad or narrow I want to go with the different areas/questions. I will refer to them as questions but they are more like a guidance to be certain to cover my interest areas. All according to the recommendations from the book, *Interviews in qualitative research* (King and Horrocks, 2010: p.25). I used the recommended structure for the questions that is presented by Holme & Krohn Solvang (*Forskningsmetodik - Om kvalitativa och kvantitativa metoder*, 1997: pp.174-175). This mean you start with some fact oriented questions first to get the respondent relaxed as a sort of “warming up”, about their job and the organization. Then the questions were a little more controversy can exist, for example questions with the respondent’s values, things like what Lean means to you and how it is used in the organization, IT-support and Lean (aspects, thoughts). And at the end, finish the interview with some “easy” questions to wrap up the interview with and to get the respondent relaxed again if any tension has accord in the controversy questions like, how would your dream IT-support and Lean to work together, any new thoughts about it.

I conducted a test interview on a department manager in the private sector in Norrköping that works with Lean at a daily basis with the test version of the support questions to see if my scope of the questions were too broad or too narrow. And to see if the respondent interpreters the questions as I want them to be interpreted and the answers or talk will be around the right subjects/areas. The test interview made me realizes that I have to ask the questions in another order and change some of the formulations to get a better “flow” in the interviews and too not affect the responses.

**Interview analysis**

The interview analysis is made on the respondents Swedish responses so because of that all of the analysis is done with Swedish as the language and when the analysis has been done then and first then, it is being translated to English. All this is done as an attempt to minimize the effect of unnecessarily mistranslations before the analysis is done. All audio from the interviews are converted to text, transcription, and is compared with the field notes before being summarized in the result section.

I will use a part- and comprehensive analysis with a hermeneutic approach close to the hermeneutic circle (Holme and Krohn-Solvang, 1997: p.98) but in a spiral form were my pre-understanding starts in the material I have read in order to create the support material/questions (Appendix 1) and continue with the transcription of the interviews and then work my way up like a spiral with the text and theories alternately. The thought is that I start to compare what the department managers say and what the IT-managers say in the interviews, this done separately on the municipality level first. Then continue to compare respondents with the same work titles across municipalities. This to see if there is any similarities or differences in the way they interpreters and use IT-support between the different municipalities in the material. To find patterns. This material will hopefully lead to a hypothesis or some conclusion.

**Literature search**

**The searching of literature**

The search for earlier literature in the problem area has been done by booth a library search for books and for searching several databases for articles.

I have searched for articles in ACM Digital Library (Acm digital library, 2010) that is an information technology and computer science database, SienceDirect (SienceDirect, n.d.) that is a multidisciplinary database, IEEE Xplore (IEEE Xplore, 2010) that is a technology and computer science database and Google-scholar (Google, 2011) that is a multidisciplinary search engine for articles.
The search word that have been used is “Lean”, “manufacturing”, “production”, “tools”, “IT-support”, “ICT”, “governmental”, “public sector”, “municipality”, “IT”, “approach” in various constellations and the restriction of time has been 2004 and onwards regarding the Lean and IT subjects in articles, not on methods and books.

Because this is a fairly new phenomenon with Lean in governmental environment in Sweden I have also done a regular Google-search with the same keywords as I used in the database searches (Lean, Lean production, Lean manufacturing, Lean tools, it-support & Lean and so forth).

I have been searching on the municipalities’ websites and on the documents that can be downloaded from there to find documents or statements regarding Lean from the municipalities. I will give a short summary of some of what the different municipalities have published about Lean.

Selection of literature

The selections of articles are made by first reading the abstracts and then make a first sorting of the articles. Next step is to read the article in whole and see if it actually is useful for my thesis about IT-support and Lean. If the article fills all my demands of search words, and the search words are used in the real text and not just used without any connection to my area of interest, then will I read it thoroughly and either take it in the thesis or reject the article.

Method troubles

Troubles of my choices of methods

A theory-creating approach with this limited amount of material will not be as complete as if there were more material to build the theory/hypothesis on. It will also be a factor when talking about generalizability of the findings in the material.

A case study, in the form I use in this thesis, depends a lot on the respondents, and one have to consider that the interviews take place under different circumstances (Wallén, 1996: p.117). For example were there municipal elections a few days after I did the interviews and the respondents may have been more or less anxious and involved in this.

To interview respondents are hard and a tricky thing to do, and it takes years of practice to perfecting, if ever. The fact that the respondents know and also can see that the interview is being audio recorded, may affect the interview (King and Horrocks, 2010: pp.44-46) negatively. The sound quality of the audio recording may also affect the actual converting to text. One thing one has to keep in mind when doing interviews is that the respondents may not speak the truth all the time, but one must assume that they do.

When searching literature one can miss important material because they have used some other word for key factors that one doesn’t anticipate.

Scientific quality

Validity

To increase the validity of my interviews and my support material/questions (Appendix 1) I did a test interview with a chief’s person working with Lean in her daily work (Holme and Krohn-Solvang, 1997: pp.175-176). This to see if my support material/questions (Appendix 1) lead to the supposed

1 www.google.com
areas of information that is relevant for my thesis and so the “questions” was understandable (Holme and Krohn-Solvang, 1997: p.163).

**Reliability**

I have as suggested by Holme and Krohn-Solvang (Forskningsmetodik - Om kvalitativa och kvantitativa metoder, 1997: p.167) created a support material/questions for the interview so I can as close as possible follow the same routines in every interview, this to increase the reliability. How and where the interviews will be conducted is specified and with what technology I will record the interviews have been described in detail in the chapter Interviews.
Theoretical framework

In this chapter a short description of definitions and taxonomy within Lean and IT-support will be presented. There after theories in and around Lean will be presented.

Taxonomy & definitions

Lean concept will just be described in an essential way with the most necessary facts for the reader to understand the basic things.

Muda

Muda is a Japanese word for waste, the kind of waste that human activity generates when using resources and not create any value from the activity, mistakes that need to be corrected, production of non wanted products just for storing, unnecessary process steps, unnecessary movement of employees and transport of goods, people in a downstream activity waiting on a non delivered upstream activity, products or service that not matching the customer needs (Womack and Jones, 2003: p.16).

Lean or Lean thinking or Lean production

Lean or Lean thinking is an “antidote” to muda (see explanation muda). “Provide a way to do more and more with less and less”. A way to find and specify value, order the value-creating activities in the best sequence, without any interruption conduct these activities despite if someone request them, do things more and more effectively (Womack and Jones, 2003: p.16).

In an outline of Lean thinking, the preface to the 2003 edition (Womack and Jones, 2008: p.1) there is five Lean principles specified:

- **Specify values** – the only one that can define value is the ultimate customer.
- **Identify the value streams** – all actions needed to get the “product” to the customer is a value stream.
- **Flow** – Do so the value creating steps flow.
- **Pull** – let the customer pull the product from you. “Sell one, make one”.
- **Pursue perfection** - always find ways to reducing time, space and mistakes.

In Lean you need to have the directors/managers with you in the process, “The shop floor (where people work) is a reflection of the leaders” (Bicheno, Anhede and Hillberg, 2009: p.1)

Process or business process

A process is a collection of structured, related tasks or activities that leads up to a product or a service (Zchiz et al., 2011).
Lean manufacturing
Two pillars in Lean manufacturing are Just-in-time (see below) and autonomation. Autonomation is a term that groups procedures together for stopping the production line in case of error, methods to eliminate these causes and problem analysis (Houy, 2005: p.57).

Lean IT
The definition of Lean IT that Bell and Orzen present (2011: p. 9-10) is simple to understand and at the same time very informative:

“Lean IT engages people, using a framework of Lean principles, systems and tools, to integrate, align, and synchronize the IT organization with the business to provide quality information and effective information of processes. Lean IT has two aspects: outward facing, supporting the continuous improvement of business processes, and inward-facing, improving the performance of IT processes and services.”

JIT (Just In Time)
Is to produce and deliver the right item at the right time in the right amount (Womack and Jones, 2008: p.7).

5S
Is the most popular tool in Lean because it is easy to use, often a positive influence on productivity and quality and can be used by all. One thing negative with 5S is that it could cause the focus to move from what is really important. The 5S’s stands for: Sort, Systemize (correct or sort out), Shine (visibility, clean), Standardize (secure or stabilize) and sustain (self discipline, create habit) (Bicheno, Anhede and Hillberg, 2009: pp.79-81).

Kaizen
The continuous and incremental improvements (Womack and Jones, 2008: p.7). “Kaizen uses rapid improvement events to make small, quickly introduce changes” (Radnor et al., 2006: p.20). Kaizen-blitz (or RIE, Rapid Improvement Event) is a way to introduce Lean by focus on the process or key area in a few days (Radnor and Walley, 2008: p.14).

Kanban
Some sort of signal (often a card) that regulates pull by signal upstream operation and delivery (Radnor et al., 2006: p.77).

“Lean toolbox”
The toolbox is the tools and technique used for implementing Lean, like Kaizen-blitz, JIT, 5S, Kanban etc. (Radnor and Walley, 2008: p.14).
Theories around Lean

IT in Lean

I wrote in the background of the thesis, IT-support and/or IT is widely spread in organizations, both private and public. And as Steve Bell (Bell, 2006: p.36) say when he is talking about “where IT fit in?” it is to put the right information to the right place at the right time, in right format, and then ends with, that’s a “powerful tool for continuous improvement”.

According to Womack and Jones (Lean thinking, 2003: p.19) when starting with Lean one has to ignore existing technologies and assets and to start from the beginning all over again. “Install new business system to encourage Lean thinking” (Womack and Jones, 2003: p.261) As told in the chapter with the title of the quoting from the earlier sentence, when you have gained momentum and rethought the organization and are on the way towards a Lean transformation but you still have to make it self-sustaining. After a while with doing things better and better you need a new way of keeping track of everything and reward people for continuously doing the right things, and keep all in the organization transparent for all to see. Then they also can see what to do and how. An at the end it is time to “systematically rethink your tools, ranging from monster machines in the factory to computer systems for scheduling, with the objective of devising right-sized technologies which can be inserted directly into the value stream for individual product families” (Womack and Jones, 2003: p.261). In short terms when things are going a little bit smoother after a while in the transition to Lean, you are going to need some sort of ERP system(Enterprise resource planning system), that is an integrated IT-system that handles the organizations information management, often also named as business system (JAnDbot et al., 2011).

The use of a virtual collaborative workspace can help Lean with things like “distributed team works in unison, tightly coupling learning with action”. Other capabilities could be communications, document management, task lists, and reports and also links to material on other places, this is called simple implementations of collaborative workspaces. There is also a thing called sophisticated implementation and there are things like scheduling and group calendars, dashboards, automated status alerts and score cards. Lean is a team sport (Bell and Orzen, 2011: p.127). The use of IT gives many opportunities of fancy business intelligence tools, such as visualization, statistical analyses, data mining, predictive analytics and so on and on, but as they say in the book, Lean IT: Enabling and sustaining your Lean transformation (Bell and Orzen, 2011: p.133), “from a Lean perspective, a simple business intelligence approach used effectively is far better than a sophisticated tool used improperly”, which is actually a very obvious thing but this could be easy to miss with all the new technology.

An aspect of Lean and IT are the one that the book, Lean IT: enabling and sustaining your Lean transformation (Bell and Orzen, 2011: pp.249-250) shown with a figure (Figure 5), is that there must be balance between the three key elements – people, process and technology. The sweet spot in the figure is the thing to strive towards. No one of the three elements should be too dominant or too weak, but the people must lead the way through a transformation. Or as they write in the book:
The success of Lean IT, and the future of a sustainable Lean enterprise, relies upon people, process, and technology, in that order.

(Bell and Orzen, 2011: p.250)

Figure 5: Balancing people, process and technology (Bell and Orzen, 2011: p.250)
Result

In this chapter publications of Lean from the municipalities and the result of the interviews will be presented divided in the different cases. At the end of the chapter there will be a short discussion about the validity of the results.

Interview respondents

All interviews were between 40 minutes to a little over one hour.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Worktitle/ work description</th>
<th>Location of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trollhättan city</td>
<td>IT- manager</td>
<td>Respondents office</td>
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<tr>
<td></td>
<td>Department manager:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Payroll &amp; Personnel office</td>
<td></td>
</tr>
<tr>
<td>Alé municipality</td>
<td>IT- manager</td>
<td>Respondents office</td>
</tr>
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<td></td>
<td>Sector manager:</td>
<td></td>
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<tr>
<td></td>
<td>Built environment (Technology, property, environment, planning &amp; construction)</td>
<td>Study room at University West</td>
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<tr>
<td>Mellerud municipality</td>
<td>IT-manager:</td>
<td>Respondents office</td>
</tr>
<tr>
<td></td>
<td>IT, Personnel &amp; Labor</td>
<td>IT-managers office</td>
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<td></td>
<td>Department manager:</td>
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<tr>
<td></td>
<td>Rehab &amp; Home medical team</td>
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<tr>
<td>Kungsbacka municipality</td>
<td>IT-manager</td>
<td>No interview</td>
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<tr>
<td></td>
<td>Department manager:</td>
<td>Conference room at the respondents office</td>
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<td></td>
<td>Building permits and planning</td>
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</table>
I will further on in the thesis only name the respondents as IT-manager or Department manager from their municipality, for example IT-manager Alé or Department manager Alé.

Public documentations about Lean from the Municipalities and interview summaries by subject areas divided in cases

The rest of the answers from the interviews, those who are not in the text below will be in a compilation (Figure 7, page 29). All questions will be summarized as objective as possible and be presented down below, divided into municipality cases and by IT-manager and Department manager.

Because the interviews were done in the Swedish language and the websites I used is also on Swedish. So all of the quotations been translated into English, with the risk that the quotations that has been used may have been altered slightly.

Case study 1: Trollhättan city

In a reportage in the Trollhättans personnel journal, Stadsporten (Axelli, 2010: p.6), about the payroll department, they talk about how important the payroll process is for all employed by Trollhättan city. "The payroll ‘Leanish’ the payroll process", they tell that they have tried several models for the work with the "quality questions", but got stuck on the Lean thoughts and work ways. The article says that they "began by doing a visualize of the hole process, finding time losses, and quality problems in areas as sick leave, contract of employment and vacations".

**Interpretation of Lean**

**Department manager Trollhättan:** About the knowledge of Lean the respondent say "Has a pretty good grip", the respondent is familiar through courses and have read literature and have also conducted a value stream map of a school. The respondent interprets Lean like this, "Lean means a systematic way to review its internal processes so you really do the right things from the beginning and at the right time, so that you don’t have to make a lot of tie-backs and sit and wait".

**IT-manager Trollhättan:** The respondent self say "very little knowledge about Lean, have read a book on 80 pages". But the respondent also says "have been to some seminar some time". The respondent interpret Lean as "grassroots-based organizational development of those who actually do the work", to take away work that don’t add anything to the process chain. And continue with "that’s what I hope that Lean mean because that’s how I want it to work".

**The use of Lean**

**Department manager Trollhättan:** The respondent says about, why Lean, "Tried to get more structure in the processes, felt that things just floating around". The respondent explains that they have tried many different system models from books but these tried systems only helped for the moment. Another thing the respondent said was "I want it to sit here (pointing to the neck) in the neck, to always think, why am I doing this and is it the best for our “customer”? That requirement was to be found in Lean and that’s why the respondent was hooked on Lean. One other aspect is that the government contributed with money to Trollhättan city for testing Lean. Been using Lean since 2010.

**IT-manager Trollhättan:** The city directors have given signals about Lean but at the end it is up to the department to decide. The inspiration to read about Lean comes
from a friend that is a Lean specialist and from a seminar, from lectures from other municipalities that use Lean. This department don’t use Lean at the moment but the respondent is not in any way opposed to it either, quite the opposite.

**Factors that can influence Lean**

**Department manager Trollhättan:** Here the respondent is talking about that the directors/managers can be a factor, how in the process they made them work differently and do some work that the payroll department earlier have done. Reactions from employees and managers, positive, can also affect the outcome of Lean according to the respondent.

**IT-manager Trollhättan:** The respondent says “positive managers” as a factor that can affect or influence Lean.

**The consequences of using Lean**

**Department manager Trollhättan:** See earlier area, and they have removed the fax. They have more time over that they invest in more improvements. Better quality. Bigger commitment from the employees, and bigger understanding about that all processes might be connected to each other.

**IT-manager Trollhättan:** The respondents department does not use Lean yet but see the consequences of using Lean should be an organization development in a more structured work way, a structured way.

**Continuing to work with Lean**

**Department manager Trollhättan:** The respondent use a short but clear answer and this is yes, and they do it continuously and says that Lean is an ongoing process.

**IT-manager Trollhättan:** Don’t use Lean yet.

**Computer programs**

**Department manager Trollhättan:** What kind of computer programs the department has is answered in this way, “It is the normal that you have in municipalities”, and with this the respondent mean, HR+, a personnel system and a pay system and the Microsoft Office package.

**IT-manager Trollhättan:** The department has a lot of different computer programs available for the employees both in their own department but also in others and clarifies it by saying “everything from Mulle Meck build cars cornflakes edition (we say) to financial systems, personnel systems, healthcare systems, livelihoods support. Tell that they have 20 major systems and 10 or so really large systems, HR+. “Every department decide themselves which IT-system to use but they have to talk to me before they can buy it, but I can’t say no”. The respondent has an advisory role.

**The desired behavior of IT-support and Lean**

**Department manager Trollhättan:** When asked about how they would IT-support and Lean to work together, the answer is, something like: a system for entering the

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2 [http://www.aditro.se/programvara/hr-och-lon/losning-for-publik-sektor](http://www.aditro.se/programvara/hr-och-lon/losning-for-publik-sektor)
identification in, especially the big paper (value chart analysis my interpretation). It would be easier with a data system, instead of making it by hand. The respondent would like to have a computer program that supports the processes, to make a summary of them. “Have track of when and how and how many forms that are received”.

IT-manager Trollhättan: The respondent here say” A better link between processes and system, more transparent” when talking about what Lean really is. And mean that it is to be able to visualize the process in the system support, and system support for drawing up the processes to integrate them in the system and be able for customer to see where in the process the action is.

**Case study 2: Alé municipality**

Alé municipality has had representatives on conferences where they have lectures on their use of Lean in the building permit process. Where they have talked about things like why Lean, the mapping and analyzing of the organizations processes and flows, and about their winnings, result and experiences with Lean (Teknologisk Institut, 2009: p.3).

**Interpretation of Lean**

Department manager Alé: The respondent says that Lean means so much business value as possible with as little resources as possible to become more efficient. Furthermore the respondent says it is a common understanding of the work, orderliness, a common approach towards the goals, less vulnerability and finishing it up with “a better work environment”. In a continued attempt to set words to Lean the respondent say that ”Lean is a mindset, a culture that shall run thru the organization”. How long the respondent have “been doing this” with Lean is since 2006, but still don’t consider oneself not knowing a lot about. The knowledge has been collected by reading and by participating in educations. Still the respondent have had the work way and way of thinking many years, and have even given lectures of Alé municipalities work with Lean.

IT-manager Alé: The respondent’s interpretation of Lean is that it is a way to map processes, “process-oriented approach, I think it means”. Sees it as a process thinking in the usual work situation and that “Lean is soft values”.

**The use of Lean**

Department manager Alé: The respondent explains why I chosen Lean am because Lean uses already created concepts with bottom-up perspective and visualization instead of as many other systems and concepts that use a more top-down perspective. This means for an organization that have a lot of “different levels on the departments” it will be easier to look at each department at a time although everybody are trying to reach the same level at the end, “everybody will achieved the same things”. The respondent also pinpoint that the co-workers will get a better grip of why things (read processes) are done and why they are done in a certain way. The respondent has used Lean since 2006.

IT-manager Alé: The respondent tells that they don’t use Lean, but uses something developed in the municipality called the “wheel of knowledge” as a part of the improvement program, “quality ladder/step”, which is process-oriented. Something that’s also said is that the respondent believes that “it is supposed that it should comply with Lean concepts”. On a question if there have been any statement about that they should work with Lean, the answer is “no, no, no we have never talked about
that Ale municipality shall work with Lean, not as long as I have been here”. The proposal of using the “quality ladder/step” and “wheel of improvement” comes directly from the top. In these concepts there is a point about starting with process mapping, but there are no explicit methods for how to do it according to the respondent. And the respondent lacks knowledge and education to use Lean. The respondent has been on the job for two years.

Factors that can influence Lean

Department manager Alé: According to the respondent there are a lot of factors that can influence Lean, “it has to be many”. Then comes a line of factors like, the time, the skills to make a value mapping, to have the support from the management is another thing that’s mentioned followed up with the support from politicians. One other thing that is said after some thought are that it cannot be seen as a way to save, because then it can lead to as the respondent describe it “then you have no staff with you in the process”. As a finishing of the factors that can influence Lean the respondent point out that there must be space/room to actually do the things one have came up with.

IT-manager Alé: Because of the respondent don’t use Lean will I set it against the “quality ladder/step”, and the respondent says “that you get a understanding of what you do”, and continue with “if people don’t see the use of it” then they probably won’t use it either, and ends with that the interest and the need have to come from the top.

The consequences of using Lean

Department manager Alé: To identify all processes is the first thing the respondent say about consequences of using Lean. By that meaning that you must have a clear view of which tasks that actually exists in the organization. Because of that “each service contains very many consequences”. With Lean the workers can see for themselves what is happening and why. This way of work will further lead to a lot of talks about where the actual problems are, without having any ‘scapegoats”. The respondent also says that Lean “involves all that doing the actions”. And at the end state that Lean has increased legal certainty and that the case handling time has been shortened.

IT-manager Alé: In this case I have used the same question but changed the word Lean to their quality “ladder/step” and the respondent answer “no, not at the IT-department anyhow”.

Continuing to work with Lean

Department manager Alé: They used and used value stream assessment and improvement teams in those places where they had/have problem. They use a thing that they call the “quality ladder/step” to identify processes, in this “quality ladder/step” the “improvement wheel” is a basic thing, and this is something that applies to the whole municipality and not only the respondents part. In the “quality ladder/step” Lean are a tool to chose of, and then with value stream mapping as a method. The respondent says that the next step to be worked on after the inventory are along to the process map prioritize which processes who should be made a value stream map on. The respondent also says that to “think Lean takes many years to implement”.

IT-manager Alé: The respondent says they do not use Lean, but the work with the “quality ladder/step” is still in progress.
Computer programs

Department manager Alé: When the respondent talks about what computer programs that are used by the respondent, it is programs like, Microsoft Office-package, ClickView³, HR-⁴, Economa, personnel and economic system. The respondent tell that they at the moment doing a total “see thru” of the programs and say, “All together it is two full A4 pages just with programs” the respondent says when trying to explain how many programs there is for all employees to use, in every area, for example, Plan & build, Elder care, Environment, schools, Rescue, GIS and so on. “Every department has specific case management systems”.

IT-manager Alé: The respondent tells that the IT-department serves as a support for the administration when other departments need to acquire new systems. The IT-department are only manages the actual database for the system and a person with special knowledge of the actual programs is to be found at every department. The respondent also says that they are in position of changing systems, they have just updated to Microsoft Office 2010, Exchange 2010 and “Linc with the new unified communicator”. Another thing is that the IT-department has a special system for case management and support which errand that’s going on for the moment. Furthermore says the respondent that they have no IT-support for the “quality ladder/step”, but then just a minute later say that “we use Visio but that’s probably just in the IT-department”, and then declares that everyone has access to the program they just have to ask for it first, no one have it by default. The use of Visio is according to the respondent to “document processes, and to make different use cases”, where they draws the processes for the e-services to be.

The desired behavior of IT-support and Lean

Department manager Alé: The respondent explains that they have had difficulty to understand what is needed, they have been checking up against the project part, and then at MS Project. The respondent also says that they need some sort of project management support, so all can use it in all different kind of works. When wishes upon how such a system should be the respondent mention things like, the system should be easy to work with, it should not need much of special competence to use it, as for functions the respondent want the system to be able to work with in the same way that you use the paper or the board, and be easy to alter things in. Then as something of a punch-line the respondent ends it with “it should be cheap, simple and have great customer benefits”.

IT-manager Alé: The respondent finish by saying that they should have an IT-support in relation to business processes, “we should not buy an IT-support and adopt the business processes to that, it should be contrary”.

Case study 3: Mellerud municipality

At their website (Mellerud kommun, 2010) they have a Lean document, continuous improvements – dare to challenge your processes. Were they state that every department use some part of Lean, and they hope to use the thinking, philosophy and tools in the whole organization. Also have all managers been studied Lean during 2010, and 2/3 of the employees have had an inspiration day about Lean.

Voices about Lean in Mellerud (Mellerud kommun, n.d.) is another webpage on the municipality website where they have gathered quotations from employees like, “when we started with 5S was

⁴ http://www.aditro.se/programvara/hr-och-lon/losning-for-publik-sektor
there a big concern that we should get rid of ‘good to keep stuff’, but the result has instead become
good order of things and more space’ and “can summarize that the work we have done with value-
flow analysis and 5S is small changes but the perception is that there are improvements”.

**Interpretation of Lean**

**Department manager Mellerud:** When the respondent interprets Lean it is first and
foremost as flows, “flows so that it will be as smooth as possible”, then waste is
another thing that’s the respondent points out and continue to tell is that waste is one
of the first thing they look for when they go thru processes. According to the
respondent there are two ways of Lean work, one is more rigorous, “the long process”,
where all the big things are done, like checking all the processes and wastes and you
walk thru all flows so it will be easy to clearly see why things do not work. The second
way is where there is a problem just decide what to do directly, “this is how we do
instead” and don’t look at why it has become a problem.

**IT-manager Mellerud:** The respondent interprets Lean as taking advantage of resources
as well as it possible can be done. Then the respondent continues with “Lean is a
philosophy, the philosophy has in various been used to build a core value of what Lean
should stand for”. The respondent tells that “Lean is a pulling concept, when
something is requested then and first then a process starts”. When the respondent is
asked about the knowledge of Lean the answer is “I would say that I am very well
familiar to it”, and the respondent tells about studying Lean at university and
furthermore have taken extra points in the subject at Chalmers’ where the Lean
concept was in a broad perspective but linked to the participants workplaces. The
respondent is also in a group of 5 persons who provide training in Lean for the staff in
the municipality.

**The use of Lean**

**Department manager Mellerud:** The respondent thinks the knowledge of Lean is
reasonably versed. The knowledge has been caught by being with in educations and
also by doing processes in the healthcare group. Lean has been introduced from the
management and the management has also provided support for those groups who
want to work with Lean. The decision is however for each group to make. The
respondent has as every department managers been taking part in municipality
attended information sessions on Lean where the subjects has been, why Lean. Time
savings is one thing that’s addressed on the meeting as a god thing with Lean. This is
something that the respondent have snapped up along with that it will make a more
structured way of working, so there will be easier to see what has been done and who
that did it. The respondent also talks about training days where they have played a
“Lean-game” and looked at certain processes together.

**IT-manager Mellerud:** Lean is used throughout the municipality, from top to bottom,
according to the respondent and why it was become Lean was determined following
discussion of the management team. The respondent says that one reason of Lean is
that all municipal directors in Dalsland attended a training course on Lean organized
by Chalmers. Another reason can be the fact that the municipal director in Mellerud
earlier worked in Vara, where they were very early with Lean in the Municipality which
probably has been an inspiration the respondent say. Despite that they have worked
with Lean in three years the respondent say “there is a lot left to develop and to find
around the methodology and the core values of Lean”.

5 Chalmers is a university in Gothenburg
Factors that can influence Lean

Department manager Mellerud: When the factors that can influence Lean is the topic the respondent immediately says patients and then follow up with time as major facts and ends with the supply of nurses. The respondent tries to explain that it will be hard work, “it becomes a vicious circle”, and by that mean that if a work with Lean is planned, but then instead of doing a thing that reduces time they might have to nurse patients that demands a lot of time. This means that they have to postpone the Lean work until later when they have the time, “you can have a good plan, but then reality will catch up on you”.

IT-manager Mellerud: The respondent sees a factor in what may affect the Lean process and it is politics, and also in combination with laws and regulations of according to the respondent “which we have no control”. Politicians can also be a factor or as the respondent put the words “especially if they are not completely with on the Lean concept regarding thoughts and ideas”.

The consequences of using Lean

Department manager Mellerud: The respondent tells that when they find waste in the processes they try to find a solution that could solve this problem. They use, now and even before they began with Lean, a binder where they keep all their routines how things should be done, or as they call it a “routine binder”. This binder has all procedures that apply to any procedure that has to be right and work for the patient, and then not the actual treatment of the patient but the rest. When it comes to the hard routines that do not work properly they use Lean in order to get it to work better. Why they would not do Lean on every routine the respondent explains by telling that this would take much too long time to be realistic too do, “if we would Lean all routines we would not have time to do anything other”. The work according to the respondent gets much more structured and that processes and flows that is hard to handle will be easier to solve, “make complicated flows easier”. The respondent also says that Lean will make it easier to get the staff involved in the work because they can see what goes wrong when showed in flows, “it will be so visualized, it becomes so clear”, and furthermore will the staff understand the processes better. Another consequence the respondent mention is the quality increase, and explains It by saying that if one can make the flows better then you will get better time with the patient and also this time will make it possible to do other good things.

IT-manager Mellerud: The respondent begins by telling about that the departments or groups have to begin from the start with 5S and what values the municipality has and by doing a process mapping. For the users the biggest consequence is that they will have more time to work on improvements, “you get more time to do things better” which means that more time providing better quality and better quality means more time according to the respondent. The worker have thanks to Lean gained more time, they don’t have to look for things anymore because everybody knows where they are and that extra time has been used to develop the concept of Lean even further and this in turn gives a less stressful environment. The respondent believes that even customers notice the difference because the employees not are in such a hurry all the time and this will lead to less stressful meeting with the customer.

Continuing to work with Lean
Department manager Mellerud: The respondent says that they will continue with Lean, but not in the extinct as they want, “one week every six months would be nice”, but that time does not the daily work permit because of the work with the sick people is hard to predict, the workload can vary tremendously.

IT-manager Mellerud: The respondent says that there is a constant working with improvement when using Lean, “Lean is continuous improvement”, the respondent also says that even thou the process map are made once it does not mean that there is no need to do it over again, “a process map must be done over and over and over again”.

Computer programs

Department manager Mellerud: The respondent make a short lecture about what programs they have to use and mention programs as, Procapita\(^6\) (an IT-support for healthcare), E-dos\(^7\) (a pharmacy program), VK\(^8\) (virtual office for staff). The respondent continues with “and then there is the usual, folders and Word documents and PowerPoint, I work a lot with Excel”, the respondent don’t use the word Office package until I ask if they have the hole Office package and the respondent confirms. Instead the respondent talked about it as I earlier described, I more or less experienced that this is something I should know because it is so obvious things. The respondent tells that they do not have any IT-support for Lean but also tells that all work is documented and transferred to Word-documents, “I make flows in Word, flow arrows and boxes and then write what steps to make”. The respondent have never reflected over why there is no special IT-support, however when participate in a regional meeting they used a system/program with possibilities to write flowcharts. But follow up with that such things should be suggested by the experts on Lean, “I expect that it will come from those working with Lean, I mean those who have attended an instructor training”.

IT-manager Mellerud: The respondent tells about that there is a work going on with the improvement of computer programs in the municipality. The way a department acquire software is different, sometimes they have a proposal that they want us to consider and sometimes the ask us if we know about any program that might work, but usually they sit down together and discuss their way to a suitable software, this according to the respondent. When I ask about what programs there are available the respondent exclaims “shall I count up all those?” and on the question if there is many I get the answer “oh, yes, my god” and starts to explain that there is over one hundred programs, but not everybody has access to all programs, it is a question of licenses so only those in need will gain access. All programs are used but the Microsoft Office-package and Procapita (a healthcare service program) are most used. The respondent say that they have a system, VK (virtual office), where they do all of their internal information and document, every employee have an account. VK have approximately 4 million unique documents and 12-13 million discussions, and there is possible to connect a document to a discussion. Another program mentioned by the respondent is Stratsys\(^9\) which is a goal attainment program that “automatically also become a Lean support”, so can also VK be used; it depends on as the respondent say “the way you look at it”.

The choice of not having an IT-support for Lean is according to the respondent a conscious choice, “because the employees are not ready yet”. Instead they will use their

\(^9\) [http://www.stratsys.se/](http://www.stratsys.se/)
senses to work with the values, with “color, hands, smell and touch”, all in a way to impress the basic values and work ways. The respondent explains by telling about the use of post-it notes when doing process evaluations.

The respondent concludes that “the IT-support for Lean will be used some day!” Then explains about the benefits with a IT-support. With the help of an IT-support you can get Lean out on the field very quick and cLeanly, direct to the workers, and continue by saying that “the Lean toll I’ve seen shortens the process time, another way to work with what Lean is for, to streamline and get more benefit and I do not have to spend a lot of time creating benefits but can take tools that will help me in the next mode and by that get more time for other things”.

**The desired behavior of IT-support and Lean**

**Department manager Mellerud:** The respondent thinks it would be easier with an IT-support instead of all the “notes” that are included when doing Lean processes and flows. It would be easier to move the different notes around and at the end have computer print-outs instead of handwritten notes when communicate with employees.

**IT-manager Mellerud:** The respondent has a vision that the municipality will be completely hardware independent, that they not will be locked to the PC environment. When not locked to PC’s there could perhaps be a different view on some IT issues, could bring new knowledge into the purpose of improvements.

**Case study 4: Kungsbacka municipality**

In a document (Kungsbacka kommun, 2009), a story about the planning permission boards year (2008) the department of building permits tell about how they have made a process fluoroscopy with the help of “Lean management”. That the mission was to enhance security in the work process for the employees, and by doing that better use both resources and competence, and also shorten the work process at the same time as the quality of the rule of law and equality processes will improve.

**Interpretation of Lean**

**Department manager Kungabacka:** The respondent say when talking about the interpretation of Lean, “We usually say, like this: Order and clarity, visibility and collective conscience”, that is some of the “point words” initially used. “Cannot interpret in a way, it must adapt to our business”. The respondent said that visibility is important but also to systematize, rationalize or removing unnecessary elements without stressing. Continuous improvement, improvement wheels that sets ideas, changes and improvements. “It is a living work methods, one must not say that we have implanted Lean, We are doing Lean all the time”. The way they work with Lean is a own variant or as the respondent say “we have developed it ourselves” with some guidance from the consultants.

On question about respondent’s knowledge the answer is “had a little idea of what it was”, and later the respondent say “I think I am well familiar of the basis of our production model”. The respondent also mentions reading some and have had a lecture from a represent from Alé (they used Lean) and have worked together with the hired consultants when Lean was introduced.
At the end of the interview the respondent also say about how they interpret Lean, “Lean is an umbrella, how we work” and continues with “Lean is a say: is there a way to improve our way of work”

**IT-manager Kungsbacka:** No interview

### The use of Lean

**Department manager Kungsbacka:** They work a lot with business issues, everything that is about us in such work, attitude towards customers, to do as good job as possible. The building permit process is very essential for a person or a company, and something they want as quickly as possible. One thing that affects the speed of the process is legal regulation for what steps that needs to be taken. “To get a shorter holding time for each errand was an important incentive for us”. They could choose handle it themselves or hire a consultant. They choose consultants. Under the process of getting consultants they heard about Ale and that they used a new method called Lean, so they invited them to talk about it. The concept was very appealing with “a lot in front perspectives, we who work with it, and not so much someone from the outside telling us what to do”, we could self see “how we could do and be able to improve ourselves”, this meant another role for the consultants so after that seminar they stopped the process of finding just a consultant and instead start a new process of finding a Lean consultant.

**IT-manager Kungsbacka:** No interview

### Factors that can influence Lean

**Department manager Kungsbacka:** In some cases the time is factor that can influence the Lean work, “Time aspect is an outer fact that can affect”. Another thing the respondent says would be an affect would be that to have a new e-services who can ensure that the incoming documents are more complete from the start and by that meaning, how good or bad a incoming document are have impact on the time and then also on Lean. Human thing could affect, like when people are sick, away and so on, the “human factor”.

**IT-manager Kungsbacka:** No interview

### The consequences of using Lean

**Department manager Kungsbacka:** They changed the way of working with files, instead of having a few or more cases at each employee so are all cases in a flow rack and available for all. Employees just take one case at a time, that way all can see what kind of workload there is just by locking in the rack, “make it visible”, and not even have to count the cases and even more the cases are in a better order. This has streamlined the management of documents. Lean gives per automatic a better sense of order and employees feel good. The customers also notice it because the waiting time for cases gets shorter, when talking about the “normal cases”.

**IT-manager Kungsbacka:** No interview
Continuing to work with Lean

**Department manager Kungsbacka:** On how they are going to continue with Lean the respondent said, “It is a living work methods, one must not say that we have implanted Lean, We are doing Lean all the time”.

**IT-manager Kungsbacka:** No interview

Computer programs

**Department manager Kungsbacka:** The respondent says that everything is registered in a database and we have a system Byggreda that is our head system. Byggreda is used to handle/manage, diary both incoming and outgoing cases. They also have Microsoft’s Office-package and Cartago, a GIS program. Nothing especially for Lean “it is not possible to distinguish this, our IT support is our Byggreda, our database where we bring in all actions”, and in their work it is to diary cases so it can “be found now and then and historically”. This is really important and a part of their Lean. So they cannot break out that they have a special computer support for Lean, “we are working in Lean and our support is the then Byggreda is the sole function of our case management”. The respondent also says “We do not need a special Lean IT computer support, but the Lean work was adopted” to what they already had. But just in a sentence later the respondent say that they have created a module to see the flow better, do a better flow analysis. Another thing said is “we don’t adjust for Lean; we look if Lean can benefit us or make us work according to other principles when we analyze our processes”.

**IT-manager Kungsbacka:** No interview

The desired behavior of IT-support and Lean

**Department manager Kungsbacka:** To have an IT-support (ex. E-service) who will see to that all documents are already checked, that all rules and regulations are completed, that all needed information is already included and so on, this before the document can reach the building permits department. An e-service or support where it would be easy to inform customers and where they could obtain all the useful information for themselves, this would be desirable.

**IT-manager Kungsbacka:** No interview
### A compilation of more subjects/questions

<table>
<thead>
<tr>
<th>Case study/ Municipality</th>
<th>Respondent</th>
<th>Estimated use of computers and computer software at work</th>
<th>Do you use any IT-support for Lean?</th>
<th>Were there any thoughts around some IT-support for Lean when Lean was introduced?</th>
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<td>Case study 1: Trollhättan</td>
<td>IT manager</td>
<td>“100%”</td>
<td>“No”</td>
<td>Use ‘Leanish’ approach and not real Lean yet</td>
<td>“if the system in use describe the process, things will be transparent for everybody”</td>
</tr>
<tr>
<td></td>
<td>Department manager</td>
<td>“About 80%”</td>
<td>“No”</td>
<td>“yes, but the Lean consultants said no”</td>
<td>“That you don’t see the philosophy of Lean”, “to show processes”</td>
</tr>
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<td>Case study 2: Alé</td>
<td>IT manager</td>
<td>“Everything”</td>
<td>“No”</td>
<td>“not specifically for Lean”, “have tested programs for processes”</td>
<td>“No, just support for document... well maybe”</td>
</tr>
<tr>
<td></td>
<td>Department manager</td>
<td>“Entirely dependent”</td>
<td>“No”</td>
<td>“not any”</td>
<td>“clarify”, “speed up”, “easy to do changes”, “access”</td>
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<tr>
<td>Case study 3: Mellerud</td>
<td>IT manager</td>
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</tr>
<tr>
<td></td>
<td>Department manager</td>
<td>“All day”, “big part, about 30%”</td>
<td>“No”</td>
<td>“No, expected to receive proposals from IT”</td>
<td>“Yes, easier to compile in a IT-support”, “everybody have access to it”, “flowchart”</td>
</tr>
<tr>
<td>Case study 4: Kungsbacka</td>
<td>IT manager</td>
<td>No interview</td>
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</tr>
<tr>
<td></td>
<td>Department manager</td>
<td>“In virtually all”</td>
<td>No interview</td>
<td>“Not a specific”, “created a module for flow analysis”</td>
<td>“sometimes”, “change of measuring instruments”, “scan documents”</td>
</tr>
</tbody>
</table>

**Figure 7:** Usage and thoughts of IT & Lean

### Validity of the results

Because I used a semi-structured way of conducting the interviews and used a support (appendix 1) as a guide for me so I could check of all areas that my interview should cover, what I intended to get
answers about, this makes that the validity increases. Another thing is that I used quotations in the result presentation. The fact that I have translated all the text to English is not an increasing thing, rather the opposite, and this is also that I have summarized approximately 45 minutes of interviews to about 1 page of text. My pilot interview with the respondent from the private sector in Norrköping gave the same results as all of the other interviews; this is also a fact that increases the validity of the research results.

Reliability of the results

One thing that can influence the research result could be a regional factor, that all of the respondents are from the west of Sweden. This is however is not likely to be the case because the same results were shown from the pilot-interview with the respondent from the private sector in Norrköping (on the east side of Sweden).
Analysis and discussion

This chapter includes the discussion and analysis of the result I earlier found and stand these against my problem area and research question. A comparison with the reviewed literature will also be done, as well as shortcomings and benefits of the chosen methods.

Analysis of the different “cases”

Case study 1: Trollhättan analysis

Lean

Just to make it clear, the IT-department do not use Lean at the moment but the IT-manager is quite positive to use it in the future and use a “Leanish” approach. The department manager on the other side is using Lean and is very pleased. The managers have various knowledge around Lean, they both have attended lectures or seminars on the subject and have read about it. They interprets Lean a little different from each other in words, the IT-manager says “grassroots-based organizational development of those who actually do the work to take away work that don’t add anything to the process chain. While the department manager says ‘Lean means a systematic way to review its internal processes so you really do the right things from the beginning and at the right time, so that you don’t have to make a lot of tie-backs and sit and wait’. They have both the same essential view of Lean, to get rid of muda. The reason to use Lean was as the department manager says “tried to get more structure in the process” and that they got a fond from the government to test Lean. This is what will happen, if you look at the theories, if you do all 5 steps of the Lean principles correctly (Womack and Jones, 2008: p.1) you will get a more structured way of handling processes, flows and also a way to find and then get rid of muda. Both of the managers also point out that directors/managers can be a factor that can influence Lean and that make sense, it is hard to use a philosophy /system that people above in the hierarchy doesn’t approve to, because of “the directors/managers perceptions flows down towards the employees” (Bicheno, Anhede and Hillberg, 2009: p.13) in fact in Trollhättan, the city director has given signals about Lean, but in the end it is up to the different department to if use or not. There have been some consequences with the use of Lean for the department manager and that is that they have freed more time that they can “invest” in more improvements, and this is all in the line of Lean, pursue perfection (Womack and Jones, 2008: p.1) or kaizen (Womack and Jones, 2008: p.7).

Computer use and software

Both the IT-manager and the department manager uses computers and computer software really much, they estimate the use to “100 %”( IT-manager) and “80 %”( department manager) which mean that it is almost all the time for both and therefore also should mean that most of the work will be in digital form in some way and in their systems. As the department manager tells they have some system they use like HR+ and an economic system and then they use the Microsoft Office package. The IT-manager on the other hand have as understandable a lot more programs in a wide spectrum or as he puts it “everything from Mulle Meck build cars cornflakes edition (we say) to financial
systems, personnel systems, healthcare systems, livelihoods support”, and about 30 large systems and mention HR+, but he don’t mention the Microsoft Office package (although they have it) and the respondent says that they only have a advisory role on which programs the departments use. This I think is interesting that the Microsoft Office package is so obvious that we sometimes not even mention it or take for granted that everybody know that it is used, as I mentioned in the introduction about IT-support.

**Lean and IT-support**

There is a very interesting thing that becomes visible when looking at the result over Lean in combination with IT-support, no one of the respondents say that they use any IT-support for Lean (maybe not so strange with the IT-manager because they just use a “Leanish” approach not real Lean) even though they use the computer and computer software in almost everything (Figure 7, p.29). But the department manager had thoughts about some IT-support for Lean but was told no by the Lean consultants involved in the Lean transformation. The department manager thinks that IT-support could have affect of how to show processes but also thinks that it could be a negative effect to and that might be “that you don’t see the philosophy of Lean” while the IT-manager has only positive thoughts like “if the system in use describe the process, things will be transparent for everybody” around the affect software can have on Lean (Figure 7, p.29). According to the theories one should ignore the existing assets and technologies (Womack and Jones, 2003: p.19) but my impression is that the instead have more or less adapted to the existing technology instead, this may be because it is expensive to by new systems or that they don’t have started from an absolute “blank paper”. I think they are indeed using IT-support for Lean but not see them as IT-support for Lean because they are not special programs for Lean but instead supportive of Lean, for example a package like the Microsoft Office where you have figures to draw flowcharts with and are able to make many different calculations and I could even bet that the HR+ got some functions which is a support for Lean (even though I never have seen or tested the program). I even think that if they look at all the programs that the IT-manager mentioned they got, they probably find something that also could work in a Lean purpose. There is although as far as I can see it a good thing to have the Lean philosophy properly anchored, “I want it to sit here (pointing to the neck) in the neck” as the department manager described it, first and then involve technology but in some point you need to have new technology or adopt a existing (Womack and Jones, 2003: p.261) if you going to reach the “sweet spot” (Bell and Orzen, 2011: p.250). Furthermore both of the managers want in the future to have a Lean IT-support that visualize the processes and is able to draw processes and value chart analysis.

**Case study 2: Alé analysis**

**Lean**

In Alé the situation is the same as in Trollhättan, IT-manager do not use Lean but the department manager does, however the IT-manager (and the whole municipality) uses a thing called “wheel of knowledge” that is a part of a improvement program named “quality ladder/steps” and in these there is a point about process mapping. For reasons not so hard to understand, the IT-manager that do not use Lean have a little less interpretation about what Lean is, “process oriented approach” and process thinking in the usual work situation”, then the department manager that actually uses Lean and further more have done lectures about how Lean is performed in Alé, “Lean is a mindset, a culture that shall run thru the organization”, “Lean means so much business value as possible with as little resources as possible to become more efficient” and that Lean has a bottom-up perspective and visualization where the co-workers will get a better understanding why processes are done and how. I could say that both of them are right but the IT-managers view is that Lean is more of a method in Lean and the department managers is more of a philosophical way with the methods as a tools, like the original thought, as I mentioned in the introduction. The department manager says that the support from the management is a thing that can influence the Lean work the same goes for skills.
Per Eriksson  
Master thesis in Informatics  
University West, Institution of Economy and IT  
2011-06-06

(to do things as value mapping) and time is always a factor and that the politicians support it also. Lean cannot be seen as a way to save, in that case it is hard to have the employees doing it properly (department manager), and they have to see the use of it as the IT-manager said, Lean is a team sport (Bell and Orzen, 2011: p.127). I think that the "wheel of knowledge" and "quality ladder/steps" in reality is quite a lot like Lean thinking and that the IT-manager would get some of the methods that are missing from Lean and its tools (Radnor et al., 2006: p.77), the IT-manager said that "there is no explicit methods for how to do it" referring to the "wheel of knowledge" and "quality ladder/steps". While the IT-manager sees no consequences by using the "wheel of knowledge" and "quality ladder/steps" (do not use Lean), the department manager sees a lot, that they identify all processes and employees can see what is happen and why which can lead to more involvement from them, increased legal certainty, and naturally that time on case handlings have become shortened. This is another example of Lean thinking’s possibility to do things mere effectively (Womack and Jones, 2003: p.16).

Computer use and software

Even this time the usage of computers and computer software is massive, the IT-manager says in “everything” and the department manager tells that they are "entirely dependent" and so the conclusion is here as well that most of the material would be in digital form. The department manager describe that they use programs such as ClickView, HR+, Economa and the Microsoft Office-package but they have just done a "see thru" of all programs in the municipality and that this list fills two full A4 pages, and say "every department has a specific case management system". Some program that they have to be acquired according to the IT-manager, Visio is such a program (IT department uses it). The IT-manager serves only as support for the administration when a department needs a new system; the special knowledge is on the actual department in question. This can with my experience in procuring programs easily lead to that not enough skilled people take decisions.

Lean and IT-support

The same scenario as in Trollhättan analysis appear here, that despite the fact of using computer and computer software massive they say that they do not have any IT-support for Lean(Figure 7,p.29). And the thoughts about using some IT-support for Lean (quality ladder/steps in the IT-manager case) has not been there either although the IT-manager says they “have tested programs for processes”. Both of the managers (IT-manager after a short think pause, "No, just support for document...pause... well maybe") can see the usage of computers and computer software affect Lean. Department manager mention keywords like clarify, speed up, access and easy to do changes when talking about in what way IT-support could affect Lean. All these words fit right in the Lean thinking with the five Lean principles (Womack and Jones, 2008: p.1), and the strive to pursue perfection. And in this case as well as the one before I have the feeling that they have not started from a blank paper, that they have not ignored existing technologies and assets (Womack and Jones, 2003: p.19) and instead adopted them a bit to the ones existing. In this case the IT-manager has the program Visio, which is a program built to draw and show flowcharts and so on (Microsoft, 2011), and says that everybody can have it they just have to acquire it, it not accessible for everybody by default. This at the same time as the department manager says that they do not have any IT-support for Lean, the already available program Visio might do some of the things that the department manager talks about that IT-support could do, clarify, speed up, easy to do changes and access. This could be just a coincidence or maybe show a lack of communication between the departments. They actually already have a program that they could to some extent be able to work with in the same way that you use the paper or the board, and be easy to alter things in, Visio, and even the punch-line may fit in to Visio, “it should be cheap, simple and have great customer benefits” as the desired IT-support for Lean should be able to do. I am not sure if Visio is simple to use (every program tend to take a while to learn) or if the customers will have great benefits for it, but one thing I am sure of is the cheap part, because they already have the program. Neither Åle is right in the "sweet spot" (Bell and Orzen, 2011: p.250) of a successful Lean IT due to the missing of good technology for Lean. This case I think have had the same approach as I though the first case had, and that is that they did not ignore
existing assets and technology when first started with Lean (Womack and Jones, 2003: p.19), but instead started with the ones they already had as a base.

Case study 3: Mellerud analysis

Lean

In this case both of the managers use Lean but they still got different interpretations of what Lean is. The IT-manager sees it as a philosophy and a way to take advantage of resources as well as it possible can be done, and that is a "pulling concept" that the processes starts firsts when requested for. This knowledge of Lean has come from studying Lean and from taking extra courses in the subject at Chalmers University. The IT-manager is also 1 of 5 persons in the municipality that trains the staff in Lean and that every group or department start with 5S and finding values and doing process mapping. When the department manager interprets Lean the description is that it is first and foremost flows and finding muda in processes. There is also according to the department manager two ways to do Lean, one long with all the steps like the 5 Lean principles (Womack and Jones, 2008: p.1) and one where they just notes that it is wrong and decide what to do instead, without looking for the cause. The way the department manager uses Lean is more as a tool and not as a philosophy, because if they do the second one and they don’t find what is causing the troubles they might do the same mistake again which indeed is muda. At the same time the department manager sees Lean as a time saver and a structured way of working that will make it easier to see what has been done and who that did it. In this municipality the Lean use was determined by the management team. Lean is a continuous process (always pursue for perfection (Womack and Jones, 2008: p.1)) and as the IT-manager says “there is a lot left to develop and to find around the methodology and the core values of Lean". The factors that can influence is not seen alike by the two managers the department manager directly mention patients and the time or more correct the lack of time to do Lean work, while the IT-manager says politics and this in combination with laws and regulations. This is the only respondent that talks about politic even thou all work at municipalities, which are very much linked to politic. One thing mentioned by the department manager is that a consequence of using Lean is that the work being more structured, an easy way to show staff why and how things work, the quality increases because if you get the flows better then they will get more time with the patients and time to do other things. This is a bit of a contradiction when looking on how they use Lean, they only do Lean on the hard routines that do not work properly to get them to work better, and explain that if they should do Lean on all routines they "would not have time to do anything else". This could be one of two reasons as I can see it, one would be that this is a way of going thru all routines or it would be that they just do not have enough support from the top in sense of people or time to actually do Lean all the way. It should be as Womack and Jones (Lean thinking, 2003: p.16) says “a way to do more and more with less and less” and that is hard to accomplish when the time is no near enough. The IT-manager on the other side has a different view of the time perspective, they have because of Lean more time to improvements, and more time render in better quality and better quality render in more time and more time means more time to develop the Lean concept and so forth in other word exactly, “a way to do more and more with less and less” (Womack and Jones, 2003: p.16).

Computer use and software

Yet another time the usage of computers and computer software is massive but not as massive for both managers, the IT-manager estimate it to 100 % while the department manager says “all day”, “big part, about 30%” and then we have to consider that this is a healthcare group that goes to patients in their homes. I think this once again mean that there is a lot of digital material to handle. The programs the department manager counts up when asked of which programs they can use, is Procapita, E-dos, VK(virtual office) and ends with “the usual, folders and Word documents”, Excel and Power point, as I experienced it a obvious thing. The IT-manager said that they have over a
hundred programs and mention that the Office package and Procapita is the most used and that not all have access to all of these one hundred programs. It is a question of licenses so they who need the programs get it. How a department acquire a program could be different from case to case, but usually all sit together and discuss their way to suitable software according to the IT-manager. This is in my opinion by far the best method to find the probably most useful and right program for the specific purpose.

**Lean and IT-support**

The same scenario as in Trollhättan and Alé analysis appear here, that despite the fact of using computer and computer software massive they say that they do not have any IT-support for Lean (Figure 7, p.29). But the reason for this is according to the IT-manager that the “employees are not ready yet” and say that the lack of IT-support for Lean is a conscious choice. I interpret this as they first want to impress the basic values and ways of Lean concepts, for example process evaluation. Like if they do the circles, and the Lean work in the order which Bell and Orzen (Lean IT: Enabling and sustaining your lean transformation, 2011: p.250) advocate (people, process, technology). In this case, the IT-manager concludes that “IT-support for Lean will be used some day”, and tells about software usage that might affect Lean in word like “disseminate information”, “overall efficiency”, “visualize” and shorten process time or even reach out on the field to the workers very fast. The department manager on the other side had no thought at all about an IT-support for Lean, and say that this should the Lean experts (for example the IT-manager) propose. But is still the department manager is able to see some benefits with an IT-support when making Lean processes and flows, instead of using handwritten notes, everybody have access to it at all time. And then tell about how they use Word to make flows in with flow arrows and boxes. I got the same impression here as in the other cases, that they have not started with a blank paper when it comes to what kind of technology and assets they use when first starting with Lean concept. Neither do I think they are in the Bell and Orzens “sweet spot” (Lean IT: Enabling and sustaining your lean transformation, 2011: p.250) but they could be well on their way, and as I understand they are going to use some IT-support for Lean in the future when they are ready for it. This is the way that Womack and Jones (Lean thinking, 2003: p.261) talks about when they mention that you need a new way of keeping track of everything.

**Case study 4: Kungsbacka analysis**

**Lean**

Due to the fact that I not could do an interview with the IT-manager there will there naturally not be any comparisons. The department manager interpret Lean as “an umbrella, how we work” and also tell about some words that are used like, “order and clarity, visibility and collective conscience” and state a thing about Lean, “it must adapt to our business”. And talks about that Lean is a “living work method, one must not say that we have implanted Lean, we are doing Lean all the time”, by this and by another things the department manager says I interpret that they want to see it more like a philosophy then just a tool to use although a quote shows a different view, “we don’t adjust for Lean, we look if Lean can benefit us or make us work according to other principles when we analyze our processes”. This for me is a contradiction, they cannot both, not adjust to Lean at the same time as the Lean principles make them work according to them. If you use Lean you have to adjust to the Lean principles (Womack and Jones, 2008: p.1) other wise it is not Lean. They like Trollhättan have had Lean consultants to assist with the actual implementation of Lean. And by using Lean they have changed their way of working in a big way, and by that made the workload visible for everybody and streamlinned the management of documents which gives better order and happier employees and shorter waiting time for normal cases. But as in the other cases time is a factor that can influence Lean another would be the “human factor” (people is sick or away).
Computer use and software

And even in the last case the usage of computers and computer software is massive or as the department manager expresses it “in virtually all” when asked to estimate the use of computers and computer software. The programs that they use is Byggreda, Cartago and the Microsoft Office package.

Lean and IT-support

Even in the last case the same scenario as in the other analyses appear here, that despite the fact of using computer and computer software massive they say they do not have any IT-support for Lean (Figure 7, p.29), “not a specific”. However little later in the interview between the lines so to say, the department manager tells about a module for flow analysis that they have created. This might of course is to be seen as an IT-support for Lean. And when talking about computer programs that they use the Byggreda is their IT-support and “the sole function of our case management” and continue with “we do not need a special Lean IT computer support, but the Lean work was adopted” to what they already had. This is also along with the statement, “immediately saw that it was not necessary”, about thought around an IT-support for Lean when it was introduced that they have not ignored the existing technologies and assets and started from the beginning (Womack and Jones, 2003: p.19) when introduced Lean. This could mean that they are in the Bell and Orzen (Lean IT: Enabling and sustaining your lean transformation, 2011: p.250) sweet spot, but I doubt it regarding to some of quotes of how they do not adjust for Lean.

Analysis of all “cases”

A combined analysis over all cases

Lean

The knowledge of Lean or interpretation of Lean varies from those who see Lean as a philosophy/system (IT-manager Mellerud) with the “Lean toolbox” (Radnor and Walley, 2008: p.14) to those who interpreting Lean more like a tool to use when there is a hard routine to solve (department manager Mellerud, case study 3). It is impossible to make any real assumptions with these results except that the knowledge of Lean varies a lot. But all, with more or less no exception sees Lean as a structured way of working. And many of them have got the idea that Lean is a way of doing more and more with less and less, and to find and get rid of muda (Womack and Jones, 2003: p.16) and many of the respondents identifies, that to have a good and prosper Lean work, you need the support from the management on top. The interpretation is not just different between the municipalities but also between the various respondents from the same municipality, for example IT-manager Alé and department manager Alé (case study 2).

Software, IT-support and Lean

One remarkable thing that becomes obvious in all cases is the fact that they say that they do not use any IT-support for Lean, this despite that most of the managers is estimated their computer and computer software is massive, from “80%” to “entirely dependent”, with one exception the healthcare where the amount was estimated to “30%” which for me is very much for a department that doing healthcare in patients home.

I believe is that the IT-support can affect in both directions. As shown in the modified model of “controlled system” (Figure 8, p.37), which is a modified model made by me based of another variant and where the arrows goes from the Management principles box towards the IT-support box and from the IT-support box against the Management principles box. This because, in the case where

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10 The variant was made and displayed on a lecture, 2011, by Prof. Per Flensburg
the arrow is against the IT-support, when a IT-support is too difficult to use (need s a lot of skills), or when it is to tedious to make changes so this creates a high threshold just to go in and make changes periodically and in that way affect the actual pursue for perfection (Womack and Jones, 2008: p.1). This IT-support can also have embedded principles in the IT-support where the actual IT-support direct the way of how to do for example a flowchart analysis. And in the other hand the management principles affect how you use the IT-support, if it is the opposite of the earlier mentioned case or for example a package like Microsoft Office that not many sees as a IT-support for Lean, but still use for making all kinds of flowcharts, analysis, value mapping and so forth for Lean in. In this case it is the actual management principles that determine how the IT-support will be used because it has no or few actual boundaries for how it is used, it is much up to the user. The down arrow towards the management of production box from the IT-support box (Figure 8, p.37), shows how IT-support also can affect the production management, for example if the IT-support have a way to send Kanban (Radnor et al., 2006: p.77) or to enhance the Just in time work (Womack and Jones, 2008: p.7)

This thing that none of the interviewed managers said that they do not have any IT-support for Lean and but all of them have some sort of business system, ex Mellerud has VK, Alé and Trollhättan has HR+ and Kungsbacka has Byggreda, which all probably have a lot of supportive functions for Lean thinking but not are specially made for Lean. Another thing they all have and that I got the impression that this is obvious is the Microsoft Office package, which in my eyes is also an IT-support that can be used to do a lot of Lean things on, the department manager in Mellerud use Word to make flows in, with flow arrows and boxes. So my hypothesis is that to interpret an IT-support for Lean as an IT-support for Lean it has be specific just for Lean and probably installed after the introduction of Lean, it seems to be hard to see the “same old system” and the Office package as IT-support for Lean. They don’t have any IT-support or in some cases not even have considered it, “not any” department manager Trollhättan(Figure 7, 29).

And if we consider what Bell and Orzen written about it, “from a Lean perspective, a simple business intelligence approach used effectively is far better than a sophisticated tool used improperly” (Lean IT: Enabling and sustaining your lean transformation, 2011: p.133), then the “old system” or the Office package if it is used good be an OK thing to use.

Another thing I noticed was that even thaw the respondents know in advance that my interview is about IT-support and Lean know body puts IT-support in relation to factors that can affect Lean and instead mention things as, time, the support from the management and even politics, but not anything about IT-support. This despite the fact that almost every one of the respondents on the question, could the usage of computers and computer software have affect on Lean?(Figure 7, 29) could find one or more positive thing, “things will be transparent for everybody” department manager Trollhättan(Figure 7, 29), when using computer software that could affect Lean
Because of the job description of the IT-manager it is naturally that they have more knowledge of the computer programs the municipality has, and the users have access to. It is even easy to believe that they automatically should have better knowledge of what kind of programs or IT-support for enhancing Lean exists, but to know what Lean demands they most likely also have to have good knowledge in the Lean thinking (Womack and Jones, 2008: p.1) and maybe even know all the tools, and their principles, in the Lean toolbox (Radnor and Walley, 2008: p.14). This make me think of the two IT-managers that do not use Lean yet (IT-manager Trollhättan and IT-manager Alé) that they never the less is advisory when it comes to what programs the department in question should use for Lean. This is not at problem if the IT-manager has good knowledge in Lean but otherwise it could end with the wrong programs or that a similar program that could fit already existing in the municipality. All of the IT-managers stated that they have lots of programs, for example the IT-manager Mellerud said “there are over one hundred programs” (case study 3). This amount of programs can lead to the situation like the one in Alé (case study 2) where the department manager says that they do not use any IT-support and then the IT-manager says that they have Visio, a program used for flowcharts, calendars, and network diagrams etc. (Microsoft, 2011) and that is even possible to download shapes just for Lean (fyxm.net, 2010). But Visio is not available for everybody by default they have to ask for it.

I have tried to make a model and a ranking of what knowledge that is useful when getting/buying an IT-support for Lean.

<table>
<thead>
<tr>
<th>3.Ok</th>
<th>2.Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Best</td>
<td>A lot knowledge of IT</td>
</tr>
<tr>
<td>4.Worst</td>
<td>Little knowledge of Lean</td>
</tr>
</tbody>
</table>

Figure 9: Ranking of the knowledge's needed when buying a IT-support for Lean

"Blank paper"

I got the feeling, and this is by no means substantiated by the result, that no one of the cases have started with a "blank paper", that they have ignored the assets and technologies they already have (Womack and Jones, 2003: p.19) when started with the Lean concept. This could well be due to financial (the department manager Alé said explicitly that the IT-support should be cheap) and time constraints, it is expensive to buy a new program/system and it also could be time consuming to learn out a new system/program and to get it to work properly. The closest to this is Mellerud where they have deliberately taken a position that they should not use any IT-support for Lean in the beginning. And there the IT-manager also says that they are going to use IT-support for Lean when they ready, “the IT-support for Lean will be used some day!”

Hypothesis of the role IT-support have in Lean concept

Out of the result a have come to a conclusion or a hypothesis, and that is that IT-support have a much bigger role in the Lean concept then most people realize. This is because of most people do
not even consider their business system or Microsoft Office package as a IT-support that can and very often is used to do "Lean" things with. That it is as many times before a question of definition, of what kinds of values you put in the words IT-support for Lean. I stated in the beginning of this thesis that I will see IT-support as a program or software that in any way involves IT, it could be on a local machine (computer, telephone, iPad etc.) or out on the Internet and this means it not necessarily have to be a specially created and installed program/system just for the subject in question. The thing Bell (Bell, 2006: p.36) says when talking about where IT fit in, “it is to put the right information to the right place at the right time, in right format”, is obvious, but worth considering. It actually reminds a whole lot of the definition of JIT (Womack and Jones, 2008: p.7). And this also reminds us to look at the Bell and Orzen figure (Figure 5p.16) That “the success of Lean IT, and the future of a sustainable Lean enterprise, relies upon people, process, and technology, in that order” (Bell and Orzen, 2011: p.250) and the sweet spot is a thing to strive towards.
Conclusion

This chapter will try to answer the research question and tell about some other reflections that have been raised during this thesis. At the end of the chapter some suggestions for further studies in the subject will be done.

Conclusions that is possible to make

That although none of the respondents say that they have any IT-support for Lean, all of them say that they are using some sort of business system, ERP (Enterprise Resource Planning) and Microsoft Office package. Both which definitely can and probably already act as some sort of IT-support for Lean, but the respondents did not really make the connection when asked if they use any IT-support for Lean. So to answer my research question, which role does IT-support have for Lean concepts?

My hypothesis, which is based on these interviews and the literature I have read around my problem area, is that IT-support has a bigger role in Lean for organizations, like the municipalities in this thesis, then what the users realize. This because most of the users take a lot of the programs, like Microsoft Office package and their old business system, more or less for granted and don’t see how it is embedded in the way they do and work in a Lean way. They have a tendency to think it has to be a separate IT-system or program especially made for Lean for it to be important and be interpreted as an IT-support for Lean.

Another conclusion I can make is that although the best for Lean and Lean IT is to start with a “blank paper” (Womack and Jones, 2003: p.19) when it comes to technology and assets, it is almost nobody that does it in practice because of the costs. And that the model of Bell and Orzen (Bell and Orzen, 2011: p.250) where they show that there has to be balance between people, process and technology has to be considered if to be able to archive what they call the “sweet spot”, best performance.

Reflections made during thesis

This subject is hard to grip area. There are a lot of different interpretations of every word and meaning in and around the organizations.

Suggestion for further studies

This report is focused on the governmental sector but it would be just as interesting to look on the private sector, or maybe even both (governmental & private) in the same study and with my hypothesis as a starting point, to compare similarities and differences. It would also be interesting to do the same study in a bigger scale, with more interview respondents from municipalities all over Sweden. Another study might be to interview the same municipalities after a couple of years, first to see if they still use Lean or have expanded the Lean use, then secondly if they have any IT-support for it or have even considered it after the first interviews.


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IT-supports role in Lean concepts,
Stödfrågor för intervjuerna

Fakta om inspelningen:
Inspelningen sker på plats med hjälp av en smartphone med ett specialprogram för röstinspelning. Intervjupersonen är medveten om att samtalet spelas in.

Bakgrund och bakgrundsfrågor
Lite bakgrund om intervjuerna, varför jag gör dessa.
Magisteruppsats i Informatik, Högskolan Väst. Intressant område med Lean i offentliga verksamheter och då speciellt i samband med ev. påverkan av IT-stöd. Magisteruppsatsen kommer sedan att skickas till dig om intresse för det finns, samt att den kommer att finnas tillgänglig på nätet.

Namn: ........................................
Plats: ........................................

  o Vad jobbar du med? Jobbtitel
  o Vilken funktion har du i organisationen?

Verksamhetsfrågor
  o Berätta om verksamheten
    o Hela organisationen
    o Din egna avdelning
  o Hur stor del av arbetet utförs med datorer och datorprogram?
  o Vilka programvaror finns det tillgäng till?
  o Vilka programvaror arbetas det med?

Lean specifika frågor
  o Vad betyder Lean för dig?
  o Hur tolkar du Lean?
  o Hur insatt tycker du att du är i ämnet?
  o Har ni fått någon utbildning eller gått någon kurs om Lean?
APPENDIX 1

Lean användnings frågor

- Hur används Lean i verksamheten? Hur, var och på vilket sätt?
  - Vem bestämde att just Lean ska användas?
    - Varför?
    - Hur blev ni inspirerade?
    - Hur implementerades det i verksamheten?
      - Och när?
  - Använder ni något IT-stöd för Lean?
    - Varför?
    - Varför inte? Planerar ni att införa IT-stöd?
    - Beskriv användningen av IT-stöd för Lean?
  - Beskriv konsekvenserna av Lean användandet för er verksamhet?
    - Ex. Effektiviteten
    - Ex. Kvalitet
    - Ex. Arbetarnas situation/förändring
    - Ex. Kundernas situation/förändring

Aspekter som kan påverka Lean frågor

- Vilka yttre respektive inre omständigheter (faktorer) kan påverka arbetet med Lean i eran verksamhet?
  - Chefer
  - Arbetskamrater
  - Avdelning
  - Kunder
- Vad fanns det för tankar gällande IT-stöd och Lean när Lean introducerades
  - Om inte, varför tror du att de inte fanns?
  - Om, varför just dessa tankar?
- Kan Lean påverkas av hur man använder datorer och programvaror?
  - På vilket sätt förklara?

Avrundande frågor

- Planeras någon fortsatt utveckling inom Lean i verksamheten?
- Hur skulle du vilja att det fungerade gällande Lean och IT-stöd hos dig?
  - På vilket sätt? Förklara.
- Har mina frågor väckt några funderingar runt Lean och IT-stöd hos dig?
  - På vilket sätt? Förklara.
- Finns det något som vi inte tagit upp gällande Lean och IT-stöd som vi inte tagit upp och som du skulle vilja säga?
- Tack för att du tog dig tid att ställa upp på den här intervjun.