Master of Business Administration
Lean – A Cultural Issue?

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A study of different stakeholder's perception of Lean in correlation to corporate culture

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Preface

This spring I will finishing my master's degree in business and administration at the University of Stavanger. I have chosen strategy and management as my specialization. In this occasion, I will look deeper into the Lean concept and its relation to corporate culture in Lean companies, in the Stavanger region. The purpose of the thesis is to uncover how different stakeholders perceive Lean in correlation to corporate culture, and how various perceptions might affect desired results and consequences of a Lean implementation.

In the initial phase, it was challenging to get a clear overview of the Lean concept. There are many different definitions of Lean, as well as many aspects related to the term. It was difficult to determine what makes an organization Lean, and how to decide which participants to include in the study. Companies that have made a decision to implement Lean, regardless of their results, were chosen as the target group for this study. The study will look at elements describing how Lean is perceived in relation to culture, and whether this has affected desired results.

Working with this study has provided experience with using the qualitative research method to collect meaningful data through interviews, and further with processing and analyzing the information attained from the interviews.

I would like to thank my advisor Dr. Jan Frick for involvement, inspiration, guidance and helpful supervision throughout the process. Our meetings and discussions were helpful in the process of writing this thesis. Special thanks are also extended to informants for their hospitality and their willingness to participate in this study.

Abstract

Lean has been a growing trend among companies who want to achieve greater efficiency, less waste of labor and materials and achieving competitive advantage. Lean is an area that many researchers have explored, but there still exists misinterpretations of the concept and its function. Lean can be regarded as both a practical sense where the application is based on tools and methods, or it can be interpreted as a philosophy, where the concept should be integrated into the culture and the leadership style in an organization. A known perception is that there often exist a lack of focus or an inability of organizations to create a culture that will sustain Lean as a continuous change- and improvement process. On this basis, I wish to look at perceptions from various participants from different organizations, and their opinions regarding Lean and Lean as a cultural issue.

How do various stakeholders perceive Lean in correlation with corporate culture, and what consequences might this have for desired results for different companies implementing Lean in the region?

An assumption is that the culture in an organization has an impact on performance, and that the perception of Lean in relation to culture therefore has an effect on desired outcomes. Furthermore, it is assumed that perceptions will vary between those participating in this study. It is desirable to identify differences, and to consider how this may affect results, as well as collaboration across organizations.

From using a qualitative method and a comparison of different perceptions among different companies, I wish to evaluate similarities and inequalities in perceptions. The strategic selection of participants is based on selecting candidates from companies from different industries. One representative from each company participate in individual interviews. The information attained from the interviews serves as a basis for the analysis.

The study have found that there are variations in perceptions of Lean among the various stakeholders. The majority of the participants consider Lean as both a set of tools, and a philosophy or a mind-set. The variations revolve mainly around what aspects of Lean they consider as more important, which tools they have implemented and the results they have achieved. Based on the analysis, it is interpreted that those companies who focus more on communication and cooperation both internally and externally, experience a greater success and are generally happier with their results from implementing Lean. In addition, it is perceived that challenges described with the Lean

concept, are generally due to a lack of fellowship and lack of a common understanding of the Lean mind-set. Communication and information-flow between senior management, managers and other staff is therefore considered as essential for succeeding with Lean. It is considered that by having a consistent understanding of Lean that includes all employees throughout the company, and realizing that it is not only for some parts of the company, can contribute to a more successful implementation of Lean.

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1. Introduction

Lean is a concept that has accelerated in recent years. Organizations implement Lean hoping to achieve greater efficiency, reduced or eliminated waste of resources and gaining competitive advantage. The term has many aspects beyond this, and I will in the theory section attempt to delineate the theme and draw parallels to the concept of corporate culture. This chapter explains what this study concerns, and will and be evaluated against results in the analysis part of this study. Further, I will advocate the significance of the study, and why this is an interesting research contribution. Finally, I will undertake a review of the thesis structure.

1.1 Background and choice of topic

Lean occurred at a time when the industrial society was increasingly characterized by overproduction, increasing global competition and survival on margins (Melander, 2015, s. 1). Lean is known as a westernization of the Japanese concept known as the Toyota Production System, developed by the Vice-President of Toyota Motor Company Mr. Taiichi Ohno in the early 1950s. The purpose is to continuously improve quality, cost, delivery and safety through eliminating waste and creating flow in order to meet customer demands (Plenert, 2006, s. 146). The Lean concept has evolved to become a widespread concept, and there has been a continuous development of the phenomenon over the last two decades (Arnheiter & Maleyeff, The integration of lean management and Six Sigma, 2006).

There are different perceptions of Lean. A practical view of Lean means that the application is based on techniques or tools within the concept. Another belief is that Lean must be integrated into the organization's culture and management philosophy. It is assumed in this study that businesses with different perceptions will have different experiences from implementing Lean. The interesting part is whether focusing on Lean being integrated in the corporate culture is a crucial factor for succeeding and achieving preferred results when implementing Lean.

Research conclude that especially with Lean production, there seems to be too much focus on training people mainly in tools and techniques with too little focus on understanding the human factor. An important part of the human factor is focus on how to build the right company culture (Dahlgaard & Dahlgaard-Park, 2006). Such assumptions are the basis for this study, and I will

attempt to survey different perceptions about corporate culture as an important key element to Lean thinking as a continuous improvement process.

1.2 Research Question

As covered in the previous section, the broad Lean concept can be perceived in different ways. I will examine the concept by mapping various stakeholders' perceptions of the term. The research question reads as follows:

How do various stakeholders perceive Lean in correlation with corporate culture, and what consequences might this have for desired results for different companies implementing Lean in the region?

The focus of this thesis is thus directed towards the Lean concept. I will examine if the concept generally is seen as a management philosophy among various enterprises, or whether it is perceived more as a collection of tools and techniques, or perhaps a combination. An analysis of the different perceptions will be essential, and the interest will be directed specifically towards this. I will also look at whether this affects cooperation between different stakeholders. I want to shed light on how different interpretations between stakeholders might have positive or negative effects in terms of cooperation. The interest is also directed towards whether the concept is perceived as a trend where traditional techniques still apply, or if it is perceived as something new and revolutionary. Similarities and differences in perceptions among stakeholders in the study is intended to assess what the term indicates, and the purpose is to highlight how Lean is interpreted in correlation with focus on corporate culture. It is desirable that this thesis can contribute to clarify how Lean can be used to achieve advantageous and desired results in an efficient way.

1.3 Purpose

The main purpose of this thesis is to get a better understanding of what different stakeholders emphasize in the Lean concept, and what effect this may have on the implementation of Lean. On this basis, I consider the study as a contribution in relation to the development of theory and an understanding of Lean in general. The assumption is that all individuals in an organization must have a common understanding of what the Lean concept means, in order to take advantage of the

concept and have a successful implementation, which in turn can be related to focusing on the corporate culture.

To answer the research question, the literature is reviewed to identify relevant variables for the data collection. The relevant literature review identify relevant past research and covers key concepts and theoretical findings of Lean practices and cultural aspects. The history of Lean and definition of Lean and culture is covered in the first part, followed by theories on the relationship between Lean and culture. A mapping of Lean building blocks followed by models related to Lean is the last part of the theory chapter.

1.4 Thesis structure

First, a theory section is introduced, where history around Lean and existing theories are reviewed. One purpose of this thesis is to complement earlier research on Lean and culture, and it is therefore important to look at what has been done before. After the theory is reviewed, a chapter of method is presented. Choice of methodology, selection of participants and the interview guide of the study is described. Here it is also argued for the choice of the data collection method, which are depth interviews with eight different participants form eight different companies. Further, an analysis with a comparison of the results shown by the data is presented. A table is prepared to show the use of tools described in the theory section. This illustrates the variance in use of tools between the different companies. This is to illustrate which tools that are used, and it is discussed whether it affects desired results. The results of the analysis presented in a following discussion chapter followed by a conclusion. Finally, limitations of the study and suggestions for further research is the last part of this thesis.

2. Theory

The purpose of this chapter is to give an insight in theory around the Lean concept, trying to create an overview of the term. The chapter will include literature around corporate culture as well, as it is relevant to the research question. Initially, I will introduce the origin of the Lean concept, followed by relevant theory regarding Lean and corporate culture as well as relevant Lean terms. The theory part as the basis for the interview guide, is intended to contribute to answer the research question. It is attempted to find theory that can be related to the interview guide, and thus help to make the analysis more comprehensive.

2.1 The history of Lean

Lean is known as a westernization of the Japanese concept known as the Toyota Production System. After World War II, Eiji Toyoda and Taiichi Ohno at the Toyota Motor Company pioneered Lean production. A consequence was the economic rise of Toyoda and of other companies in Japan and elsewhere that adopted Lean production (Nicholas, 2011). After World War I, Henry Ford and Alfred Sloan advanced from craft production to mass production, and America became the dominant global economy (Nicholas, 2011). Toyota recognized that Japan had disadvantages in terms of raw material compared to American and European countries. Producing better quality goods with higher value and lower production cost was essential to overcome challenges (Sugimori, Kusunoki, Cho, & Uchikawa, 2007). Representatives from Toyota went to the United States to study the American system of automobile manufacturing. Among the concepts that they brought back to Japan was Henry Ford's suggestion system. Eiji Toyoda instituted the first Kaizen process within the Toyoda Group based on the Ford Motor Company's suggestion system, based on continuous improvement (Smith & Hawkins, 2004). Toyota has attached special importance to the just-in-time production to avoid inventory unbalance and surplus equipment and or workers. They further expanded upon the just-in-time concepts to reduce waste (muda) (Sugimori, Kusunoki, Cho, & Uchikawa, 2007).

Another important feature that underlies for the development of the Lean concept was the Japanese concept of work. Japanese traits like group consciousness, sense of equality, desire to improve, high degree of ability, resulting from higher education brought by desire to improve, and centering their daily living on work. These traits differed from attitudes in Europe and America. The Toyota

production system revolves around two basic concepts. First, all efforts are made to attain low cost production and reduction of cost through elimination of waste. Minimum amount of equipment, materials, parts and workers or working time is essential to reduce waste. Second, the labor environment should make full use of the workers' capabilities. This means treating workers as human beings and with consideration, building up a system that will allow the workers to display their full capabilities (Sugimori, Kusunoki, Cho, & Uchikawa, 2007). This philosophy was widely called the Toyota production system in Japan. Later it was labelled as Lean production and Lean thinking (Dahlgaard & Dahlgaard-Park, 2006, s. 264). Lean has later been defined by the Americans based on what they saw in the Toyota Production System. The concept of Lean was first used in the article *Triumph of the Lean Production System*. In 1990 the term reached a wider audience through the bestseller *The Machine That Changed the World*, which was released and translated into several languages. The background to both the article and the book was an American research that revolved around the Japanese success and competitive advantage in the early 70s (Rolfsen, 2014).

2.2 Definition of Lean

The emergence of Lean has generated a debate around change and restructuring in private and public organizations in Norway for the last twenty years. Lean has become more relevant because several companies have started to use the organizational term "Lean". Some companies are experiencing great success, while other companies have mixed experiences (Rolfsen, 2014). One challenge with the Lean concept is that it is quite comprehensive and imprecise. The term carries with it a debate about cultural adaptation versus standardization across countries, cultures and industries. The Lean phenomenon, which occurred in Japanese context, has now spread globally. It is natural to assume that Lean practices change when moving between continents and cultures, which may be a reason why it is such a comprehensive concept (Rolfsen, 2014).

It can be difficult to define a concept precisely, and many researchers in the field of the Lean concept has enhanced to put together a definition. Shah and Ward (2007) points out that Lean production is most frequently associated with elimination of waste usually within organizations with excess inventory or excess capacity. Their definition describes Lean or Lean production as "an integrated socio-technical system whose main objective is to eliminate waste by concurrently

reducing or minimizing supplier, customer, and internal variability*"* (Shah & Ward, 2007). Their point of view sets Lean in a direction towards both a philosophy and a set of tools where management of both technical and social systems are emphasized as a key to effectively manage variability in supply, processing time, and demand (Shah & Ward, 2007).

Treville and Antonakis (2006) propose a definition of Lean. They refer to it as

"*..an integrated manufacturing system that is intended to maximize the capacity utilization and minimize the buffer inventories of a given operation through minimizing system variability, where variability is related to arrival rates, processing times, and process conformance to specifications*." (de Treville & Antonakis, 2006).

Their research is based on the relationship between job characteristics and motivational outcomes in Lean production, with a basic idea that motivation might be limited by excessive leanness. Their research conclude that Lean can create motivation among employees where management invests in right worker perceptions of Lean production, and where social identity is strong (de Treville & Antonakis, 2006).

Hasle et al. (2012) points out that Lean can be understood on both a strategic and an operational level. The strategic level revolves around understanding value, whereas the operational level is more directed towards Lean as a tool to eliminate waste. Hasle et al. (2012) supports the definition by Shah and Ward (2007) where Lean is described as a socio-technical system that can be analyzed through its practice, and emphasis a stronger focus on the human side as well, where Lean should be understood as more than waste reduction (Hasle, Bojesen, Langaa Jensen, & Bramming, 2012).

A question is whether Lean manufacturing can apply Lean concepts in a service environment. Literature on Lean service reveals a noticeable lack of theoretical models establishing the core constructs of Lean service, their interrelation and impact on organizational performance (Allway & Corbett, 2002).

Allway and Corbett (2002) describe the "Lean" approach as

"*…eliminating non-value activities from work processes by applying a robust set of performance change tools and emphasizing excellence in operations to deliver superior customer service*." (Allway & Corbett, 2002).

They state that Lean has become legendary in improving manufacturing companies' operations and profitability, but that the same principles can with equally impressive results, apply to many service-sector firms (Allway & Corbett, 2002).

2.3 Defining Corporate Culture

Organizational culture is a complex term perceived differently in various literature. According to Fivesdal and Bakke (1998) the culture in an organization can be illustrated as an ice berg. The visible parts includes an organizational plan, technology and visible groupings. These aspects are only a small part of what happens daily in an organization. The informal aspects are hidden. Attitudes, values, feelings and social relationships plays an important part in an organization (Fivelsdal & Bakke, 1998, ss. 143-144).

Formal aspects: (visible)
- Organizational goal
- Technology
- Structure
- Abilities/skills
- Financial resources

Informal aspects: (hidden)
- Attitudes
- Values
- Feelings
- Social relationships
- Group norms
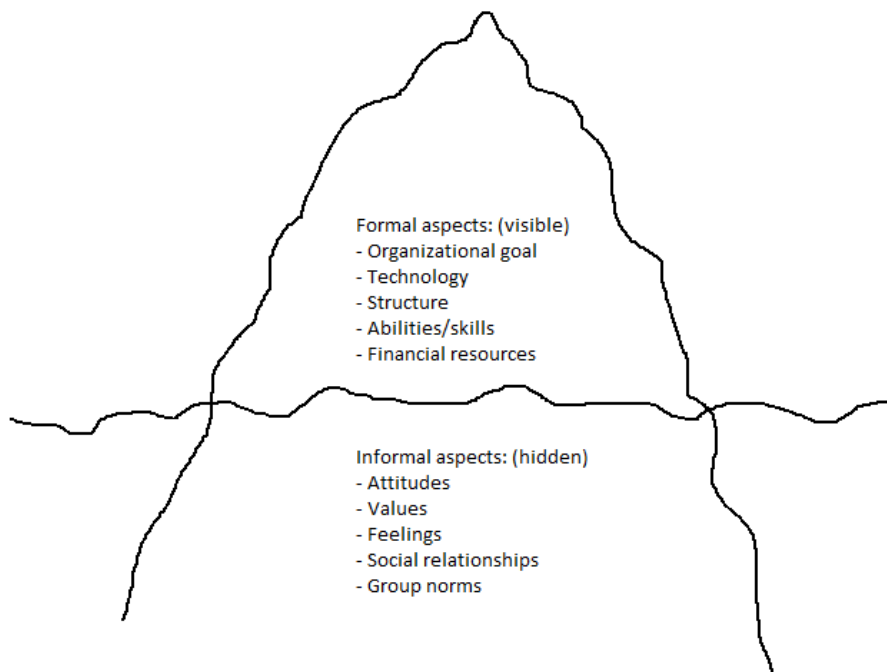
Figur 1 The organizational iceberg illustrates the culture in an organization.

Drawing parallels to Sahah and Wards definition of Lean mentioned earlier, the technical aspects of Lean applies more to the visible aspects of organizational culture. This refers to the various tools and techniques that can be implemented as a part of Lean. When it comes to the social systems and the human factor, this refers more to the hidden aspects of the organizational culture. Having the

right attitudes and group norms contribute to committed workers, which again is considered as an important factor when implementing Lean (Angelis, Conti, Cooper, & Gill, Building a high-commitment lean culture, 2011).

Corporate culture has been defined in many ways. Edgar Schein (1987) defines corporate culture as a pattern of assumptions created by a group of people as they learn to handle their challenges with external adjustments and internal integration, which has worked well enough to be considered as true and to be forwarded to new members as the right way to think, feel and perceiving (Fivelsdal & Bakke, 1998). Another definition by Deshpande and Webster (1989) states that it is "the pattern of shared values and beliefs that help individuals understand organizational functioning and thus provide them with the norms for behavior in the organization" (Deshpande, Farley, & Webster, Jr., Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms: A Quadrad Analysis, s. 24). Corporate culture is also a pattern of beliefs, symbols, rituals, myths, and practices that have evolved over time in an organization, or it can be a set of values and assumptions that underlie the statement "this is how we do things around here" (Rashid, Sambasivan, & Johari, 2003). Van de Post et al. (1997) states that

"*Culture is, to the organization, what personality is to the individual. It is a hidden but unifying force that provides meaning and direction. It is also a system of shared meanings, or systems of beliefs and values that ultimately shapes employee behavior.*" (Post, De Coning , De Coning, & Smi, 1997).

A study by Deshpande and Farley (1999) showed that the corporate culture of successful Indian and Japanese firms were quite different in their marketing orientation. Their findings show that entrepreneurial and competitive cultures perform better than consensual and bureaucratic cultures in Indian and Japanese firms. The consensual and bureaucratic cultures were more inward looking and closed than the former, which is more innovative and risk taker. Competitive cultures emphasize values relating to demanding goals, competitive advantage, marketing superiority, and profits. Entrepreneurial cultures emphasize innovation, risk taking, high levels of dynamism, and creativity. Bureaucratic cultures emphasize values like formalization, rules, standard operating procedures, and hierarchical coordination. The long-term goal is predictability, efficiency and stability. Consensual culture emphasize elements of tradition, loyalty, personal commitment, extensive socialization, teamwork, self-management, and social influence (Deshpande & Farley,

Executive Insights: Corporate Culture and Market Orientation: Comparing Indian and Japanese Firms, 1999).

An essential question in this study is to what degree culture is emphasized when implementing Lean. Since Lean is a mechanism to improve, it is useful to look at the relationship between corporate culture and performance. A study by Denison (1990) looks at the influence of corporate culture and organizational commitment on performance. The results show that there is a significant correlation between corporate culture and organizational commitment. His study looks at the impact that organizational culture can have on effective performance. He found that the organizations with participative cultures performed better than other cultural types (Denison, 1990).

A committed employee is defined by Meyer and Allen (1997) as "the one who stays with the organization through thick and thin, attends work regularly, puts in a full day (and maybe more), protects company's assets, shares company goals and others" (Rashid, Sambasivan, & Johari, 2003). Research on organizational commitment has attracted more attention in recent years. Various findings has contributed to generate interest. Organizational commitment has been found to influence job performance, motivation and involvement among other factors (Rashid, Sambasivan, & Johari, 2003).

2.4 Organizational Learning

It is known that there exists Lean networks or forums in the Stavanger region, and some Lean companies choose to collaborate with each other in their work with Lean. Relevant theory about organizational learning is therefore included in the theory chapter, and intended to be helpful to the analysis chapter.

Organizational learning can be a complex term. Tsang (1997) attach importance to the difference between "organizational learning" and "learning organization". He states that a learning organization is one which is good at organizational learning. Tsang has categorized the definition by Cook and Yanow (1993) as a definition with a cultural perspective.

"*…a definition of organizational learning as the acquiring, sustaining, or changing intersubjective meanings through the artificial vehicles of their expression and transmission and [through] the collective actions of the group*".

This definition emphasize that it is the "group" that changes the common perceptions in an organization, where the group can be regarded as the culture in an organization.

A more simple definition by Shrivastava (1981) is categorized by Tsang as a definition with a cognitive perspective (Tsang, 1997).

"*Organizational learning refers to the process by which the organizational knowledge base is developed and shaped*".
(Tsang, 1997)

Hanssen-Bauer and Snow (1996) attach importance to increased competition, and the development of learning networks. A firm's ability to develop and apply knowledge, often in collaboration with other firms, is demanded due to increased competition (Hanssen-Bauer & Snow, 1996). Their research is based on a six-year study of a forum with 46 different companies located in Ålesund, Norway. Findings from their studies show that the forum did set up effective mechanisms for developing knowledge and diffusing it throughout the network's member firms, and that in general they did become more responsive to the region's business needs (Hanssen-Bauer & Snow, 1996, s. 425).

A study of collaboration networks in the Rogaland area found that that "industrial collaboration with emphasis on knowledge transfer may have a huge impact both on the participating organizations and the region." (Frick, 2003, s. 157). The basis for this finding is a study of two cases over a long period, that both are successful virtual organizations that seem to have had impact on their surroundings. One observation in the study is that many industrial collaboration networks of various kinds has been generated over the last 20 years in the Rogaland area, including people that have direct or indirect experience from one of the cases. Another observation from the second case is that unlike in the past, where many organizations worked quite isolated towards industry, participation in collaboration networks can be more money generating (Frick, 2003).

An article by the Public Policy Research Institute at the University of Montana has identified some essential principles to regional collaboration. To recognize that people or organizations are more likely to achieve their interests by working together than by acting independently, is essential. A common disadvantageous pattern is to focus on the tasks immediately in front of us, within our small sphere of influence. Providing input and advice, sharing knowledge and resources, and building a regional identity are matters that are described as objectives for regional collaboration (The University of Montana - Public Policy Research Institute, 2008).

2.5 Lean and culture

According to Miller (2011), author of Lean Culture: A Leadership Guide, Lean culture focuses on the importance of a total system solution that consider culture as part of a holistic process-improvement effort. Rather than considering Lean as a tool, organizations need to make a broad commitment in order to improve in the long term. This includes a collection of tools, methods, approaches and cultural change. Lean is not a temporary process, but a deep change in the corporate culture (Miller, 2011). The five S's of culture described by Miller emphasize the behavioral aspects of change. *Structure* refers to how an organization evolves over time, and how it affects effective process management. *Systems* refers to the disciplines within an organization that make it function. This can be hiring, training, or financial aspects. It is important to consider how misalignment of these functions prevent progress. *Skills* refers to human competence in technical skills and people-oriented capabilities. These are necessary in order for people to function together. *Style* can be described as the behavior in an organization that expresses its values, principles, judgments, and priorities. Finally, *symbols* are things done in an organization that can create unity or division. For example offices versus cubicles (Costello, 2011).

2.6 Cultural requirements

Basin and Burcher (2004) share the idea that Lean is a philosophy rather than a system or a concept. Their research concluded that several aspects are required to successfully implement Lean. They mention some different cultural requirements that reads as follows:

1. Making decisions at lower levels,

2. forward a concrete vision as an indication of what the organization believes it will look like once the transformation is complete,

3. implementing a strategy of change where it is communicated how to achieve goals,

4. allocating responsibilities,

5. develop supplier relationships based on mutual trust and commitment,

6. nurture a learning environment,

7. systematically and continuously focus on the customer,

8. promoting Lean leadership at all levels,

9. maintain existing processes,

10. maximize stability in a changing environment reducing schedule changes,

11. assess the fraction of an organization's employees operating under Lean conditions,

12. Observe the proportion of an organization's departments pursuing Lean, and long-term commitment.

(Bhasin & Burcher, 2004, s. 58)

Successful Lean implementation requires the engagement of people to realize the potential of a business (Enterprise Ireland). This correlates with Wig (2013) and his perception that management within Lean is about asking the right questions and highlighting employees through mentoring and coaching. With Lean, it is essential that the employee contribute to shaping an organization, allowing solutions. The leader needs to be proactive in order to develop a Lean culture, a culture where learning and active participation is essential (Wig, 2014, ss. 32-50).

Many authors emphasize the importance of culture when implementing Lean. Nørgaard, Brandi & Hildebrandt (2009) state that Lean equals cultural change, and that it is necessary to create a shared "language". They further state that Lean is a culture, and that it should not be limited to a few selected people because it is a way of working. Lean requires a common understanding and a willingness to change, which means that all employees act as creators and leaders of change (Nørgaard, Brandi, & Hildebrandt , 2009).

2.7 Lean Theory

Enterprise Ireland has identified some practical steps to become Lean, and to build competitiveness. In the publication "Becoming Lean - Practical steps to build competitiveness", it is stated that Lean tools and techniques addresses competitiveness issues within a businesses, building the capability of people to identify issues and improve an operation. Here it is claimed that Lean is more effective in businesses where it has become a way of doing business, as opposed to using Lean as a primarily as a strategy with tools (Enterprise Ireland).

The Lean spiral involves looking, seeing and understanding processes, thinking about how to improve them before acting to improve them, time after time. Concerning competitiveness, Lean focuses on providing customers with the best possible products at the best possible prices, at the best possible quality levels and at the best possible delivery times. In order to do this, finding and removing waste is essential. Various tools and principles are used to find wastes and tackle them (Enterprise Ireland).

Angelis et.al (2011) emphasize that Lean is based on several key principles that require committed workers. Such principles are to eliminate wasteful activities, minimizing process variability, pursuing continuous process improvement with employee involvement, devolvement of quality inspections and periodic maintenance to line workers and maintaining synchronized production flow (Angelis, Conti, Cooper, & Gill, Building a high-commitment lean culture, 2011). Lean encompasses a wide variety of practices. Lean can be related to many tools or building blocks (Angelis, Conti, Cooper, & Gill, Building a high-commitment lean culture, 2011, s. 12).

The expected result from Lean approaches are empowered employees working with committed management to build systems that respond to customers (Heizer & Render, 2011, s. 671). What differs Lean from similar practices is the external focus on the customer. By analyzing all activities required to produce the output, one can optimize the process from the customer's perspective. Learning, empowerment and continuous improvement needs to be integrated in the organizational culture. Lean firms drive out activities that does not add value to the customer. Such firms typically use JIT techniques to minimize inventory, reduce space or travel distance, partnering with suppliers, develop employees, pushing responsibility to lower levels and increasing flexibility (Heizer & Render, 2011, ss. 668-669). Some key principles are eliminating wasteful activities, minimizing process variability, pursuing continuous process improvement with employee

involvement, devolvement of activities such as quality inspections and periodic maintenance to line worker (Angelis, Conti, Cooper, & Gill, Building a high-commitment lean culture, 2011).

2.7.1 The eight wastes

As mentioned, reducing waste is an essential part of Lean. Waste in an organization can be referred to as non-value-adding activities. The eight wastes originate from the Toyota Production system (Kilpatrick, 2003).

Overproduction	A Lean principle to avoid overproduction is to produce the output when the consumer needs it, resulting in less work-in progress inventory.
Waiting	Waiting for material, information, equipment and tools. The Lean principle is to produce just-in-time, to allocate resources more efficiently.
Transportation	Unnecessary transportation. The principle here is to ship directly from the vendor to the location in the assembly line where it will be used.
Non-Value-Added-Processing	Non-valued-added steps in the process. E.g. when work is done incorrectly the first time or with burrs.
Excess Inventory	Correlates with overproduction. Excess inventory takes up valuable warehouse space.
Defects	Errors that waste resources. This indicates wasted material, wasted labor, rework and possible complaints.
Excess motion	Unnecessary movement due to poor layout and work methods.
Underutilized People	Lack of both mental, creative and physical skills and abilities. Common wastes are poor workflow, poor organizational culture, inadequate hiring practices, poor or non-existent training, and high employee turnover. The principle here is to create cross-functional Lean environment through the system.

There are a number of concepts contained in the Lean concept. Below, some key principles often related to Lean are listed. These principles can be considered as tools, techniques, methods or Lean as a philosophy with independent tools used as required. These can be referred to as Lean building blocks. According to Kilpatrick (2003), different building blocks may be implemented as stand-alone programs, but few have significant impact when used alone (Kilpatrick, 2003). This is not a complete list of all Lean initiatives, but of many key concepts mentioned in various literature of Lean.

2.7.2   Lean Building Blocks

Pull System

The term pull is used to imply that nothing is made until it is needed by the customer, and the application of a make-to-order (MTO) approach (Arnheiter & Maleyeff, The integration of lean management and Six Sigma, 2006). Producing what the customer actually need, opposed to the historically push system where products are produced without customer orders.

Just-in-time

Just-in-time production aims to match the production process with the market place. The ideal is the establishment of perfect symmetry between demand and supply. It is desirable with no shortages, no costly stockpiles, and no waste (Sewell & Wilkinson, 1992).

SMED

Single – Minute Exchange of Dies (SMED) is various techniques that help reducing the time it takes to readjust a machine or equipment. The idea is that readjustments should happen in less than 10 minutes. The goal is to create a more effective process. In other words, dramatically reduce the time it takes to complete equipment changeovers (Moreira & Pais).

Standard work

Standardizing procedures might increase participation in decision making and thus support, rather than degrade, skill use (Parker, Longitudinal Effects of Lean Production on Employee Outcomes and the Mediating Role of Work Characteristics, 2003).

One-piece flow

The movement of a product through the process, one unit at a time. This can be seen as the opposite of Batching. One-piece flow reduces wait time, lead-time and WIP. Traditional cells with irregular material flows are replaced with u-shaped production lines where flow is regular and paced by a cycle time and flow is controlled by pull signals (Miltenburg, 2001).

Batch Size Reduction

With Lean, the ideal batch size is one, or as low as possible. Reducing batch size will give less work-in-process inventory, reducing cost and lead-time (Nightingale , Fundamentals of Lean, 2005).

6S - Workplace Organization

Standardizing the workplace. Usually the first step when implementing Lean. It's a methodology for organizing, cleaning, developing, and sustaining a work environment.

1. Sort out what is not needed.

2. Set in Order. Clarify what must be kept.

3. Shine. Clean and inspect equipment, tools and workplace.

4. Standardize. Make processes more automatic.

5. Sustain. Stick to the rules and make them a habit. This requires self discipline.

6. Safety. Improving safety issues.

(Nightingale , Fundamentals of Lean, 2005)

Kaizen - waste elimination

Eliminating waste (muda in Japanese). All activities along the value stream that create value, is known as perfection. This is pursued through continuous improvement or kaizen events. Perfection is the goal and the journey to perfection is never ending. As mentioned, the eight wastes is a known tool dealing with waste elimination (Brunet & New, 2003).

Work cells

Better utilization of people and improved communication through arranging people and operations.

TPM - Total Productive Maintenance

Knowledge and cooperation to optimize machine performance to eliminate breakdowns, reduce of unscheduled and scheduled downtime, improve utilization, gain higher throughput, and better product quality (Hansson, Backlund, & Lycke, 2003).

Total Quality Management

Similar to Japanese Kaizen, TQM seeks to continuously improve all areas of a company's operation, emphasizing employee involvement (Hansson, Backlund, & Lycke, 2003).

Quick Changeover

Reducing use of time when changing a process to increase flexibility (Nightingale , Lean Manufacturing, 2005).

Red – yellow – green "dots"

Value added activities (green), non-value added needed activities (yellow) and non-value added activities (red) as pure waste. A value-added activity is any action that transforms information/materials into a capability for our ultimate customer at the right time and the right quantity. Non-value added needed activities are activities causing no value to be created but which cannot be eliminated based on current state of technology or thinking. Non-value added activities are pure waste, and does not create value to the customer (Nightingale , Fundamentals of Lean, 2005).

Visual Controls

Simple signals that provide an understanding of a condition or situation and what's happening with regards to production schedule, backlog, workflow, inventory levels, resource utilization, and quality.

Concurrent Engineering

Using cross-functional teams in order to reduce time-to-market to capture and maintain market share (Anderson, 2004).

Reduction of variability

Reduction of variability at every opportunity, including demand variability, manufacturing variability, and supplier variability. Manufacturing variability includes not only variation of product quality characteristics (e.g. length, width, weight), but also variation present in task times

(e.g. downtime, absenteeism, operator skill levels). Lean management attempts to reduce variation by establishing standardized work procedures. Supplier variability includes uncertainties in quality and delivery times. The reduction in supplier variability is often achieved through partnerships and other forms of supplier-producer cooperation (Arnheiter & Maleyeff, The integration of lean management and Six Sigma, 2006).

Reducing lead time

Lean production attempts to use make-to-order production with on time deliveries. A process where production starts only after a customer's order is received. Reducing inventories and making the supply chain more responsive (Arnheiter & Maleyeff, The integration of lean management and Six Sigma, 2006).

Internal and external benchmarking

Comparing company performance with other companies, and or comparing own performance with peers (Comm & Mathaisel).

Value Stream mapping

Check sheets. The Check Sheet is one of the simplest quality tools, but it can be very powerful. When faced with the task of improving a process, the challenge is often in knowing what is actually happening. Facts are considered, rather than people's opinions. Problems occurring frequently deserve attention (Heizer & Render, 2011).

Teams and People

Arranging people in teams and groups and bringing people together working with team building .

Time, money, effort

According to Enterprise Ireland, these are the three key elements of Lean. Evaluating the amount of time spent, the delivery time to customers is a guiding principle. Evaluating the use of money to "see" wastes and problems. Evaluating the use of effort can enable you to do more with less effort, reducing waste (Enterprise Ireland).

Seven Lean rules

1. Fairness - the lean process needs to be fair both to staff and the business.
2. Firmness – Sticking to decisions. Once it is decided how things should be done, they need to be done that way.

3. Consistency - Deal with people, problems and issues in the right manner.

4. Look - look closely at your processes, go to the place where work is done and,

5. See - see what is actually happening, how things are actually being done to service your customers to produce your products, it will often be quite different to what you think is being done.

6. Understand - understand what is being done, what are the underlying principles that affect the outcome.

7. Do - do something to improve the process. You don't have to make it perfect, just better than it is now

(Enterprise Ireland).

Five questions

1. What are you doing?

2. How are you doing it?

3. Why are you doing it?

These first three questions are made in order to capture facts of any given situation.

4. Who is going to improve it?

5. When?

The two last questions are made focused on making things better (Enterprise Ireland).

A3/PDCA

A written documents to support problem solving. A3 Reports are based on the Plan-Do-Check-Act cycle. The PDCA cycle has later evolved into the Plan-Do-Study-Act (PDSA). The A3 report was originally developed by the Toyota Motor Corporation. It is a problem-solving tool existing in three types: The Problem Solving A3 Report, the proposal A3 report and the status A3 Report (Bassuk & Washington, 2013).

An A3 report describes how solution on complex decisions can be efficiently reached. The tool is based on the 13th Principle of the Toyota Way (''Make Decisions Slowly by Consensus'').

2.7.3 The house of Lean

"House of Lean" was originally developed by Toyota. However, today different versions of the model including different principles and practices exist. Lean work in organizations are supported by just-in-time production. Producing the right work in the right quantity at the right time and at the same time creating an environment where the employees can identify what goes wrong and fix it (Kim, Spahlinger, & Billi, 2009).

Radnor (2009) attempts to clarify the House of Lean, as a framework not only for the tools, but also the factors to support the implementation of the tools. The house is defined to engage, establish and embed Lean to allow not only technical but also cultural change to create a structured dynamic learning environment (Radnor, 2009).

Jidoka is a Japanese word that is defined as "automation with a human mind," meaning that employees are automatically directed to something that has led to an error and they work to improve that part of the process (Kim, Spahlinger, & Billi, 2009). This is a model of Lean that includes both the goal of the production performance and the focused approach of involvement of people (Höök & Stehn, 2008).
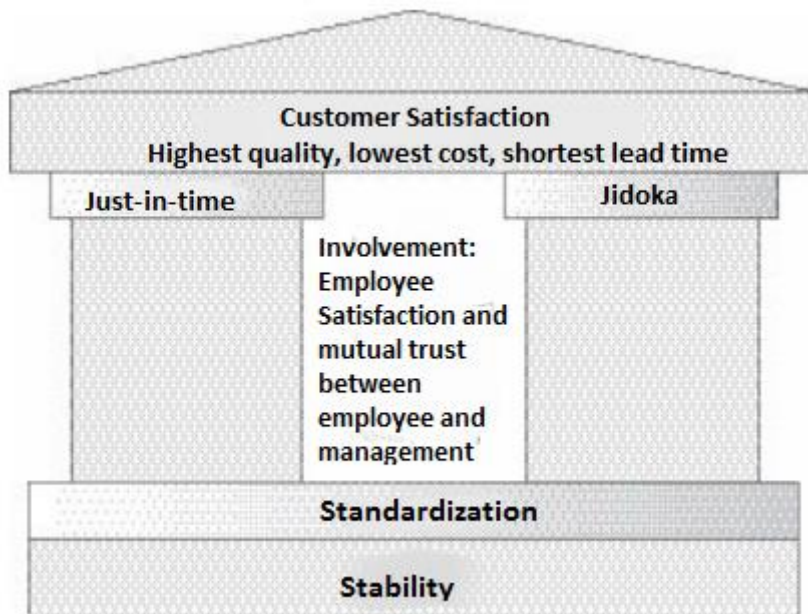
Figur 2 The House of Lean

2.7.4 Japanese Kaizen

Japanese Kaizen is a job characteristics model. The term Kaizen, is a Japanese word that basically means "continuous improvement or the principles of continuous improvement" (Sua´rez-Barraza & Ramis-Pujol, 2010). Brunet and New (2003) define Kaizen as "Pervasive and continual activities, outside the contributor's explicit contractual roles, to identify and achieve outcomes he believes contribute to the organizational goals." Kaizen is often presented as one of the underlying principles of Lean production (Brunet & New, 2003).

It is important to remember that Kaizen is not about putting people and systems under a constant stress in hopes of continuous improvement. Studies suggest that Kaizen increases job enrichment and employee motivation, and may move employees to higher levels of growth need strength (Cheser, 1993-2002). In an ideal Kaizen environment several characteristics are present. Skill variety refers to people working in teams with each individual performing several different tasks. Workers utilize a wide variety of skills providing flexibility. Through extensive training and participation, employees acquire broader responsibilities and higher skills. Task identity refers to employees being involved in a wider range of production operations, participating in activities much closer to the end product. Task significance refers to having an overall vision of a workplace free of waste. This indicates that each individual makes an effort to improve the operation, to benefit employees, the organization and the society. Autonomy refers to giving employees training to become independent, making their own decisions and controlling their own production. They are delegated responsibility for outcomes. Finally, feedback is given through visual control, performance charts, graphs and immediate and constant feedback to all employees (Cheser, 1993-2002).

Kato and Smalley (2011) has identified several Toyota Kaizen methods, many of them mentioned in the chapter of Lean building blocks. They focus on the skills, methods, and analysis techniques practiced inside Toyota Motor Corporation for the past few decades. One area that they emphasize is generating original ideas by combining ideas with others. Ideas can be created in groups greater than by one individual. Working in collaboration can often increase both the quantity and the qualities of ideas generated. Involvement is appropriate when seeking to generate new ways to do things (Kato & Smalley , 2011, s. 88). Generating ideas by combining ideas with others is a method

that can be used both internally within a company and externally between several companies, for example in a region.

2.7.5 The Shingo Model

The Shingo Model evaluates Lean performance in different categories. The Shingo Award program is useful to mention when attempting to define Lean, and culture is considered as an important part in this model. Shingo is known as the international standard for what Lean should look like (Plenert, 2006, s. 146).
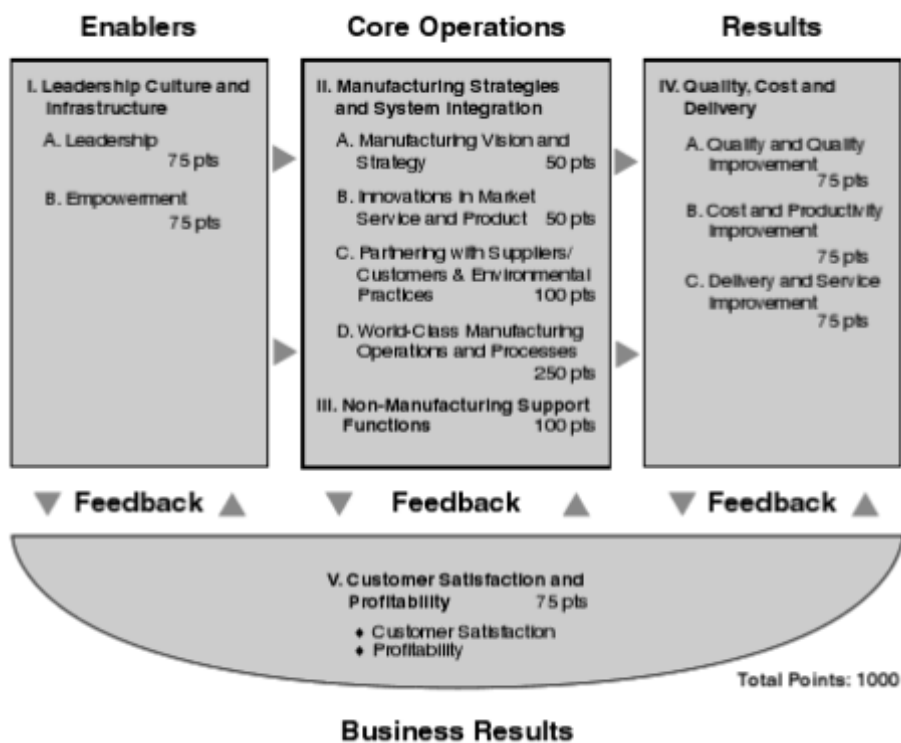
Figure 3: The Shingo model.

(Plenert, 2006, s. 146).

According to Bergmiller and McCright (2009) the Shingo philosophy is based on the perception that world-class business performance can be achieved through focused improvements in core manufacturing and business processes. The Prize Committee use criteria's based on leadership, organizational culture, empowerment, manufacturing strategies, system integration, quality, cost, delivery, and customer satisfaction (Bergmiller & McCright, 2009).

In terms of enablers, this refers to having a management and corporate culture that enables the company to implement strategies and practices required to implement Lean. The leadership revolves around defining vision, mission, values and strategies that are used in the planning process. Empowerment focuses on educating employees to work as a team, as illustrates in the model above. They consider it the best representative model for the measure of "Leanness" (Plenert, 2006, s. 147).

Core operations are manufacturing strategies and system integration that focus on achieving world-class results. The manufacturing vision and strategy makes sure there is a reasonable correlation between corporate vision and the manufacturing level. Innovations in market service and product is focusing on looking for cost reductions in different areas like logistics, sales and service, using benchmarking and quality tools.

Partnering is forming relationships with suppliers and customers. This can be related to theory around collaboration and organizational learning mentioned in chapter 2.4.

Non-manufacturing support functions emphasize integration between manufacturing and non-manufacturing processes, and to which extent Lean improvement tools are applied in non-manufacturing settings.

Results revolves around evaluating outputs of the core business systems considering quality, cost and delivery. Quality and quality improvement is attempting to have zero defects reaching the customer.

Cost and productivity improvement – can measures confirm reduction in cost and increased productivity?

Delivery and service improvement – ensuring that products are on time and at the right quantity. Focus on meeting customer expectations.

Feedback/business - Evaluate customer satisfaction and profitability through outcomes of quality, cost and delivery from customer satisfaction and business results. Looking for evidence of customer satisfaction and look for documentation that supports the business financial attainment (Plenert, 2006).

2.7.6   Critics of Lean

Hines and Holweg (2004) conclude from research by various authors who have criticized Lean, that it should be regarded as more than a set of tools and techniques and that the human dimensions of motivation, empowerment and respect for people must be valued. Several authors argue that these elements are key to the long-term sustainability of any Lean program, regardless of the industry sector (Hines, Holweg, & Rich, 2004, s. 1000). One of these critics are expressed by Green (1999) and his concern around the human cost of Lean production. Green emphasizes that literature in favor of Lean, ignores the long traditions of organizational theory and human resource management (Green, 1999). Researchers also suggest that the level of employee participation in decision making is very limited (Berggren, 1993). Terms such as "mean production" have been used to emphasize the negative consequences of Lean production for employee motivation and well-being (Parker, Longitudinal Effects of Lean Production on Employee Outcomes and the Mediating Role of Work Characteristics, 2003).

Mehri (2005) has done research exploring the darker side of Lean. After working in the Toyota group company Nizumi for three years, he concluded the impact of Lean work to be the human cost. He challenges the "Lean work" systems, which claim to improve product quality and employee productivity. He claims that western failures are based on the failure to distinguish what you are supposed to feel and do from what you actually feel or do, called *tatemae* and *honne*. Mehri claims that "the Toyota Way" results in limited potential for creativity and innovation, narrow professional skills, worker isolation and harassment, dangerous conditions on the production line, accident cover-ups, excessive overtime, and poor quality of life for workers (Mehri, 2005, s. 21). Regarding the culture, some claim that the reason the Japanese are such disciplined workers is because of their family-like environment. Mehri states from his research that Lean work has little to do with improving the lives of workers and much to do with producing vehicles with the least amount of money in the quickest time (Mehri, 2005, s. 24) The family ideology of the company defines management as parents and employees as children, where breaking a rule leads to punishment used as an example to other employees. Employees are working within rules that tightly control every aspect of their behavior (Mehri, 2005, s. 26).

The critics of Lean seems to revolve mainly around the lack of focus on the human factor, which can be related to the culture in an organization.

2.8 New Public Management and Lean

A concept that can be confused with Lean is New Public Management, which has become more influential in public administration theory and practice since the 1980s. Vigoda define it as

"an approach in public administration that employs knowledge and experiences acquired in business management and other disciplines to improve efficiency, effectiveness, and general performance of public services in modern bureaucracies." (Vigoda, s. 1)

Similar to the emergence of Lean, the emergence of NPM is due to the growing demands for higher efficiency and effectiveness (in modern public administration). It is easy to see the similarity.

Case studies by Radnor and Walley, of public sector organizations claiming to be implementing aspects of 'Lean', show that for example while Lean Manufacturing focuses on the elimination of variation, this is not possible in the public service sector where e.g., the variation of the symptoms of a patient arriving at a hospital cannot be predicted. Another aspect they emphasize, is that Lean can reduce variety through e.g. modularization. This can be possible in some services, while not in other services, especially in public services, where the needs of the 'customer' need to be managed with high levels of flexibility. They further state that "the evidence from the research within the public sector indicates that Lean should be used as a means to achieve greater output, faster, with higher quality, with the same resource, rather than a method of rapid unit cost reduction to release cash or create job losses." (Walley & Radnor).

The truth is that NPM is actually the opposite of Lean. NPM emphasize the "customer" and responsibilities for results. This is achieved through a clear distinction between different decision-making levels and a separation between the strategic and the operative level. Lean on the other hand, is a model used in the private sector where more "flat" organizations and better teamwork is emphasized. In other words, the organizational structure with Lean and NPM is different (Walley & Radnor).

2.9 Digital Lean Manufacturing (DLM)

A digital Lean manufacturing tool embodies the Lean manufacturing principles. DLM facilitate a digital manufacturing assembly line layout and configuration for new products prior to their production. It is to embody Lean manufacturing process design principles. The idea is to develop

a digital manufacturing environment that will enable competing assembly line configurations to be evaluated and optimized in terms of lead time and cost, prior to undertaking any conventional physical layout activities, and hence ultimately increasing competitive advantage through time and cost reduction (Nottingham University Business School, 2008, s. 62).

2.10   Summary

In the review of various literature is clear that there are somewhat different opinions around the Lean concept, and what an implementation of the concept implies. In criticism of Lean it is argued that a Lean implementation can be at the expense of the employees, and lead to a higher work pressure nicknamed as "mean management". On the other hand, it is argued that Lean contributes to increased efficiency, maximization of improvements, reducing waste, increasing motivation through for example more responsibility, increased performance and involvement of employees. In theory around Lean and culture, it is argued that Lean equals culture, and that an understanding of this is necessary to succeed with Lean.

There exist a number of contradictions of what an implementation of the Lean concept implies. It is therefore predicted that such differences can have an influence on the results of an implementation of the Lean concept. The introduction of the Lean concept will lead to changes in a company, which can possibly create uncertainty in the workplace. If there exist contradictions within an organization, it might be a challenge to achieve a successful implementation of the Lean concept in the organization. Different understandings can lead to communication problems, which can create conflicts within the organization, between e.g. senior management and employees.

The study of how the different stakeholders perceive the Lean concept and deal with possible contradictions in the workplace and across companies is an interesting field of this thesis. It is interesting to examine how the various stakeholders stand in relation to aspects in the theory. Another approach to increase efficiency called New Public Management is discussed in the theory chapter to illustrate the difference, and to highlight what makes Lean different from this concept. Thus, it is interesting to evaluate whether companies are actually Lean, or whether they are more similar to other concepts.

3. Previous Research

3.1 Shanghai Surprise

A pump manufacturing plant in Shanghai, China, experienced a threat of closure after tremendous process changes. They had an ineffective organization, a lack of staff cooperation, disproportional waste, and a lack of visual control and standard work ethics. This led to the top management focusing on Lean manufacturing. Line workers, executives, and the logistics department adopted and advanced Lean principles through a carefully created plan by human resources (Aiqiang, 2008).

In the beginning of their Lean transformation, human resources were not involved in the process. The person responsible for the Lean implementation was quite busy and did not have enough time to think about goals, and he did not have the necessary support from others. Many of the operators at the plant lacked exposure to Lean thinking and manufacturing. To rectify this situation, a Lean team was established and a leader was appointed. Training and workshops in addition to permanent Lean positions contributed to greater responsibilities. These minor changes created an immediate shift in the organization. It was created a willingness to work harder and in a different manner when required (Aiqiang, 2008).

The manufacturing company now had a greater focus on organizational capability and on the culture of the organization. Organizational capability is the ability to manage people and products in an efficient way to gain competitive advantage. This includes leadership, cooperation, a shared mindset, and openness for change and improvement. A team-oriented and flexible organization involves staff with various experiences and different core competences to focus on one Lean project in a certain period. A more flexible organization at the plant was developed through focusing on human resources through maximizing organizational capabilities through assigning duties and deadlines. Before the Lean implementation, the manufacturing plant in China had a bad material flow. They identified people who could be "culture carriers" to build the transformation teams (Aiqiang, 2008).

In order to motivate staff, the human resources department prepared a package of materials including market share, customer complaints, and strong points and weak points of the company and competitors with the help of sales and marketing personnel. Case studies were presented in order to catch the attention of their employees creating a better structure of Lean. Through working

on human resources, the reshaped warehouse now included a logistics control department. The logistics control department have tasks like working with suppliers for them to deliver just in time, creating an in-progress production line, implementing a Kanban system and filling in personnel in the warehouse when necessary (Aiqiang, 2008).

According to Aiqiang (2008), many companies in China are governed by a strong, group-motivated work ethic. This means that one employee's achievements depends on the entire team's work measurement. In China, it is customary for some employees to provide a higher effort to reach a desired outcome. It is for example usual for workers to remain at the office through the night or seven days a week to reach a specific goal. The Lean program that was implemented at the pump manufacturing plant in China was codified by the human resources department. The human resource department in shop floor environments tend to lead the way in Lean efforts because of their knowledge of communication, improvement planning, performance appraisal, safety and organizational systems (Aiqiang, 2008).

4. Method

This chapter is a review of the choice of method. Mainly, one can distinguish between quantitative and qualitative methods. According Mehmetoglu (2004) there are several things that separates quantitative and qualitative methods. Usually a questionnaire with a large random sample is used in quantitative methods. With a qualitative method, information is usually obtained through interviews and observation of small samples (Mehmetoglu, 2004).

This chapter describes the different choices being made related to methodology, and how the work is performed. The choice of research methodology and research design are discussed first, followed by a description of the data collection and the interview process.

The research question emphasize different perceptions of the Lean concept, and how this might affect desired results for different companies in the region. Initially in this thesis, different perceptions of the Lean concept in various literature are reviewed. To gain a deeper understanding of the various participants' perceptions, it was decided to use the qualitative method. It is believed that the use of qualitative research design with interviews, will provide a more accurate picture of the participants in contrast to a questionnaire with specific choices of answers, which are usually used in quantitative research.

4.1 Choice of methodology

The *research methodology* refers to the type of study design, i.e. the methodological framework of the study.

Lean is a phenomenon where there are several competing beliefs. The phenomenon is defined by individuals, where there are several different views. In other words, the concept is socially constructed with individuals using their subjective perceptions to define the concept. Grennes (2012) distinguishes between two parts of the reality one seeks more knowledge about, which he calls the objective versus the subjective. Since the objective operates with only one truth, and the subjective with several different truths, this presents the subjective considering the different perceptions of Lean. The subjective is also known as the phenomenological paradigm, which requires a qualitative method (Grennes, 2012, s. 136). Phenomenological studies describe the opinion people put in an experience (Postholm, 2011).

Interviews used as the qualitative method, is used when it is interesting to figure out how people think and feel about something. The purpose it to get an insight to other individuals reality or perspective of what is being studied, because it is assumed to be of value and able to enlighten the area of interest. The purpose is to figure out how different individuals subjectively perceive the phenomena, and to get an understanding of it through their way of expressing it (Lotherington, 1990, s. 2). This correlates with the background for choosing a qualitative method with interviews as research method for this study.

Another argument for choosing the qualitative method is the purpose of the study. Grenness (2012) classifies purpose of study into three main categories, exploratory, causal and descriptive (Grennes, 2012).

Considering the purpose of this study, as well as the research question "How do various stakeholders perceive Lean in correlation with corporate culture, and what consequences might this have for desired results for different companies implementing Lean in the region?", it is considered that this study seeks to *explore* various stakeholders perception of the Lean concept. This means that this study can be seen as an explorative study design. The exploratory approach provides more flexibility. In the qualitative method, flexibility is important. From these aspects, it has thus been decided to use the qualitative method approach in this study.

The qualitative method distinguishes between two approaches. A deductive approach is based on theory, where conclusions are deducted. The researcher has prior knowledge of the topic, and hypotheses that are developed can be confirmed or rejected. The inductive approach is based on empirical data and then theory is developed. This approach is used when you do not have much prior knowledge about the topic. This study is based on theory to get an understanding of the Lean concept, and to look at variations in perceptions. The theory is relevant in the analysis, and the study is therefore deducted from theory. On the other hand, the research questions opens up for new insights to the Lean concept that has not been covered in the theory chapter. It is therefore more correct to consider this study as a combination of a deductive and inductive approach (Gadde & Dubois, 2002, s. 559).

4.2 Selection of participants

When using the qualitative method with interviews, it is not necessary with a very large number of participants. In practice, it turns out that after 6-7 people within the same category has been interviewed, it is enough to result in the same information to start repeating itself. This means that the value of the eighth and ninth interview will be marginal (Lotherington, 1990, s. 13). Regarding selection of participants, it was important for the study to get between five and ten participants in order to collect enough data. All the participants are employees in companies that have implemented Lean to a greater or smaller extent. It has been important to find participants who have actively participated in the work of implementing Lean, and who can provide information about possible outcomes from this process. Since the purpose of this study is to look at different perceptions of Lean in correlation with corporate culture, it was important to speak with informants that could provide information about their work regarding this and about the results that they have achieved. It will also be looked at what actual changes that has been made from implementing Lean, and variations in such changes among the different companies regarding this. Using the qualitative method it will be examined what different attitudes towards Lean and what different experiences with Lean that the various participants express.

In order to get access to information from companies that have implemented Lean, the TPM-Lean user network was of great help. This consists of members from more than 50 different groups and companies. As a member, companies have the opportunity to establish contacts and exchange experiences and expertise. Immediately after the interview process had started, some of the participants were helpful with suggesting possible other companies that could seem interesting and relevant to this research. This was very helpful, and it contributed to getting access to committed and willing participants. A main criterion is that the informants have good knowledge of the Lean concept. On this basis, members of the TPM-Lean forum were chosen as a part of the selection. Not all the participants are members of the TPM-Lean user network. The selection of participants is varied and consists of two Lean Coordinators from two different companies, a principle at a Lean elementary school, a plant manager, a Vice President Manufacturing & QA, TPM/QHSE Manager, a Learning Manager and a CEO.

It is assumed that participants will have different views and opinions about what the Lean term implies, and presumably have somewhat different experiences with the Lean concept. It is natural

to assume that the eight different participants from different positions have different perceptions and experiences with Lean. Considering that the selection of participants consists of people from eight quite different companies from different sectors, it is also assumed that their experiences with the corporate culture within their company is different as well. It is therefore believed that it will be sufficient to focus on this group of participants. If not, a possibility is to include additional participants. This has not been done when it subsequently was considered as sufficient with eight participants. Because of the focus and scope of the thesis, the study is based on participants who work and live in the region.

It was expected that the informants within the different companies had a high commitment and strong opinions about Lean, which proved to be true. This has helped to strengthen the study.

4.3 The interview process

Lotherington (1990) differs between three types of interviews that all may be combined or used alone. The informal, conversational interview is a conversation where planned concrete questions are absent. The interview is unplanned, and the participant might be unaware that the interview is happening. The interview-guide approach is a loose approach, and includes a list of questions and an area of interest that will be discussed during the interview. It is not necessary to follow the concrete order of the questions, but they are used more as a checklist ensuring that all areas are covered. Standardized, open-ended interviews is a fixed approach where questions are carefully thought through and each candidate are asked the same questions in the same order. This approach is used when it is important that all interviews are equally performed (Lotherington, 1990, ss. 3-7).

With a fixed approach, the degree of structure high. The questions and the direction is determined in advance. When using a loose approach, the degree of structure low. Little is determined in advance, and you have an open, emerging and inductive approach to data collection. This can be considered as two extremes, but it is also possible to use an approach that is somewhat in the middle. By selecting a fixed approach and practice this fully, some aspects or themes that emerge during the interview might be lost. By choosing a loose approach and practice this fully, it is a risk ending up with an information overload, not getting the answers really needed.

On this basis it has been used a middle ground between the two approaches. Questions are not necessarily asked chronologically, but are used to encourage participants to talk and to make sure that areas of interest are covered. Some participants are willing to provide more information, while others stick mainly to the specific questions that they are asked.

An interview guide with twelve questions that are meant to cover the needed information is used in each interview. It is expected that some of the conversations will derail beyond this. Everything that is mentioned during the interviews will be written down, with the exception of sensitive information that should be kept anonymous. It is desirable that the interview has a relatively high degree of transparency and openness. It is expected that conversations can go beyond the twelve questions formulated, resulting in greater variations in the data collection. Naturally, some are more talkative than others, while some reply only to the questions formulated. It is also assumed that the face-to-face interviews will give more detailed information as opposed to telephone conversations and e-mail interviews.

4.4 The Interview guide

As a preparation for the interview process, an interview guide was developed in advance (attachment 1). The interview guide is intended to ensure that the interviews will cover the required areas being researched. As mentioned, a middle way between a loose and a fixed approach allows more flexibility where additional information relevant for the research can be acquired.

In interviews, it is distinguished between open and closed questions. With open questions, the participant can answer openly what they want as opposed to closed questions where one can only choose between different alternatives. In this study, open questions are used in the interview guide. It can contribute to make the participant feel more relaxed in the conversation. Open questions also helps to uncover misconceptions and ignorance (Halvorsen, 1996). It is therefore chosen to undertake informal depth interviews with open questions.

With depth interviews, the informant is encouraged to express their opinions with their own words, expressing experiences and attitudes that are relevant. The entire conversation is often be recorded on tape, which has been the case in those interviews where this has been possible. The advantage

of such interviews is that the participant can formulate their own opinions freely without being forced in a certain direction.

Some informants have participated in the interview through email and phone call conversations. This has been necessary because it has been challenging to find sufficient informants to participate in the survey, and many of the participants expressed that they were too busy to arrange a meeting. All interviews, conducted through e-mail, phone calls or meetings, has given the needed information. E-mail interviews did not leave as comprehensive information as interviews conducted face-to-face or through phone call conversations. Some of the questions in the interviews conducted through e-mail were not answered.

4.5 Preparations

Before the data collection can start, necessary preparations needed to be made. The first step in this process was to contact different organizations, inviting them to participate in an interview. Most of the participants were contacted by e-mail or contacted over the phone. Working with the preparations was challenging due to many of the requested participants having a lack of time, and or did not want to prioritize it.

The interview guide explained earlier is designed in order to extract relevant information from participants from the various organizations. The eight chosen participants all deal with Lean in their daily work.

4.6 Data collection

The data collection with the interviews were scheduled at a time and place desired by the participants. The interview guide is used as the basis for all the interviews. Some of the questions in the interview guide overlap each other, and questions vary to some extent between different participants due to variations in conversations. The interviews take place either as face-to-face conversations, telephone interviews or with communication through e-mail. The interviews that took place face-to-face and through phone call conversations are recorded using an audio recording app on iPhone 5 and a regular audio recorder for phone conversations on speaker. In addition, notes were taken in case of failure of audio recordings.

4.7 Presentation of data

There are different ways to present data, using tables, graphs, diagrams, statements etc. The information extracted from the interview process gives a perception of how different stakeholders perceive Lean. It will be presented data through various statements regarding Lean from the eight different participants. The data is further divided into various categories. Similarities and variations are examined between the various statements from different participants. Further, in the analysis process it is discussed to what degree Lean "building blocks" are mentioned in each interview, to provide an insight into what is emphasized the most in the various companies. In this relation, a table has been conducted to illustrate the use of Lean tools. The various participants from the eight different companies will be referred to as company A, B, C etc. and e.g. Lean coordinator from company A, B, C etc. The reason for this is that several participants expressed a desire to be kept anonymous.

4.8 Ethics

In the interview process, it is important to create a good relationship with the participants. They should be able to remain anonymous if desired. Research can for some people or companies be perceived as an interference in their work and or in their life. It is therefore important to be grateful for the information acquired from the interviews. Informants should be informed why they were chosen for the study, considering that this can help to ensure that the researcher is taken more seriously. Informants should also be informed about the duration of the data collection and how it will take place so that they know what they are agreeing to. The anonymity of both the person interviewed and the institution should be guaranteed if desired. Anonymity can contribute to better quality of the information, and that additional requested participants want to participate. The researcher can offer to send a copy of the final product to those who participate (Mehmetoglu, 2004). These aspects have been carefully considered while working with this study. All participants are informed about the purpose of the study, all participants are kept anonymous and the final thesis will be sent to all eight participants after censorship of the thesis.

4.9 Assessment

The choice for this research was the qualitative method, which indicates that a relatively small number of participants are included. This leads to the data collected being analyzed more thoroughly and more in detail.

The experience is that many of the participants have the same opinion about Lean, possibly a result from many of them being a part of the TPM-Lean network in Stavanger. Most of the participants were quite positive to the concept as well. On reflection, it is possible that the selection of informants could have been better planned. Although such attitudes dominated, most participants were open about what they find challenging and difficult with the Lean concept. This created a foundation for an analysis of the different perceptions. The interviews improved in quality during the data collection process. This is assumed to be a result of the researcher getting more experienced along the way. It is considered that the learning curve has been rising.

After performing the interviews, the impression was that all participants were Lean "supporters", and that they described a concept where only the positive aspects of the Lean concept were promoted. A natural reason for this is most likely that all participants are part of organizations that have decided to implement Lean, and are therefore automatically positive to the concept. In addition, some of the participant knew each other, and recommended each other for participating in an interview. It was on this basis that it was decided to include participants who are not part of the Lean network. This contributed to more variation of beliefs around the concept. In hindsight, the selection of informants could have been better thought through.

4.10   Summary

This chapter have reviewed the choice of methodology, and relevant elements in relation to this. The choice landed on the qualitative method with an exploratory study design conducted with depth interviews. It is focused on the subjective part of the reality one seeks more knowledge about, called the phenomenological paradigm, which requires a qualitative method. The participants were selected on the background of companies having implemented Lean. The intention was to conduct depth interviews of five to ten informants, resulting in eight participants from different companies and industries.

5. Analysis

In this chapter, the data collection is analyzed and seen in context with the theory chapter and the research question. Various aspects from the data collection is highlighted to contribute to answer the research question:

How do various stakeholders perceive Lean in correlation with corporate culture, and what consequences might this have for desired results for different companies implementing Lean in the region?

Initially, a short presentation of the eight companies describe what type of companies that participate in the study. In the next part of the analysis, various statements from participants seen in context with literature reviewed in the theory chapter, contribute to enlighten relevant findings that works as the foundation for the discussion and the conclusion.

5.1 Description of Participants

Company A

Company A manufactures and sells animal feed, fertilizers and seed goods. They also sell tractors, machinery, equipment and engineering services to both agricultural and other customers. The background for implementing Lean was to prepare steps to become more efficient in order to produce enough.

Company B

Company B is a well-established coffee producer. The Lean implementation was implemented with a desire for overall improvements.

Company C

Company C is an elementary school, and thus the only one of the participants who do not sell a physical product. With Lean, they want to secure the best future state of education.

Company D

Company D is a machine manufacturer related to the oil industry in Rogaland. They mainly deliver advanced turnkey solutions, assembly and parts to the oil industry. Structure, measurements and systems are emphasized in their work with digital Lean.

Company E

Company E produce and sell building materials. The choice to implement Lean was on the basis that they wanted to get away from standard production, shifting to a production with better focus on customer needs.

Company F

Company F is a global supplier of training and treatment equipment for lifesaving. The reason for implementing Lean was a combination of that they saw that something had to be done with the customer complaint system and with the non-conformance system.

Company G

Company G is a manufacturer and supplier of industrial equipment to the Norwegian and international oil and gas industry. A Lean implementation was decided due to a difficult period in 2006.

Company H

Company H is an enterprise consisting of a lumber department and a mechanical department. Their purpose is to ensure that persons with impaired work gets personal development and improved quality of life through meaningful work. Lean was implemented after loosing an important customer due to a very messy and disorganized mechanical workshop.

5.2 The background for a Lean implementation

Greater efficiency, reduced or eliminated waste of resources and gaining competitive advantage are areas of interest for many companies choosing to implement Lean. This seems to be the case for most of the companies in this study as well.

"The main reason for the implementation was to gain efficiency to increase production. We experienced a negative culture with people blaming each other when problems occurred, and we realized that we had a desire to break down the existing culture, building up a new mindset."

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"Lean was implemented to deal with problem areas, and we experienced immediate results after implementing Lean."

Principle, Company C

"A desire to get away from standard products, and focus more on what the customer actually needs."

Lean Coordinator, Company E

"In 2006 there was a difficult period. We grew a lot and experienced a chaos that was difficult to handle. This was the reason we decided to implement Lean."

HSE/QA Manager Company G

"Our form of Lean has been - and is - an unconditional success and vital to our competitiveness."

Vice President Manufacturing & QA, Company D

"For us it was about responding faster to customer needs and to streamline the way we work and our processes. Meanwhile, we had quite a strong focus on finding a problem solving methodology that could be shared throughout the organization."

Learning Manager, Company F

"Our mechanical workshop did not look good, and an important customer left because of this. It was decided that something had to be done to improve the situation."

CEO, Company H

To summarize, the only participant mentioning a change in the corporate culture as a reason to why they decided to implement Lean, is company A. This indicates that cultural change is not always referred to as a goal in itself, but as the analysis will illustrate, it is emphasized by some of the participants as a natural part of Lean. The next sections will enlighten to what degree the culture is acknowledged and put emphasis on in the various companies.

5.3 Perceptions of Lean in Relation to Culture

It is assumed in this study that different perceptions leads to different experiences, and that corporate culture is a crucial factor. Several of the participants from the various companies agree that culture is important, even though they do not mention culture when asked why they implemented Lean.

Regarding the first part of the research question, how various stakeholders perceive Lean in correlation with corporate culture, this study show that the majority agree that working with the corporate culture and considering Lean as a mind-set is essential. Some have spotted this after "failing" with Lean in their first attempt.

The HSE/QA manager at company G described that loosing focus contributed to a relapse with their Lean work, creating a strong culture unsupportive of Lean.

"*I've had improvement meetings that have been quite tragic with negative attitudes to the management and to the Lean concept. It was not possible to gather people, and people were not interested in doing this. But there will always exist people who are skeptical.*"

HSE/QA Manager, Company G

Some of the companies in this study have realized that they have had insufficient emphasis on the human factor in the past, which correlates with Dahlgaard and Dahlgaard-Park's study described in chapter 1.1. They emphasize that an important part of the human factor is focus on how to build the right company culture.

HSE/QA manager at company G explained that they have realized that they need to change the attitude of all their employees, bringing everyone on the same team. Attitudes like "It is not my responsibility", and "I will leave work at 4 pm", regardless of whether the job is finished or not, has been destructive for the Lean environment at "G". They are still working with this.

Basin and Burcher's literature around Lean and culture described in chapter 2.6 emphasize the importance of decision making at lower levels. It appears that companies that have realized this have succeeded in creating a new and healthier corporate culture.

The Lean coordinator from company A explained that they previously experienced a negative culture with people blaming each other when problems occurred. This was something that changed

after implementing Lean. Their employees are now more involved in making decisions related to their work.

"*Before there was yelling and bad attitudes claiming that "nothing is happening." Today people take responsibility for themselves and their environment. This has been improved and we have much better control. Employees have a say in decision making, for example if there needs to be ordered new equipment, they are allowed to make suggestions. It increases motivation.*"

"*If you don't have the people with you, you don't get any results. The people are the most important.*"

<div align="right">Lean coordinator, Company A</div>

Several of the participants agree that culture is a key element to Lean as a continuous improvement process. Unlike the implementation of Lean described by Lean coordinator at company A where cultural change was a goal from the beginning, some have realized the importance of changing the corporate culture along the way.

Plant Manager at company B explained that their first attempt to implement Lean lacked Lean thinking embedded in the working routines and in day-to-day routines in the organization. Their goal was to use Lean techniques to improve. They realized that they needed to focus more on follow up.

"*A few years ago, a first wave of Lean was done at "B", but it was not really embedded in the working routines and the day to day organization.*"

<div align="right">Plant Manager, Company B</div>

This indicates that some of the companies have had a learn-by-doing approach with Lean, realizing from experience that the culture in the organization is essential when implementing Lean. The findings suggest that the first attempt to implement Lean both in company B and company G, failed due to lacking support from employees and a poor focus on Lean in relation to working routines and the day-to-day organization. This supports the assumption that how the culture behaves, affects desired results with Lean.

5.4 A Trend with Traditional Techniques?

Most participants also seem to consider Lean as a holistic philosophy with traditional tools and techniques that still apply. It is expressed that the tools and techniques under the Lean-umbrella, are not considered as something new and revolutionary, but that the mind-set is a new way of thinking.

When asked about a personal opinion around the Lean concept, Vice President Manufacturing & QA at company D describes it as "Old-fashioned in shape, although the principles are valid."

The Learning Manager from company F agrees that regarding the tools and techniques, there is nothing new in that respect. They have used the same tools earlier, perhaps with other names. She explains that employees who have worked at "F" for a while, have negative attitudes like "Yes, we have been through this before." She thinks that the main challenge of implementing Lean is to integrate the new mind-set and the new culture. It is, in quotes, "easier" for people to learn the methods and tools, but to see the totality of Lean is the challenge.

CEO at company H has a similar impression as well.

"*I was first introduced to concepts such as Kanban and JIT which later, along with several concepts, have become a more comprehensive Lean methodology. Lean builds therefore on many of the old principles, but they have been rebranded through time. It is a concept put together by older concepts now used more as a comprehensive strategy.*"

In other words, Lean is generally not perceived as something new and revolutionary in terms of tools. It is the mind-set that is considered as something "new", at least by the management. Company F express a struggle with implementing the new culture or the new mind-set, which indicates that they have acknowledged the importance of having a 'Lean culture'. The challenges might suggest that Lean is not properly integrated in the culture, due to employees feeling that the same old tools are introduced repeatedly. They are not following the same way of thinking as the management. This supports the literature by Treville and Antonakis that management needs to invest in the right worker perceptions, described in chapter 2.2. This can be related to the aspect mentioned in the previous chapter, that support from employees is essential when implementing Lean in order to bring everyone on the same team working towards the same goal.

5.5 Consequences of Different Perceptions

Regarding the second part of the research question, "what consequences different perceptions might have for desired results for different companies implementing Lean in the region", the responses regarding results are varied.

HSE/QA Manager from company G explains in detail their choice to implement Lean, and their ups and down during the process. He explains that after a setback with Lean in 2011, they realized that they needed to change the negative culture against Lean and bring everyone on the same team. As mentioned, the problem at "B" was that they lacked Lean thinking embedded in the working routines and in day-to-day routines in the organization, which is similar to the case at company G. This strengthen the assumption that focusing on cultural aspects has an effect on desired outcomes.

The aspects above supports various theories around Lean and culture by Miller and Basin & Burcher mentioned in chapter 2.5 and 2.6. These findings also correlate with literature by Dahlgaard and Dahlgaard-Park mention in chapter 1.1, that there often seem to be too much focus on training people mainly in tools and techniques with too little focus on understanding the human factor. This can have ripple effects and prevent desired results with Lean, which appear to be the case in company "B" and "G".

It clearly appears from both Plant Manager at "B", and at HSE/QA Manager at "G" that "forgetting" to focus on the day-to day work, their employees and the culture in general, result in negative consequences for the company, not giving desired results.

On the other hand, it appears that some of the companies have a learning culture beyond their own company, where collaboration with other companies is valued to achieve the best possible results with Lean. In such collaborations, their employees are included in the process as well. This stands out from working with Lean mainly internally in a company. The effects this have on their work with Lean and on achieving desired results, is looked into more closely in the analysis section of regional collaboration where organizational learning is discussed.

5.6 "Modernized" Lean

Lean occurred in Japanese context, but has now spread globally. Learning Manager at company F recognizes that there are different interpretations of Lean. She believes that there is a huge specter

of Lean, and that some are very true to the Japanese mindset. She thinks that in Scandinavia we have developed a variant that fits in our social democratic mindset to a greater extent. She thinks that there is a whole spectrum and "subspecies" of Lean. This can be related to Rolfsen's statement mentioned in chapter 2.2, that it is natural to assume that practices change when moving between continents and cultures.

Have the concept really changed that much, or is the traditional mindset still valid?

Two things valued in the traditional Toyota Production System described in chapter 2.1, is to eliminate waste and to make full use of workers capabilities, building a system that recognizes and includes all employees. These two aspects appear to be valid at company C. The Principle at company C explains that they have experienced improvements on many levels. From day one when they started to work with Lean, they experienced positive repercussions.

"It was the working environment that improved from day one. In many areas, work is easier and we spend less time searching for things we need. For example, cleaning personnel spend less time cleaning. The working environment was the first thing we marked an effect on."

Principle, company C

This shows a correlation between what is valued in the Toyota Production System and in the more "modernized" Lean term. The traditional way of thinking is still present. They have managed to remove waste and distracting factors, creating a better workplace.

What differs company C from many of the other companies in this study, is the description of the culture. They have a supportive corporate culture with little or no resistance to Lean, where this is a result of the management focusing on bringing everyone on the same team from the very beginning. They have had a constant perception of Lean as something that concerns everyone in their workplace. Their perception of Lean in correlation to corporate culture has made it easy for them to work towards desired results as a team.

The traditional way of thinking Lean emphasize to "build a system that recognizes and includes all employees", which is building up a culture. Therefore, regardless of Scandinavian mind-sets or subspecies of Lean, culture is still a cornerstone in the work with Lean.

5.7 Technical and Social Aspects

Lean is often associated with elimination of waste usually within organizations with excess inventory or excess capacity. A reason for implementing Lean that occur repetitively in this research, is problems with clutter, unnecessary equipment, and poor structure. Sahah and Ward's research, supported by Hasle et.al discussed in chapter 2.2 emphasize that both technical and social systems are essential with Lean. This is something that is emphasized differently in the different companies.

Many of the participants are very eager to give information about the tools and techniques that they have implemented, as the technical part of Lean. Many have implemented several of the exact same tools, but their experiences with Lean are different. This can be related to the social aspects. It is often agreed that culture is essential in the work with Lean, but how the different companies work with this is quite varied.

Company C stand out again, where resistance is taken seriously and dealt with immediately. Those having attitudes like "there will always exist some resistance", seem to express having more negative attitudes among their employees. These findings support that culture can be related to performance in an organization, and affect desired results.

The principle at company C stresses the importance of creating the right worker perceptions. He states that:

"*One misconception I have interpreted from others, is that Lean is all about getting the staff to "run faster" where one stands "ready with the stopwatch". If one perceives Lean in this way, it is not Lean, it is something else entirely.*"

The principle further explains that the reason many fail to implement Lean is perhaps due to a lack of competence, and too little involvement in management. A challenge at company C was to get people to understand how Lean, which is basically based on machinery and metal parts, could work, and be transferred to the care and training of young students. The way they have dealt with this is by demanding that all objections against Lean has to be written down and then handled in a practical way.

This goes back to elements mentioned in chapter 5.4, that it is important to invest in the right worker perceptions, where social identity is strong. Companies focusing more on the social aspects,

such as dealing with negative attitudes from day one, experience more cohesion and corresponding perceptions among employees, which makes it easier to gain results with Lean.

5.8 Lean in non-manufacturing Companies

Allway and Corbett's definition in chapter 2.2, emphasize to apply performance change tools, and emphasize excellence to deliver superior customer service. They point out that Lean apply to both service-sector firms and manufacturing companies. The situation with company C, which is an elementary school, prove that Lean can function within quite different companies with different purposes, where their "customers" are the students. Their long-term goal with Lean is better learning conditions.

Since company C is a non-manufacturing company it might be easier for them to focus more on working with the corporate culture, since their minds are not "occupied" with focusing on specific tools for specific machines, aiming to increase production and capacity.

Regardless of what type of company, the assumption is that investing in the right culture has an effect on performance with Lean. The statements from the Principle at company C support this assumption, and the idea that Lean can apply to both service-sector firms and manufacturing companies.

5.9 Committed Workers

Fivesdal and Bakke's figure of corporate culture as an iceberg is illustrated in chapter 2.3, where the hidden parts like right attitudes and group norms are considered as important human factors. HSE/QA Manager at company G can confirm that human factors like having the right attitudes and right norms is a challenge for them in their work with Lean.

"*What I can say as a native Brazilian, is that people have a tendency to put all responsibility on the management. They will relinquish responsibility to only concentrate on their tasks from 8am to 4pm. They will not contribute more than what they need. I understand this well, but it is somewhat problematic to resolve this.*"

Company G seem to lack committed workers, defined by Meyer and Allen in chapter 2.3 as a worker who stays with the organization through thick and thin, puts in a full day (and maybe more), protects company's assets, shares company goals and others.

In the theory chapter committed workers are related to culture, which establish that uncommitted workers can be related to the negative culture at "G", which again amplify that culture and performance are closely linked, meaning that "G" could achieve better results with Lean by having a more supportive culture in their company.

In terms of better results, not having committed workers and a supportive culture can be destructive for further development and competitiveness, which are key elements with Lean.

5.10   Corporate Culture Types

In chapter 2.3 "consensual" and "bureaucratic" cultures were considered more inward looking and closed than "entrepreneurial" and "competitive cultures", which are more innovative and risk takers. Company H is the opposite of inward looking and closed. Before starting with their 5S implementation, they visited other companies in order get a visual image that could be compared with their situation.

"We saw the contrasts to our own situation. The operator took several trips to the same factory where the supervisors and operators joined in. Lean includes and empowers everyone. This was the initial phase of the implementation. To engage everyone is "Alfa Omega". Visiting a company that had implemented Lean gave an important visual image that provided motivation. Employees were able to be there and to take part and experience which changes to make."

CEO, Company H

Company H has after their success helped other companies with their Lean work as well.

"In retrospect, we have also been visited by other companies who wanted to see what we had done. We also received several new assignments and got a lot of attention around this."

CEO, Company H

Denison's study discussed in chapter 2.3 show that organizations with "participative cultures" perform better. Company H seems to have a participative culture both internally within their business, and externally, with other companies in the region. The CEO can confirm that they have improved and achieved good results with Lean, which supports Denison's literature, as well as the assumption that culture has an impact on performance.

5.11 Collaboration in the Region

Collaboration with other companies in the region is obviously something that company H has realized the importance of in their work with Lean, which is interesting since they have experienced such great success, according to the CEO. This can be related to findings by Hanssen-Bauer and Snow described in chapter 2.4, that in general organizations collaborating with mechanisms for developing knowledge and sharing it, are more responsive. This also supports Frick's study of collaboration networks in the Rogaland area, that found that industrial collaboration with emphasis on knowledge transfer can have a huge impact on the participating organizations and on the region.

The Principle at company C, explains that he heard about the concept from his own father, working at a company that also happens to participate in this study. He also explains that his father in law work as a consultant in a company that operates with Lean. Thus, they have all exchanged business related information and shared experiences with each other. This is perhaps something unique for the region, with companies who collaborate and "talk" with each other about Lean. In addition, the Lean Coordinator from company A recommend the CEO from company H as a candidate for an interview regarding this research, due to their knowledge of each other in relation to Lean.

What this means in terms of organizational learning, is that it appear as if those companies who seem to value collaboration with others in their work with Lean, have advantageous in terms of creative solutions, information sharing and performance. This can also be related to the culture types in chapter 5.9, where cultures who are more open perform better than inward looking cultures. The basis for this reasoning is that solely positive experiences has been described from collaboration in the region, several of them mentioned in the previous chapter.

5.12 Cultural Aspects

In chapter 2.5 Miller's 5S's of culture is presented. The first S, structure, is to learn by doing. Both company "B" and "G" have explained that they have had a learn-by-doing approach with Lean, in other words trying and failing in order to realize how to work with Lean as a continuous process.

"We have been doing Lean for a long time. We are not specialists, but we are mature in this area. We have struggled for a long period, and have had relapses."

HSE/QA Manager, Company G

Systems refers to hiring and training. CEO at company H as well as the Lean Coordinator at company A, explained that they hired a consultant in order to do the Lean implementation as correct as possible. The CEO from "H" also emphasized that the administration as well as all the leaders had to complete a LEAN Leadership class through Bergen University College or College of Buskerud. This was in order to acquire "skills", which is the next aspect.

Style refers to behavior in an organization, and symbols are things done in an organization. At company G and company A, both the participants explained that they are experiencing some resistance to Lean among some employees. This proves that they have acknowledged it, and that they know that they need to work with it as a part of working with changing the culture.

Millers S's like systems and skills are clearly present at company H. This can be seen in context with the already existing perception that H is a learning organization at a high level. Structure and style are cultural aspects that appear to already be present and well established at "H", since they have a well-functioning culture supportive of Lean.

"It can be hard to break away from old habits, but we managed it with the help of our consultant. He was good at asking us questions and helped people to find solutions and to see opportunities for themselves. We have made the implementation properly. I think one can easily fail if you do it with "half your heart". The management must have knowledge of what Lean is. That is why it was decided that all managers and operations managers and management should take Lean Management course."

CEO, Company H

In chapter 2.6 Basin and Burcher's cultural requirements are presented. Participants who explain that they have made an effort to allow decision making at lower levels, have solely described positive experiences. The following statements can also be seen in correlation with another principle, which is to allocate responsibility.

"Lean creates flexibility and sense of responsibility. This is linked to our vision of providing our employees with meaningful work with transfer value. The fact that employees have been developing their expertise provides more flexibility by allowing them to perform multiple tasks. They are motivated by this."

CEO, Company H

"We have also spent a lot of time on improvement meetings, where employees participate. Employees are allowed to determine a bit how to do things. They will contribute a bit more on how things are done from now on."

HSE/QA Manager, Company G

"Yes, to succeed with Lean it is a key to involve and engage every employee in improvements. All are members of improvement groups, and we expect that everyone think 'continuous improvement'. We expect that all report problems. It is about recognition of the individual. We expect everyone to contribute. It is important that each person's opinion matters. Quality is created by those who are working in the classes, and therefore they should contribute."

Principle, Company C

To forward a concrete vision as an indication of what the organization believes it will look like once the transformation is complete, will naturally be easier if all employees have the possibility to participate. The same goes for communicating how to achieve goals, and promoting Lean at all levels.

Building supplier relationships based on mutual trust and commitment is valued specifically at company H. To avoid as much "waste" as possible, they used a creative solution when ordering heat-treated lumber. Trucks coming from the Baltics to retrieve farmed fish needed to have cargo

on their way to Rogaland. They therefore had the possibility to bring heat-treated lumber, and then bringing fish on the way back home.

Two important principles that Basin and Burcher emphasize is to encourage a learning environment, and ensuring maximized stability. There are several Lean building blocks described in the theory chapter, including A3, improvement meetings, instruction boards etc., all intended to encourage learning and creating stability. How frequently these are adopted by the various companies in this study will be analyzed in a table in the following chapter.

The effort to systematically and continuously focus on the customer, have already been mentioned as an important area within Lean. Company E, F and H explained that they mainly had the customer in mind when implementing Lean. As mentioned, company H add extra emphasis on this due to their loss of an important client prior to their Lean implementation.

Even though students at the elementary school, Company C, are not exactly paying customers in that respect, the most important part of Lean in their situation is to create better learning environments for their students in the long-run. In that respect, it can be considered as having the "customer" in mind.

Ensuring and observing long-term commitment to Lean has already been discussed as an important factor. The case at company G, where they have already experienced fallbacks with Lean, is a confirmation that ensuring commitment to Lean is a crucial cultural requirement.

Having the S's present, like for example the consultant and the LEAN Leadership class, is confirmed by the CEO at "H" to increase performance and results with Lean. Further, making decisions at lower levels and creating good supplier relationships are cultural requirements with Lean that are expressed to give positive results.

Not all companies have all the requirements, but many are present. The cultural aspect can therefore, again, be related to performance with Lean, which strengthens the assumption that culture affects performance and then again, desired results with Lean.

5.13   Lean Building Blocks

	A	B	C	D	E	F	G	H
The eight wastes		X	X		X		X	X
Pull System			X		X			
JIT			X					
SMED	X		X					
Standard work			X		X	X		
One-piece flow			X		X			
Batch Size Reduction		X	X		X			X
6S - Workplace Organization	X	X	X		X	X	X	X
Kaizen - waste elimination	X		X		X		X	X
Work cells			X		X			X
Total Production Maintenance TPM	X		X	X	X	X	X	X
Total Quality Management			X		X		X	X
Quick Changeover		X	X		X			
Red – yellow – green "dots"			X				X	
Visual Controls		X	X		X		X	X
Concurrent Engineering								
Reduction of variability		X	X		X			
Reducing lead time		X	X		X			X
Internal and external benchmarking			X		X			
Value Stream mapping			X		X	X	X	X
Teams and People	X		X		X	X	X	X
Time, money, effort								
Seven Lean rules								
Five questions		X	X		X		X	X
A3/PDCA	X		X		X	X	X	X

A question is whether using Lean tools indicates being Lean. Several of the participants agree that many 'Lean tools' are old or traditional techniques that still apply. Does using these traditional techniques imply that a company is Lean? As mentioned, some participants described that they thought that they were Lean, but later they realized that they lacked the mindset. They needed to realize that Lean is not at stand-alone program with some "tools".

It is also mentioned that the traditional tools are now part of a more comprehensive methodology or philosophy called Lean. There is a difference between talking about and having knowledge of Lean, and to actually be Lean. Several of the participants speak a lot about the mindset and the continuous process, but little about what changes they have actually done. Other participants have been very informative in terms of which tools they use, and what changes they have made. As it appears in the table, the use of various tools or building blocks varies largely between the different stakeholders.

Implementing Lean has resulted in various changes in all the companies participating in this study. The changes include for example better structure, better attitudes and reduced waste. Better structure is explained e.g. by lining up the warehouse with yellow lines marking minimum or maximum stock of for example pallets. Reduced waste, for example through using red-yellow-green "dots", have been explained to be a very efficient tool to get rid of unnecessary equipment and tools (waste). Better attitudes are often described as a positive consequence of the implementation. Some of the participants express that they are happy with the results they have achieved, and it is interesting how the development will continue. Elements in the table are both tools that are implemented once, and tools that are used continuously. An element for continuous improvement, for example total quality management, is only mentioned by company E, G, C and H. The same goes for Kaizen, A3/PDCA and 5 questions. Around half of the stakeholders mention that they use these tools. This can imply that they focus on getting better, and that they do not consider Lean as a one-time thing to be implemented, and then finished. This does not necessarily mean that those mentioning fewer tools don't share the same idea.

Regarding the cultural aspect, it can appear as if implementing the tools without focusing on the culture and the human aspect entails relapses or failure with Lean. In the table above it is visible that company G has implemented a fair amount of various tools and techniques in their work with

Lean. Despite using many tools, they have experienced challenges with their Lean implementation. Their plan to deal with this is by including their employees more in the process with Lean, allowing decision making at lower levels, focusing more on "teams and people".

Lean Manager in company A, described that they have had a tremendous cultural change after implementing Lean, and that they have achieved good results after starting with Lean. They are not one of the representatives using the highest amount of tools, but they seem to have a strong focus on "teams and people".

"If you don't have the people with you, you don't get any results. The people are the most important."

<div align="right">Lean coordinator, Company A</div>

Hence, it is not necessarily those using many tools that are more successful with Lean. Including the employees is a key element. The most essential change at company A was building up a new corporate culture, at the same time as the use of Lean tools have generated success as well.

"We have evolved in line with the methods that we have used. We have seen what kind of benefits we have received, and how we have improved tremendously in capacity and production, with up to 70%. It is wonderful."

<div align="right">Lean coordinator, Company A</div>

On this basis, it is reasonable to establish that what type of tools or techniques that are implemented, has little relevance alone. The culture has a bigger meaning, which often appears from the interviews, considering that fewer tools combined with an implementation of a new and better culture provides good results, as opposed to implementing many different tools with an unsupportive culture. To summarize, if the culture works as the founding building block, other Lean building blocks can be added on top. This contribute to give culture a bigger meaning, where other building blocks or tools work as support functions.

5.14 New Public Management and Lean

An important factor is what characterizes the organizational structure and communication in the companies. If the structure is characterized by "New Public Management", this indicates that the company has a pyramidal structure with management on the top. The important factors are the "customer" and responsibilities for results. This is achieved through a clear distinction between different decision-making levels and a separation between the strategic and the operative level. Lean on the other hand, is a model used in the private sector where more "flat" organizations and better teamwork is emphasized.

Some of the participants mention that they emphasize better teamwork and decision making on lower levels. Still, the pyramidal organizational structure is present, with leaders at the top and staff members being instructed on their job. If employees are not involved in the implementation of Lean in a company, many will often be critical of the method because they do not feel that they have been involved in the decision-making. For example, if they are not involved in defining the improvements. This means that businesses that implement efficiency tools to "continuously improve", without involvement from employees, result in having their employees perceiving it only as "new instructions".

Have some companies intended to implement Lean, and ended up implementing NPM instead? Employing knowledge and experiences to improve is an essential aspect of Lean, but when the organizational structure stays the same, one can wonder if it is really Lean or NPM.

In company A, the Lean Coordinator described that they experienced a better culture with better attitudes by letting their employees participate when making decisions. In company G, they plan on getting better at this in the future, and they are currently struggling with negative attitudes. Perhaps they have an organizational structure that is more pyramidal, resulting in a management style closer to NPM than Lean.

Regarding the culture, a bureaucratic and hierarchical culture defined in chapter 2.3 has already been evaluated as inappropriate when implementing Lean. Bureaucratic cultures emphasize values like formalization, rules, standard operating procedures, and hierarchical coordination. The long-term goal is predictability, efficiency and stability. This type of culture refers more to the NPM style, suggesting that companies with bureaucratic cultures will likely fail to implement Lean, and perhaps end up implementing NPM instead.

The bottom line is to have the culture in mind when implementing Lean. Involvement of employees appear to be essential, striving to create a more flat organization. The findings from the data collection mentioned so far, suggest that involvement create a more supportive and enabling work environment, which again is related to performance and desired results.

5.15 House of Lean

The house of Lean, originally developed by Toyota, focuses on both production performance and the human factor. The Lean Coordinator at company E explains that they use the "house" in their work with Lean.

"*The DNA is TPS (Toyota Production System) and how they work. Therefore, I prefer to collect input from the TPS.*"

He illustrates the house similar to Kim, Spahlinger, & Billi's house illustrated in chapter 2.7.3, with Jidoka in the right column, and JIT in the left column. Motivated people are in the middle of the house, and the foundation of the house consists of the customer, respect for people and continuous improvement. On the "roof" they have highest quality, lowest cost and shortest lead time. In addition, company E have best safety and high moral in this area.

Regarding the culture, the Lean Coordinator states that the "motivated people" in the middle of the house illustrates this.

"*Without the employees we do not go forward. It is optimal that the employees are motivated and develop their workplace every day (in a systematic manner).*"

Lean Coordinator, Company E

As stated earlier, the culture in an organization can be perceived as the founding building block, where other Lean building blocks such as JIT, TQM etc., can be added on top. Many of the same Lean elements recur under different names. The house is a selection of some items that are highlighted. In the house, the culture is in the middle of the house, with "floor", "walls" and a "roof" consisting of continuous improvement, JIT, Jidoka and quality. The Lean Coordinator from company E is the only participant who mentions the house of Lean in itself, but the elements of the

house are mentioned in the table with Lean building blocks, where it appears that the parts of the house are used by several companies.

What can be drawn from this is that the house illustrates the importance of the culture and the motivated people in the middle of the house. This is again, an argument that culture has a great importance, and by using the house, this implies that company E has acknowledged this. One can look at it like all the parts in the house needs to be present for Lean to fulfill its purpose. Without the people inside the house, as the "motivated employees", it becomes a "house without residents" which makes it impossible to achieve anything.

5.16   Kaizen Environment

HSE/QA Manager at company G expressed that they want to achieve a Kaizen environment, but that they still have a job to do in this area. Citing the statement from earlier:

"*What I can say as a native Brazilian, is that people have a tendency to put all responsibility on the management. They will relinquish responsibility to only concentrate on their tasks from 8am to 4pm. They will not contribute more than what they need. I understand this well, but it is somewhat problematic to resolve this.*"

Their situation is not consistent with Brunet and News's definition of Kaizen as "Pervasive and continual activities, outside the contributor's explicit contractual roles, to identify and achieve outcomes he believes contribute to the organizational goals."

This can be related to having committed workers, discussed in chapter 5.9. Kaizen environment is another term for a Lean culture, and it has already been identified as essential for performance and desired results.

In the literature of Kaizen in chapter 2.7.4, characteristics have been identified to an ideal Kaizen environment. Several of the characteristics by Cheser are present, and many are similar to Basin and Burcher and Miller's characteristics of cultural requirements mentioned earlier.

Skill variety is achieved through people working in teams with each individual performing several different tasks. Workers utilize a wide variety of skills providing flexibility. This is something that is referred to by several as ideal to create motivation and a better working environment. Lean

Coordinator from Company A expressed that allocating more responsibility for employees contributed to solve a problem with workers 'blaming each other', and then again, to a better organizational culture.

Task identity are employees being involved in a wider range of production operations. CEO at company H described a system that they have with detailed instructions attached to each machine, to make their employees more independent, and to avoid employees constantly asking for help.

Task significance is an overall vision of a workplace free of waste. Participants often refer to this as "it is "Alfa Amega" that everyone contributes" and "bringing everyone on the same team".

Autonomy is about creating independent employees, which can be correlated to task identity. Finally, feedback is given. As it appears in the table, there are several who use "Lean building blocks" like visual controls and A3/PDCA in order to give feedback and improve.

Kato and Smalley mention the importance of combining ideas with others and creating ideas in groups in their Toyota Kaizen book, mentioned in chapter 2.7.4. This is compatible with the organizational learning, and collaboration in the region reviewed earlier. Company H focuses both on internal training through submitting a Lean class for employees, and external collaboration with other companies to learn and get better at Lean.

Considering the strong similarities with cultural requirements in chapter 5.11, it is natural to note the same establishment that when the characteristics are present in a company, it can be related to performance, which strengthens the assumption that culture affects performance and then again, results with Lean.

5.17 The Shingo Model

In the Shingo model, corporate culture is described as an "enabler". Even though none of the participant mention the Shingo Model in itself, they touch upon several of the aspects. A core operation in the model is partnering, which means forming relationships with customers and suppliers. Again, this goes back to company H and their way of doing Lean through collaborating with others, and having creative ideas to obtain heated lumber from their supplier. In addition, they emphasize to gain trust from both customers and suppliers.

Lean Coordinator from company E also mentions that they appreciate forming Lean relationships.

"*Providers who do not work with Lean quickly becomes a brake pad in our system.*"

<div align="right">Lean Coordinator, Company E</div>

Non-manufacturing support functions are when Lean improvement tools are applied in non-manufacturing settings. Both company C and Company H emphasize that this is important.

"*Lean is everywhere, even in the broom cupboard.*"

<div align="right">CEO, Company H</div>

Therefore, some elements from the Shingo model are present as well, and can also be seen in correlation with other concepts already discussed, that are basically the same elements described in different models and theories resulting in many aspect being mentioned repetitively in this study. Especially collaborating, or partnering as it is called in the Shingo model, has been found to be exceptionally positive in relation to achieving good results. This is already elaborated on in chapter 5.10.

5.18   Workers Perceptions

The critics of Lean revolve mainly around a lack of focus on the human factor. Green calls it "Mean production", and stresses that it is destructive for employee motivation and well-being.

How Lean is perceived, can be correlated to how the employees in an organization perceive it. Treville and Antonakis' research in chapter 2.7.6, claim that the management have to invest in the right worker perceptions, where social identity is strong.

The companies experiencing resistance to Lean seem to have an impression that negative attitudes will always exist, but that they have a strategy for handling it. Principle at company C on the other hand, utters that resistance is not a big challenge for them. They have a clear system where complains have to be written down and delivered in, and this is a system they have had from the beginning. This might have contributed to get rid of resistance immediately, investing in the right worker perceptions.

"As long as we handled objections as early as possible, we could fix it right away. All objections were asked to be written down, and then handled in a practical way. A challenge was to get people to understand how Lean, which is basically based on machinery and metal parts, could work with us and be transferred to the care and training of young students. Some skepticism remained, but as long as we have managed to convey a different view this has not been a problem with us internally."

Principle, Company C

It is natural to assume that how employees perceive Lean can have positive or negative effects on the corporate culture, and thereby on performance and results of a Lean implementation. Investing in the right worker perceptions, emphasized by Treville and Antonakis as essential to succeed with Lean, seem to be confirmed by the situation at company C due to their good results with Lean.

5.19 Shanghai Surprise

The problem with the company in Shanghai was that they were too busy, and did not have the necessary support when implementing Lean. The challenges described at company G as the cause of their relapse with Lean, are almost identical. Both have realized that a key is the right leadership, cooperation, a shared mindset and openness for change and improvement.

The solution for the company in Shanghai was to implement "culture carriers" to build the transformation, where they experienced an immediate effect. For them, emphasis on culture was essential.

The HSE/QA Manager from company G suggests that something distinctive for the Norwegian working culture is that people expect to work only from 8am to 4pm, not contributing to something extra. As mentioned by Aiqiang, in China, it is customary for some employees to provide a higher effort to reach a desired outcome. It is for example usual for workers to remain at the office through the night or seven days a week to reach a specific goal.

Even though such a higher effort is customary in China, it should be possible to create a supportive Lean culture in Norwegian companies as wells. The difference between the company in Shanghai and company G, seem to be the workers' perception of Lean, reinforcing the establishment from

the previous chapter and confirming Treville and Antonakis' research again, that a culture with the right worker perceptions has an important meaning for achievements with Lean.

5.20   Measuring Consequences of Lean

How can one measure the outcome or desired effects in businesses implementing Lean? Information acquired from the various interviews show that companies have managed to become better qualified and to increase their competitiveness in the market after implementing Lean. As mentioned, CEO from company H explained that they managed to gain back trust from their customers, winning back an old customer who had previously left due to their unattractive mechanical warehouse. Lean Coordinator from company A described an increase in capacity and production with 70%.

From the time Lean was first implemented, and until today, conditions have changed regarding capacity and production, competitiveness, waste, working environments and culture, for several of the companies. The table below illustrates what has been achieved.

Company	Achievements
A	Reduced waste, increased capacity and production with 70%, better organizational culture and well-being, increased efficiency and better working conditions
B	Reduced waste, higher focus, improved processes/better flow, clear roles and responsibilities.
C	Reduced waste, better structure, better culture, better working environments.
D	Increased competitiveness, visibility, measurements
E	Reduced waste, improvements, better culture, increased motivation
F	Reduced waste, better fellowship, supportive culture
G	Better understanding of Lean tools, improvements in management
H	Reduced waste, better structure, better culture, competitiveness

Company G experienced that their successes and growth contributed to "forgetting" about, and giving less priority to the work with Lean, leading to relapses. One can wonder if some of the other companies will make the same mistake, now that several of them have already achieved what was

mainly the reason for implementing Lean in the first place. Yet there are many who emphasize a mind-set with continuous improvement, which in turn suggests that the Lean concept will stay in mind both in good and bad periods in their company.

Measuring consequences of Lean reveals whether desired results has been achieved or not. Some of the companies have already achieved desired results, and are now focusing on keeping up the good work stating that they will "never be finished". Others are still struggling with getting where they want to be. The data analyzed in this chapter have revealed different indications as to why these differences exist, and to what degree they can be related to the culture in the organizations.

6. Discussion

In this chapter, the findings from the analysis chapter are discussed and seen from different angles.

A main finding is that there is a variety of opinions about what the Lean concept entails. Most of the included participants look at Lean as a mindset and a philosophy that involves the entire organization, with a focus on customer value and continuous improvements. The variations are mainly around what tools that are being used, and what changes that are actually made. Those who have managed to implement the Lean mind-set and build a new culture express greater changes, linking the positive changes to the shift in the corporate culture describing a direct connection between these two. The perception that Lean is about investing in the right worker perceptions appear to be essential to desired results. Having negative internal perceptions of Lean in an organization has shown to be destructive and therefore affecting desired results in a negative manner. The perception of Lean in a company can also depend on what type of company it is, and what work responsibilities people have.

Companies in this study work with Lean on different levels. For some it is solely an internal program to reduce waste and increase efficiency etc. For others, communication is more emphasized. This refers to communication both internally and externally. In the region, there seems to be a culture of sharing knowledge and experiences with each other in order to improve. The companies working with Lean in this manner has a unique learning culture that benefits both themselves and others. In the literature, this is referred to "Entrepreneurial cultures" and "Participial cultures". On the other hand, it is also possible that the learning culture and the

collaboration between different companies in the region are coincident, with people randomly knowing each other in a region where "everyone knows everyone".

Those who perceive Lean close to culture, and who emphasize cultural requirements such as decision making on lower levels, close supplier relationships, skills and systems for hiring and training does report higher efficiency, better working environment and reduced waste in their organization, due to these elements. This implies that they have experienced success with Lean. On the contrary, allowing employees to participate more and being able to make an influence can create positive results, but it does not necessarily make the organizational structure flatter. It could be that some of the organizations have attempted to implement Lean, but that they in reality are closer to the concept called "New Public Management", with clear distinctions between different decision-making levels and a separation between the strategic and the operative level, also associated with a bureaucratic hierarchical culture. This could possibly have a correlation to why internal attitudes towards Lean are negative, if the employees feel that they are just being pushed to work harder.

A perception that appeared in the interview process, is also that the negative culture towards Lean, that some of the companies experience, is assumed to be something specific for the Norwegian working culture, where people expect to leave work at 4pm, and that they don't normally feel like doing "something extra". This is perhaps a possibility, but it might as well be a result of the attitudes mentioned above, with employees experiencing "constant stress" and more pressure from the Lean implementation. In other words, that Lean has not been implemented in the right way with the right priorities in mind.

Initially, it was questioned whether Lean is perceived as a new concept with traditional techniques or whether it is something new entirely. The analysis shows that a number of participants consider the Lean concept as something trendy today, and that Lean might be replaced by another "trendy term" in the future. In addition, several of the participant argue that the tools, techniques and methods within the Lean concept has been around for years. Thus, it is considered that this could be another possible underlying factor to why there exist misunderstandings or different interpretations of the concept. What for some people can be perceived as a tool that has been around for a long time, prior to the Lean implementation, can for others be perceived as something new and only a part of the Lean concept. This might create conflicts and friction within an organization.

If an element is introduced as a specific Lean tool, at the same time as some employees have been working with the same tool under a different name in the past, this can possibly create conflicts within an organization. Employees may perceive this as unnecessary changes, which might cause them feeling indifferent. This is reviewed in the analysis as an actual event that has occurred in company C, with negative attitudes like "yes, we have been through this before".

The difference between those using many of the building blocks discussed in the theory, and those using few building blocks appears in the interviews. Typically, those using many tools have very detailed and informative interviews, while those describing fewer tools are more concise. This may be perceived as those using many tools being "Leaner". On the contrary, companies using fewer tools describe equal or better results from their Lean implementation, which weakens the argument. It might as well be a consequence of the quality of the interviews, considering that face-to-face interviews, phone interviews and email interviews can vary in terms of quality of the information acquired. Face-to-face interviews are typically more detailed than e-mail interviews, and it might therefore be a coincident that those using many tools are more informative. It can also be a result of participants using many tools, spending more time describing how they use the various tools, which makes them appear more informative.

6.1 Reliability and variability

In qualitative research, the traditional demands for reliability and validity are problematic considering that the meeting between the researcher and the informant is unique. Reliability refers to the trustworthiness of the results. The normal criteria is that the results can be reproduced and repeated, which is not logical with qualitative research. In a phenomenological understanding, it is a benefit that the sensitivity of the participants are varied. The conversation should enlighten a unique case, as a specific phenomenon. The question with reliability, is how well the analysis defend interpretations. (Postholm, 2011, s. 169).

Validity refers to whether you have actually measured what was intended to be measured. The criteria consider whether statements are correctly documented. When statements are interpreted, the validity depends on whether the theory is valid for the study's field of interest, and whether interpretations follows logically from the theory. Validity is how well you measure the field of interest, and is a key to accomplish meaningful results.

In order to strengthen the reliability, all the face-to-face interviews have been recorded with an audio recording app. This has contributed to a more accurate transcript of the information given during the interviews, and it has also made sure that important information is not forgotten or remembered incorrectly. In addition, data attained from interviews are generously presented in the analysis as accurate statements by the participants. In addition, all interviews are transcribed and included as attachments.

The transcription of what the participants say during the interviews strengthens the validity, due to statements formulated from the participant's actual language and personal opinions. Further, to avoid misinterpretations, it is made sure to have the ability to contact participants at later occasions in case of any ambiguities or misunderstandings. In addition, counseling from advisor has been useful contributing to other insights. This has been helpful considering that this thesis is written by one single researcher, with limited inputs from other points of view.

7. Conclusion

After the data collection, conclusions can be made based on the data analysis. The findings presented in the analysis is the basis for the conclusion. Various quotes from the interview process is included and referred to in the analysis. This contributes to highlight the participants' utterances and attitudes more accurately.

This thesis is carried out as a study, where different stakeholder's perceptions of Lean in relation to culture is emphasized. In addition, consequences of Lean implementations and experiences around this are included as relevant variables. It is sought a better understanding of what the different companies emphasize in their work with Lean, considering that variations in perceptions around the concept, and how it is regarded in relation to the corporate culture, is assumed to affect desired results.

One definite conclusion is that the way culture is perceived, and the dedicated importance of culture, is varied among the different companies. This has had an impact on desired results with the implementation of Lean in companies, in terms of achieved improvements or results.

This chapter presents a brief summary of the key findings linked to the research question that was presented in chapter 1.2:

How do various stakeholders perceive Lean in correlation with corporate culture, and what consequences might this have for desired results for different companies implementing Lean in the region?

Several elements that can be related to culture has been identified as elements that can hinder a successful implementation of Lean. Lacking support from employees, forgetting to focus on the day-to-day organization, uncommitted workers, bureaucratic cultures with hierarchical coordination and lack of ability to collaborate and create beneficial relationships both internally and externally, are some of the elements that stand out. By bringing everyone on the same team working towards the same goal, the management need to invest in the right worker perceptions. "Forgetting" to focus on the day-to day work, employees and the culture in general, result in negative consequences, and does therefore not provide desired results.

It has been established that uncommitted workers can be related to a negative culture. In terms of gaining better results, lacking committed workers and a supportive culture can be destructive for further development and competitiveness, which are key elements with Lean. It appears as if "participative cultures" perform better. Relating this to organizational learning, it appear as if those companies who seem to value collaboration with others in their work with Lean, have advantageous in terms of creative solutions, information sharing and performance.

In the initial phase of this thesis, it is assumed that culture and performance are closely linked, and that a closer focus on culture when implementing Lean is essential for better achieving desired results. How employees perceive Lean can have positive or negative effects on the corporate culture, and thereby on performance and results of a Lean implementation

The analysis contributes to strengthen the assumption in different areas. This study has contributed to enlighten underlying cultural factors, such as focusing on changing the culture from day one, creating a foundation for committed workers, collaborating with other stakeholders and better involvement of employees.

On this basis, the conclusion is that the culture in the various organizations is related to their performance, and to what results they achieve with Lean. Culture affects how companies perform, and thus, culture affects the outcome and desired results from a Lean implementation.

8. Limitations of the Study

This study is based on statements from eight different participants from different companies in the region. One weakness is the possibility that participants from other companies might have entirely different perceptions than what occurs in this study. Regarding this aspect, time and resources has been a limitation for including a larger number of participants.

A weakness might be that the informants remember incorrectly regarding questions about historical information, and the development of thoughts and attitudes that has evolved over the years. Another possibility is that informants might communicates with a very different range of words and expressions, which can lead to difficulties when analyzing the perceptions between the various participants. Despite this limitation, the data collected does provide a fair amount of different perceptions and experiences with Lean, which has contributed to interesting and useful information in the analysis.

Another weakness is that the interviews are performed differently, i.e. face-to-face interviews, phone interviews and e-mail interviews. This naturally leads to variations in quality. Some of the interviews conducted through e-mail has been quire brief, and not all questions were answered. On the other hand, the interview guide involves quite many questions, which has led to the interviews providing adequate information that made it possible to conduct the analysis.

9. Suggestions for Further Research

A suggestion for further research is conducting similar studies in other regions. This could be an interesting research contribution due to the collaboration between different stakeholders in the Stavanger region, and how this is described to affect their work with Lean. Therefore, studying the situation in other regions could enlighten whether regional collaboration is something unique in the Stavanger region, or whether it occurs on the same level in other regions. This could also contribute to enlighten whether collaboration with Lean, if it exist, is helpful in other regions as well.

As mentioned, this study involves eight participants from eight different companies, with a limited possibility to include several companies due to a lack of time and resources. Therefore, a second suggestion for further research is to perform an extension of this study by including additional

participants from several other companies in the region This could contribute to strengthen or weaken the findings in this study.

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Attachment 1

Interview guide: A study of different stakeholder's perception of Lean

Name(s):

Gender:

Age:

Position(s):

Company:

Introduction

1. When were you introduced to the Lean concept?

    a. What was your immediate impression?

2. Has your perception of the concept changed since you were introduced to Lean for the first time?

3. Explain how Lean affects your work.

    a. What is your personal opinion about the Lean concept?

Beliefs around the concept

4. On what basis was it decided to implement Lean at _____, and what beneficial changes were expected in advance?

5. It is known that there are various interpretations of the Lean concept. Can you relate to this?

    a. Does it affect cooperation with other stakeholders, and how?

6. Has different perceptions of the Lean concept caused any challenges at _____?

    a. How do you prevent this?

7. Has Lean been something new and revolutionary for your company, or does traditional techniques still apply?

    a. Describe the actual changes made within your company.

    b. Which principles of the Lean concept do you emphasize the most at _____?

8. What do you think differs Lean from similar practices?

Key elements

9. What do you believe characterizes the Lean concept? Name some aspects that you think is essential.

10. What do you think enabled the implementation of Lean at _____?

    a. How long did it take until Lean was considered as implemented?

11. Can you explain your point of view on a relationship between Lean and the organizational culture?

12. What is in your opinion the underlying principles of a Lean work environment?

    a. Is job enrichment and employee motivation valued as important parts of the Lean process at _____, and why?

Attachment 2

E-mail invitation

Hei,

Jeg fullfører denne våren toårig master i økonomi og administrasjon ved Universitetet i Stavanger. Har valgt å skrive masteroppgave rettet mot implementering av Lean i ulike bedrifter. Forskningen er ment å svare på hvordan ulike bedrifter vektlegger fokus på bedriftskultur som en viktig del av Lean tankegangen, og hvilken betydning dette har for ønskede resultater.

Jeg har fått med meg at _____ har gjennomført en implementering av Lean. Tenker derfor at det kan være veldig interessant å få til et intervju med dere.

Har dere mulighet og ønske om å delta på et intervju angående dette? Intervju via e-post er også mulig dersom tid er en knapp ressurs.

Håper på positivt svar.

Med vennlig hilsen

Trude Elisabeth Olsen

Attachment 3
Provider of Agricultural Services

Company A

Gender: Female

Age: 55

Position: Lean Coordinator/TPM

Interview: Face-to-face interview

Når ble du først introdusert for Lean konseptet?

Det var i 2006 da vi implementerte TPM. Det er en form for filosofi hvor Lean gjerne kommer under som en metode. Det er et resultat av smal produksjon, smal ledetid. Ledelsen hadde kartlegging og forskjellige ting og endte opp med at de ville starte med TPM og Lean.

Hva var ditt umiddelbare inntrykk av konseptet?

Tenkte at det var noe nytt vi skulle begynne med, og det hørtes veldig greit ut for min del. Etter jeg ble ansatt som TPM-koordinator fikk jeg mer innblikk i hva det dreide seg om. Da så jeg for meg at det kom til å bli veldig mye nytt i forhold til hvordan vi var vant med å jobbe fra før av. Hele tankesettet var annerledes, faktisk. Det var nok forskjellige oppfatninger ut i bedriften, men for meg virket det som folk var åpne og syntes det virket nytt og spennende. Men det var også andre som var mer lunkne til det. Var en blanding.

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?

Ja, vi har utviklet oss i takt med metodene som vi har brukt. Har sett hva slags nytte vi har fått av det, og har forbedret oss enormt på kapasiteten og produksjonen, med opp til 70%. Det er formidabelt.

Forklar hvordan Lean påvirker arbeidet ditt. Hva er din personlige mening om Lean konseptet?

Det er et veldig bra konsept slik jeg ser på det. Hvis man ser på det som en prosess, og ikke bare fokuserer på det økonomiske så syntes jeg det er veldig veldig veldig bra. Det gjør noe med mennesket, det bryter ned en kultur man har fra før og bygger opp en ny kultur. Jeg ser på det som

en kontinuerlig forbedring av hverdagen fordi det forbedrer arbeidsplassen både innenfor HMS, effektivitet, trivsel og det favner om det daglige.

På hvilket grunnlag ble det besluttet å implementere Lean hos dere, og hvilke fordelaktige endringer ble forventet på forhånd?

Ledelsen hadde nok et formål om å gjøre noen grep for å bli mer effektive for å kunne produsere nok.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?

Ja jeg føler det er en del forvirring rundt begrepet. Mange glemmer å se på det som en helthet, og tenker utelukkende på det økonomiske.

Påvirker det samarbeid med andre aktører, og hvordan?

Som følge av av TPM-nettverket er oppfatningen den samme hos mange aktører. Forskjellene ligger i resultatet.

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer hos dere?

Ikke noe spesielle utfordringer.

Har Lean vært noe nytt og revolusjonerende for bedriften, eller gjelder tradisjonelle teknikker fremdeles?

Føler det er veldig populistisk nå. Men mange gamle teknikker gjelder fortsatt.

Beskriv de faktiske endringene som er gjort.

Dette har kommet for å bli. Vil ikke gå tilbake til slik det var før. Før var det mer kjefting og dårlige holdninger om at «det skjer ingenting». I dag skjønner folk at de må ta ansvar selv Miljøet har blitt bedre og vi har mye mer kontroll. Mye mindre armer og bein. Ansatte får være med å bestemme for eksempel hvis det skal bestilles nytt utstyr, og de får komme med forslag. Det øker motivasjonen.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos dere?

Våre grunnleggende verdier er PEN – pålitelig, effektiv og nyskapende. Vi vektlegger kultur, HMS arbeid, effektivitet og trivsel. Har stort fokus på at det er en kontinuerlig forbedringsprosess.

Hva karakteriserer Lean konseptet? Nevn noen aspekter som du synes er viktig.

For oss var det viktig å bryte ned den gamle kulturen for å bygge opp et nytt tankesett. Har du ikke menneskene med deg får du heller ikke resultater. Menneskene er det viktigste.

Hva muliggjorde implementering av Lean hos dere?

Et mål om endring. Det er alfa omega for endringsledelse.

Hvor lang tid tok implementeringen?

Mellom tre og fire år. Etter tre år kom de gode resultatene. Ansatt en flink konsulent og fikk fakta på bordet ved hjelp av loggføringer.

Kan du forklare ditt synspunkt på et forhold mellom Lean og organisasjonskultur?

Det henger sammen.

Hva er etter din mening de underliggende prinsippene for et Lean arbeidsmiljø?

Det daglige er i fokus. Trivsel.

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos dere, og hvorfor?

Ja, vi ser at ansattes motivasjon øker.

Attachment 4
Coffee Producer

Company B

Gender: female

Age: 43

Position: Plant Manager

Interview: E-mail interview

When were you first introduced to the Lean concept?

I used to work for the Volvo Cars factory in Gent (Belgium) and they were pioneers in Lean, so my first introduction was in early 90's

What was your immediate impression?

Structured way of working, continuous improvement.

Has your perception of the concept changed since you were introduced to Lean for the first time?

The more knowledge you get, the more opportunities for improvement you see.

Explain how Lean affects your work.

It does not affect my work, it is my work.

What is your personal opinion about the Lean concept?

In todays world it is essential, it is the base. Lean is a way of achieving goals, of improving. It can never be a goal on itself. Don't look at it as something extra, or on top of. It should be a natural way of behaving. I never use the word Lean.

On what basis was it decided to implement Lean, and what beneficial changes were expected in advance?

A few years ago, a first wave of Lean was done at "B", but it was not really embedded in the working routines and day-to-day organization.

We are now part of a bigger company, and they have a longer history in using Lean techniques to improve. The 'coat hanger' is Performance Management. In our company, those two things are completely linked. We set targets, have a breakdown to operator level and follow up the performance. If opportunities occur, the correct tool is chosen to find the root cause and/or to solve the issue. As stated previously, Lean is not a goal on its own, it is a tool.

Performance management helps to keep the focus high and to make sure that implemented routines don't fade away.

The first time, 5S was introduced, with a lot of good intentions, but without a follow up. That is why it faded away, back to the old level.

It is known that there are various interpretations of the Lean concept. Can you relate to this? Does it affect cooperation with other stakeholders, and how?
There are two ways; the first is really focusing on reducing waste in all its forms, where the second one is looking at improving the whole process, at the flow.

Has different perceptions of the Lean concept caused any challenges at your company? How do you prevent this?
No, not really. It is important to explain what you want to do, how you want to do it and never forget why you want to do it.

Has Lean been something new and revolutionary for your company, or does traditional techniques still apply? Describe the actual changes made within your company.

Different follow-ups done by the operator are now summarized and made visual in one "heart beat board". This way the operator and everyone involved can see the link between it all.

- Strict follow up, strict routine and timings, clear responsibilities

- Implement 5S again

Which principles of the Lean concept do you emphasize the most at your company?

5S, SMED, continuous improvement, PDCA

What do you think differs Lean from similar practices?

N/A

What do you believe characterizes the Lean concept? Name some aspects that you think is essential.

Everything you do is to have the best possible product for your target customers, with the best quality for the best price.

What do you think enabled the implementation of Lean at your company? How long did it take until Lean was considered as implemented?

For me it is a lifetime journey, which can never be considered as implemented. You can always improve and learn. If you look at it more as "are the techniques known" then you can put a date on it.

Can you explain your point of view on a relationship between Lean and the organizational culture?

As explained above, Lean should be a natural way of working, so be part of the culture. Therefore, clear roles and responsibilities are needed.

What is in your opinion the underlying principles of a Lean work environment? Is job enrichment and employee motivation valued as important parts of the Lean process at your company, and why?

Yes, not recognizing or using the human potential is one of the types of waste. The knowledge of the operator, the forklift driver, the technician is essential! It is vital that they work in teams and that they have an impact on their way of working and work environment. The management needs to coach them.

Attachment 5
Elementary School

Company C
Gender: male
Age: 44
Position: Principle
Interview: Phone interview

Når ble du først introdusert for Lean konseptet?

Hørte om det første gang i 2003-2004. Det er en litt spesiell historie. Hørte om konseptet fra min far som jobber med dette. Da handlet det mest om systematikken i forhold til oppfølging og forbedringer. Min umiddelbare tanke var at det virket som et godt og robust system som kunne fungere i praksis. Hadde også en svigerfar som også var konsulent i et firma som også begynte med Lean. Dermed har det vært litt familiært både via min far og min svigerfar. Gradvis har Lean tenkningen kommet inn gjennom disse kanalene. Har i ettertid tilegnet meg mer kunnskap om Lean på eget initiativ, på bakgrunn av de to. Har vært en langsiktig modningsprosess før vi startet med Lean her hos oss våren 2012.

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?

Oppfatning, forståelse og kompetanse om Lean har ikke endret seg, men utviklet seg.

Forklar hvordan Lean påvirker arbeidet ditt. Hva er din personlige mening om Lean konseptet?

På mange forskjellige nivåer. For meg er det en ledelsesfilosofi, men det er og en måte å tenke og utvikle en organisasjonskultur på. Det representerer og en type metodikk og en rekke verktøy. Så sånn sett så er det en måte å tenke ledelse på, det er en måte å tenke kvalitet, det er en måte og tenke utvikling. Så er det også oppfølging hvor vi bruker verktøy i hverdagen. En del av min jobb er å etterspørre. På en måte så gjennomsyrer Lean veldig mye av det vi gjør på mange nivå.

Har Lean vært noe nytt og revolusjonerende for bedriften, eller gjelder tradisjonelle teknikker fremdeles?

Det er ingenting nytt i seg selv i Lean, men det er den systematikken og strukturen som er gjerne det som er nytt. Sammensetningen og systematikken er ny tenking.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos dere?

Det er mange begreper. I utgangspunktet snakker vi om over 18 prinsipper for Lean eller Toyota. For å svare på hvilke deler vi benytter så er det 5s, bruker aktivt forbedringsgrupper og forbedringstavler, jobber aktivt med standardisering, jobber aktit i forhold til oppfølging av måltall, også jobber vi og med visualisering som er en metode for verditenkningen. Sånn sett også det som går på flyt og verdistrømming. Men og, selvfølgelig det som går på problemløsning. Finne rotårsak.

Hvor lang tid tok implementeringen?

Lean er jo på mange forskjellige nivåer. Vi startet med en kickoff med personalet i april 2012. vi forankret at Lean er noe vi går for som noe kollektivt. Det første vi gjorde var å kjøre en 5s i gymsalen og på lageret. Effekten var umiddelbar. Da vi hadde fikset det siste bilde av hvordan vi ønsker at det skal være, så ga det en umiddelbar effekt. Det som før hadde vært et kaos område ble nå systematisert. Alt utstyr fikk sin faste plass. Slik har det vært siden. Sånn sett var det veldig taktisk å starte med et problemområde hvor vi så en umiddelbar effekt. Vi har hatt en strategi for å tilnærme oss mer og mer kompliserte utfordringer i vår organisasjon.

På hvilket grunnlag ble det besluttet å implementere Lean hos dere, og hvilke fordelaktige endringer ble forventet på forhånd?

Har to mål med vårt Lean arbeid. Det ene handler om at vi på sikt vil se at elever får økt læring. Det andre er å få et enda bedre arbeidsmiljø. Det med læringen ser vi på litt mer langsiktig, og det med arbeidsmiljø har vi sett effekt av fra dag en. På flere og flere områder så blir hverdagen enklere, man bruker mindre tid på å lete, og mindre ressurser på å frustrere seg. For eksempel renholdere bruker mindre tid på å rydde. Dette var gjerne det første vi merket effekt på.

Hva er etter din mening de underliggende prinsippene for et Lean arbeidsmiljø?

For å lykkes med Lean så er det en nøkkel med den tenkningen vi har i forhold til å involvere og engasjere hver enkelt ansatt i forbedringsarbeid. Alle er medlem i forbedringsgrupper, og vi forventer at alle tenker kontinuerlig forbedring. Forventer at alle rapporterer problemer. Det handler om anerkjennelse for den enkelte. Vi forventer at alle skal bidra. Det er viktig at hver enkelts mening betyr noe. Kvalitet skapes av de som jobbes i klassene, og da må de og bidra.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?

Ja, og det har vi vært bevisst på fra dag en. Mange har hatt sukse med Lean, og mange har hatt fiasko. Det henger sammen med at ulike faktorer har gitt Lean et dårlig rykte. Vi har fokusert på hva ulempene med Lean kan være. Må fange opp motforestillingen for å kunne gjøre noe med det. Da må vi gjerne avklare eller begrunne på ny for å få alle med.

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer hos dere?

Nei, så lenge vi fikk håndtert motforestillinger så tidlig som i April så kunne vi ordne dette med en gang. Alle motforestillinger ble bedt om å leveres skriftlig, slik at de kunne hånderes på en praktisk måte. En utfordring var å få folk til å skjønne hvordan Lean som i utgangspunktet er basert på maskiner og metalldeler kunne fungere hos oss, og overføres til omsorg og læring av små elever. Her har skepsisen ligget, men så lenge vi har klart å formidle et annet syn så har det ikke vært noe problem hos oss internt.

Kan du forklare ditt synspunkt på et forhold mellom Lean og organisasjonskultur?

For meg handler Lean om å utvikle en organisasjonskulturs. Det er ikke kun metoder og verktøy, men tenkning innad i organisasjonen. Det handler som kontinuerlig forbedring, og det handler om å gjøre hverandre gode. Hvis vi skal bli god i Lean så må vi tenke tre til fem til syv år, fordi det handler om en kulturendring og det handler om menneskene. Det tar tid å endre gamle holdninger, så det må endres gradvis.

Grunnen til at mange feiler er kanskje manglende kompetanse, og for lite engasjement i ledelsen. Det er nok mange forklaringer til at mange ikke får det til.

En feiloppfatning jeg har tolket fra andre er at Lean egentlig handler om å få de ansatte til å springe fortere. Hvis man oppfatter Lean slik så er det ikke Lean, da er det noe helt annet.

Attachment 6
Machine Manufacturer

Company D

Gender: Male

Age: 51

Position: Vice President Manufacturing & QA

Interview: E-mail

Når ble du først introdusert for Lean konseptet?
1998

Hva var ditt umiddelbare inntrykk av konseptet?
Nødvendig, nyttig og strukturert

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?
Ja, nå virker det gammeldags

Hva er din personlige mening om Lean konseptet?
Gammeldags i form, selv om prinsippene er gyldige

På hvilket grunnlag ble det besluttet å implementere Lean, og hvilke fordelaktige endringer ble forventet på forhånd?
Lean ble innført i 2007, men ble etterhvert erstattet med det vi kaller "digital Lean".

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette? Påvirker det samarbeid med andre aktører, og hvordan?
Nei

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer? Hvordan forhindres dette?

N/A

Hvilke prinsipper fra Lean konseptet vektlegges mest hos dere?

Synlighet, måling

Hva karakteriserer Lean konseptet? Nevn noen aspekter som du synes er viktig.

Synlighet, systmatikk, målinger

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos dere, og hvorfor?

Vår form for digital Lean har vært - og er - en ubetinget suksess og avgjørende for vår konkurransekraft

Attachment 7
Provider of Construction Materials

Company E

Gender: Male

Age: 32

Position: Lean coordinator

Interview: E-mail interview

Når ble du først introdusert for Lean konseptet?

I år 2000

Hva var ditt umiddelbare inntrykk av konseptet?

At dette er selvfølgelig helt riktig. Logisk og en selvfølge, alt satt i ett system.

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?

At det ikke er et prosjekt, konsept eller en quick fix. Lean er en kultur som en bruker flere tiår på å bygge. En langsiktig reise uten ende. En reise preget av utholdenhet og to steg frem, ett tilbake.

Forklar hvordan Lean påvirker arbeidet ditt.

Systematikk, oppfølging, ut av kontoret.

*Hva er din personlige mening om Lean konseptet?*

Fascinerende, lett misforstått. Mange tror dette er en quick fix og at 5s er lean. Den lange kulturforandringen vil aldri fungere om ikke alle ledere går all inn på dette. Igjen, ikke et konsept men en endring av måten en organisasjon lever på.

På hvilket grunnlag ble det besluttet å implementere Lean hos din bedrift, og hvilke fordelaktige endringer ble forventet på forhånd?

Behov for masseprodusert skreddersøm, bort fra standard inn med kundebehov. Dette har vi oppnådd.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?

Ja, problemet er at for mange ikke setter seg inn i hva Lean er. Selve DNAet er TPS (Toyota Produksjons System) og måten de jobber på. Derfor foretrekker jeg å hente impulser fra TPS. Se på TPS huset og forstå alle byggesteinene.
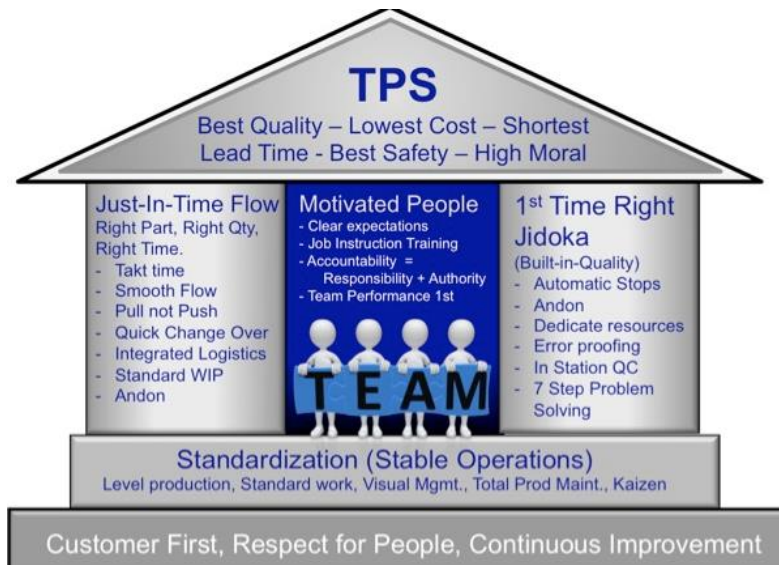
Påvirker det samarbeid med andre aktører, og hvordan?

Leverandører som ikke jobber med Lean blir fort en bremsekloss i vårt system.

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer hos dere?

Uttrykk blir lett misforstått og ensidig fokus på et Lean verktøy kan hemme helhetsforståelsen (for eksempel 5s)

Hvordan forhindres dette?

Bygg et hus, start i bunn, fokuser og gå videre så raskt som mulig. Identifiser: Hva skaper verdi i organisasjonen, kartlegg dette. Skap flyt på kundeverdi, produser etter kundens tempo (pull), og perfeksjoner prosessen.

Har Lean vært noe nytt og revolusjonerende for bedriften, eller gjelder tradisjonelle teknikker fremdeles?

Alt er helt nytt. I stedet for å unngå, konfronterer vi. Det er i problemene mulighetene ligger. Istedenfor å unngå omstillinger forbedrer vi omstillingstiden. Se på elementene i huset over. Alt dette er nytt og revolusjonerende for oss.

Beskriv de faktiske endringene som er gjort.

Vi har gjennomført i overkant av 12000 forbedringer. Hvor mange av disse kan plasseres i nedre deler av huset. Bygge levende standarder visualisere 5s etc.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos dere?

Grunnmur, venstre søyle og senter av hus. Mer og mer høyre søyle, vi begynner å forstå dette nå.

Hva tenker du at skiller Lean fra lignende konsepter?

Lignende konsepter er ofte hentet ut fra Lean huset. Ofte har en tatt et element ut av en kontekst og forsøkt skapt noe eget. Eksempel, 6 sigma: Egentlig forbedringsarbeid gjennom et mikroskop, fordi mulighetene finnes i små små variasjoner. Når en skal perfeksjonere må en ned på mikroskop. Eksempel 20 keys: Fortsatt verktøy som ligger i TPS huset, satt opp i et hjul og blitt kommersialisert. 5s: Da er vi på gunnmuren i TPS huset (standardisering)

Hva karakteriserer Lean konseptet? Nevn noen aspekter som du synes er viktig.

Igjen, ikke et konsept men en væremåte en kultur.Se på huset på side 1. Alt er viktig men huset er en glimrende måte å visualisere en sekvens på. Når du bygger starter du alltid med fundamentet.

Hva muliggjorde implementering av Lean hos din bedrift?

Initiativ fra ledere, uten dem er det et kortsiktig vindpust

Hvor lang tid tok implementeringen?

Den slutter aldri. Virker som du må lese mer om Toyota

Kan du forklare ditt synspunkt på et forhold mellom Lean og organisasjonskultur?

Det er to sider av samme sak, feil kultur og feil holdninger dreper en Lean reise.

Hva er etter din mening de underliggende prinsippene for et Lean arbeidsmiljø?

Se på senter i huset. (blå firkant)

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos din bedrift, og hvorfor?

Igjen senter på huset. Uten de ansatte går vi ikke fremover. Det er den som har på skoen som kjenner hvor steinen ligger. Det er alfa og omega at den ansatte er motivert og utvikler arbeidsplassen sin hver dag (på et systematisk vis).

Attachment 8
Retailer of Medical Devices

Company F

Gender: Female

Age: 43

Position: Learning Manager

Interview: Phone interview

Når ble du først introdusert for Lean konseptet?

Det må ha vært rundt 2010.

Hva var ditt umiddelbare inntrykk av konseptet?

Jeg syntes det hørtes spennende og fornuftig ut. Tenkte at jeg hadde lyst å lære mer om dette.

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?

Ja, det er ofte sånn at når man begynner å jobbe med ting og setter seg inn i det så ser man hvor komplekst det er. Jeg skjønner mer at det er krevende å få det til. Det skjønte jeg kanskje ikke innledningsvis, at det skulle være så krevende.

Forklar hvordan Lean påvirker arbeidet ditt.

Jeg har jobbet med Lean og prøvd å lære vekk en del av de Lean verktøyene og opplæringen er på huset. Det har vært min rolle. For min egen del er det klart at Len har gitt meg en del flere verktøy å spille på, og andre innfallsvinkler. Mer systematiske måter å gå inn i problemløsning på.

På hvilket grunnlag ble det besluttet å implementere Lean hos dere, og hvilke fordelaktige endringer ble forventet på forhånd?

Det har vært flere runder. Lean var ikke nytt for oss i 2010, men det var da vi hadde det store prosjektet som var en trigger. Dette var en kombinasjon av at vi så at noe måtte gjøres med kundeklagesystemet og med non conformancy system. Vi fikk for stor back log og vi responderte

ikke kjapt nok. For oss handlet det nok om å respondere kjappere mot kundebehov og å strømlinjeforme måter vi jobber på, prosessene våre. Samtidig hadde vi ganske stort fokus på å finne en problemløsningsmetodikk kunne være felles for hele organisasjonen.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?

Ja, det tror jeg. Jeg tror det er et stort spekter av Lean og at noen er veldig tro mot den japanske tankegangen. Men jeg tenker kanskje at i Skandinavia har vi fått en sånn variant som passer i vår sosialdemokratiske tankegang i større grad. Jeg tror det er et helt spekter og en del avarter av Lean.

Påvirker det samarbeid med andre aktører, og hvordan?

Nei, samarbeider ikke om Lean utenom sånne faglige fora. Vi har fire fabrikker, og mellom disse er det jo et visst samarbeid. Det er i fabrikkene Lean er best implementert. Alle har imlementert Lean, men ikke alle har kommet like lagt i bruken av verktøy. Men vihar den samme tilnærmingen i alle fabrikkene.

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer hos dere?

Innledningsvis så var det nok litt sånn utfordrende hvordan vi skulle gå fram med vår Lean tankegang. Så hadde vi et større globalt prosjekt som gikk litt på akkurat det, og indentifisere hva slags verktøy og tilnærming vi ønsket å ha. Nå tror jeg det er ganske strømlinjeformet sånn sett i organisasjonen. Har et noenlunde likt syn på hva vi mener med Lean

Har Lean vært noe nytt og revolusjonerende for bedriften, eller gjelder tradisjonelle teknikker fremdeles?

Litt blandet. Det er jo ikke noe nytt sånn sett. Har benyttet de samme verktøyene tidligere, kanskje hadde de andre navn. Men tankegangen er lik. For en del som har jobbet her var det litt sånn «ja, dette har vi vært gjennom før». Men for andre var det kanskje nytt. Jeg tror at hovedutfordringen med å implementere Lean er å få med det nye mind settet og den nye kulturen. Det er lett i hermetegn for folk å lære seg metoder og verktøy, men å se helheten i det er det som er utfordringen.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos din bedrift?

5s er godt etablert. Vi har kjørt A3 opplæring for veldig mange i organisasjonen, både på et basic nivå og på et mer avansert nivå. Standard work brukes og value stream mapping. Vi har også årsplaner i fabrikken med mål og vi har tavlemøter hvor vi har satt opp tavlemøter i de ulike avdelingene i fabrikken. Vi har en fabrikktavle og vi har morgenmøte hver morgen. Vi har forsøkt å skape en brei involvering.

Kan du forklare ditt synspunktet på et forhold mellom Lean og organisasjonskultur?

Lean er en kulturendring og det handler om kontinuerlige forbedringer, og forbedringer handler vel om endring av atferd og å lære seg nye ting. Det er litt gjensidig forsterkende at man skaper en organisasjonkutltur som man lykkes med å implementere Lean.

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos dere, og hvorfor?

Vi har prøvd å gjøre dette med Lean på en måte som involverer flest mulig eller alle i organisasjonen. Dette med problemløsning for eksempel, er jo noe som kan gi en følelse av større eierskap i forhold til den jobben man gjør. Når man klarer å se forbedringer og at man blir hørt med de innspillene man har.

Jeg tror mange opplever at det krever ganske mye før det setter seg i veggene. Må jobbe med det systematisk med det kontinuerlig. Må ha noen som brenner for det. Viktig å ha en toppleder som støtter det.

Attachment 9
Provider of Industrial Equipment

Company G

Gender: Male

Age: 34

Position: HSE/QA Manager

Interview: Face-to-face interview

Vi er egentlig to bedrifter. Vi har bestemt oss for å dele bedriften i to, men det er så klart en del av konseptet til Lean at det er en filosofi som begge bedrifter skal beholde. Vi har en visjon for 2015 som går ut i desember. Vi har vært borti Lean lenge, vi er ikke spesialister men vi er modne på området. Vi har strevd lenge og har hatt tilbakefall. Det blir aldri ferdig. Hvis man tar vekk folk med kompetanse på Lean, så blir bedriften kanskje ikke Lean lengre. Slik er det ikke i Toyota, der er tankegangen implementert i kulturen.

Stikkord: filosofi, TPM, standardisering.

På hvilket grunnlag ble det besluttet å implementere Lean hos dere, og hvilke fordelaktige endringer ble forventet på forhånd?

I 2006 var det en vanskelig periode. Vi vokste mye og det var et kaos som var vanskelig å håndtere. Da kom Lean inn i bildet. Det som vi ønsker er kontinuerlig forbedring. Vi kjører et prosjekt på maskiner som går på et år. Vi prøver å få alt inn i et mer helhetlig system. I 2011 hadde vi et tilbakefall i prosessen. Vi hadde ikke tid. Hadde et stort prosjekt på gang, og vi hadde ikke tid til så mye fokus på kontinuerlig forbedring. Ledelsen glemte det litt, og sluttet å etterspørre.

Det som har skjedd hos oss er veldig interessant med tanke på kultur. Hvis du hadde kommet hit i 2011 og snakket om dette så ville mange hatt den oppfatningen at dette er noe tull, at det ikke fungerer og at dette ikke er noe for oss. Det var skapt en veldig sterk kultur mor dette, og vi brukte masse masse tid på å snu dette igjen. Det finnes fortsatt folk som er imot dette, men det er mye bedre nå enn før. Jeg har hatt et forbedringsmøter som har vært ganske tragisk der det va

negative innstillinger til ledelsen og til konseptet. Det var ikke mulig å samle folk, og folk var ikke interessert heller i å gjøre dette her. Men det vil alltid være folk som er skeptiske.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos din bedrift?

I 2012 hadde ledelsen en såkalt lede trening. Vi leste boken The Toyota Way i løpet av 6 måneder, og bestemte oss for å lage en plan for å oppnå prinsippene i Toyota. Fokuset var å finne hva vi kunne bli bedre på. Vi startet nå i 2013 – 2014 med lede trening både internt og eksternt og både på samarbeidsutviklingsopplegg. Dette tilsvarer også kanskje black belt. Vi prøver å få god forståelse av verktøyene og bra coahing på dette området.

Vi har gjort flere forskjellige grep. 24 timers møtene har også blitt omstrukturert mange ganger, og vi fortsetter å justere kontinuerlig. På verkstedet skjer dette klokka syv, klokken 8 på team og en felles på kontoret klokken åtte, og prosjektleder og økonomiansvarlig og avdelingsledere har et møte klokken halv ni. Slik at informasjonen går oppover. Disse møtene er standardisert på alle ledd. Disse inkluderer hendelser i går, status for dagen i dag. Vi trener på dette ennå, og er ikke i mål med det. Men det har blitt bedre.

Andre ting vi har gjort er å dele jobber i små pakker med en standard som folk må følge. Tegninger å instruksjoner er satt opp slik at ansatte ikke trenger å alltid spørre ledelsen. Men hvis du spør han som leder verkstedet i dag, så mener han fortsatt at folk spør veldig mye. Er veldig flink på dette med Lean, men han strever med å få personalet med. Det er dette som er kultur biten. Det japanere er flink på er å få alle til å delta. I Norge og kanskje i vesten er det kanskje litt mer vanskelig å få folk til å delta og forstå videre. Kanskje folk er mer uavhengige av hverandre, og folk jobber «i sitt telt». Det er veldig viktig med samarbeid på dette. Det jeg kan si som brasiliansk, er at folk gjerne har en tendens til å legge ansvaret på ledelsen. De vil gi fra seg ansvar å kun konsentrere seg om sine oppgaver fra åtte til fire. De vil ikke bidra mer enn det de trenger. Jeg forstår dette godt, men det er litt problemskapende å løse dette.

Vi har og startet å benytte dette A3 som du kanskje har hørt om, for å forbedre Kaizen gruppene. Dette vil si å jobbe strukturert med kontinuerlig forbedring. Det vil si å trene folk og ha kurs på dette. Dette e basert på PDCA metodologien. Plan-do-control-act. Japanere er flinke til å planlegge. Vi forsøker å se på situasjonen i dag sammen med mål og hvordan vi kan oppnå disse. Det ligger ikke i naturen til nordmenn og vestlige folk å tenke sånn.

Vet ikke om du har hørt om 80/20, Pareto. Du bruker 80 prosent av tiden til å planlegge og 20 prosent av tiden til å gjennomføre. Dette henger sammen med six sigma. Dette er et statistisk verktøy. Det er egentlig at du skal se på antall problem, og så fikse det som er størst. Etter du har fikset det har du en ny nå tilstand. Hvis man har for eksempel seks problem, at vi ikke kan levere på tiden fordi vi ikke har kommunikasjon med kunde. Dette tilsvarer femti prosent av tilfellene. Et dårlig system tilsvarer tjue prosent av tilfellene. Kunde blir ikke informert osv. så griper man tak i det største problemet først. Dette er kontinuerlig forbedring i statistikken. Skal streve mest mulig for å få minst mulig variasjon. Jobber med de største årsakene først, og med en gang du er ferdig med der det et nytt bilde. Da kommer det en ny «størst årsak», og man har blitt bedre. Dette slutter aldri.

Viktig å ikke bare anta løsninger, det må planlegges. Vi vil at folk tenker litt mer før de setter i gang med action på problemene. Bruker mer A3 enn Pareto. Vi har en plan på å kjøre ti aktive Kaizen grupper. Vi ønsker å bruke A3 teknikken i alle ledd for kontinuerlig forbedring. Som Deming sier, at alle problemer er system relatert, ikke menneskerelatert. Så hvis man fikser systemet slik at folk kan følge systemet så er man i mål. Det er denne kulturen vi ønsker å spre, men har ikke kommet i mål med det. Fem ganger hvorfor er en del av A3'en.

Det som vi gjør nå er at vi fokuserer på standardisering av kompressorpakkene for at systemet skal bli bedre. Vi ønsker bedre system.

Nesten alle store bedrifter har et Lean program, men det kalles for forskjellige ting.

Jeg har vært i Norge som utvekslingsstudent fra 2005 til 2007, deretter reiste jeg t   ilbake til Brasil og tok master. Så kom jeg tilbake til Norge for å jobbe. De trengte en

TPM-koordinator her. Jeg har erfaring fra å ha implementert 5s og forbedringsgrupper i Brasil. Tok også over HMS og personalutvikling, min master er i miljø og ledelse.

Vi har brukt mye tid på ansatte, og har hatt stort fokus på 5s. Vi har kjørt morgenmøter også, men har ikke vært så effektiv på dette. Det ble litt mer som avviksmøter hvor vi jobbet med avviksbehandling. Vi har også brukt masse tid på forbedringsmøter, hvor ansatte deltar. Små forbedringer.

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos din bedrift, og hvorfor?

Ansatte får lov til å bestemme litt hvordan de skal gjøre ting. De skal bidra litt mer på hvordan ting blir gjort.

Vi ser at vi har forbedret oss, men vi har fortsatt forbedringspotensial.

Når ble du først introdusert for Lean konseptet?
Så litt prosesstilnærming på administrasjon fakultet i Brasil. Hørte om det et par ganger her, eller TPM eller Toyota.

Har din oppfatning av begrepet endret seg etter du ble introdusert for Lean for første gang?

Nei, men min forståelse har endret seg. Forstår mye mer i dag enn første gang. Jobber med ISO 1001 og blir mer og mer spesialisert. Men konseptet er det samme. Men ikke alle verktøy kan brukes over alt. Må gå i kulturen.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?
Ja.

Påvirker det samarbeid med andre aktører, og hvordan?
Ikke så enkelt å svar. Hvis bedrifter jobber med Lean, har de gjerne bedre systemer. Man kan stole på de. Men det spiller ingen rolle for om man kjøper deres produkt eller ikke. Men hvis jeg skulle velge mellom to bedrifter, hvor den ene har fokus på kontinuerlig forbedring, skulle jeg velge denne. Men det er ikke sikkert denne har best konkurransefortrinn likevel.

Hva muliggjorde implementering av Lean hos din bedrift?

Mulig å implementere i alle bedrifter. Alle har en input, output og en prosess. Men det er noen nivåer man kan implementere. Lean er en kultur som bygges opp i en organisasjon. Vil ikke si at alle i bedriften jobber Lean, men vi prøver å få til at alle tenker slik med tanke på flyt effektivitet. I stedet for å tenke på at alle skal være flink på sitt område, vil vi bli flinkere til å bli fleksible. Men mange er veldig glad i å bli i «sitt telt». Mennesker er annerledes, tenker jeg, og hvordan de forholder seg til sitt arbeid.

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos din bedrift, og hvorfor?

Jeg tror at ansatte ikke ser Lean slik her ennå. Med få unntak. Er mange som ikke ser verdien i dette. Det er noe som må endres i hver enkelt, og dette er ikke enkelt. Vi har brukt mye tid på å få folk til å forstå konseptet. Det med ledelse er veldig viktig.

Disse A3 Kaizen gruppene er ikke så veldig effektive. Jeg har nå fått ansvar for å forbedre dette.

Attachment 10
Manufacturer of Wood and Steel

Company H
Gender: Male
Age: 66
Position: CEO
Interview: Face-to-face interview

Company H er en arbeidsmarked bedrift, og formålet er å skape og tilrettelegge arbeid til folk som faller utenfor ordinært arbeidsmarked, altså å gi arbeidstrening og arbeidspraksis til folk som trenger hjelp for å komme ut i arbeid, eller tilbake i arbeid. Det er dette som er kjernevirksomheten vår. Men, for å kunne gi tilrettelagt arbeid og arbeidstrening så må vi ha noen produksjonsavdelinger med arbeidsplasser som kan brukes til dette formålet. Vi har tre avdelinger. En på Nærbø som er mekanisk avdeling, en avdeling på Håland som er en pakke og monteringsavdeling og en avdeling i Øksnevad næringspark som produserer treverk og paller og spesialemballasje for næringslivet. Vi kan ta en tur dit ned etterpå så jeg kan vise deg hvordan Lean er tatt i bruk.

Vi er helt avhengig av å kunne tilby arbeidsplasser. Vår visjon er å kunne gi økt livskvalitet gjennom arbeid og personlig utvikling. Vi ønsker å synliggjøre for markedet hvem disse folkene kan tilføre arbeidsmarkedet. For å kunne gi relevant arbeidstrening så trenger vi metoder og teknologi for å hjelpe oss med dette. Derfor har vi tatt i bruk relativt moderne teknologi. Vi bruker mye CNC styrt teknologi. Noen så på dette som en utfordring fordi vi har kun ufaglært arbeidskraft. Vi valgte å benytte lange serier for å standardisere produksjonen og oppnå effektive produksjonsprosesser selv om ansatte er ufaglært.

Vårt arbeid med Lean er veldig visuelt og synlig. Alt er satt i system og struktur, hvor alt har sine faste plasser. Dette gjør at de ansatte blir mer selvstendige. Lean benyttes i hele virksomheten. Før var vårt mekaniske verksted lite tillitsvekkende, og en viktig kunde sa opp forholdet til oss. Det var her det ble bestemt at noe måtte gjøres.

Når ble du først introdusert for Lean konseptet?

Ble først introdusert for konsepter som Kanban og JIT som senere sammen med flere konsepter har blitt en mer helhetlig metodikk. Lean bygger altså på de samme prinsippene som har fått andre navn opp igjennom tiden.

Hva var ditt umiddelbare inntrykk av konseptet?

At det er et konsept satt sammen av eldre konsepter som nå benyttes som en mer helhetlig strategi.

Forklar hvordan Lean påvirker arbeidet ditt. Hva er din personlige mening om Lean konseptet?

Da det ble besluttet å implementere Lean hos oss ble det bestemt at administrasjonen og alle ledere og driftsledere skulle fullføre emnet LEAN ledelse via Høgskolen i Bergen eller Høgskolen i Buskerud. Lean påvirker arbeidet hos alle ved at bedriften er mer strukturert og ryddig. Lean er ikke en forkortelse. Jeg ville kalle det strømlinjeforma. Poenget med Lean i henhold til Toyota sitt system er å fjerne muda, all for form ikke-verdiskapende arbeid. Sløsing kan være både med materiale og tid for eksempel. Vi bruker mye «the 7 wastes».

Et case som jeg brukte da jeg tok LEAN ledelse kurset: value stream mapping. Produksjon av paller. Når vi hadde fått 5s på plass var utfordringen å få bedre flyt i produksjonen. Hadde en del maskin og utstyr som var push. Prøvde å dytte gjennom mest mulig på hver enkelt maskin. Ved pull er det det som skal produseres på slutten som bestemmer produksjonen. Dette gir flaskehalser. Vil unngå varer og halvfabrikat over alt. Denne casen handler om en reinhart sag. Den klarte bare å produsere 2700 per dag. Det var ikke nok. Er en veldig dyr maskin, så var ikke mulig med en ekstra maskin. Vi satte i gang med å kjøpe pre-cut fra Baltikum. Brukte en kreativ løsning hvor det kom lastebiler fra Baltikum som skulle hente oppdrettsfisk. De trengte å ha last når de kommer bort hit, og kunne frakte varmebehandlet trelast til oss. Videre ble det benyttet en analyse for å øke kapasiteten på sagen til 3900 enheter produsert per dag. Da flyttet flaskehalsen seg til neste stasjon. Hvis flaskehalser flytter seg er det et tegn på høy kapasitet som er målet.

På hvilket grunnlag ble det besluttet å implementere Lean hos dere, og hvilke fordelaktige endringer ble forventet på forhånd?

I første omgang ble det besluttet å implementere Lean på vårt mekaniske verksted. (Bestemte oss fort at dette ønsket vi å gjøre i hele bedriften) Før var vårt mekaniske verksted lite tillitsvekkende, og en viktig kunde sa opp forholdet til oss på grunn av dette. Det var her det ble bestemt at noe måtte gjøres for å forbedre situasjonen. Dette var en viktig grunn til at valget om å implementere Lean ble tatt. Vi trenger effektive og standardiserte produksjonsprosesser fra før, men det var disse signalene fra markedet som fikk oss til å skjønne at noe måtte gjøres. Jeg og driftsleder hadde en litt vanskelig samtale, hvor vi diskuterte dette problemet. Etter hvert ble enig om å tilrettelegge for å få dette til. Forventningen var forbedret struktur, mindre rot, bedre tillit hos kunder, standardisering og effektivisering samt mer fleksibilitet. Jeg kjente til TPM-Lean fra før av, fra tidligere arbeidsplasser.

Først besøkte vi Forus Industri for å se hvordan vi kunne bli ved å gjennomføre en 5S implementering. Vi tok flere bilder for å få et visuelt bilde som kunne sammenlignes med vår situasjon. Vi så kontrastene. Driftsleder tok flere turer til Forus Industripark hvor også arbeidsledere og operatører ble med. Lean inkluderer og ansvarliggjør alle. Dette var den innledende fase i implementeringen. Å engasjere alle er alfa omega. Å besøke en bedrift som har implementert Lean ga et viktig visuelt bilde som bidrar til motivasjon. De ansatte får være med å ta del i og oppleve hvilke endringer som skal gjøre. Så kontaktet vi samarbeidsutvikling Norge som er et konsulentselskap. Vi trenger en konsulent for å hjelpe oss med implementeringen av Lean. Fikk en konsulent som jobbet freelance med samarbeidsutvikling, og hadde jobbet med 5S på Hydro Aluminium Karmøy. Var viktig med en konsulent som hadde troverdighet.

Det er kjent at det finnes ulike tolkninger av Lean konseptet. Kan du kjenne deg igjen i dette?

Opplever ikke det hos oss men jeg tror at det finnes en kultur i Norge for å hive seg inn i ting. Så etter et stykke oppstår det gjerne ulike oppfatninger av hva som egentlig skal gjøres. Det skaper forvirring og sender en tilbake til utgangspunktet. Tror det er viktig å fokusere på den innledende fasen for å skape en felles forståelse av hva dette egentlig går ut på. Hva er det egentlig vi skal oppnå? Vi bruker Plan-Do-Study-Act. Hvis effekten er i tråd med det som er målet så gjør vi det

slik hver gang. Hvis ikke må vi gjøre en ny runde. Hvis man gjør denne biten opplever man ikke at folk har forskjellige oppfatninger.

Vi har gjort implementeringen skikkelig. Jeg tror man lett kan gå i fellen hvis man gjør det halvhjertet. Ledelsen må ha kunnskap om hva Lean egentlig er. Det er derfor det ble besluttet at alle ledere og driftsledere samt administrasjon skulle ta Lean Ledelse faget. Jeg tror mange glemmer å inkludere for eksempel innkjøpsavdeling eller personalavdeling. Slike funksjoner har like stor aktualitet. Der er ikke noe de «bare holder på med der nede i produksjonen». Disse problemstillingene oppstår ofte hvis man ikke gjør det helhjertet. Da vil det sprike litt i alle retninger.

Påvirker det samarbeid med andre aktører, og hvordan?

Det er lettere å samarbeide med andre som vi har noe felles med. Mange blir begeistret over av vi fokuserer på Lean. Men har ikke merket noe spesielt på samarbeidet.

Har forskjellige oppfatninger av Lean konseptet forårsaket noen utfordringer hos din bedrift?

Ikke hos oss.

Har Lean vært noe nytt og revolusjonerende for bedriften, eller gjelder tradisjonelle teknikker fremdeles?

Lean bygger på gamle prinsippene som har fått andre navn opp igjennom tiden.

Beskriv de faktiske endringene som er gjort.

5S ble implementert først. Vi gikk grundig gjennom hele avdelingen og tagget rødt på det som vi ikke hadde bruk for (waste), gult på det vi var usikre på og grønt på det utstyret vi trengte. Etter opprydningen kunne vi begynne å systematisere. Faste rutiner ble etablert, og alt ble flyttet opp fra gulvet for å gjøre rengjøring lettere (7 wastes). Alle har ansvar for dette. Det ble hengt opp skilter med bilder av hvordan det skal se ut. Har daglige og ukentlige rutiner som følges. Dette fører til bedre kvalitet og mindre feil. Feil oppdages lettere, og det er enklere å finne roten. For

eksempel en gang var det en maskin som lak veske, hvor det ble lagt ut matter for å stå på på grunn av dette. Etter rengjøringen ble denne lekkasjen oppdaget og gjort noe med.

Standardisering er gjennomført ved hjelp av instruksjoner og forklaringer med bilder og piler på alle maskiner. Dette gjør at de ansatte slipper å springe å spørre ledere hver gang de lurer på noe. De blir mer ansvarliggjort og mer selvstendige. Vi har også sjekklister som må følges for å sjekke at alt blir gjort. Dette gir personlig utvikling blant ansatte, som er en viktig del av vår visjon. Vi benytter også kompetansematriser. For eksempel for en dreiebenk. Denne er delt inn i fire deler. I første kolonne krysses det av for når personen har fått teoretisk opplæring. I neste kolonne krysses det av for praktisk trening. Videre krysses det av for når de kan kjøre selvstendig, eller utføre dette selvstendig. Til sist krysses det av for når den ansatte kan lære opp andre. Denne prosessen er dynamisk. Folk blir bedre og bedre gjennom å øke kompetansen sin gjennom forskjellige arbeidsoperasjoner.

Mekanisk avdeling ble delt opp i tre områder hvor hver gruppe fikk ansvar for sitt område. En arbeidsleder pluss tre til fem operatører. Hver gruppe noterte ønskede forbedringer i hvert område. Videre ble det utviklet en handlingsplan, og ble satt av en halv time til å jobbe med forbedringene i handlingsplanen. Igjen er det viktig at alle deltar. Dette gjorde at det faktisk ble gjort, i stedet for at det kom 1000 unnskyldningers på slutten av uken om hvorfor man ikke hadde hatt tid. Kan være vanskelig å løsrive seg fra gamle vaner, men vi greide dette med hjelp fra vår konsulent. Han var flink til å stille oss spørsmål og hjalp folk til å finne løsninger og å se muligheter selv.

Effekten av 5S implementeringen førte til mer effektivitet, ganske umiddelbart. Omstillingstiden raste ned. Det ble ryddighet og orden over alt. Ble ikke lenger nødvendig å løpe rundt å lete etter ting. Før hadde vi for mange verktøy og rot, og hvis et verktøy ikke ble funnet ble det gjerne kjøpt et nytt som endte med 5-6 av hver. Nå oppdager vi lettere hvis det er avvik.

Vi fikk også et betydelig bedre HMS. Det er mindre risiko med system og struktur på arbeidsplassen. I tillegg ble det mye bedre arbeidsmiljø, og gøyere og komme på jobb. Det har betydd mye. 5s ble også gjennomført på kontor og spiserom, til og med i bøttekottet.

Vi klarte å oppnå en fordel som ble forventet på forhånd, som var å vinne tilbake tilliten hos våre kunder. Mange ble imponert over det vi hadde fått til. Den ene kunden som hadde sagt opp avtalen hos oss bestemte seg for å tegne ny avtale. Fikk også besøk av mange som ville se hva vi hadde gjort. Har også fått flere nye oppdrag. Vi fikk mye oppmerksomhet rundt dette. Etter oppslag fra Aftenbladet ble vi kontaktet av Heli One som også ville se hvordan vi gjorde det hos oss. Vi fikk årets inspirasjonspris innad i TPM-Lean nettverket for det vi hadde fått til. Dette var en stor ære.

Vi ordnet også et system for minimum og maksimum lager. (Se bilde) En rød strek markerer minimumslager. Dette reduserer high inventory. Transport er også lettere med ryddigere gulvplass.

Hvilke prinsipper fra Lean konseptet vektlegges mest hos din bedrift?

5S er helt grunnleggende for Lean arbeidet hos oss. Må nesten ha det i bånn før man går videre. Seven wastes er i fokus. Total process management, standardisering, visualisering og kontinuerlig forbedring. Tavlemøtene bidrar til dette. Her tar vi for oss det som skal skje de neste 24 timene. Tar for seg den daglige produksjonen.

Da vi startet med dette forbedringsarbeidet, noterte vi først ned hva vi ville forbedre. Bruker hele tiden forbedringslister med hva-årsak-tiltak-tidsfrist-gjennomført. Tre månder etter vi startet med 5s ble vi sertifisert. Da hadde vi gjennomført 384 forbedringer. Nå er vi oppe i 1055 som er gjennomført. I øyeblikket har vi 14 saker under arbeid. Dette er kontinuerlig forbedrig. Vi har en TPM-Lean runde en gang i mnd for å finne nye ting å føre inn på listen. Tingene kategoriseres som gul eller grønn hvir grønn er relativt enkelt å gjennomføre, mens gul er litt mer utfordrende. I fjor ble vår bedrift brukt som vertsbedrift i forbedringslederskolen, en skole for folk fra det ordinære arbeidslivet som skal lære seg Lean. Disse laget et Lean-speil for vår bedrift. Vi fikk signaler om at vårt HMS arbeid var synlig forbedret, som er et komplekst og sammensatt forbedringsområde.

- Lager en A3 for slike forbedringsområder:
- Forbedringstema

- Bakgrunn
- Nåsituasjon
- Analyse, finne årsak. Spørre 5 ganger hvorfor
- Setter opp tiltak
- Lager handlingsplan
- Oppfølging
- Resultat

Hva tenker du at skiller Lean fra lignende konsepter?

Det er en kontinuerlig prosess.

Hva muliggjorde implementering av Lean hos din bedrift? Hvor lang tid tok implementeringen?

Skjønte at noe måtte gjøres. Jeg hadde en prat med driftsleder på mekanisk og kom etter hvert fram til at vi skulle få dette til. Var viktig med det visuelle. Brukte før og etter bilder samt at vi sammenlignet våre bilder med bilder fra sertifiserte bedrifter. Dette bidro til motivasjon.

Kan du forklare ditt synspunkt på et forhold mellom Lean og organisasjonskultur?

Går på involvering. Alle er delaktige. Kontinuerlig forbedring er en del av kulturen vår. Måten vi jobber på blir ikke sett på som kritikk. Hvis noe bør forandres eller endres, kan man jobbe godt med Lean metodikken slik at man unngår motstillinger eller motstand mot endring.

Hva er etter din mening de underliggende prinsippene for et Lean arbeidsmiljø?

Vår visjon er å tilrettelegge arbeid for folk som trenger hjelp til å komme i arbeid eller tilbake i arbeid. Vi ønsker å skape meningsfylt arbeid med kvalitet og konkurransedyktighet. Vi benytter Lean i hele virksomheten. En nøkkel for oss er fokus på menneskene.

Vurderes jobb berikelse og ansattes motivasjon som viktige deler av Lean hos din bedrift, og hvorfor?

Ja, dette skaper fleksibilitet og ansvarsfølelse. Dette henger sammen med vår visjon om å gi våre ansatte meningsfylt arbeid med overføringsverdi. Det at ansatte har fått utvikle kompetansen sin gir mer fleksibilitet ved at de kan utføre flere oppgaver. De motiveres av dette.