



## **The Lean principle user guide for Finnish industries with the case study of Vaisala Oy**

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## Abstract

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<b>Thesis Title</b> The Lean principle user guide for Finnish industries with the case study of Vaisala Oy
<b>Number of pages and appendix pages</b> 24+11
<p>This product-based thesis deals with the use of Lean principle in Finland. The goal was to create a guide, which serves as an introduction to Lean principle for Finnish company executives. The guide was created with the help of the theory and case study used in this thesis.</p> <p>The subject of this thesis became from author's interest towards Lean. The initial thought was to explore how common it is in Finland, and after researching this, it became clear Lean was not as widely used as previously expected. Biggest problems regarding Lean in Finland results from poor understanding and misuse of Lean. Best way to approach the subject was to create a guide that can highlight and correct these problems for achieving successful Lean implementation.</p> <p>Theoretical framework of this thesis consists of two chapters. These chapters deal with Lean thinking and Lean management. Lean thinking chapter explains what Lean is and what are the key factors of Lean manufacturing. Lean management chapter describes Lean from executive's and management's point of view and is more based on strategy.</p> <p>The fourth chapter gives a company example of successful use of Lean in a Finnish organization. This company example aimed to highlight the factors that made a Finnish company thrive with Lean. Also, the creation of the guide is explained in this part.</p> <p>The guide consists of suggestions on how to approach and use Lean as a Finnish company executive. It also describes the biggest problems Finnish companies usually make when trying to implement Lean. Creation of the guide began in September of 2022 and was completed in March of 2022. The guide was created with Canva. All the information in the guide come from theories, conclusions, research and other sources used in this thesis.</p>
<b>Key words</b> Lean, Lean management, Lean thinking

<b>Tekijä</b> Matti Pirhonen
<b>Tutkinto</b> Liiketalouden tradenomi
<b>Opinnäytetyön nimi</b> Lean filosofian opaskirja suomalaiselle teollisuudenalalle käyttäen Vaisala Oy:n tapaustutkimusta
<b>Sivu- ja liitesivumäärä</b> 24+10
<p>Tämä toiminnallinen opinnäytetyö käsitteli Lean filosofian käyttöä Suomessa. Tavoitteena oli luoda opaskirja, joka toimii esittelynä Lean filosofiaan suomalaisille yritysjohtajille. Opas luotiin teorian ja tapaustutkimuksen pohjalta, joita on käsitelty tässä opinnäytetyössä.</p> <p>Opinnäytetyön aihe löytyi kirjoittajan kiinnostuksesta Lean filosofiaa kohtaan. Ajatuksena oli tutkia, kuinka yleistä Lean filosofian käyttö on Suomessa. Tätä tutkiessa kävi selväksi, että Lean filosofian käyttö Suomessa on vähempää mitä osasi odottaa. Lean filosofian suurimmat ongelmat Suomessa liittyvät sen huonoon ymmärrykseen ja väärinkäyttöön. Paras tapa lähestyä tätä aihetta oli luoda opaskirja, joka pystyy tuomaan esiin ja korjata nämä ongelmat, jotta Lean filosofian käyttöönotto olisi onnistuneempaa.</p> <p>Teoreettinen viitekehitys tässä opinnäytetyössä koostuu kahdesta luvusta. Ensimmäinen kappale käsittelee Lean-ajattelua ja johtajuutta. Lean-ajattelu luku selittää mitä Lean filosofia on, ja mitkä ovat Lean teollisuuden tärkeimmät tekijät. Lean-johtajuus luku selittää Lean filosofian johtajan ja johdon näkökulmasta strategia painotteisesti.</p> <p>Neljäs luku antaa yritys esimerkin onnistuneesta Lean filosofian käytöstä suomalaisessa järjestössä. Tämän yritys esimerkin tarkoitus oli tuoda esiin tekijät, jotka tekivät suomalaisesta yrityksestä menestyneen Lean filosofian avustuksella. Samassa luvussa myös esitetään oppaan luomisprosessi.</p> <p>Opas koostuu erilaisista ehdotuksista Lean filosofian lähestymistä ja käyttöä varten suomalaisen yritysjohtajan näkökulmasta. Se myös käsittelee suomalaisten yritysten suurimpia ongelmia Lean filosofian käyttöönotossa. Oppaan teko aloitettiin syyskuussa 2022 ja viimeisteltiin marraskuussa 2022. Opas on luotu Canvalla. Kaikki oppaan tieto pohjautuu teoriaan, tutkimuksiin, päättelmiin ja muihin lähteisiin, jotka esiintyvät tässä opinnäytetyössä.</p>
<b>Asiasanat</b> Lean, Lean-johtaminen, Lean-ajattelu

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## 1 Introduction

I have heard about Lean, what is that exactly? I know it is something to do about getting rid of waste, right? Lean sounds so bad, you have too many meetings and everything is done based on that. These are a just some lines I have heard people say about Lean. I am aware of what Lean is and I have tried to recognize Lean elements in my work. My work experience with Nordic medicine distributor firm has given me a great deal of knowledge about how to smoothly flow the goods as efficiently as possible. Innovative solutions, investments and working methods always wondered me: why did we do it exactly like this? What was the benefit? Speed or damage repair perhaps? Or was it something that the customer specifically required? All the changes within the company should be beneficial in some way. It might be a major investment or maybe it is just a small suggestion made by the staff about the working environment. All these decisions made should serve the customer's interest. In a nutshell, our medicine distributor firm is expected to deliver our goods as efficiently, quickly, and safely by our customers and manufacturers and all the decisions made in our firm should serve this purpose. Is this use of Lean or just trying to be efficient?

The use of lean has already been implemented into the Finnish infrastructure and it is being used for example in health care and construction although it is relatively new concept in Finland. These days you might hear about lean anywhere you go. The word almost possesses an annoying tone since it feels like it is implemented in near everything. Lean can be mirrored into every aspect of life and the thinking behind it sounds quite simple, but there is a lot more to it. It is vastly different to pick a couple Lean ideas and try to utilize them versus truly becoming a Lean organization.

In 2016, Jyrki Pettunen told in his Aalto University blog that he has been trying to find a Finnish led Lean organization for quite some time without any results. He worked with Danaher, which is one of the leading Lean organizations in the world. A question from a congressperson in 2011 surprised him, after visiting one of Danaher's companies which CEO Pettunen was. The congressperson wondered why there was no similar Lean management systems in Finland in which Pettunen had no answer. His blog highlights the biggest flaws when it comes to utilizing Lean in Finland. Finnish company executives often state that they are using Lean only to realise these are only separate projects that do not carry any value in the long run. The problem is that these Lean projects are not enough, it needs the support of Lean management systems. (Pettunen 27 June 2016)

This dilemma fascinated me since I have always known the benefits of Lean and my thinking was it would be in wide use at this point. Now I understand that the misconception of using Lean methods instead of truly being Lean is more common than I initially thought. I wanted to know why this was and what can we do about it. My goal is to highlight why Lean has not worked in Finland and what

is there to do to make it work. In this thesis, I am using a Finnish company Vaisala Oy as an example of how they managed to implement Lean successfully.

### **1.1 Objective of the work**

Objective of this product-based thesis is to create a guide that is usable for any Finnish manufacturing company looking to implement Lean. This is especially targeted for Finnish company executives who are responsible for implementing Lean. The goal is to explain the purpose of Lean and how can the executives manage it for their company's benefit. Using Vaisala Oy as an example mirrors how Finnish companies can be successful with Lean. Using the theories in this thesis as basis, enables myself raising valid points and suggestions in the guide. The outcome of the work is a guide, which is usable and easily understood by organization executives. The guide section presents a realistic approach to Lean supported by theory and knowledge I have gained thus far. The main question this thesis answers is how a Finnish manufacturing industry can use Lean management to their advantage and here is a list of subproblems this thesis has:

- What is Lean and what is the use of it?
- What is the difference between Lean and Lean management?
- What are the steps of becoming a fully Lean organization?
- How can you make Lean management work in Finland?

### **1.2 Concepts**

There is a couple good to know concepts, which are worth understanding before diving into this thesis. Some concepts might sound familiar, but in terms of Lean could be possess a whole different. These concepts are common and important in the field of Lean and are present in this work.

**Waste** – Everything that does not generate value for the final product or service from customer point of view.

**Value-added activity** – All activities that bring value for the final product or service from customer point of view.

**Value stream** – All the activities needed when delivering a product or service for the customer. Consists of value-adding and non-value-adding activities.

**Kaizen** – A method for gaining continuous improvement by eliminating waste. The goal is to eliminate waste one by one with smallest investment possible.

**Just-in-time (JIT)** – Customer receives the product or service, which possesses desired effectiveness, when he or she needs it.

Standardized work – Work is organized by best practises possible.

(Lean Thinking, LEAN-sanasto. n.d)

## 2 Lean thinking

In the 1980's there was a shift in working culture in the factories of Europe and the United States. Huge production lines, mass manufacturing and management techniques of early 1900's were discarded, as new methods rose from Japan. Just-in-time method, used by Japanese manufacturers, proved to be much more efficient approach. Toyota adopted these Japanese methods and refined them, what is now known Lean manufacturing or Toyota Production System. Later the term formed into Lean thinking what was the philosophy behind it. Lean thinking began to spread into different corporations and organizations, not only factories. Militaries, normal offices, logistics, services and constructions all began to adopt Lean thinking proving, that it was guaranteed to provide results. (Charron, Harrington, Voehl & Frank 2014, 307-308)

### 2.1 Definition of Lean thinking

Lean thinking is based on customer value. The thinking goes that the most important task of the company is to create value for the customer. When it is determined, what type of value is offered for the customer, it is possible to review the return on value of the activities. All activities can be divided into value-adding activities, waste, and support functions. Value adding activities are functions that modify information, materials, or humans for the benefit of the customer. Wastes are functions that do not create any value, and with investments, can be eliminated. Support functions do not directly add customer value but are necessary to return on value. These types of functions can be, for example, risk management and legislation. (Logistiikan maailma. n.d.)

When the customer value is determined, and productive and unproductive functions are recognized, only then can we talk about lean improvement. After these steps the aim is to eliminate all the waste and all value adding activities are made to flow as smoothly as possible. These flows can be, for example, flow of materials, orders, deliveries, or manufacturing processes. To ensure the smooth and steady current, it is important to understand the sources of dispersion and variation in relation to it. The key element for good flow is the creation of unified standards. These standards should also be developed and maintained. (Logistiikan maailma. n.d)

### 2.2 Wastes of Lean

Eliminating waste is a crucial part of Lean thinking. Taiichi Ohno, who is considered one of the founding fathers of Lean manufacturing, described organizations facing three important road-blocks: Muda, Muri, and Mura. These can be translated as wasteful activities, overburden, and unevenness. Definition of waste in Lean is that every resource spent on something that does not bring any value to the customer can be considered as waste. Even though the goal is to eliminate

all waste, some waste is necessary and therefore not eliminable. These activities can be, for example, testing and planning, which eventually adds to the quality. Pure waste is always unnecessary and non-value-adding and therefore elimination should happen immediately. Waiting is an example of pure waste. Figure 1 describes the major areas, where you can identify wasteful activities.

Transportation waste is often unnecessary movement of resources which do not add any value for the customer while holding time, space, and equipment. Inventory wastes usually occur when companies hold extra inventory for just in case reasons. This does not bring any value for the customer, and it only adds to storage costs. Motion refers to movement of people and machines when it is not necessary causing loss of time or could even lead to injuries. Waiting is perhaps the most obvious waste to recognize since it consumes valuable time and nobody benefits from, for example, waiting for a delivery or waiting to get machinery fixed. Overproduction and over-processing are wastes that occur when there is too much done compared to the actual need. Overproduction leads to unnecessary costs and triggers the other six wastes, while over-processing creates waste when unnecessary work is done compared to actual value-adding work. Defects could lead to re-work and even scrap. Defects should always go back into production, which causes loss of time and extra work being made. (Kanbanize n.d.)



Figure 1. 7 Wastes of Lean (Kanbanize s.a)

### 2.3 House of Lean

House of Lean (Figure 2) is a way to visualize and explain Lean systems such as manufacturing, thinking and structures in a harmonized manner. The foundation of the house is stability which refers to overall business process stability and this includes, for example, strategies and method standardization. Two key elements of the foundation are Kaizen and reduction in Mudas (waste and instability). In traditional house, there are at least two pillars emerging from the foundations

that are Just-in-time and Jidoka. Typically, there is a middle pillar which represent motivated people and it is considered the most important one. The roof of the lean house is the end goal, and it is summarized to better quality with reduced costs while deliveries are matched with the customer timetable needs. (Charron, Harrington, Voehl & Frank 2014, 66-67)

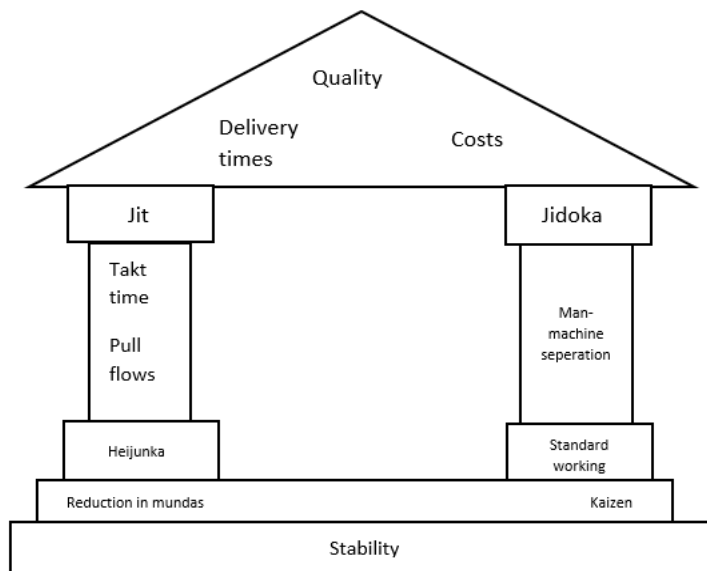


Figure 2. Traditional house of Lean (adapted from Charron, Harrington, Voehl & Frank 2014, 67)

### 2.3.1 Just-in-time

After World War II, there was serious challenges for Japanese manufacturers because of limited resources, space for warehouses and funding. Toyota managed to find a solution to this by using Just-in-time (JIT) production. The idea is to produce only when there is a need for it, therefore saving inventory and extra resources. Just-in-time production can be a player for gaining competitive advantage and help optimize resources for more productive use. There are also many other benefits Just-in-time offers. A pull system can be created for a product, which enables only focusing on work that is already in progress. When creating the pull system, extra wastes in the production are identified and eliminated. JIT is also beneficial for the workers: it offers visibility, which helps teams identify current goals and assignments, thus team members will be more involved and alert on topical tasks. It encourages employees to find solutions and create suggestions, promoting continuous improvement. Flow of the work will improve since the entire process will be easy to overview and therefore detecting any possible issue or bottleneck will become more likely. Just-in-time enables your team to focus more on smaller tasks, which will create more simple solutions and more flexible approach for problems, which large-scale tasks cannot do. (Kanbanize. n.d.)

Just-in-time should be considered as a vision to work towards since short-term achievements are rarely possible. When viewed widely, JIT affects company's' whole operation and many production sections. Examples of fields affected are product and process planning, people, production planning and guidance. Product suitability for production lines is especially important and needs careful planning since standardized parts and modular structures are used. Process planning requires reduced batch sizes and limited setting times in production, while production planning guides and levels the amount of production. (Logistiikan maailma. n.d.)

### **2.3.2 Jidoka**

Jidoka refers to automation and the idea is to connect human mind to automatic device. This means shutting down automatic devices either by humans or devices itself when a problem occurs. Jidoka is a power of suspending production by humans or machines when there is quality issue or malfunction with the machines, and it prevents flawed products from going forward in the value stream. It helps with the quality of production and value stream, while improving problem solving and detecting. (Lean Thinking. n.d)

An example of Jidoka in use can be found on Toyotas production line. Toyota designed its assembly lines to stop whenever a problem occurs. When their employees work in the assembly line and do not finish their work before the line starts running again, the worker steps on a mat that is in between processes. This triggers the line to stop, and the focus is headed towards why the worker did not finish the task in required time. Toyota also uses lasers for their parts to determine if the length is correct, and if some parts do not meet the requirements, it causes the line to stop and starts the process of finding out what was the issue. (Wang 2010, 206)

## **2.4 Key to continuous improvement**

The secret of Toyota's production system was continuous improvement, which is also known as Kaizen. If there would not be continuous improvement, there would be no realization of the systems full capability. In Toyota, the philosophy was built around measuring yourself where you should be, not what you were. The mistake the management makes often is that they are satisfied where they have come from and do not recognize the gap leading to continuous improvement. For the senior management, recognizing the need for improvement and continually moving towards the goal is the key for motivating the organization to develop. It is a route of frustration, since the improvement is never-ending, and it requires continual effort for the cause. (Stewart 2011, 51-52)

Continuous improvement means eliminating the waste and continuously improving the flow. Here the main players are the working people: their talents, suggestions and visions are required. Continuous improvement should be supported by everyday leading by measurements and meters of

the activities and therefore any found problem and deviation can be detected early. Finding these problems and deviations are vital for continuous improvement. Businesses can identify these problems going forward and thus avoid the same mistakes. This is also known as PDCA (Plan-Do-Check-Act) which tests different solution options to problems and finds the best methods as response. These methods are taken later into wide use within the company. (Logistiikan maailma. n.d.)

When seeking continuous improvement for your company, it is important to recognize the main standard towards which you are working. While this does not find all the solutions, it does help clarify the purpose of your work and makes it more straight forward. Standards should always aim to improve, and the key is to find the best method out of the many. There are often two different options, that companies expect, when it comes to improvement methods: first is the assumption of revolutionizing the way of working, and the second, the assumption of smaller profits with lower investments. (Santos & Torres 2006, chapter 1)

It has been said that the biggest mistake a company could make is to underestimate its employees. In Lean, this does not mean you should give all the power and luxury to them, not at all. In this case, respect for people means understanding the value employees present and the knowledge to utilize them in a manner which helps the company progress. The mistake occurs when employees are not challenged or developed enough. Understanding the respect for humanity is much harder than understanding lean tools and many companies fail to understand what the term truly means. A good company executive is assessed by the development of their employees. These executives are the ones who are building a working culture which is respectful, supportive, and inclusive. Two-way communication is important and feedback and listening both ways is key. (Prozman, Whiton & Prozman, chapter 2)

### 3 Lean management

Lean management is a method used for companies to gain profitability and improve quality of their output and overall performance. Lean management is based on two main purposes: customer satisfaction and fulfilling employee potential. Reducing non-value-adding factors, like overproduction or waiting, is the key for smooth flow of processes. There are many benefits that lean management offer, for example, the work made by employees is reduced to only beneficial and value adding activities, which leads to improved productivity. The work is also to be matched with the demand. This means that the amount of work matches the demand and therefore eliminating non-value-adding work while still matching the production. (Huser 3 January 2022)

#### 3.1 Main principles of Lean

There are five main principles of lean for better workplace efficiency: define value, map the value stream, create flow, establish pull and pursuit perfection. Figure 3 shows how founders of Lean Enterprise Institute James Womack and Daniel Jones saw the five key principles of Lean. Value answers to customers specific needs. This raises points about the production and delivery timeline as well as the price. Identifying the value is determining the end goal for your business. Value stream should always be mapped after determining the end goal and that includes all the steps of production from raw materials to final product. Everything that goes in that specific products route is a part of value stream mapping, for example: designing, human resources, customer service, manufacturing and delivering. When identifying these steps, you can create the map, which includes the flow of the products or materials. This map aims to detect and eliminate any wasteful steps that do not create any value. (Crawford 9 March 2016)

Ensuring the smooth flow of products and services is the next process after eliminating all the waste from the value stream. It is important to make sure there is not any bottlenecks, delays, or interferences when the flow towards the customer begins. With good flow, the pull system improves, since the products are delivery ready as needed with just in time method and the waiting time for products decreases. This enables cutting down excess inventory as there is no in-advance production nor materials waiting for production. Not only is this beneficial for the manufacturer, but also the customer. The last and possibly the most crucial step is seeking perfection. In this case, seeking perfection means implementing lean thinking and continuous improvement to company culture. Lean needs time and effort constantly and these steps need multiple reviews before truly becoming lean. (Crawford 9 March 2016)

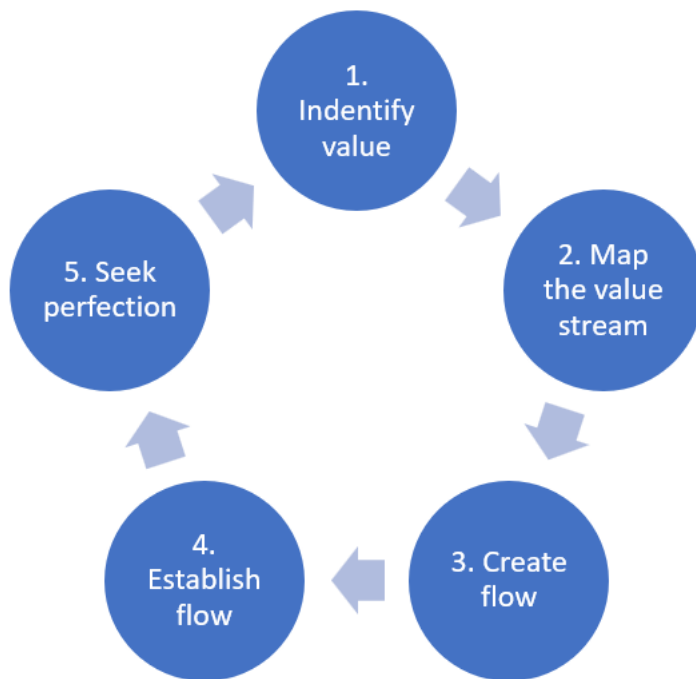


Figure 3. The Five Steps of Lean Implementation (Adapted from Lean Enterprise Institute 2000)

### 3.2 House of Lean Management

House of Lean management, or HOLM, is relatively new and different, when comparing to the House of Lean. Those trying to implement lean concepts faced a problem: using just Lean tools is not sustainable enough for today's management requirements. When trying to achieve long lasting improvements, the people element becomes too significant to ignore. Company culture and the people are raised as the most crucial factor of Lean, rather than only implementing Lean tools, which previously was the foundation. Lean management systems are impossible to achieve without required structure, which includes three main elements: Implemented Lean philosophy company wide, organisational structure built around lean learning and practise, and infrastructure based around HOLM. The roof of HOLM, in figure 4, contains the Lean management main systems, which are crucial when implementing Lean. These systems are mandatory, and without them, the company culture's development will suffer, and the people are not able to internalize the management system. These systems are divided into four main sub-systems: Quality management system, socio-technical system, change management system and educational system. In HOLM, the pillars consist of waste identification, waste quantification, waste elimination and creation of waste free processes, while the foundation chambers consist of project-, resource-, change, knowledge- and process management excellence. (Charron, Harrington, Voehl & Frank 2014, 63-87)

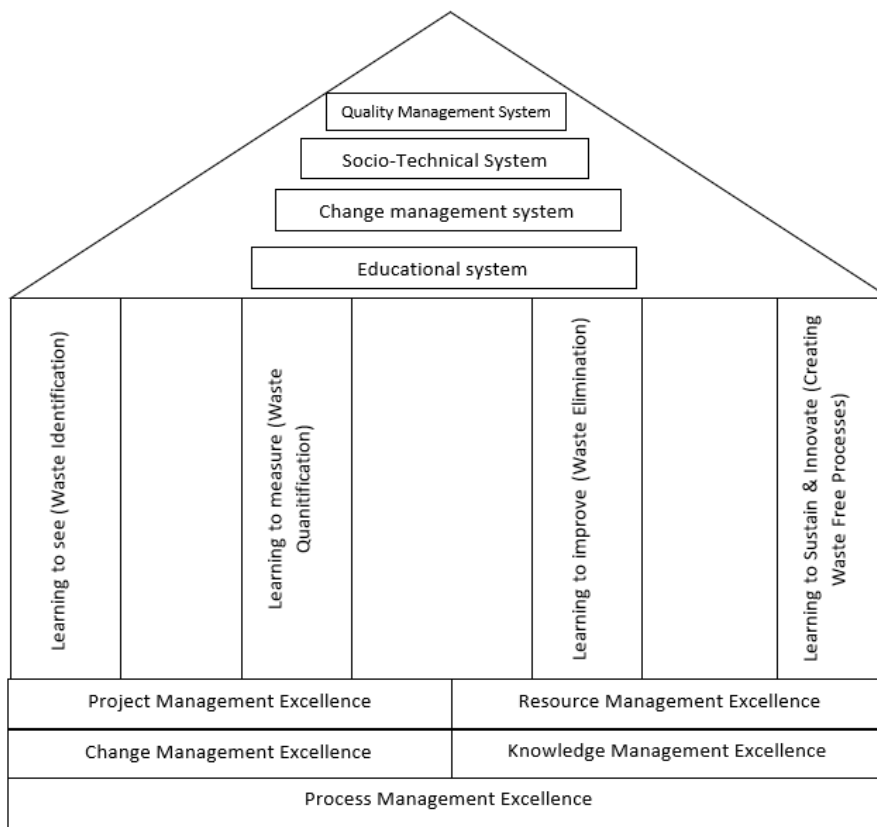


Figure 4. House of Lean management (adapted from Charron, Harrington, Voehl & Frank 2014, 68)

### 3.2.1 Lean management systems

HOLM presents your organization when it has fully adopted Lean management system in use. Organizations often fail to visualize HOLM and therefore leaving them riddled with unfinished and deficient projects and processes. When striving for fully operational Lean organization, there are three main management elements to be followed: education, communication, and application. To become a Lean organization, you must adopt a companywide learning culture, where every employee at every level pursues refining the understanding and implementation of Lean. The education should focus first on the concepts and philosophies of Lean, and only later introduce tools and techniques. Application refers to search of new activities, which improve and develop the management and the employees. This is because it is the responsibility of the management of Lean organization to develop themselves, while simultaneously offering environment for the employees to develop. After the Lean concepts have been educated and the application introduced, it is time to communicate the results of these into your organization. Clear communication will benefit the whole value stream, when every member of organization is aware of the positive results Lean has offered. (Charron, Harrington, Voehl & Frank 2014, 101-102)

The socio-technical system highlights the value of integrating the social part (the driving force of people) with the technical part (processes and machines) to optimize the efficiency of organization. The social system tells us the driving forces of people, which include values, motivation, attitudes, relationships and so on. These forces should go hand in hand with the technical aspect: motivated people should be assisted by quality machinery and other way round. Big mistake is to invest only one of the two, leaving either mediocre quality of products with talented and striving workers or superior quality processes with workers who have no required knowledge for utilize them. To make sure this does not occur, the organization should be able to change with the times and adapt with the environment. This can be achieved by planning the social and technical systems at the same time to integrate with one another. (Quarterman. n.d.)

Along with change-, quality-, socio & technical management systems, the roof of HOLM consists also of educational management system. When transitioning to Lean, employee education needs investing money and time wise. Organizations often overlook this when trying to implement lean systems and often fail searching for short term profits. Traditional management blames lack of time or resources when they find out Lean management system does not achieve the management's objectives. This points the main issue that the traditional management has, lean has not been implemented as the main philosophy and therefore it cannot run. The challenge is to create an education strategy that produces Lean practitioners' company-wide at all levels. First important task is to recognize the need for change to improve and this is crucial since the willingness to change must come from senior management. This way when the workers are applying lean believes into their work, they are supported by the management, which is aware of the Lean tools and believes. The key for management is to adopt lean quickly and develop a plan, which is aimed for employee participation of 100%. New strategy also requires readjusting the mission, vision and value statements since Lean systems affect all these areas. (Charron, Harrington, Voehl & Frank 2014, 137-144)

Lean change management is often difficult, but the ability to understand change and how to control it, is vital for a successful Lean organization. With change there is always uncertainty in the air, people not knowing what to expect from the future and is it beneficial or necessary for the company. Understanding the roots of change is crucial, people need to know why the change is happening and where are we going with it. A model by William Bridges, figure 5, highlights three main steps for creating an effective change management: shed old beliefs, achieve neutral mind zone, and start a new beginning. (Charron, Harrington, Voehl & Frank 2014, 77-78)

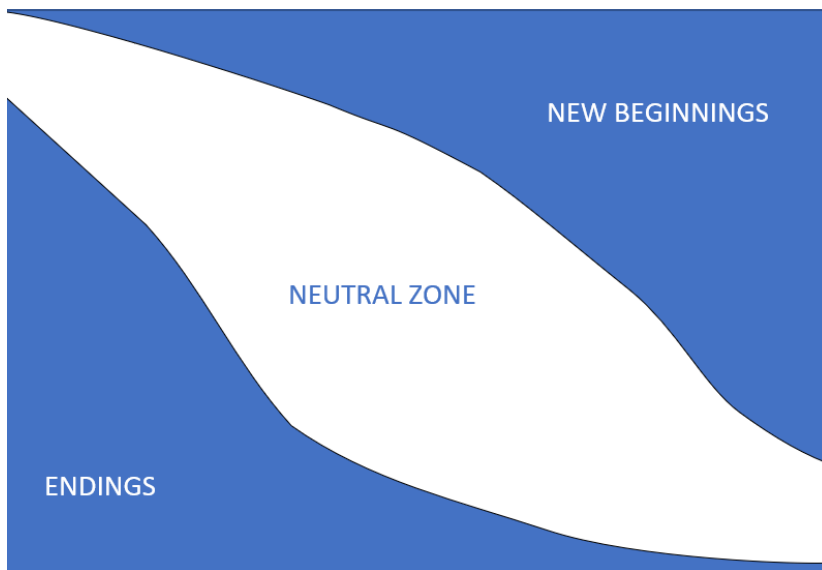


Figure 5. Bridges Transition Model (adapted from William Bridges Associates)

First step of transition is in fact an ending since people realise the losses they are facing and learn how to manage them. They identify what parts they are keeping and the parts they are leaving behind, these could be co-workers, processes, locations etcetera. The next step is the neutral zone, and this is where people go to a transition phase, where old things have left behind but the new is yet to be completely operational. This phase is the very heart of transition, where new roles and processes are learned. The time in this zone is psychologically very demanding and stressful. New beginnings is the zone of new understandings. New values and mindsets are in place, while a refreshing energy runs in the organization. Everybody understands their role and purpose, creating effective participation and contribution. (William Bridges Associates. n.d.)

### 3.2.2 Pillars and foundation

The pillars of HOLM tells us how to control the waste. Identification of waste is the most important pillar, since we cannot fix anything what we cannot see. Only when the waste is identified, quantification is possible and measuring this waste in a Lean way means identifying what measures are Lean and what are not. Usually, Lean measures are focusing on external factors, such as performance or customer requirements, whereas non-Lean measures are normally non-flowing, like labour costs or raw material costs. When we reach the third pillar, employees are nearing to be capable Lean practitioners and the Lean management systems are starting to operate, the use of Lean tools is necessary for eliminating waste. When these pillars are in order, the organization is able to sustain and innovate. Continuous improvement should be in the core of company culture and the Kaizen equation implemented across all levels. Foundation of HOLM consists of five organizational excellences, which should be managed simultaneously. These five are process-,

project-, change-, knowledge- and resource management excellence. These foundation stones can be achieved by managing more efficiently and effectively with following guidelines. Processes should be continuously improved, and the improvements should reflect into project management as well. Organizations should be ready to manage the chaos caused by changes the Lean systems create. Knowledge of the organization is its most valuable asset and therefore it needs careful managing. Managing this accomplishes competitive advantage for the organization. The results made are driven by assets and resources and managing them goes without saying. (Charron, Harrington, Voehl & Frank 2014, 78-83)

### **3.3 Lean product management**

Lean Product Development follows the Lean way of creating value while still eliminating waste, but the emphasis is on the value the product brings for the customer. Companies who practice Lean Product Development deploy their products to the right markets at the right time and place with the correct quality and price. There are several proven benefits Lean Product Development has brought to companies. Scheduling the development cycle improves and therefore companies can hit the required launch dates in time. Developing the products is significantly faster while still being able to cut extra costs. Also, the people are freed from tasks that do not create any value and are now able to spend time innovating. Quality of products will be more consistent when teams are learning to understand the issues and the new needs of customers. The core purpose of Lean Product Development is to create time by eliminating waste, which gives the engineers and designers time to create value by tackling business, customer or technical related problems. (Radeka 2012, 3-11)

Crucial role of Lean product management is in the shoulders of product managers: their role is to transfer customer demands into appealing products. Often this purpose is overshadowed by internal pressure or from stakeholders who expect results. Loads of resources are being used by product managers without really understanding what the customer genuinely wants, leaving them unsatisfied while the company sees their product teams with low morale. Lean product management keeps these teams delivering valuable work quickly. The managers of these teams prioritize customer needs over internal demands, experiments using data instead of assumptions, customer problem roadmaps instead of feature roadmaps and idea generation and collaboration over solution requirements. Their energy should be focused on listening the customer and avoiding overthinking about requirements from executives, marketing, sales and so on. Of course, stakeholder value is the ultimate goal, but this is achieved by intimately understanding the customer. Feedback from customers is essential and talking to them helps product managers understand customer value from their perspective. Validated science should always be the driving factor behind

products. Assumptions, gut feelings and predictions often fail. Companies lean into these because of the lack of intelligence to collect data or experimentation is not a part of their company culture. Great products are built by Lean teams and not only by Lean product management teams. This means including cross-organizational collaborations when creating product strategies and developments. Listening others and sharing the opinions of, for example, engineers, marketing, designers and sales is important for creating a healthy process for products. (Peterson, 10 July 2019)

## **4 A Lean principle guide for Finnish industries**

Product section of the work deals with how Finnish manufacturing industries can successfully implement lean into their organization. With used theoretical framework, company example and my own learning, this part of the thesis will give suggestions on how to approach Lean in practice. These suggestions are compiled into one guide, which is an appendix at the end of this thesis. The guide serves as a handbook for any Finnish company executive who is responsible for implementing Lean and wants to know the basics about it. The guide was created using the knowledge this thesis has presented. In additionally, the company example of Vaisala Oy highlights valid solutions, which are also presented in the guide.

### **4.1 Creation of the guide**

There are several problems Finnish companies have faced when implementing Lean. Some of the problems were mentioned in the introduction chapter, but now we will take a deeper dive to see what is causing these problems to occur. After researching these problems and using the case study of Vaisala Oy, the guidebook was ready to be completed. The guide was created to highlight what causes Finnish companies to fail Lean implementation and raise awareness about how the matter should really be approached. Even though the guide is practical on its own, the support of this thesis will give the reader a greater understanding of the subject.

The guide was created with Canva, which is a tool for creating presentations. The target was to create a straightforward and understandable guide with a visual tone to it in for a better read. The guide was made after researching the theory and the case study. To make the guide more approachable, the main points and theories of Lean have been hand-picked by relevancy and practicality. The guide is successful if an organization executive can mirror their activities into Lean and get a glimpse and understanding of the process of becoming a Lean organization.

The guide starts with a small introduction into what Lean means and what are the benefits of it and for whom the guide was made. The actual suggestions are divided into three main categories, which I have decided would be relevant for Finnish executives. First category is learning about Lean, second deals with avoiding the mistakes of Finnish companies and the third highlights the crucial factors of change.

### **4.2 A case study of Vaisala Oy**

Vaisala Oy is Finnish company that offers measurement solutions globally in the field of weather, manufacturing and nature. The company was founded in 1936 by Vilho Väisälä, when he created his innovation called RS11, a radio probe. Now Vaisala is the global leader of measurement

solution-based company in the field of weather, manufacturing and nature. They employ over 2000 people and have over 25 offices globally. 29 percent of their employees work in R&D. (Vaisala. Vaisala yrityksenä. n.d.)

What is interesting about Vaisala, is that they are heavily invested in R&D and Lean, and the company checks every box required for Lean organization. They state their success is built by the employees who are motivated and guaranteed to create quality products. The company also encourages its employees to continuously improve themselves and the working methods. Like in any Lean organization, Vaisala's target is customer satisfaction and constant customer feedback drives the development of products and other activities. Continuous improvement in Vaisala is based on Plan-Do-Check-Act, which utilizes the elements of organization-wide learning and the development of people, process thinking, extensive tracking and analysis based on science. Quality of product development and innovation are driven by customer demands. In their R&D process, customer needs are turned into product requirements that are to be matched. Vaisala has also created its own production system consisting of three elements: lean management, systematic improvement and standardized working. (Vaisala, Vaisalan laadunhallintajärjestelmä. n.d.)

This proves Vaisala is not just doing Lean projects, but they have implemented Lean into their company culture. Their values, goals and working methods are made to serve the customer, which is in the very core of Lean. The reliance and trust for employees to develop and drive the change forward has clearly been one of the factors for Vaisala's remarkable success. Vaisala has even created its own production system called Vaisala Production System, which I assume takes inspiration from Toyota Production System. Stating that their own production system stems from Lean management, systematic improvement and standardized work does not surprise since they are global leaders. This tells me Vaisala's management has always been open to improvements and have made significant investments to achieve them. High rate of R&D employees is one example of investments made and this enables continuous improvement to thrive in the company. Standardized work ensures that the work done in Vaisala is meaningful and made as efficiently as possible.

The reason Lean management has not worked in Finland is that Finnish executives do not demand enough, leaving the performance levels low. In addition to this, the common Finnish management is not willing to change their leading methods and the management often segregates itself too much from the company. This leads to the management being unaware of the capabilities the company possesses, and in Lean organization, the management is always present even in the field of work. Finally, there really is no actual competence within Finnish executives to create their own Lean management systems. (Pettunen 27 June 2016)

Vaisala is a successful Lean organization because it has overcome the reasons why usually Finnish companies fail at Lean. The demand at every company level to always keep developing their products and finding ways to match customer demands, even when they already are the global leaders in their field. Vaisala's strength comes from the willingness to change and develop continuously. This mentality has been in the company from the very start and that is why it strives even today. The key to their success has been innovation and the management system that supports it.

### 4.3 The effects of Lean in Vaisala Oy

A report by Vesa Pylvänäinen, in 2019, shares Vaisala's Lean journey and how it has affected the company. From 2009-2018 there are several systematic development programs that has majorly benefitted deliveries, quality performance and productivity (Figure 6). After implementing first Lean production cells in 2009, there has been many continuous improvement projects yearly, for example, value stream mapping was introduced, Kaizen events were started, and standard work was implemented. Figure 6 shows how these affected the company: on-time deliveries and quality performance are seeking perfection in almost 100 percent efficiency. On-time deliveries has risen rapidly almost 40 percent and productivity as well with about 15 percent. (Pylvänäinen 2019)

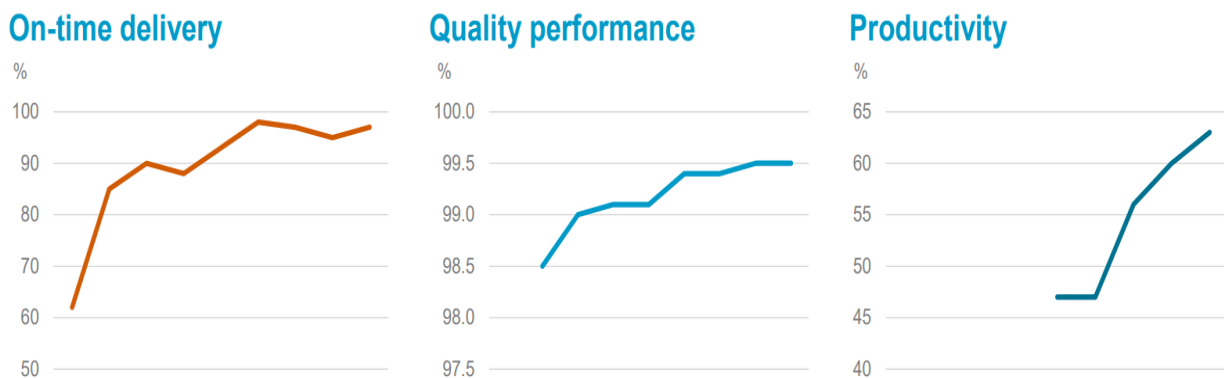


Figure 6. Systematic Improvement Brings Results (Vaisala s.a.)

In the same report, it is explained how Vaisala uses Lean for improving performance and capabilities. They have recognized the current situation, the wanted target and the middle ground between these ends. Current situation for Vaisala is value stream mapping and daily management, while the target could be an execution plan or other set target. Because Vaisala is transparent, continuously learning and have motivated people who are respected, the middle ground between the two ends gets much easier. The middle ground contains activities such as Kaizen event, continuous problem solving, coaching and Plan-Do-Check-Act. After these steps the plan is possible to execute with faster marketing time and higher reliability and efficiency. (Pylvänäinen 2019)

Vaisala has succeeded with basic Lean management elements and have improved greatly because of them. Of course, Vaisala has some great talent who can drive these Lean activities forward, but maybe the most important factor was that they genuinely tried Lean the way it should be tried. Many of these Finnish company executives have most likely failed because of the lack of courage to dive deeply into the world of Lean, but they rather tip toe it with small projects and experiments. Implementing Lean halfway is not the mistake your company should make, it must be fully implemented to company culture at every single level to work properly like in Vaisala's case.

## 5 Discussion

This chapter deals with the process of creating this thesis and its usability, necessity and timeliness. I will evaluate how my thesis process went, what was challenging and what went well. I am also going to present further processing possibilities and finally, describe my own learning and professional development during this process.

### 5.1 Evaluation of the thesis process

Starting this thesis process was challenging at first. It took longer than expected to find a topic I was interested while simultaneously had knowledge of. After dabbling with few different subjects, this topic formed, which I found fascinating and thought it could be relevant and useful as well. Making the product-based thesis in guide form was a good decision, since I truly believe the theories and the knowledge I gained got to stand out. Perhaps the scope of the subjects dealt in this thesis was quite difficult to manage at times. Challenging task was to narrow it down to more key factors while still supporting the product part of this thesis. Regardless of that, I believe this work presented the crucial information of this subject and therefore answered my expectations I had previously set.

The goal of this thesis was to create a usable and approachable guide, which was easy to understand. The theoretical framework aimed to be relevant and timely, while supporting the guide and other themes of this thesis. The case study hoped to be eye opening and supportive for the theory and product part. I was excited and delighted about how well the case study and theory linked up together and the combination of the two gave me the necessary tools to create the guide. At first, I was sceptical about how the subject would work, since Lean in Finland has not been landing well with manufacturing firms, but more in healthcare and construction where the product and service are not that obvious. However, if there is a company like Vaisala, which has succeeded incredibly well with it, I knew there was a point to be highlighted. The guide in that sense is relevant, but if the notion in Finland truly is that Lean is something to be avoided at all costs, this guide loses its value.

### 5.2 Usability and further processing possibilities

Because this work is targeted mostly at executives, they might already be aware of Lean. In that case the theory part may seem obvious to them, but I believe they manage to find new and useful information they have not previously thought out. If it is somewhat of a myth that Lean does not work in Finland, this work might debunk it, at least in some executive's mind. The purpose of this thesis really turned into displaying the problems and offering solutions for them. The final product does not only offer these solutions but also introduces Lean with versatility for the reader.

Someone, who is not aware of what Lean is, will find this extremely educating and perhaps use this information for their advantage. The way the guide was made to appeal to a wider audience because the information is more general and not specific to a certain industry. It also leaves out specific industry-based factors in efforts to highlight the important points. This also has negative sides to it, since there is a possibility of the reader not finding any added information and was hoping for more industry specific suggestions.

There are also possibilities for further processing. Firstly, a deeper dive towards the implementation process of Lean is possible to establish with the support of this work. There is also a possibility to tailor this for a specific company or industry example. In terms of dealing with Finland, it would also be beneficial to research how our neighbouring countries use Lean and how do they compare and differ. This could lead to a guide, which suggests solutions inspired by the factors countries similar to Finland have used for their advantage.

### **5.3 My own learning and professional development**

This thesis was my first bigger project that I have done, and it took a lot of work and time to complete. Of course, I have done similar projects, but in a smaller scale with team members. This thesis has helped me to develop my researching skills, writing skills and critical thinking. Furthermore, I managed to compare and utilize various sources more efficiently than in the past. I learned a great deal about Lean and especially its management side. More importantly, Lean principle has helped me realise the factors of running a successful business not in a sense of using Lean, but more about understanding what the crucial factors are a business needs for it to be productive. Most of the theories used were completely new to me, but very eye opening at the same time.

I now understand that many companies use Lean methods but not necessarily are Lean organizations. I know now that the medicine distributor company where I work is most likely not Lean, but more trying to be efficient and productive using methods like Lean systems. The difference is that these are separate solutions and not culturally implemented. This thesis has helped me consider things in a more expert manner with problem solving and critical thinking mentality. As expected, this thesis has its flaws. Because of the time spent thinking of the subject, the time for the actual research and creation of the product was limited. I am satisfied that the theory part was strong and the company example timely. With more time and planning, the guide could have more timely information and suggestions. The guide successfully highlights the main points I wanted to raise and overall, I am happy about the process and the result of this work.

I believe this thesis process has given me new abilities that can be used in working life. Ability to create a product out of nothing is never easy but I am sure going forward I can use the experience

I have gained from this work in even bigger projects. This work has on top of that taught me self-discipline, productive time use and different learning methods. Also, I have never done anything in guide format, so it was interesting to create something completely new to me.

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## Appendices

# LEAN PRINCIPLE GUIDE FOR FINNISH INDUSTRIES

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A CONCISE GUIDE TO USING LEAN IN  
FINLAND

CREATED BY  
MATTI PIRHONEN

RESEARCH BY  
MATTI PIRHONEN



# WHO IS THIS FOR?

**IF YOU ARE A FINNISH  
COMPANY EXECUTIVE  
LOOKING FOR CHANGE THE  
LEAN WAY, YOU CAME IN THE  
RIGHT PLACE**

This guide is targeted for executives looking to change their company for the better. Lean is possibly something you are interested in, but don't really know how to approach it. This guide presents you with an idea on how to get started.



## WHY DOES THIS GUIDE EXIST?

Finnish companies have struggled with Lean for a long time now and there seems to be no sign of any development. In Finland, the problems have occurred because of the failure to understand Lean, not because they have not tried. People who should drive the change forward are in truth the ones stopping it. Company executives want their organizations to be Lean but are not willing to either invest or educate themselves enough. The benefits of Lean have been known for quite some time. Even though Lean is being used in Finland, we still get left behind by our competitors. This guide was created to highlight this problem and raise awareness about how the matter should be approached.

# WHY LEAN MATTERS

## LEAN IS FOR THE CUSTOMER

The very heart of Lean is the customer and everything done in the organization should be serving their interest and demands. Creating customer value is essential and necessary. It is very important to determine what type of value you are offering for the customer, and that is why customer interaction and feedback is key. A product or service selling company can not truly be successful without understanding their clients.

## LEAN IS ELIMINATING WASTE

Lean eliminates processes and activities that do not create any value for the customer. This is called waste. Common wastes are, for example waiting, overproduction and extra inventory. While this waste is being eliminated, the organization should seek continuous improvement. This creates a space of maximum productivity and efficiency, which every company should seek



## **BENEFITS OF LEAN MANAGEMENT**



Eliminating waste



Better quality  
products/services



Customer satisfaction



Motivated employees



Culture of continuous  
improvement



Increased productivity

# HOW TO APPROACH LEAN AS A FINNISH COMPANY EXECUTIVE

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The following pages deal with how Finnish company executive can approach Lean. These are suggestions on a general level and are not set in stone. That being said, these are very solid proposals that should definitely be taken into consideration, when implementing Lean.

## ADVICE FOR GREAT LEAN IMPLEMENTATION

- 01** Learn about Lean
- 02** Differ from other Finnish organizations
- 03** Be ready for the change



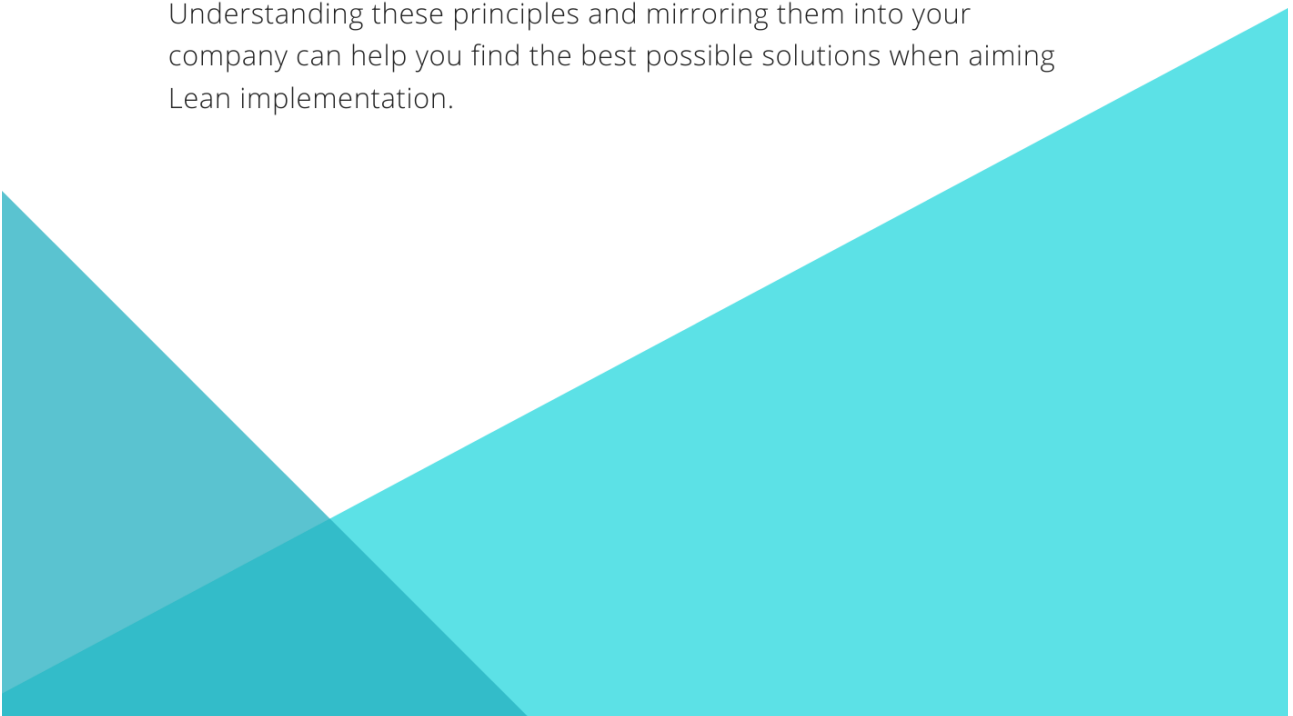
# 01 LEARN ABOUT LEAN

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Easiest way to get a sense of what Lean really is comes from literature. Reading the history and theory will increase your chances on successfully implementing it. This clarifies your starting position and what it takes to make the change or start building it from scratch. Of course, there are tons of material on Lean, but here is a few important recommendations for you.

I urge you to understand how the Toyota Production System worked, and more importantly, adopt the House of Lean. The full context of Lean manufacturing is a must know thing as an executive. As you most likely are a part of management, adopting the House of Lean Management is also necessary. This gives you an understanding on how Lean organization as a whole works, with focus being on the employees.

Furthermore, the five main Lean principles should be familiar to you. This helps your company to be more efficient and increases customer satisfaction while promoting continuous improvement. Understanding these principles and mirroring them into your company can help you find the best possible solutions when aiming Lean implementation.



## 02

## DIFFER FROM OTHER FINNISH COMPANIES

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- **Demand more from your employees.** Common mistake of Finnish companies is underestimating the talents of their employees. Give them a chance to influence and develop themselves as much as possible. Motivated employees lead to quality products and services.
- **Invest in innovation.** This not only gains profit in the long run, but also leads to a motivated workplace with a desire to develop continuously. It is easier to reach future customer demands, when investing in R&D early.
- **Lean is a culture, not a project.** Seeing if couple Lean projects do anything is misleading and not Lean at all. For truly becoming a Lean organization, it must be applied into the company culture. This is the only way to gain value in the long run.
- **Create your own Lean system.** Do it your own way. Lean systems are impossible to copy straight from other companies, since there are too many variables. Of course, you can take inspiration from Toyota Production System for example, but only up to an certain point.
- **Manage! Do not hide.** As an executive, you must be an example of change in the workplace. Arrange your own trainings and participate in other ones. Visit the actual workstations and see for yourself how the work is being done and how it is developed. You must show everyone in the company, that Lean also affects the management.

## 03

# BE READY FOR THE CHANGE

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Do not go halfway. It is important to take the leap of faith and fully dive into the world of Lean. Unsuccessful transition and changes into Lean could leave your organization with unhappy employees and wasted resources that unavoidably affects the results. Make it clear there are no expenses spared to accomplish smooth transition or implementation to Lean.



Be aware of what the purpose of the change is and make sure everyone knows what the goal is. It is easier to do meaningful work when everyone knows what they are heading towards. Changes and transitions are very stressful in every company level, and keeping your employees motivated during this time is crucial.



Surround yourself with the right people and hire the ones who are ready to take risks in efforts to gain value in the long run. The management should be hungry to develop and change. Problem with traditional management is the unwillingness to change old methods and therefore stall the process.



# CONCLUSIONS

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***"Lean is a way of thinking, not a list of things to do"*** -Shigeo Shingo

Approaching Lean in only technical manner without understanding it can be challenging. It is crucial to educate yourself about the thinking behind it and afterwards start implementing Lean the way you see fit for your company. This is especially important in Finland where Lean has not been understood and educated properly.

Remember to keep in mind the benefits Lean provides in the long run. Do not evaluate the efficiency of Lean after few projects, be patient and the results will come. Keep your mind open and avoid judging it too early.

Believe in yourself! Believe in your employees and products. This way your workplace will be efficient and motivated, while producing quality products and services. Make these factors your strengths and play your cards right for gaining even more results.

***I wish you the best of luck on your Lean journey!***



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Pictures: Canva