APPLYING CONTINUOUS IMPROVEMENT IN ORDER TO REACH OPERATIONAL EXCELLENCE

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ABSTRACT

Research's primary goal is to find out what are the success factors of continuous improvement as a change management discipline, and second goal is to clear out what role organizational culture and leadership have in this change in order to reach operational excellence. Personal and professional aim of this research is to produce operational manual type of guideline collection from continuous improvement targeted for small and middle sized companies, which are developing their change management disciplines and planning operational transformation using continuous improvement philosophy or methodology in order to help their overall change process e.g. improve the business, add more value to the business, reduce costs or improve the production and projects. Above mentioned activity means attempts to reach operational excellence, the success. This study concentrates on topics of continuous improvement and how business can adapt it to achieve the success? Thesis research scope concentrates for analyzing continuous improvement strategies, processes, methods and studies relationships between the success and organizational culture with leadership. Case study delves into the change management issues of the ongoing global project.

Organizational change management disciplines are on the edge, such as continuous improvement, which affects into whole organization when applied. It is known that the organization culture has a direct impact on how employees react to change. When there is a need for a change, leaders have to think what kind of change management strategy will be most convenient and also most effective before planning the change. An organization's value system is an important source of information when defining how big effort is needed for change management. Organizational values are in connection with human behavior aspects, it means organizational culture is in direct contact with the leadership. Leadership, described as a process of social influence, has a very important part to drive that overall change. In this study, the effects of the above-mentioned issues are examined through a case study. Case study partner represents the manufacturing industry. This thesis reveals some examples of successful implementations of continuous improvement and it might give valuable and beneficial information for some organizations on their way into the operational excellence.

Keywords Continuous Improvement, Organizational Culture, Leadership, Operational Excellence, Kaizen, Lean, Quality Management, Production, Productivity

Pages 115 (Total 128)

CONTENTS

1 INTRODUCTION

Today economic situation causes lot of challenges for companies. Business is now global than ever before and companies has to face great economic challenges. Modern business world has been struggling since 2008 when worldwide recession saw the daylight. This slump has been very challenging from smaller to larger enterprises. Economic growth in Europe has not been developing so greatly as predicted past half decade ago and countries are worried about their industrial productivity, competitiveness and debt service capacity. Firstly, this lack of growth reflects especially for internationally active exporting companies so they have to be more competitive than ever - simply to do it better and better all the time in order to survive. Firms have to find new strategies to be more efficient and constantly follow up the market changes in many dimensional levels. Secondly, globalizing affects also to the companies representing domestic market, they should also carefully follow up market changes, for example the trend of digitalization gives new possibilities for the business, but on the other hand digitization also creates new threats, such as growing competition in 'once safely' domestic market. For instance, e-commerce has changed secure positions decisively at the domestic market. This trend means that firms, representing many business fields, have to challenge themselves in order to survive in future and tailor their business constantly to be more competitive. Organizations have to improve their efficiency and this leads to the question of productivity – it touches all the production units, regardless of whether they represent a manufacturing or service business.

The world is living in the middle of challenges – a brief overview of global trends highlights the stiff competition. For instance, marketing is very expensive, getting material economically is challenging, ongoing search for suitable workforce is wearing and new technologies are transforming markets, so how to stand out from the crowd? - the list is incessant. Simply business enterprises have to ponder hard to keep on going in this challenging world. In conclusion, organizations have to reshape their strategies and ensure their business would be competent all the time. Because of this constant metamorphosis, disciplines like Change Management (CM) are on the edge now, the change is in demand. Enterprise and organizational change management practices are implemented and will be implemented throughout the world. Continuous Improvement (CI) is one these practices under CM disciplines, sometimes CI is called as a management system, philosophy, methodology, practice collection or even a program. Often CI method is determined only suitable for use in the manufacturing industry, this study would like to speak out other type of rendition.

1.1. Thesis Objectives and the Structure

Point of interest - This subject was chosen, because it is widely known that conventional Change Management operations fails too often and author is interested to find a causal link between the success and Continuous Improvement, representing one of the change management disciplines. The

aim is to search answers and causes for success, but also for failures and study theories about the CI with CM. This is based on information about known examples, author's experience and existing literature reviews. A good question is how organizations should maintain the change and develop their organizational culture and leadership during the change? To resolve this relationship with CI, author will combine domestic and international knowledge from change management processes. Aim is to find relevant studies and theories available on the subject. This research would also investigate how well companies know how to apply continues improvement and its methodology to serve their transformation process? Some theorists state about underlying belief, where CI methodology is just being used as a minor method or tooling system to improve daily operations not really concentrating its value as an advanced improvement methodology and systematic approach to reach the success. Main thesis objective is to study international case and find practical and deep information about CI-implementation journey.

Essentially this thesis focuses on the theme of continuous improvement and the other three themes. Other themes, which can be named together as a triangle, have a tight bond under change management discipline, and the outcome would be Operational Excellence OE – the fourth theme. OE is a term of success, that excellent and desired result, and a phenomenon, which many businesses would like to have an access. The themes are described as follows:

i.) Continuous Improvement (CI), which is a philosophy and methodology collection representing CM

ii.) Organizational Culture (OC), as a behavioral and cultural theme even that is very complex to compartmentalize

iii.) Leadership, a theme, which is a *''process of social influence which maximizes efforts of others towards achievement of a goal''* (Kruse 2013).

Picture 1.) Themes funnel

In addition, the structure of this thesis follows structured order of chapters, where chapters 2 to 5 presents theoretical framework and chapter 6 to 8 are presenting actual research work including research questions, goals, methods and results. Chapter 9 is reserved for discussion and contribution. There author presents conclusions and after that chapter 10 shows all references.

Chapter 2 aims to describe Philosophy of Continuous Improvement (CI) and its relations with terms of production, productivity and profitability. This chapter presents the history behind CI, so we can understand how it developed into the form we understand it today. This chapter reveals some significant approaches and ideas, which had been guiding principles until these days.

Chapter 3, brings out the Quality Management (QM) and its theories, which have a connection with continuous improvement. Chapter also tells how QM can be seen as a starting point for CI development.

Chapter 4, presents Lean Thinking philosophy and also variety of production concepts with different views of Lean methodologies. The outcome of this section introduces Lean implementation process and transformation from traditional approach to Lean approach. Also this chapter explain implementation challenges.

Chapter 5, introduces Operational Excellence (OE), and its connections with organizational culture and leadership. Lean implementation part propose issues and examples from Lean failures and possible reasons behind implementation attempts. Chapter also display topics of leadership such as 4P model, Servant Leadership and OE Management System.

Chapter 6 explains Research Questions and Goals. Also there is a space for supportive questions, which helped author to find answers for main research questions. These secondary questions were useful during interviews and when searching information from large theory base.

Chapter 7 is reserved for Methodology. This chapter display used methodology at this research e.g. strategy, methods and also research implementation.

Chapter 8 exhibits Research Results gathered from Operational Excellence case study. The questionnaire (web-survey) results are displayed after case study analysis. The survey was designed to obtain background information on how the companies internalize continuous improvement within their own organizations.

Chapter 9 Discussion presents the case framework, discusses about surrounding issues and summarizes this research. It presents authors observations about Operational Excellence.

Chapter 10, shows the Reference list.

1.2. CI supports Activities to reach Business objectives

Many top organizations today are very interested about Continuous Improvement strategies and practices in order to achieve better business alignment and to reach future goals. Especially during the time of economic depression, firms would like to find new ideas to improve their business, but usually it seems like their first target is just a cost reduction. Used strategies can vary a lot – some companies choose conventional change management strategy, others might like to use CI and some practices of it e.g. Lean, 6 Sigma, Kaizen or perhaps Agile. However, companies are accustomed to use traditional approaches, typically procedures like workforce reduction, outsourcing or other similar type of acts. Anyhow, these practices and derived strategies are used worldwide, and the purpose is to get better results identifying saving opportunities and estimating any possibilities for greater efficiency. In the heat of financial crisis this activity tends to be the rule rather than the exception.

Many sources state, that using 'continuous improvement way' as a main leadership and business discipline can be very successful for businesses in different fields. In 2009, using CI methodologies like Lean production and Kaizen, Japanese car manufacturers Nissan, Honda and Toyota were still much more profitable (per vehicle) in North American market than their rivals Chrysler, GM and Ford. Also the labor costs per vehicle were over 30% better comparing to American manufacturers. (Koskela 2009.)

Above case examples adduces fact information from manufacturing business, but the reason behind these success stories could lay behind CI's systematic approach and the way how it supports the business and the people together. One of the key issues is known widely – as a fact CI has a strong connection with productivity through its process approach. Better productivity is one of those core business desires. The term productivity informs what is the average efficiency of the production - it is a measure, which can be calculated and it is used to inform the status of production together with other measures. As a comparable measure it can be used well in micro- and macroeconomic calculations. For example, productivity as an average measure is used also to inform economic state of a country or a continent. Today productivity varies strongly within different industrial sectors inside above mentioned framework. Country statistics can give some perspective and information about how important productivity is for nation and what part improvement is acting on that macroeconomic scene. A good and compact example from this macroeconomic scene is Finland, the country member of European Union. 1990s Finland's productivity growth was quicker in manufacturing than in other business sectors. Former rapid growth in productivity can be explained by change of the industrial trends and changes in production structures. Later Finnish industry's cost competitiveness has deteriorated since the peak years. During 1990s if looking through private services, the productivity was slightly better than international average. Finland's ranking weakened slightly during next decade 2000-2010, but between 2012 and 2014 Finland hold weakest position inside the EU. Comparing country competitiveness in terms of productive development, Finland was not so competitive anymore. (Confederation of Finnish Industries 2016.)

The outlook of Finland's productivity growth was just a half percent to one percent. This growth rate reflects how well the country and its core industries are on the right track. Shortly, it informs also what is the economical angle of growth – the curve should be ascending, but not so steady as it was in 2016. Normally, many countries see their predicted growth between values of 3% to 4%. Now predicted growth rate, such as 0.5-1.0% informs what is the status of exporting business and this will depict, of course, into the inside market activities. The root cause, which led Finnish economy to collapse after initial of global financial crisis 2008, were structural changes in key industries e.g. forestry, ICT and then there were some economic difficulties in export functions and few social resource problems like rapidly ageing workforce. During that time Finnish export industry lost its cost competiveness, mainly because of high labor unit costs and some economic difficulties among key customers in abroad. (Finnish government 2016.)

The Confederation of Finnish Industries (n.d.) informs that traditionally productivity is not assessed and compared in the public sector activities. Productivity is strongly linked with those processes and activities, where improvement is connected to daily work operations, and this will reflect straight to the used process, a way of working and any activities to achieve results gaining better product or service quality. Continuous improvement is combination of tools and techniques in order to achieve its main purpose – better productivity by it all means. Continuous improvement will challenge us to dig in to the processes and find the root cause of problems of productivity.

It seems that even today some organizations are willing to search solutions for better productivity and viability but only partially. For instance, author believes there are some sort of existing tendency to 'pick up' technical approach to improve one part of the process in order to speed up service delivery or manufacturing capacity. However, there is more to reveal than a technology aspect, organizations should be more determined to analyze whole context in other words studying addictions like their values, customer feedback, quality issues and cultural issues together with overall processes, strategies, motivation and working styles with many other related matters. When attempting to reach preferable results and success in common, firms should show better interest and dedication for long term practices rather than just showing interest for partial process improvements and short term profits.

2 PHILOSOPHY OF CONTINUOUS IMPROVEMENT (CI)

Continuous improvement means development of the business itself, it affects to the company strategy as a whole. As a matter a fact, it is a change management discipline including methodologies and principles. It can be called as a philosophy. Actual business case determinates how deep this philosophical aspect would be. Usually when determining the depth of the change, business operatives should know what is the goal of the change and how their organization is going to benefit with that change. The need for the change will arise, when organization realize the business should be more profitable or there is some kind of forced demand for cost cutting. Improvement work would begin, when the organization will begin to feel pressure for change that comes e.g. from customers, owners or perhaps financial curves are not showing enough positive direction. Owners have the power to send signals to board of directors and then whole organization might get claims and request to improve company's economic state and this causes a situation, where leaders are forced to start the change in order to improve production or operations to cut costs to get better efficiency. However, sometimes these signals can touch the entire organization or just some departments of it. In some cases, re-shaping activities can touch processes or projects, so that they would achieve better effectiveness and cost handling. These signals might be based on some external changes on that business e.g. variation among customers or kind of material or delivery problem. Then organization has to improve their business process based on these signals and give better answer to these market variations. Basically, when company is able to give response quickly enough into any market demand, they evidently will get better business alignment in the market. This context leads for discussion about production, productivity and profitability. These three issues have a strong connection with the business itself. Productivity and profitability are business measures and for example productivity growth with profit rate informs how profitable the company, the business or the production is. This chapter concentrates mainly for CI at production management framework. However, all these theories presented in chapter 2 are important to understand also when looking continuous improvement philosophy and its methods from operations management perspective.

2.1. Production in brief

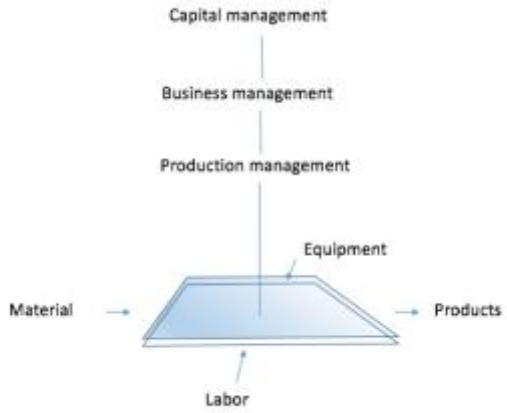
Kumar and Suresh (2009, 1-3.) define production as *''the step-by-step conversion of one form of material into another form through chemical or mechanical process to create or enhance the utility of the product to the user''*. It is a process where value addition is created on each stage. Production management guides production and it means those interrelated management activities which are present when manufacturing products. The term operations management are used when production is associated with services as required output of production.

According to Koskela (1999, 242.) production can be divided by its goals, which have some internal and external characteristics. A general goal is to produce intended products or services as planned. Second goal is related to the production itself and some of its characteristics like minimizing costs and

its utilization level. Third goal can be presented from the side of customer needs, like quality, flexibility, time and what are exact product features based on the need.

2.1.1. Production system

A production system includes number of common elements like machines, humans, estates and material, but also there are also dimensions for processes affecting into it like decision making process which have relations with capital-, production- and business management processes. Capital management is taken care and produced by owners. (Bellgran & Säftsen 2010, 45-46.)



Picture 2.) Production system model added with dimensions. (Bellgran & Säftsen 2010, 46.)

Production systems can be divided for classes based on their characteristics. These classes are Job-shop-, Batch-, Mass- and Continuous production. Sometimes above classes are presented through classification of three: i.) Continuous production, ii.) Intermittent production and iii.) Flexible production. Main literature presents production systems under two categories: 1.) Continuous production deals with Mass and flow production systems and 2.) Intermittent production describes batch, job and project production systems (Al-Turki, Ayar, Yilbas & Sahin 2014, 5-6.)

Continuous production system typically uses assembly line to produce products and these products will move further on that standardized production line. The word 'continuous' means the production goes on and on without any interruptions for weeks or even months. Mass production can be used to produce continuously very large quantities of goods or just to process materials for goods. Some examples from this type of production processes are oil breeding, sugar mills, metal furnace and paper production. These production processes use process control for operational variables like pressure, temperatures, material flow and also automation. Mass production system has higher operating costs and control and it is not so flexible comparing to others. Intermittent production, like a batch production, means that some amount of products would be made during short time intervals. The

name ‘batch’, means group of identical or similar products. These products are produced in stages, and stage means following different workstation. Low setup costs would make this production type affordable for smaller businesses unlike mass production, which would be more expensive. Costs are much more feasible to handle when making products in smaller batches. Also it reduces some risks caused by seasonal demands and other similar business variables. However, there are some disadvantages comparing it with continuous production. For example, after producing work, production line has to be stopped between batches for calibration, configuration and testing, and this will take time and causes equipment downtime and adds costs. When production line produces items with exact requirements by customers, it is called a ‘Job production’. These products are designed well and tailored based on customer needs even each customer might have different needs, it can be called the product customization by client. This production type has some benefits: high quality, customers would get exactly what they want and it offers a good flexibility for possible changes. Disadvantages might be higher production costs, need for skilled labor and its slowness comparing to other production systems. (Al-Turki et al. 2014, 5-6.)

Project production is a combination of interrelated activities, which must be performed a.) in particular order b.) within a given period of time c.) in a way that project will meet estimated budget. Project production are used in many fields like in construction, where buildings, ships, airplanes, roads or bridges can be build up through this type of production system. Disadvantages are mainly related to high cost overruns and personnel problems. Project production is a complex way and needs a good understanding and careful follow up. (Abey n.d.)

2.2. Productivity and its dimensions

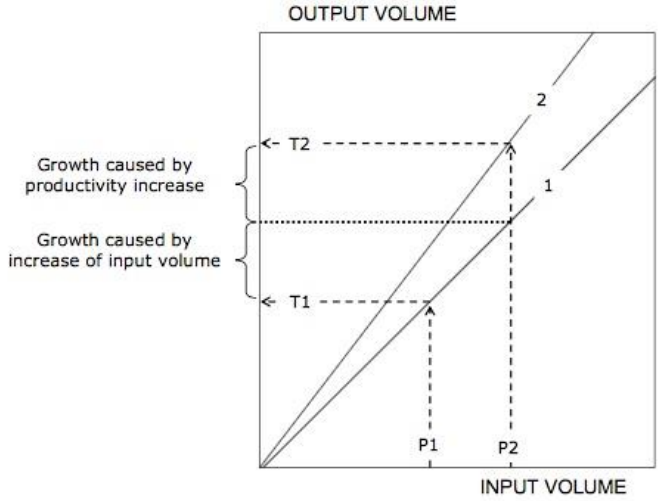
Productivity has many dimensions, today it can be classified as a multi-dimensional phenomenon. This multidimensionality reflects todays opinion about productivity, this modern dynamic concept of productivity can be called as a productivity flywheel. Now fierce competition adds more energy into this spinning flywheel. It means that surplus competition leads to higher productivity, and this forces business to gain higher results and customer values would rise. Organization will get better market share and again faces tougher competition. All this energy affects to the flywheel and pushes it to the continuous cycle. After all this energy means more designing work, better products and customer care and in common better quality of life. On the other hand, more energy will increase corporative needs for higher goals. (Kumar & Suresh 2009, 18-22.)

According to Chew (1988) productivity informs how efficient the production is as a whole and it informs the ratio of output and inputs used in production. Productivity= Output (Units) / Inputs (Units).

Total Productivity can be calculated, when all elements of inputs and outputs are defined with their economic values. It describes the total efficiency of whole production process and it has a strong link to the economic growth.

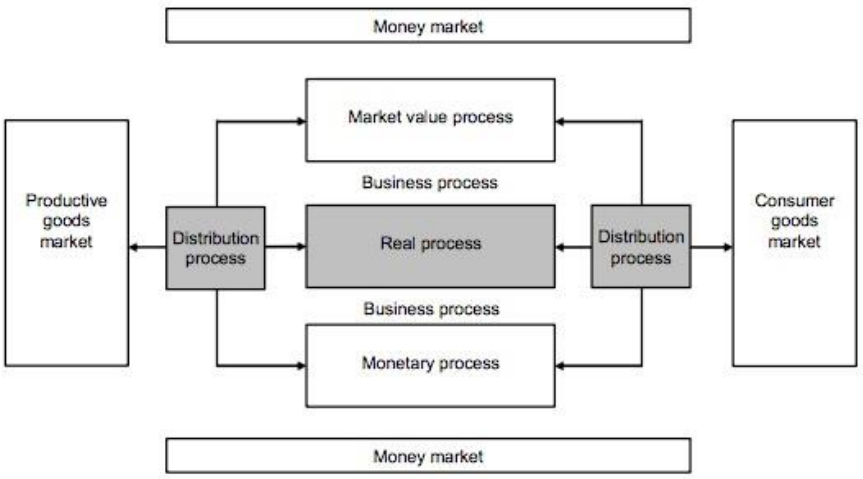
Term economic growth is simply described with a sentence: it is production increase by an economic community and it is created using two factors, which are components of growth. These components of growth are 1. increase in production input and 2. increase in productivity. (Saari 2006, 2-3.)

University of Kentucky's Lean program (n.d.) clarify that productivity is a measure and it evaluates production process. It can be calculated right if actual production equals the number of sold units. Overall productivity would be weak, if sales figures and production numbers do not follow equal curve - when efficiency improvements are reached. This means that production costs would not be reduced. Productivity can be calculated by formula as follows: ''*Production (Units only) / (Number of worker X Man hours) X 100 / (Output/Person/Hour'')*.



Picture 3.) Components of Economic Growth (Saari 2006, 2).

Above picture shows the components of growth, but growth caused by productivity increase has many dimensions and affecting processes. First, we have to understand productivity in theory level.



Picture 4.) Company main processes (Saari 2006, 3).

2.2.1. Profitability is created by Business Process

Productivity has a major part when dealing with above main processes. Productivity has a value and this value would be created during the 'Real process'. 'Income distribution' process will gain productivity and these two processes will setup the 'Business' process. The Business process can be measured only by accounting practices, other two must be measured by their own analysis where the aim is to get clear picture about the formation of income in that specific business. When business process improves its criterion of success, the result is better profitability. Real process consists series of events, where different amounts of some production input (products) are combined to other inputs with similar quantities and qualities to be summarized as an end product, which can be a physical product or service (immaterial) or combinations of these products. During this process, a producer will imply surplus value to be shared to the customer and producer, when goods are 'reaching' the marketplace. This surplus value (producer) is created in real process which creates also productivity. When producing constant-quality products, unit prices and input might vary, it causes some change in income distribution process giving pulse for price change from output to input depending the amplitude of change. The result could be lower prices, better market share and perhaps benefits for workers (salary or bonus). Business process is described through its factors, which are: profitability, returns and costs. In business process, all components of profitability will be calculated with nominal prices and in real process, components are presented with terms of fixed prices. Monetary process maintains financing events when business needs more financing. Market value process is taken into action, when investment market creates value to the company among others. (Saari 2006, 6-8.)

Profitability (for producer) is the final share taken from results based on calculations from real process and income distribution process. Measuring productivity can be seen as a phase of business development, where business in future is expected to be more productive and gain more growth, like an improvement from step A to step B. Business units would like to see the status of productivity from time to time, like manufacturing business has a need to follow the production and its change daily basis or even hour and minute basis.

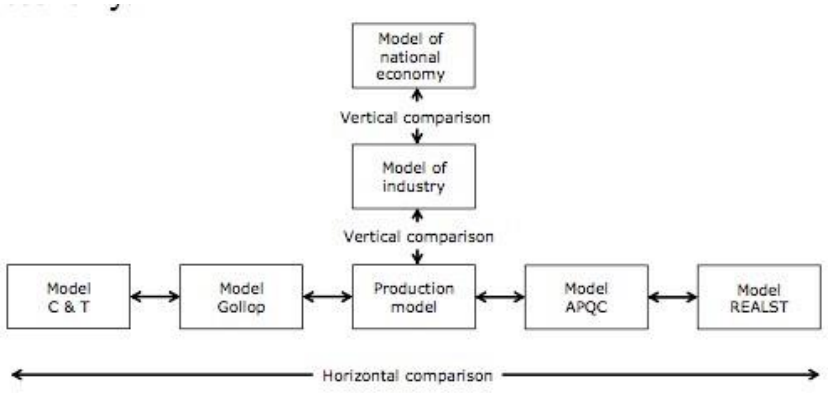
2.2.2. Single-factor and Multifactor Profitability

Productivity can be seen as a measurement of single-factor production, like output per machine or material output per time and volume. Productivity could be viewed also from multifactor perspective, where elements like labor costs, capital, materials, delivery etc. are all substitutes for each element. Company can outsource their pre-manufacturing and decrease the amount of own machinists and cut down their material needs, so the output its simple, they can source this service from elsewhere. Studying single-factor

measurement, some of productivity measurements goes up and some down. In this case labor productivity goes up and material productivity goes down. Capital productivity is better after previous outsourcing activity. Outsourcing pre-manufacturing could cause value change, when purchased material expenses would rise higher than before. When counting total productivity, it has to be measured and counted right containing all these single-factor measurements. Actions like indexing these multi-factors in order to track productivity and combining each factor to multifactor view, could give better picture when determining the dimensions of production and its productivity. (Chew 1988.)

2.2.3. Productivity expresses economic activity

Economic activity can be informed in many ways. Productivity is one part of the expression of economic activity (the phenomenon of productivity). Productivity is a concept formation and it is heavily related to other concepts like economic growth, efficiency, quality or profitability. Productivity measurement, is based on business data and usually its progression will be followed closely. It has also measures representing partial elements, which would be used when calculating smaller productivity parts of the business or some production areas. Productivity has a vertical and horizontal dimension. These dimensional comparisons are used when:
i.) Business production function models are compared by their features and then evaluating the differences / Horizontal dimension, ii.) Productivity models between nation and business are compared / Vertical dimension. (Saari 2006, 7-9.)



Picture 5.) Horizontal and Vertical Dimension (Saari 2006, 7).

In common, productivity contributes company strategy and it has an important part when there is needs for decision making. As a measurement it is followed daily, weekly and monthly basis, sometimes even hourly. Together with productivity growth it gives the picture about how well the company actually runs their business. As discovered earlier, profitability has a connection to the productivity. The business unit calculates profit rates for production and decides the level of profitable production. This connection will be identified through processes, which generates the status of current productivity and next stage - needed profitability. When

measuring productivity in business there are different models to be used such as Productivity Index-, PPPV- (Profitability, Productivity, Prices Volume) and PPPV-model (Profitability, Productivity, Price Recovery). These models measure the profitability as a function of productivity. Their calculation methods use variables such as volume and unit/prices facing income distribution process. Calculation method is basically same in all models. Below calculation models, presented in picture 4., have different calculation techniques, but these calculation methods do not affect the results by its calculation type. Calculation techniques differs significantly from each other. 'Saari'-model is somewhat the only model, which takes quantity changes and new prices into the account. In 'Kurosawa'- and 'Saari' model, calculations are carried out in compliance of production function, but the calculation order is different. When measuring profitability, there is no universal or common criteria how to rate success in the business, except the ability to create surplus value. Positive surplus value means that output has more value when comparing it with all production costs. Input costs should be calculated together. This surplus should cover also profit expectations and then positive surplus value meet those profit expectations, which are presented by the owner. (Saari 2006, 7-9.)

CHOICE	Saari	Kurosawa	Gollop	C & T
Variables used in the model	Distribution Productivity Volume	Distribution Productivity Volume	Distribution Productivity Volume	Distribution Productivity Volume
Theory, alternatives; 1. Production function 2. Cost function	Production function	Production function	Cost function	Cost function
Calculation order of variables	1. Distribution 2. Productivity 3. Volume	1. Volume 2. Productivity 3. Distribution	1. Volume 2. Productivity 3. Distribution	1. Volume 2. Productivity 3. Distribution
Accounting technique, alternatives; 1. Variance accounting 2. Ratio accounting 3. Accounting form	All changes; Variance accounting	All changes; Accounting form	Distribution; Variance acc. Productivity; Ratio acc. Volume; Account. form	All Changes Accounting; form
Adjustability, alternatives; 1. Adjustable 2. Fixed	Adjustable	Fixed	Fixed	Fixed

Picture 6.) Production data based model for calculating productivity (Saari 2006, 8).

The econometric approach of productivity measurement is based for observations of volume outputs and inputs. It might be best suited for single studies of measuring productivity growth. Income shares and production variables with their relationships to the productivity measurement is not included in this observation. All possibilities or variables can be investigated with econometric techniques for example adjusting the cost level or factor input depending the time. Other models about econometric approach can be found using literatures from Morrison (1986) or Nadiri (1998). (OECD Manual 2001.)

2.2.4. Measuring the success of the business

Furthermore, productivity and its result –profitability- measures the success of the business. Productivity growth help businesses to gain more stability and improve their wellbeing. In common this reflects to the employees and their contribution to the business. Growing organizations will create new work opportunities and new jobs. Ascending production also affects to nations and the people and their common wellbeing. The link for continuous improvement is transparent. When the firm would like to cut costs and takes continuous improvement in action it reflects many ways into single- and multifactor productivity, but these actions should be planned right to get wanted benefits for supporting the business.

2.3. Continuous Improvement Philosophy - a systematic approach

Understanding Continuous Improvement Philosophy (CIP), is good to remind what have been learned before and what kind of success is possible to reach using this philosophy and its methods or tools. When decision makers are analyzing business charts like productivity statistics and profit figures, they would like to see their organization to be more efficient and nimble for improvement in common. In some case business leaders would like to hire consultants outside from the company to search the truth and to find out any possible ways to the perfection. More likely company wish is to find a 'philosopher stone' or just perfect solution, which would be the answer to fix all of these problems of the business. But there is no short track to the success. In any case it is good to know that there are lot of examples what continuous improvement means and how to use it successfully – the history can teach us a lot and especially studying the history of Japanese industrial development for example Toyota Motor Company's production philosophy. Toyota Motor Company had no excessive capital, even so the company wanted to improve their production and the business with no money. The base of continuous improvement processes and methods are well documented.

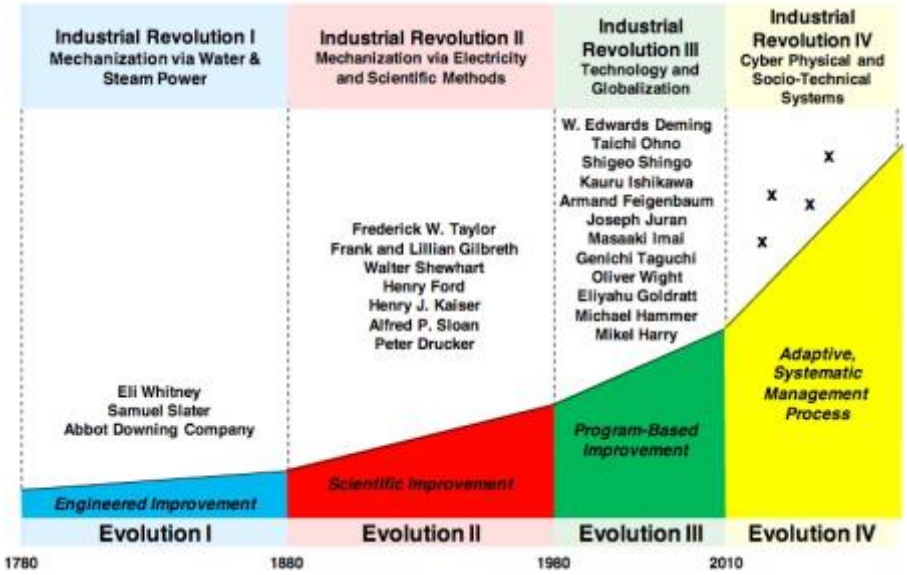
Literature presents many views such as Bhuyan and Baghel (2005,761.) cite Juergensen (2000) about Deming's description '*'Improvement initiatives that increase successes and reduce failures''* as a continuous improvement philosophy and Bessant et al (1994) description about '*' a company-wide process of focused and continuous incremental innovation*''. Bhuiyan and Baghel (2005, 761.) also introduce by Kossoff (1993) that CI is an offshoot of quality initiatives and pursuing it through all levels of the organization, the company can reach the total quality as a part of Total Quality Management. Shimokawa and Fujimoto (2009,38.) present known sentence by Toyota's plant manager Taiichi Ohno, who described continuous improvement such as "*In the workplace, trying something immediately, even something imperfect, is always better than letting things sit while you refine a solution."*

2.3.1. The evolution of Continuous Improvement

According to Burton (2015, 11-12.) CI has been adduced in many successful business stories from 19th century till 20th century, so it is good to know and understand, what kind of success expressions it may produce. Some forms of CI activities were already in use during the time of Industrial Revolution I, when manufacturing was a craft based work executed by skilled artisans from late 17th century until late 18th century.

Schroeder and Robinson (1991) states during common standardization and mechanization development phase, highly trained artisan based work started to change towards to direction, where the work itself was going to be operated by machines. During that change workers were not needed anymore to be trained or educated, so the work itself industrialized and production methods and processes came to more complex. The need for skilled workers were not dominant anymore and the machine operated production pace rose to the next level. However, amount of errors, over production and wasting products or material losses influenced a lot to the process quality.

One solution to solve this complexity, were introduced by Frederick Taylor and Frank Gilbreth, whom applied objective scientific method to fix up the complexity. This method authorized all responsibility for management. Improvement methods, problem solving and cost reduction operations was now restricted to the upper management and workers in production were not involved in or aloud to solve the problems. Improvement work was just eliminated from production floor, unfortunately but true production floor (shop floor) had all direct knowledge about process problems. 'Thinking' and 'Doing' was separated from each other and workers faced inconsistent disenfranchisement practices during that era. However, 1901 Frederick Taylor's student Henry Gantt concluded in his white paper; that production workers should be reintroduced into the improvement process and to be as participants of continuous improvement process. He introduced a theory about paying some compensation against new improved methods and ideas, should be carried on so other workers can adapt and take this improvement in use. All the way this idea was the beginning of modern continuous improvement program management. (Henry & Mayle 2002, 230-232.)



Picture 7.) Generation of improvement milestones (Burton 2014).

Above chart shows prior evolutions of improvement. According to Burton (2014;2015,11-18) CI has a straight link for adaptive thinking at philosophical point of view.

During early nineteens CI developed and changed its gown, remarkable was it was applied in different places in the world. From time to time global world had been facing crisis like convulsion of nature, industrial changes and wars. This time was quite chaotic indeed. Automotive industry faced Second Industrial revolution in early 19s until the start of World War I. During this time serial production speeded up and war time production used this method heavily. Mass production started to grow in 1930 and continued further until second World War was evident. This time was hectic for several industrial fields, which tried to tune their serial production to the next level and serve nations during their struggle. After world war II, the world needed very strong reconstruction activities. Countries had to develop their industrial presence again and one of them was Japan. Japanese industry needed new direction and Edward J. Deming with other specialists was invited to the Japan. Their economy was in bad condition and industrial structure needed help for recovering it back to the map. US government and the occupation army had some plans to help this process and then they sent number of scientists and specialists to the country to create a program of activities for reconstructing purposes. Deming's work began late summer 1950 at the Hakone Convention Center where he presented his Statistical Product Quality Administration program to Japanese leaders. His speech invented new ideas about production. Deming told how important is to improve and to reach product quality and what this kind of activity really serves. Deming introduced his fourteen philosophical points to be a new start for industrial transformation. His model was based on quality issues and especially how to improve quality in manufacturing process. Deming also presented his transcription of waste, what is the waste and how to eliminate waste? He linked this information for activities to gain faster production and also presented what economic

production really means and improvement work should also touch sales and after sales activities with customer support. (Hunter 2012.)

2.3.2. Continuous Improvement changed Automobile Manufacturing

Today, looking through the path of automotive industry, whole industry changed many times and continuous improvement affected it in large scale. There are well documented implementation examples. From development side of view, many parties give credits for Edward Deming who inspired especially Japanese manufacturers and other business developers. The result is known as a Japanese post-war economic miracle during 1950 -1960. That period of time was remarkable because, Japan rose from the ashes after the war and become the second largest economy in the world using processes based on Deming's ideas. (Du Bois 2016.)

This post-war miracle could be conducted with the time around Second World War, when Japanese employee suggestion programs were used mainly by elite workers, who had the 'capability' to offer ideas, but after the war these programs included entire workforce to be integrated as a part of continuous improvement program. A good example of first continuous improvement success was automobile manufacturer Toyota and their ongoing efforts to reach the success. Toyota also used these suggestion programs to get better improvement ideas, but they a had strong will to improve something else. Eiji Toyoda, who was CEO of Toyota Motor Corporation on that time, went on tour in United States to gather new ideas for making improvements. After his return Toyota company's cash reserve was not in a good state and the management discussed what kind of internal changes they should do without inputting any cash into program, so they decide to use Toyotas own know-how to cut down transportation costs and streamline operations without any investment or future cash input. Another starting point for success was that company staff had a chance to participate on educational program produced by US military occupational authorities. These authorities contracted TWI Inc. ('Training Within Industry') to coach Japanese industrial supervisors. Over 1 million Japanese supervisors were trained before 1952. One corner stone was the moment when TWI mastered to teach methods like 'how to improve ideas and plans' and most important part was to make sure to implement also these ideas in to the action. These experiments from educational program and information about 'how to build up low cost CI systems' and also developer visits into the US to get practical knowledge, launched the startup of Kaizen programs. This was seen as a countdown for Japanese industrial success, like the Toyota case and many others including Toshiba, Matsushita and Canon. (Henry & Mayle 2002, 233-234.)

Bhuian and Baghel (2005, 761-762.) announce by Imai (1986) that CI development process was based on Japanese's own ideas about manufacturing and quality control improvement. This development continued to grow for management tools and practices which were planned to be used in improvement processes, where every employee takes part to the development and problem solving work. Burton (2014) mentions the development of Toyota Production System TPS, was the startup for basic

industrial and systems engineering improvements. This development and implementation work in practice is pictured as a never ending work, because of its nature. Western world did not notice it until 1980, when it revolutionized global manufacturing. Toyota as the flagship of the fleet mastered the continuous improvement followed by Honda, Nippon, Sony, Mitsubishi, Hitachi, Kawasaki, Komatsu and many other Japanese companies.

Background of CI and TPS can be traced reading automotive industry history and the lineup of it. 1960s motorization was rising and Toyota enhanced its product lineup and this activity increased their sales through multiple sales channels. Their lineup included new type of cars, smaller than western rivals with smaller engines consuming less than others. 1960s Toyota had a decent market share in Japan selling passenger cars, trucks and busses. During 1970s world was facing two oil crisis and upgraded emission regulations and automotive industry faced new challenges when car sales faltered including Toyota with others. During early 1980s increased foreign demand for cars were expected and Toyota tried to answer these demands exporting more vehicles. This sudden increase in exports caused new problems in the form of trade friction. Same time economic conditions started to show positive signs and gave a sudden possibility to manufacture cars at overseas plants. (Toyota Motor Company n.d.)

Early 80s overall Japanese export business, especially the automotive and electronical industries, was booming and reached United States and Europe. In 1980 Toyota Motor Company did not have factories outside Japan and they produced every single piece of cars in Japan. They were exporting cars third to a half of their output into the rest of the world even most of their teams did not speak any English nor worked abroad. Instead of this dilemma, they presented high learning skills combined to efforts for ongoing continuous improvement process. (Dawson 2005, 2.)

When trade friction gave the possibility to start producing cars in abroad in 1984, General Motors (GM) suggest a joint venture deal with Toyota in terms of half –ownership agreement, where GM wanted to exchange information and technology aspects. GM's Nummi-plant in California had lost its value during the depression and was closed down. This deal gave such a great possibility for Toyota to invest in United States and to learn more about US market and its peculiarities from GM. Remarkable is that Toyota was not first Japanese company who had plants in US soil. First there were Honda and after that Nissan, these rivals even invented their luxury car concept before Toyota Lexus. Especially Toyota used their time to learn how to setup their production system, based on continuous improvement, so it can serve local suppliers and make it fit to meet with government regulations and labor unions policies. The partner GM also wanted to learn and change information. GM wanted to learn how their partner can be so effective using TPS production system. Toyota was in charge of operating the manufacturing system and GM manned the managerial duties. There were also space for other positions and Toyota filled open positions with own managers to teach others by Toyota's 'learning by doing'-method. 1986 Toyota opened their first fully owned manufacturing plant into Kentucky. On that time Kentucky

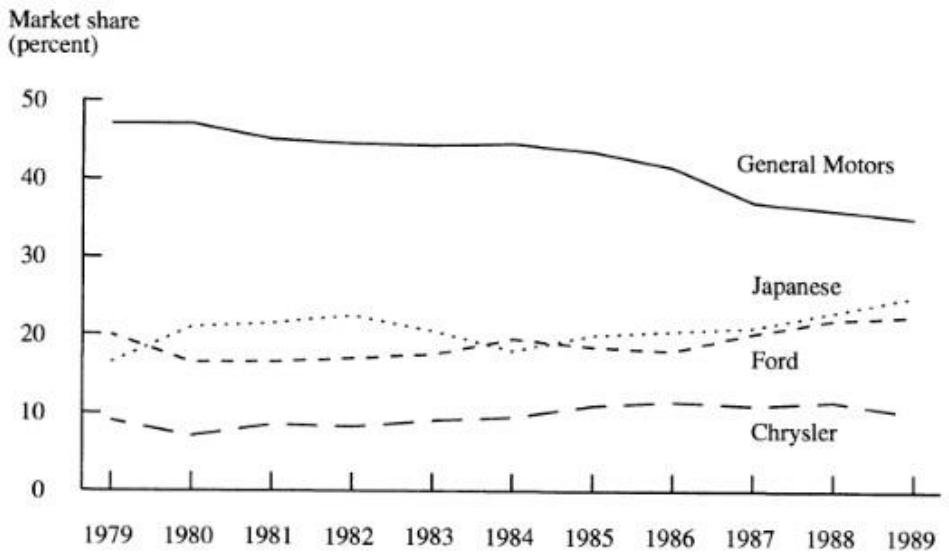
plant was their biggest car manufacturing plant outside of Japan. (Gomes-Casseres 2009.)

Unit=one vehicle; Market share %

Year	Sales overseas			Passenger cars	Trucks & buses
		Passenger cars	Trucks & buses		
1975	900,808	652,643	248,165	72	38
1976	1,071,980	775,921	296,059	72	45
1977	1,399,581	974,404	425,177	70	52
1978	1,375,054	909,220	465,834	66	48
1979	1,449,313	964,691	484,622	67	47
1980	1,845,955	1,229,877	616,078	67	55
1981	1,848,778	1,197,086	651,692	65	55
1982	1,823,241	1,164,432	658,809	64	54
1983	1,822,852	1,154,559	668,293	63	53
1984	1,925,893	1,125,645	800,248	58	54
1985	2,139,361	1,234,391	904,970	58	56
1986	2,045,943	1,243,946	801,997	61	54
1987	1,958,650	1,242,945	715,705	63	51
1988	2,067,572	1,343,199	724,373	65	49
1989	2,106,517	1,384,355	722,162	66	48

Picture 8.) Toyota's sales figures and market share overseas by years (Toyota Global n.d.).

Above chart show that Toyota doubled their overseas sales during 1975 -1980 and 1984 they started to build up overseas manufacturing plants for first time and 1985 their overseas sales numbers cleared over 2 million sold cars.



Picture 9.) Motor Vehicles Manufacturers Association (1988) chart of Motor vehicle facts and figures in 1988 (Mannering & Winston 1991,68).

Mannering and Winston (1991, 68.) explain overall competition scheme, why US companies lost their market share and faced a poor long term view and how Japanese companies increased their market share. Based on this view, US companies suffered from high production costs, low vehicle reliability and an old fashioned technology, and these issues led to an unbalanced market situation, where US cars had higher prices and lower quality than Japanese rivals.

When GM tried to learn about continuous improvement through Toyota Production System and the benefits of it, they noted Toyota did not act like the same way such as GM at the factory floor. Also Toyota took care about supplier business relations very differently. GM tried to learn it by making their Saturn model production in Detroit such a same way like Toyota did. Aftermath was painful, GM did not succeed to collect the benefits. The reason for this failure was the culture, GM's old corporate habits prevented the success. Clearly, it was evident that transformation seemed to be un-possible to make without changing the company culture. (Gomes-Casseres 2009.)

Later, many automotive manufacturers started to realize how to use continuous improvement and related production systems. However, it took some time and efforts to understand it completely.

2.3.3. Ability to transform the business is the key for success

During 1990s it seemed obvious there was something special how Japanese firms achieved better quality and great efficiency using their own production systems. It was something new and western companies noticed that Japanese cars were lasting longer and needed less repair. Western companies did not exactly catch the secret how to do it in practice even they noticed the difference. Toyota manufactured and designed their cars faster, and in common, Japanese cars were more reliable and produced with lower costs than western rivals. Remarkable was, that Toyota paid quite high salaries to their employees. Toyota seemed to be more profitable also than other rivals. Their operational excellence was created by great consistency related to the performance and production. The core element of this performance was based on techniques and quality improvement methodologies like 'just in time', 'kaizen', 'jidoka' or 'heijunka' for example. The most important element was, how they transformed the business implementing and developing practices and techniques, but also maintained deep business philosophy based on human motivation and people engagement with their abilities to develop leadership, teamwork and the culture. Also very important part of it, was the ability to devise strategy and develop supplier relationships and take care about ongoing learning organization culture. (Liker 2004, 5-6.)

Today, many continuous improvement practices based on Lean, Six Sigma, Lean Six Sigma and other methodologies like Balanced Scorecard have been developed further based on the concepts of process- or quality improvement. The target could be waste reduction, quality improvement, effective production line among many other goals. (Bhuiyan & Baghel 2005, 763-765.)

When implementing continuous improvement, it is good to know there are different variations of it, but such as the Toyota example shows CI can be major step stone for the success. Using many characteristics of CI, it can be used to solve production and operations based problems and also to help businesses to grow in corporate world.

2.4. Kaizen, a fundamental base of Continuous Improvement

The method of incremental improvement was originally invented in United States with co-operation of many American specialists. Kaizen as a word was mentioned first time on the training film *'Improvement in 4 steps – 'Kaizen eno Yon Dankai',* which was a part of TWI Inc. J-educational (Job - instruction, -methods and –relations) programs. US department of War used the program '*Training with in the Industry TWI*' to help American manufacturers to increase their efficiency when supplying wartime materials. After the Second World War, General McArthur and the army delegates decided to use this program to help Japanese reconstruction work, so they sent more engineers and scientists into the Japan to help this program to start. The team of known specialists laid first bricks of Kaizen. Edward W Deming and Joseph Juran taught scientific and quality issues and later engineers Homer Sarasohn and Charles Protzman, from companies Raytheon and Western electric, came to teach local manufacturers about how to use statistical control methods in manufacturing radio- and electronic communicational products. Their course was above mentioned '*Improvement in 4 steps'*. Consultants Edgar McVoy and Lowell Mellen were the main architects to setup this program in practice. It can be said these TWI - programs were the startup for Kaizen development work and later Kaizen was systemized and taken into action in Toyota Production System. Based on these steps, the foundation of Lean saw its daylight. Remarkable is, that TWI-programs and especially fundamental ideas and methods of Kaizen disappeared from the sight of US industry after war. The reason was simple, US industry faced lack of competition after war. These methods were kind of forgotten - western manufacturers got orders anyway and they had not to use extra efforts to maintain their businesses. On that time all sales and development activities tried to answer for high demand, so efforts for improvement was just out of minds. (Burton 2014.)

Above described situation was not present in Japan. Japanese industry was struggling and had no extra money – because cash registers were totally empty. Japanese industry needed these training programs and ideas of continuous improvement to be used for lifting up fallen industries. This was the startup of Kaizen (Change, Good) transcription, the Japanese philosophy of Continuous Improvement. Training with Industry-program changed its form from being originally ''a wartime- production program'' to the form of '' improving production methods''. (Lean Manufacturing Tools Org n.d.)

Kaizen, 'Change – Good' or a 'Good Change', means continuous improvement. It has been introduced in different forms, an idea of doing and getting better results or improving something or just a thought of the change for better – a metamorphosis. (Kaizen Institute n.d.)

Heinonen (2006) states by Imai (1986) Kaizen has large meaning in personal life, family life, social life and of course in working life. When applied it in business it means continuous improvement minded way of doing, where employees and leaders are working under balanced management policy.

Kaizen is a philosophy that should collect all employees to take a look into their work environment, so they can search possible improvements. Also it means better way to learn, to build up capabilities and exploit opportunities for improvements. As a philosophy, it supports employees to regularly present suggestions for improvements. Particularly, Kaizen is effective in business environments, which are on the way of improving their value streams and which would deliver value to the customers and their environments. (Robert Tripp 2015.)

Guiding principles and guidelines

Kaizen Institute (n.d.) quotes Imai (1986), who travelled internationally with other Kaizen architects like Shoichiro Toyoda and Taiichi Ohno after world war II, presents Kaizen philosophy and its principles and guidelines of continuous improvement through below lines:

1.Good processes bring good results
2.Go to see for yourself to grasp the current situation
3.Speak with data, manage by facts
4.Take action to contain and correct root causes of problems
5.Work as a team
6.Kaizen is everybody's business (Kaizen Institute n.d.)

The idea is to use these guidelines and principles every day and then it would be possible to reach great results through small changes accumulated over time. But changes do not have to be small all the time, greatest results might be possible to achieve with improvement activities, which are led by cross functional teams or experienced senior management. (Kaizen Institute n.d.)

Three types of Kaizen

According to Bhuiyan and Baghel (2005, 766.) by Imai (1986) there are three types of Kaizen formats: management-, group- and individual format. Bhuiyan et al. (2005,766.) present by Lillrank and Kano (1989) the term Kaizen is a synonym of continuous improvement, even when it is translated to a form of ''principles of improvement' or even thou the literature produced by Japanese Union for Scientists and Engineers (JUSE) actually does not define Kaizen. In spite of this contradiction with Lilrank and Kano (1989) definition, JUSE uses Kaizen to define other concepts. **Management oriented Kaizen** determines how it should affect for every employee inside of the company. The main focus is to maintain company strategy. **Group oriented Kaizen** supports teams formed by employees and also it supports Ishikawa's Quality Circle, where the target is to gain activity, which are concentrating to find and solve problems during daily work without any interfering activities from company management. **Individual Kaizen** (third focus) will give a chance for a worker to make problem fixing

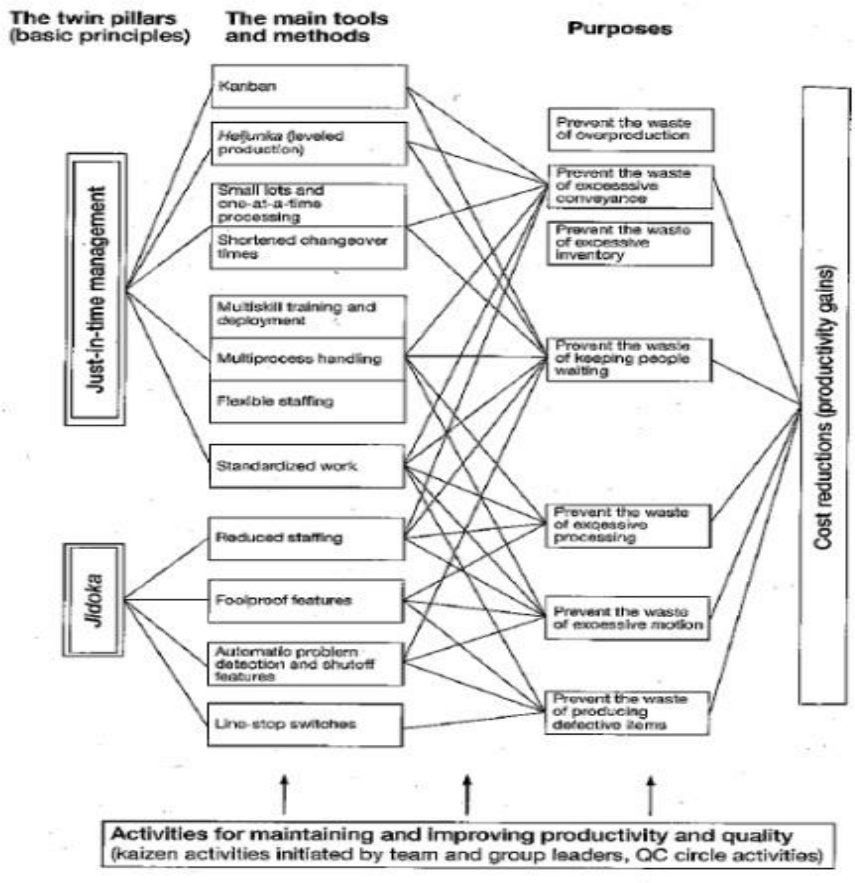
recommendations and supports worker to find new solutions after clearing these existing problems. This is called as bottom-up design. Typically, Japanese industry supports workers to study problem areas, find problems and encourage them to find the best solution to cure the problem. It is a fact that Japanese companies have been very successful using this concept.

What is good about Kaizen philosophy? It looks like possible improvements are permitted for anyone to suggest at any organizational level and needed changes are possible to be executed anywhere, not only inside at specific part of the organization. Kaizen philosophy underlines the importance of teamwork and personal discipline. These features are linked with Quality circles as a way of team work activity.

2.5. Toyota Production System (TPS) produced by Kaizen philosophy

The key element to understand Kaizen is to know how Toyota processed and developed their successful Continuous Improvement system and operative culture, which are still strongly present, being copied and used in many industrial platforms. The born idea of 'Lean philosophy' followed this development process. Toyota's competitiveness is based on using production system (TPS) together with Total Quality Control (TQC) and their leadership philosophy. Before Second World War leaders of Toyota Motor Corporation got an idea to study mass production (cars) to develop their own manufacturing system and business functions. They thought that Japanese car market was quite small and too fragmented, but needed mass production in order to survive. Before Second World War Toyota's leaders visited in General Motors and Ford's car plants to study production methods and manufacturing economies. Japanese leaders wanted to implement something new, but world politics and war came between. After the war most Japanese industries had been destroyed, the lack of materials and money was just a cruel fact, which disturbed everyday life. After the war Eiji Toyoda, the president of Toyota, had a chance to visit in US to study more about American car manufacturing business and especially he was curious to find out what they had missed before war time. He wanted to raise Toyota's productivity into the same level like Ford had and asked his plant manager Taiichi Ohno, later Vice President of Toyota, to improve manufacturing process to be at same level and so good like Ford had. Toyoda's target was to achieve high quality process with very low costs and also find a way to shorten lead times and adjust production to be more flexible. Toyota leaders were not so impressed about what they saw in US manufacturing plants. As a matter a fact, they realized that mass production had not changed so much since thirties, but what they really experienced and noted was increased waiting time in processes, more waste, overproduction and uneven production flow with disorganized workplaces. Then Toyota developers took Henry Ford's original philosophy in practice, but developed it more further. During development phase of TPS, Ohno with his team first benchmarked the competition scheme, and then studied more about Fords's philosophy and decided what kind of upgrades Toyota production system needed the most. The outcome was mastered continuous flow and moving assembly line. Toyota team chose to create a system using one-piece manufacturing flow with improved flexibility feature, which is steered by customer demands.

Also the system should be efficient all the time. Toyota used and borrowed many original ideas from American automotive plants, but developed the system to be more accurate and effective. Henry Ford's system represented push type systems and Toyota developed their system to be based on pull system. This idea came from supermarkets, where material replenishment depends about consumption. During this creating process Toyota launched few operative methods such like Muda(waste), JIT, Kanban, Jidoka. Also the system used Deming's definition about 'customer as a client' model -external and internal customers- and Kaizen as a method of Continuous Improvement. The Kaizen was developed to use Deming's and Shewhart's PDCA in order to maintain the flow. (Liker 2004,20-25.) Toyota Corporation raised efficiency radically during first five years after Second World War and their productivity multiplied 5 to 6 times larger than before, like Eiji Toyoda had planned the goal. However, that time Toyota produced mainly trucks, but they could not sell all of them. The factory still supplied 1000 trucks per month and this over production drove company for a situation, where the business was near to collapse. (Shimokawa & Fujimoto 2009, 35-36.)



Picture 10.) Toyota Production system using methods JIT/Jidoka (Shimokawa & Fujimoto 2009,344).

Looking through above original picture, the Toyota Production System lays on two base methods, which are:

I.) **Just-In-Time, (JIT**) developed by Kiichiro Toyoda, is a pull system which allows to produce and deliver small quantities using such a short lead time. It maintains customer specific needs. JIT's 'make to

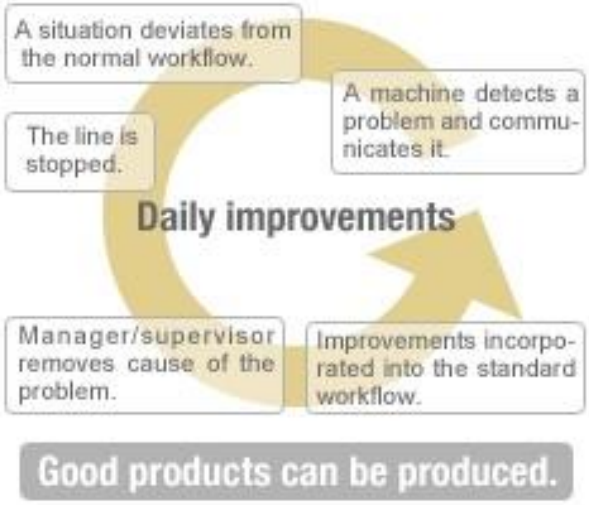
order' method replace the push system, which was representing the tradition of 'make to sell' production. JIT means that process input withdraw material from previous process and process output produces only material that the next process has withdrawn. It can be described with a sentence: Make only what is needed and how many is needed and deliver only when it is needed.

II.) **Ji-do-ka** ('for self, for motion with –ation) developed by Sakichi Toyoda) is a Japanese word and it means automation. In TPS, Ji-do-ka means combination of automated equipment and human capabilities with wisdom. Human part can maintain and check the quality, but also people have a good ability to halt the system when problems occur and they can also fix the problems. 'Pull'-production prevents timing losses, unlike western 'push' producing. However, automation has to be established using Kaizen thinking. In reality it means treating processes as they exist, but in manner, where slight automating would help process to achieve wanted state between previous process and next one. That wanted state is simply the amount what the processes are capable to deliver. (Shimokawa & Fujimoto 2009, 18-19,31,104- 105.)

Harrod (2008) states 'Just-in-time' (JIT) is the most important concept of TPS. JIT is the heart of the system, even literature mainly emphasizes Kaizen as a most important concept. Third method among two main methods is **Kanban.** It started to live, when Taiichi Ohno applied the form of 'work standardization' into the plant shop level (manufacturing level). Plant management described this standardization should be a part of every job defining guideline for the work. It explained procedures and principles how the work should be made in each workplaces. Toyota Corporation then started to use description panels at work places and the aim was to show 'standardized work flow' pattern with working instructions to the people. This method let supervisors and foremen to maintain and actually see the operation at the work place and immediately fix the problem if the operators were not following the standards. These panels were later developed more close with the image how Kanban board is seen today. The word 'Kanban' was introduced 1964. (Shimokawa & Fujimoto 2009, 38, 47-53.)

Built in Quality, a feature of TPS

In perspective of Total Quality (TQ), TPS has an internal activity called 'Built in Quality' as 'Jidoka' described earlier. This activity has an important part when looking for overall quality issues. The term means 'automation with a human touch' and it was an invention coming from Toyota's yarn and clothing production operation. Yarn and clothing production used looms and these machines had some automatic features. First fully automatic loom was developed 1924 by Sakichi Toyoda. In quality terms, automation means the loom could stop the production automatically when facing a problem, and loom operator have time to manage numerous looms at the same time and this advantage reflects straight to productivity multiplying it with no faulty products made. Human method is one important part of Jidoka, it is a method of visualization or in other words 'visual control'. Toyota mastered it using display board system called 'Andon', which allowed operator to easily identify problems. (Toyota Global n.d.)



Picture 11.) The flow of Jidoka (Toyota Global n.d.)

Above flow, daily improvement reflects to the quality, but also increases productivity. For production system, it means using just in time and automation with human touch features, the process gets more flexibility in all terms of production. When eliminating faulty products and practices associated to the waste, productivity and work efficiency can rise significantly.

Using Visual Control

TPS uses Kanban to control information between processes and ordering parts for manufacturing process. Kanban automatically informs needed parts and orders based on consumption. Every item or series of items have their own Kanban signboard which informs the usage level and needs for additional items. The production system uses principle of 'Genchi Gembutsu' 'seeing things first hand in the workplace'. This principle is important to use together methods JIT, Jidoka and Kanban. It means management should have a focus for the workplace hearing employees better and seeing how the actions are established there. This principle represents fact based management. The fact based management came from statistical quality control system, where data samples were taken and measurements were targeted to detect any discrepancy in the data. Sometimes the data was not secured or recorded, so Toyota management guided employees to take 'genchi gembutsu'- checks, in other word workplace inspecting to look at the situation carefully when data was not available. This way they could learn and fix the problems in a systematic way. Longtime Toyota Senior managing director Masao Nemoto states *"As you all know, the Toyota Production System consists of just-in-time management and jidoka. We use the Kanban and other tools to operate the system, and the ultimate goal of the system is to lower costs or, in other words, raise productivity"*. (Shimokawa & Fujimoto 2009, 34, 341,342; Nemoto 1987, 5-25.)

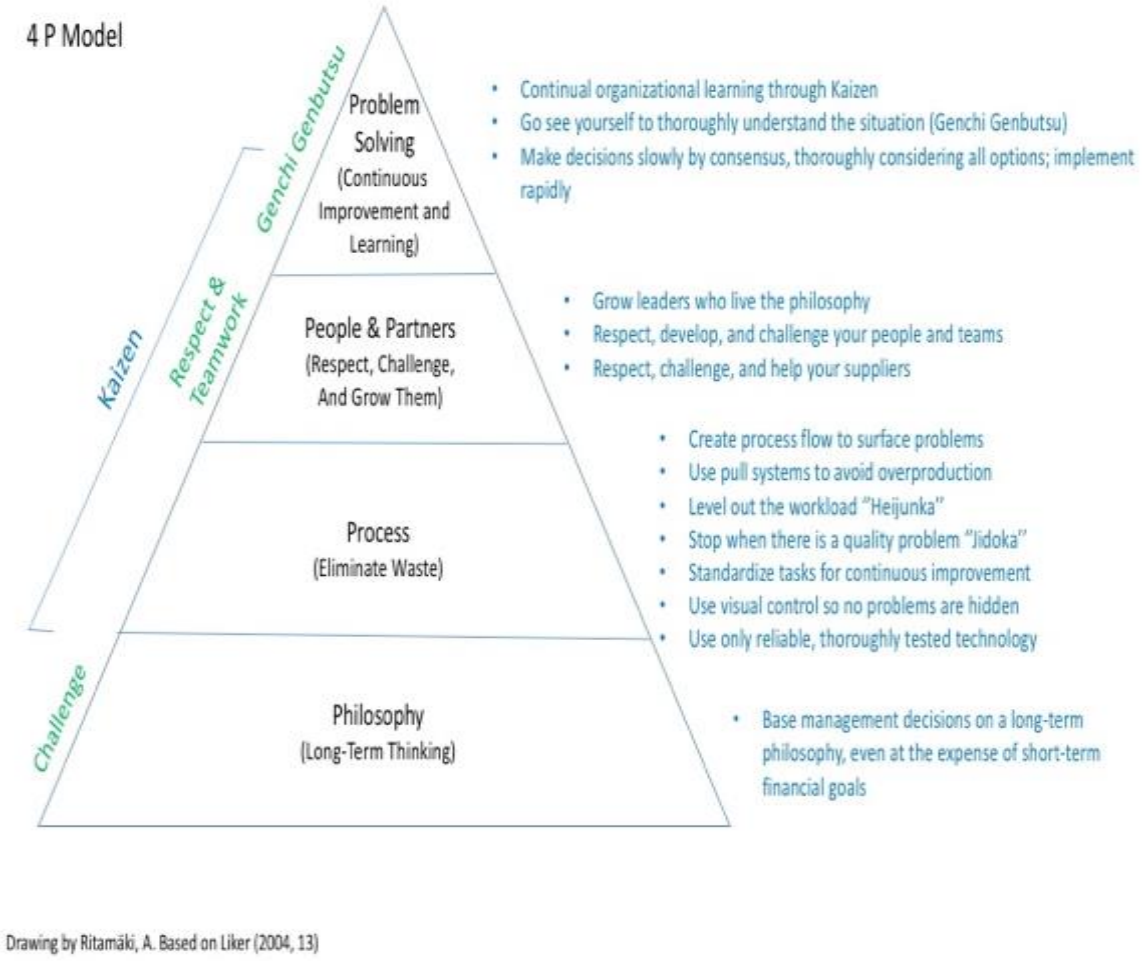
Deming's speech can be seen as one starting point for the success of continuous improvement and later the practical systems like TPS. He mentioned how important is to take care about quality in manufacturing process. Total Quality Control (TQC) was a methodology developed from many sources. Originally, it has a part in Ford's manufacturing process, but Toyota implemented it to the new form to serve Toyota's production system TPS. Toyota's implemented it to the framework, where they could spread it to the suppliers and internally activate QC for every section of their own organization, including the policy management 'Hosnin Kanri'. Toyota choose to take TQC into the action early 1960s, because quality issues were raising and they would like to find a way to fix any quality related problems. One of reason was the lack of sufficient training among workers. Toyota had doubled the workforce from 1955 to 1961. After their failure to export Toyota Crown into US, the Nippondenso, one of the affiliate companies encouraged Toyota to apply TQC showing Nippondenso's own experience and success using quality control as a vital part of manufacturing process. Nippondenso presented few key elements like how TQC ads co-operation between the people and different organization levels, but also how it raised quality awareness and internal idea sharing activity. (Shimokawa & Fujimoto 2009, 289-290.)

2.6. Culture behind the TPS – The Toyota Way, Principles and Guidelines

Toyota Motor Corporation own internal document 'Toyota Way' presents guiding principles as ''*an expression of the values and conduct guidelines that all employees should embrace''*. It supports promoting Toyota development and authority transfer to all local entities. Also it categorizes Toyota's management philosophies, business methods and values, those elements which are traditional instruments presented at Guiding Principles of Toyota Motor Corporation. The Toyota way carries out these principles e.g. Toyota employee conducting guidelines is based on dual pillars, which are 'Respect for People' and 'Continuous Improvement' and sub principles: 1. Challenge 2. Kaizen as Improvement 3. Genchi Genbutsu as go and see 4. Respect 5. Teamwork, as a sum up of these guidelines. These principles are actually Toyota's company policies and in 2002 they were taken into action as parts of Toyota Way targeting it for individual functions like overseas and domestic sales, human resources, accounting and procurement. (Toyota Motor Corporation 2003, 80.)

Picture 12.) 5 Key principles of Toyota Way (Toyota Motor Corporation 2003, 80).

Bloomberg (n.d.) states that all system parts are tied together and have a connection with the principles of 14 – the Toyota Way in Toyota Production System. These core principles will contribute the society, in other words, it is a culture of the company. According to Liker (2004, 35.) Fujio Cho, the former president of Toyota during years 1999-2005 summarized Toyota's business practices and activities have become to the source of Toyota's competitive advantage. Toyota way describes these managerial values and business methods.



Picture 13.) Four categories of principles (Liker 2004, 13).

Above 4P model, where fourteen principles are organized in four broad categories as follows:
1. Long term thinking (philosophy)
2. Process (right process, right results)
3. Add value to the organization (develop your people)
4. Solve problems continuously (solving root problems drives organizational learning). (Liker 2004,36.)

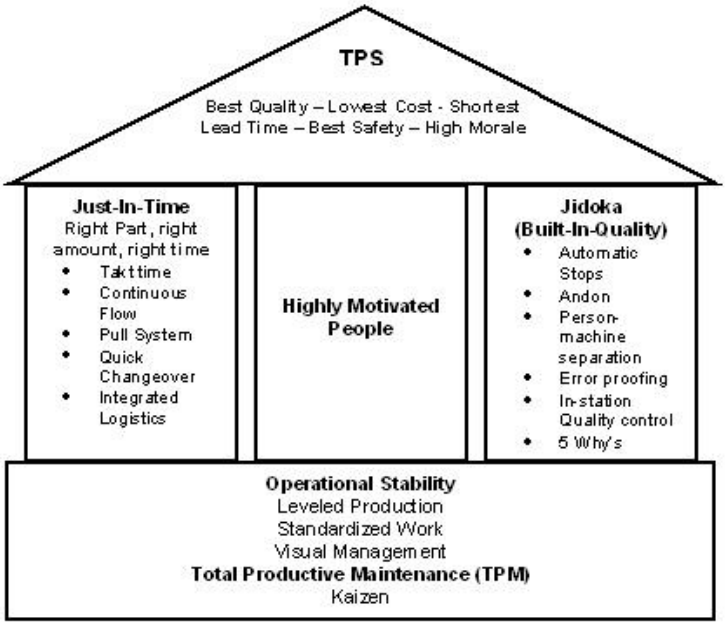
These four ‘P’s’’ could be described as Toyota Way Philosophy-model. First category ‘Long term thinking as philosophy’ focuses on guiding principles mainly through philosophical point of view. All four categories and their 14 principles are described on picture 14. These 14 principles can be used to build up the culture and maintain it through continual improvement way of working. When adapting principles there are also some other cultural issues to be noted than working culture (way of doing). TPS was planned and executed to fit with Japanese working culture. When applying TPS into western plants, sociocultural issues affects also to the working culture. In terms of cultural differences, TPS as a system assumes using multi-skilled workers instead of single skilled workers. In Western countries, workers typically represent worker groups with one skill, because of industrial relations, and they belong to craft unions and obviously represent these groups. In that context TPS implementation is possible, but only partially if not using multi-skilled workers. (Harrod 2008.)

For example, TPS uses U-shaped flow line (production line), where machine setup layout is based on ‘U’-formation. It enables workers to move from process to process easily and they are able to operate many machines, because of the short distance. One advantage is this short physical connection improves communication between the workers. Obvious is, it requires flexible multi-skilled workers to maintain smooth and efficient operation at flow line. (Gao & Low 2014, 134-135.)

Category 1 . Philosophy	Category 2 . Process	Category 3 . People & Partners	Category 4 . Problem Solving
Principle 1. Long term philosophy	**Principle 2. Create continuous flow**	**Principle 9. Grow leaders & leadership**	**Principle 12. Go and See to Understand**
* Sense of purpose to avoid short-term decision making, live within the organization	* Re-design and improve work processes, maintain value-added flow, make projects happen instead of waiting	* Choose leaders and grown them within, leaders who know the philosophy	* Go to the source to solve problems, observe and verify the situation personally
* Long term perspective	* Link processes and people together, make material and information to move quickly	* Leaders should know and understand daily work and its details; further sharing and teaching it	*Get the right data and personally verify it instead of theorizing it
* Be Responsible, maintain and improve your skills to produce added values	* Make the flow visible and evident cross the organizational culture	* Leader should be role models, support servant leadership (prioritizing team members to the top and leaders to the bottom)	*Top management should personally also to go and see things in the workplace
* Generate value for customers, society and economy	* Customer Focus		
	Principle 3. Use Pull system	**Principle 10. Build people management & support teams**	**Principle 13. Make decisions with considering all options**
	* Produce the process which serves customers needs: what they want, the amount they want & when they want	*People are the greatest asset, grow with them	* Find out the details, use decision making wisely and considering all options
	* Operate and sync by customer demands	* Develop and support excellent individual work,Promote effective teamwork	*Consider alternatives, build consensus with teams, employees and even partners
	* Minimize your work in process, warehousing with inventories	* Support cross-functional teams and harness the teams to improve quality and productivity	*Understand underlying problems versus explanation which seems obvious (surface appearance)
		*Teach & support individuals to work together, make them to work together to reach common goals	*Use efficient communication and use simple problem solving tools like 5 Why (root cause technic), A3 report
	Principle 4. Level out the workload (Heijunka)	**Principle 11. Respect Partners & Suppliers**	**Principle 14. Become Learning organization through Reflection and Continuous improvement**
	*Eliminate people & equipment overburden	* Undertand how suppliers and partners work	* Make processes which do not need inventory
	* Eliminate unevennes from production schedule	*Share information, challenge outside partners and suppliers to grow and develop	* Support people to use continuous improvement to eliminate waste
	*Level out the workload: product volume, demand on people& suppliers & equipment	*Respect your partners and suppliers, they are the extension of the business	* Reflect on mistakes and weaknesses, support ways to improve and solve problems
			* Training should be offered (philosophy, tools and techniques) for employees (Required)
	Principle 5. Built Quality (Jidoka)		
	*Support quality issues and action to get it right the first time		
	* Develop a visual system to detect problems, which informs the team and project leaders		
	* Build a culture for fast problem detecting and slowing or stopping to get quality right		
	* Make quality standards and display it for all relevant people		
	Principle 6. Standardized Tasks		
	* Use standard and stable methods everywhere		
	*Support processes for predictability, regular timing and output		
	*Leave space for creative and individual expression to improve - development work for new standards		
	Principle 7. Visual control to improve flow		
	*make it visual- people can determine and track the situation in the process (vs standard)		
	* Develop simple visual sign systems, add them to the shop floor /work place		
	*Reduce your report information, limit it to just 1 paper.		
	Principle 8. Use only reliable & thoroughly tested technology		
	* Choose technology to support people and the process , not to replace people		
	*Technology should be integrated seamlessly		
	*Test any technology carefully before taking it to the action		
	*Support people a.)to suggest and consider new technology,b.)to look new approaches to work		

Picture 14.). Authors view from 4P and 14 principles composed together by Liker (2004, 37-41.) and Gao and Low (2014, 128-182.)

Edward Deming's cycle model, based on Walter Shewhart's original model of PDCA, can be drawn into center pillar of below TPS-house. Highly motivated people would use continuous improvement as a 'way of working' using 4P principles. Center pillar recommends to use employees experience and their creativeness, when producing quality products and services. Two pillars, Just-in-time and Jidoka belongs to second category of 14 Principles. At same manner People and partners are displayed at 3.rd category. Normally, TPS house is presented with two pillars, but in this presentation people represents the third pillar. (McBride n.d.)



Picture 15.) TPS-house, ''a lean house'' (McBride n.d.).

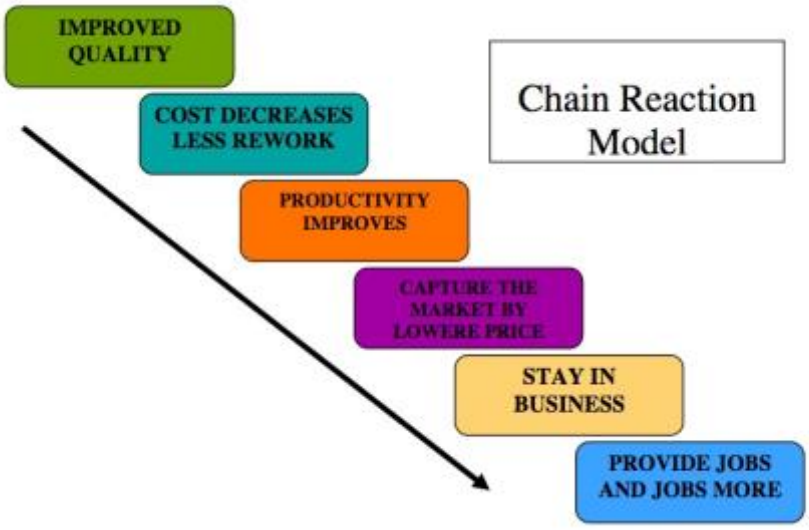
Organizational culture has a meaningful part in TPS. It encourages employee participation and promotes group activities at the shop-floor for example by allowing employees to use the knowledge base about production. One of the key features of this house, is the Total Productive Maintenance TPM. TPM-system creates stability for Lean production. Lean production line operates knowing there is one exception, a possibility to stop the line. When error occurs and the line will stop, it will cause instability and sense of urgency feeling among workers. Lean production operates also with the rule of minimized inventory. In mass production these two features are not possible and they do not exist. Operation would just run even the machine goes down. Mass operation use excess inventory and maintenance, which will fix the problem. In Lean production, operator just shut down the production line and everyone will try to fix the problem. Nippondenso, one of Toyota's supplier, realized it is not possible to deliver products with terms of just in time, quality improvement, cost reduction or even attempts to improve profitability, without a decent and systematic elimination of errors, which would cause poor equipment performance. Using TPM system it was possible to identify and eliminate downtime, inefficiency and defects from the line. Preventive maintenance and machine availability is one core function of Lean manufacturing. TPM also supports training and open communication at the shop floor. (McBride n.d.)

3 QUALITY MANAGEMENT

3.1. Quality meets customer needs

Quality is a dynamic state that meets customer needs and expectations and help produce superior value. The dynamic state of it contains the product, services, processes, people and environments (Goetsch & Davis 2010).

W. Edward Deming introduced the quality management as an organizational wide activity instead of technical task oriented approach. In his theory, combining a good design together with effective production can meet the requirements of a quality product. These two conditions together allow the quality. His theory claims the top management has to have a higher responsibility about quality improvement rather than lower management corporate levels. In Deming's Chain Reaction cycle theory, the product design, manufacturing, testing and sales actions with market surveys continues as a never ending cycle, where these sections of the work will increase the quality and leads to higher productivity. In long term this way of doing leads to competitive strength. All planned activity will cut the delays, downsize the costs, cause less rework and lower prices giving companies a possibility to achieve higher market share and better stronghold providing more work opportunities. (Gomes 2011.)



Picture 16.) W.Edward Deming's Chain Reaction Theory (Gomes 2011).

The core knowledge and evolution about quality management is based on philosophical concepts and theories which represents the current time and situation by presenters and their contributions in below picture 17.

Gurus	Contribution
Deming	- 14 points for quality management, - 7 deadly sins and diseases, - the theory of variance, - PDCA cycle
Juran	- Wrote Quality control hand book, called 'Bible of quality' - Habit of quality, Quality Triology. - Define 'quality' as 'Fitness of use' - Categorised the cost of the quality
Crosby	- 14 steps for quality improvement - Concept of ' Zero defects' - Written book ' Quality is free'
Massaki Imai	- Kaizen
Ishikawa	- Cause and effect diagram - Quality circle
Taguchi	- Loss Function
Feigenbaum	- Quality defines by the customers
William Shewart	- PDSA, Statistical Control Chart

Picture 17.) Different Quality Management views (Gomes 2011).

Toyota's quality awareness raised significantly and gave a massive advantage to reduce errors and improve quality, because TPS as a system highlighted problems and especially supported possibility to stop the production line when facing a problem. TPS allows workers to stop the line, but in Western plants, especially in US, the operational manager have the power to stop the line. The Toyota system was remarkable invention and everyone worked together to fix problems during the failure. (Shimokawa & Fujimoto 2009, 290.)

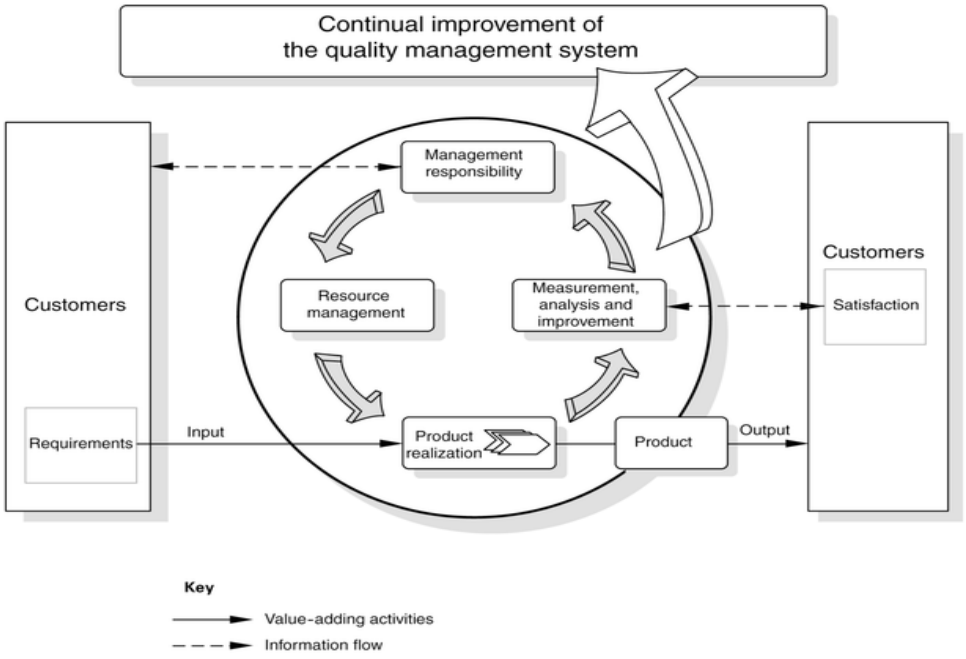
3.2. The Core of Quality Management

Quality management process maintain the quality of the product or service, which are obtained by customers. Quality can vary depending on customer requirements. Maintaining quality chain of processes is called as a Quality Management. QM has seven principles, which are actually common rules, norms with combined values and fundamental beliefs connected to each other. These principles are Customer focus, Leadership, Engagement of people, Process approach, Improvement, Evidence-based decision making and Relationship management. (ISO Quality 2015.)

3.2.1. Quality Management Process

International Organization for Standardization (ISO) promotes process approach in their standard ISO/TS 16949:2009(en) to enhance customer satisfaction (customer requirements), when developing and improving the effectiveness of a quality management system. ISO definition says:
' *''An activity or set of activities using resources, and managed in order to enable the transformation of inputs into outputs, can be considered as a process.''* (ISO/TS 16949:2009(en), 1-2.)

The aim of producing desired outcome needs a system of processes and their identification and interactions between the processes managed by the organization can be named as the process approach. Process approach gives an advantage to the users because it supplies ongoing control between individual processes inside the system and it looks closely about combination and interaction. ISO informs that Plan-Do-Check-Act methodology can be used in all processes. The paper considers the importance of understanding and meeting these requirements, looking added value when applying processes, gaining results of process effectiveness and continuous development of processes with objective measurements. (ISO/TS 16949:2009(en), 1-2.)



Picture 18.) Process of the quality management system (ISO/TS 16949:2009(en), 1-2).

In process approach perspective within a quality management system, above picture shows the importance of customers. The customer define requirements as inputs and the organization should make necessary actions to meet customer requirements. For the organization, customer requirements are essential. ISO 9001 Quality Management system process as a standard, shows the connection with continuous improvement and the PDCA-circle by it all means, the quality has an important role when producing products or services and doing it in affordable context, where productivity plays such an important role such as continuous improvement.

3.2.2. Total Quality Control TQC influence Quality Management

Deming's speech can be seen as a starting point for the success of continuous improvement. He mentioned how important is to take care about quality in manufacturing process. This is also true in operations. TQC is a methodology, which development was influenced by many sources, however, TQC origin was in Ford's automotive process, but Toyota implemented it to the new form to serve TPS. Toyota innovated and changed it to serve larger framework, so

they spread it to the suppliers and internally into every section of their own organization including Toyota policy management. Toyota chose to take TQC into the action early 1960s because of rising quality issues so they looked further to find a way to fix these problems. (Shimokawa & Fujimoto 2009, 289-290.)

4 LEAN THINKING LEADS FOR CONTINUOUS IMPROVEMENT

Kaizen can be described as a philosophy as mentioned before, but it has also practical strategy features. It can be presented through series of actions or tools, and correct use of these tools leads to incrementally raising improvement cycle. However, it is still like a mindset than series of tools, even some tools can be named like 5S or Kanban with term as Kaizen tool. Kaizen activity can be seen through the flow, where employees work towards together proactively trying to achieve regular improvements in the business e.g. to achieve better manufacturing process or to improve logistics process or just taking care and listening internal and external customers. In the other hand Kaizen can represent a process, where a single person could use it as a method when identifying and resolving many kind of problems. (Lean Production n.d.)

Kaizen, a philosophy of continuous improvement, creates the culture participating all employees to improve specific areas of work itself in production or in operation. Lean thinking has an identity of management philosophy, mainly for improving process speed and quality minimizing process waste. (LeanBlitz 2013.)

Looking though the continuous improvement and its originality, we can see the times influencing into it starting from Henry Ford's ideas about mass production and Japanese modernization of industrial production and improvement on quality issues. During late 1970s and early 1980s western automotive industry tried to take a closer study to find out the why Japanese manufacturers were so successful. According to Liker (2004, 75.) when General Motors (GM) and Toyota Motor Company re-opened old GM owned car factory based on their Joint Venture (JV) –agreement in 1984, Toyota's production system was totally earth moving production invention at US soil. After time the factory plant was so successful that its results in terms of productivity, quality, space and inventory turns, surpassed all other GM plants in North America and that was the reason why GM sent many specialists, engineers and managers to learn more about Toyota's production system TPS. Liker (2004, 74-75.) states based on interview of Dennis Cuneo from GM, that GM planned their own 'Global Manufacturing System' premised on Toyota Production System. Unfortunately, for GM, it took 15 years to get results and to see major corporate level improvement in terms of productivity and quality.

According to Liker (2004,5,25.) and Lean Manufacturing Tools (n.d.) researchers Womack, Jones and Roos introduced ''Lean production'' for its first time in 1990-1991 in their book 'Machine that Changed the World' based on MIT's (Massachusetts Institute of Technology) fiveyear study about

the future of automobile industry and analyzing the Toyota Production System.

Stone (2012, 112-132.) describe by Hampson (1999), Ziskovsky and Ziskovsky (2007), Radnor and Boaden (2004) that organizational statement 'being lean' has a broad meaning - first thought might be associated 'doing more than less', but it has a large definition scale, so the whole picture about Lean as a process improvement methodology would be difficult to define. The term 'lean production' was originally defined by Womack et al. (1990) based on International Motor Vehicle Program (IMVP) supported by Massachusetts Institute of Technology, which started in 1985 and the term 'Lean Production' as Stone informs it, was based on Baines et al (2006), Emiliani (2006), Holweg (2007) description, how this manufacturing process and its techniques were developed by Toyota Motor Company over the past 100 years. Stone (2012, 112-132.) and Lander and Liker (2007) clarify these philosophies and principles represents same description as the Toyota Production System is known for and articulated through Toyota's internal document and the book 'The Toyota Way' by Liker.

4.1. Integrated view of Production – Lean Production

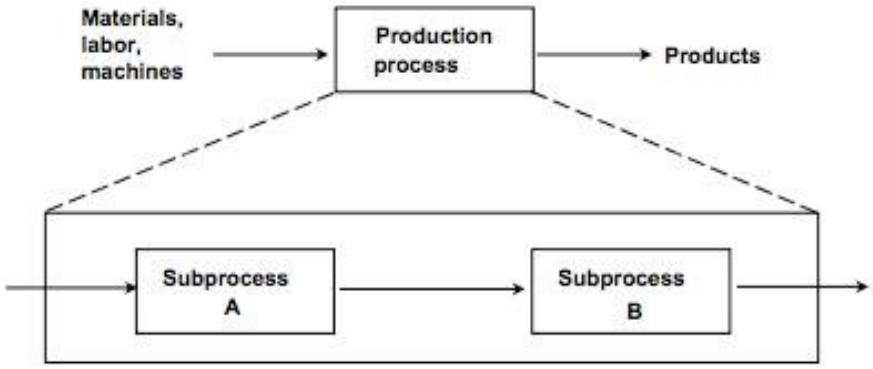
Before Lean production was defined, Schonberger and Gilbert presented Just in Time as a concept where purchasing operations serves frequent releases and deliveries in order to fulfill the demands of purchasing environment (Schonberger & Gilbert 1983, 54 -60). The term 'Lean Production' was introduced worldwide in 1990, by the book 'Machine that change the world'. However, the concept of just in time manufacturing and TPS had been introduced a decade ago by Schonberger (1983), Hall (1983) and Monden (1983). (Holweg 2006, 420.)

According to Gao and Low (2014, 56.) looking through the economical description of conventional production, it covers only one aspect of production theory: the input and output and their relationship between. Gao et al. by Shingo (1988) present that conventional model does not separate the operation and process from each other, these elements are really present when worker is actually working on with product. Process means a flow of products e.g. from worker to another worker or from stage to the next stage. Operation means a work at discrete stage, a spatial flow, where worker works with one product or with different products. All activity is done around worker.

Based on quality development and theory of Statistical Quality Control (SQC) modelling by Juran, Deming and Drucker (1990), Japanese specialists could apply built-in control into processes. Influenced by this modelling, Shingo (1988) focused especially into the material flow and quality control concept in production. Koskela (1992) outlines the term new production philosophy, which genesis was in Just In Time and Total Quality Control proceeded further in car manufacturing business. (Gao & Low, 56-57.)

Koskela (1999, 242-243.) claims that theory of production should be prescriptive by explaining how actions contributes goals settings in production. In generally these contributing actions for production systems

are: design, control and improvement. Production itself has three goals: 1.) Get products produced as they were planned; 2.) Internal goals, based on features of the production like cost minimization or level of utilization, and 3.) Customer satisfying, based on needs like quality, dependability, amount and flexibility. Theory presents also three models of the production process: 1. Transformation concept 2. Flow concept and 3. Value generation concept.



Picture 19.) Production process divided to sub-processes (Koskela 2009).

4.1.1. Transformation Production Concept

During 19th century transformation production has been major concept and conventional production template is based on this concept. In the beginning of this century it has been the foundation for scientific management, mass production and part of modern corporation modelling. During the second part of 19th century it also affected to modern production control and project management. Turner (1993) states the scope management would be-all and end-all of project management through its definition of work breakdown structure. Scope management would target to this work breakdown structure when:

> *'' (1) an adequate, or sufficient, amount of work is done; (2) unnecessary work is not done; (3) the work that is done delivers the stated business purpose''*

Also known project management discipline is based on this hierarchical breakdown model of transformation production concept. (Koskela 1999, 244-246.)

Transformation production concept (picture 19.) has three principles:

1. Production process can be presented through smaller sub-processes. This way the production concept is more manageable and can be divided into tasks and operatives
2. When smaller sub-processes are separated, containing the inputs, it is possible to study activities, where cost reduction is possible to be executed

3. Input costs are associated with output value – the value of the output can be adjusted using better materials or more skilled workers. (Gao & Low 2014, 56-60.)

4.1.2. Flow Production Concept

Flow production concept was introduced by Gilbreth and Gilbreth (1922) and it has been the base for development of Just-In-Time -method in Lean production. Ford Motor company used similar method in their car production in 1913. Japanese manufacturers developed this concept further starting from 1940 and after war, Toyota continued the development work of it. Earlier, Gilbreths presented the flow production with four stages: Processing, Inspection, Waiting and Moving. Japanese developers noticed that processing stage was the only stage, which has a feature of product transformation. Shingo (1988) noticed if looking through improvement side, these four stages have different characteristics. Changing transformation features and steps to be more efficient, it is possible to eliminate other stages and their non-transformation features. Other stages are representing production waste and can be eliminated. (Koskela 1999,244.)

It can be said that main purpose of the Flow production concept is to eliminate waste to maintain flow. According to Gao et al. (2014,59.) flow production have three root principles:
1.Reduce any non-value activities (remove waste)
2.Reduce the lead time and variability
3.Core principles, which includes: simplicity, increased flexibility and increased transparency. These principles are conducted from their usability from practical processes and do not have direct connections to the theory.

To fulfill above root principles, there are other supportive operating principles: Gao et al. (2014,60.) present principle of Lead time reduction by Koskela (2000) and Monden (1998), where:

> Lead time=queue time (before processing) + processing time +waiting time +moving time
> *Lead time can be compressed by eliminating some time pieces from queuing, processing, waiting or moving steps. (Gao &Low 2014, 60.)

Principle of Cycle time reduction, where:

> Cycle time = Processing time + inspection time + wait time + move time
> *Cycle time can be compressed eliminating non-value adding time from processing itself, speed up the inspection time and minimizing time used for waiting and moving. It means elimination of inventories, rework reduction, cutting distances etc. to serve practical Just-In-Time-production. (Koskela 1999,244.)

Principle of Little's Law, where:

> Cycle time= Work-in-Progress is divided by throughput.

*Cycle time is reduced when there are aims to reduce work in progress. Throughput will be constant. (Koskela 1999, 244.)

Gao et al. (2014,60.) presents principle: Variability reduction by Hopp and Spearman (1996) and Koskela (1999), where aims should be targeted to prevent process time variability and flow variability as follows

a.) Process time = required time for one workstation to operate the task (variables could be: setup time, rework time, operator availability etc.)
b.) Flow variability= the variability in flow, when job arrives to the workstation or workplace

Gao et al. (2014,60.) presents principle: Maintain simplicity by Koskela (2000), where actions like Standardizing parts, shortening the flows and minimizing control information are the keys for simplicity. Reducing components or steps from material or information flow would affect to the process eliminating waste.

Principle of Increase Flexibility and Transparency based on JIT, where below features and actions would support the flow:

a.) minimizing lot sizes to match with demands would maintain the flexibility
b.) reducing setups, which are difficult to handle and minimizing changeovers would maintain the flexibility
c.) train multi-skilled workforce
d.) train and teach operational flexibility to the workforce
e.) courage workers for improvement, for finding and fixing errors and support visibility of errors. Using tools like 5S, standardization and visual control helps to find any deviation from the standards. Transparency also will be increased if interdependencies of any production units are reduced. (Gao & Low 2014,61.)

4.1.3. Value generation concept

Koskela (1999.) presents theory of value generation concept which deals more for satisfying customer needs, when transformation concept mainly concentrates for internal production than customer needs. Taking care of customer needs maintains the value of the product. This concept can be described through value generation models like value based management, customer-driven company, customer orientation or mass customization. This production concept can be described through its principles of five:

1. Make sure that all requirements from customer should been captured and taken care
2. All relevant customer requirements should be available through production phases or chains like design, production planning or making the products
3. Check and maintain that production capability equals for demand in order to produce needed products

4. Update measurement activity to check that value is generated based on customer needs
5. Deliverables should to meet customer requirements and to serve all the customer roles. (Gao & Low 2014, 62.)

4.1.4. Path from JIT into Lean Production and Lean thinking

Literature study shows how Lean developed further from Just-In-Time delivery practices. Ohno (1988) state since 1948 Toyota's TPS has been under development cycle and extended also to be used by Toyota suppliers in 1965. It did not get wide interest, until first oil crisis hit the world. First formal documentation by Sugimori, Kusunoki, Cho and Uchikawa (1977a) and Ohno with Kumagai (1980) were established in such late as 1977. However, it has been quoted that Toyota Purchasing Administration Department produced JIT delivery supplier manuals about its requirements and operational guidelines. Hollweg (2006) quote Sugimori et al. (1977a) managers from Toyota Production Control Department produced a document named ''*Toyota Production System and Kanban System Materialization of Just-in-Time and Respect-for- Human System''* and introduced JIT in English to the world. This document compared, discussed and benchmarked productivity between US, European and Japanese plant cases. JIT was spreading and finally it got more attention of studies, articles and books by Parnaby (1979), Schonberger (1982a; 1982b;1982c;1983a, 1983b) Hall (1983a), Monden (1983) and Cusamano (1985) and again Parnaby (1986). JIT was introduced quite clearly before Womack et al. (1990) published the book 'Machine that changed the world', which was largely noted in public and it launched common wakeup among western companies at same time, when US automobile industry faced its 'major crisis'. Womack and Jones (1996) focused issues like product development, sales and production instead of opening Lean principles in their book. Then Womack et al. (1994) implemented the term Lean practices and its production concept. Again, Womack and Jones (1996) decided to publish the term 'Lean Thinking' and summarization of principles around Lean. (Hollweg 2006.)

Womack and Jones (1990) present that Lean could be applied outside of manufacturing context in many other levels too. Cost reduction, waste detecting and elimination, just-in-time are valuable for manufacturing companies, but there are other platforms suitable also for Lean methods. Holweg (2006) quote just-in-time manufacturing was the ancestor of Lean before a term 'Lean' came out. Baines, Lightfoot, Williams and Greenough (2006, 1539.) introduce the Lean way can be beneficial for any knowledge based setups and such activities like engineering, product design and development could use Lean in many ways. The essence of Lean is to emphasize customer value and how to get the most out of it. It means all employees and teams should turn their focus from waste reduction into the activities of recognizing and attaching value. Lean thinking by Chappel (2002) could be used in many business areas and it has a positive impact for example like sales, designing and product development (Kovacheva 2010).

4.2. Lean Thinking, a philosophy of continuous improvement

Based on prevalent literature it might be truthful to say that Lean thinking is a next generation and maybe western transcription about Kaizen and JIT. Basic elements of it were produced and developed in Toyota Production System framework and this practical development increased our knowledge about the meaning of organizational culture and leadership. Lean thinking has many dimensions, it is not just a tool set or method, it as a philosophy presented through its values and principles.

Picture 20.) Lean Circle (Lean.org n.d.)

Womack and Jones (2003,17.) introduce the term Lean thinking and its five principles. These principles describe Lean thinking quite well. Like in Deming's PDCA, principles obey continuous flow:

1. **Specify Value Stream –** a Value is based on the customer need(s) and it should display the value what the customer really wants removing non-value activities and waste specifying the product and its cost and time from producer into the customer
2. **Define the Value Stream –** Value streams are only activities, which produce exact product based on a customer need. Lean organization should find out all activities which deliver and add value to the end product
3. **Create or Improve Value Flow –** Eliminating bottlenecks, detours, waiting time etc. which are examples of waste. This principle would ensure that specific product is delivered to the customer without interrupts
4. **Pull the Value** reacting customer demands– Customer need establish the pull through the system. Lean organizations are not over producing because of the pull mechanism. Producing should be made only when customer wants it
5. **Perfection –** Now, at this phase understanding will rise and this will cause more ideas for improvements. Every step should have a value adding feature and interact together to reach continuous flow. All these principles should affect to the flow and support lean thinking by reducing waste and improving quality. (Womack & Jones. 2003, 29-59.)

When reaching the perfection, the most important part of Lean might be the transparency. Openness should be clear for everyone, it should reach every

participant even through specific business chains like subcontractors, distributors, customers, employees etc. Main goal is to discover any possibilities to create value and to give feedback for every participant. This activity creates positive information, adds flow and will support continuing efforts to improve. This is a key feature of lean system. (Womack & Jones 2003, 29-59.)

Lean principles are based on values and streams, where the value means what customers are expecting or willing to pay for it. Womack and Jones (2003) presents '*value is created by producer based on the needs of the customer*'. Company should add value instead of doing something else like waiting, moving, reworking or doing development work, which are not related to the product or service what the customer really wants. Product itself is most important, because customer is expecting to get it. Concentrating just for value adding work instead of increasing the waste, production would get a chance to start analyzing how to add more value and how value stream activities can be delivered. Activities like removing waste and minimizing non-value steps would happen, when production starts to use value stream mapping. When production is flowing, every step in that process should add value before next step and the flow should be continuous until customer gets what they exactly need. In fact, producing starts from customer side - it is the form of pull principle. In ideal situation, when customer has sent an order, manufacturing starts right away. Storing and inventory are categorized for waste, because these actions would eat resources from doing value adding activities. First four principles will prevent and actually remove great amount of waste. Last principle, which is the perfection, means continual support for all value adding activities inside the company. It maintains above described four principles. Every employee needs to have common understanding and knowledge how to produce exactly what customer needs with acceptable prices and without any waste, which could eat capital and resources. Implementing these principles into action, employees need some support, continual education and coaching. If employees get this support, continuous improvement has a chance to spread into every activity inside the company. (Lean Manufacturing tools 2015.)

Womack and Jones (2003, 29-59.) describe waste such as an activity, which consume resources and do not create value. Seven types of waste were first identified by Taichi Ohno (Seven Muda) from Toyota Motor Corporation. Lean production introduced seven waste types categorized as follows:

1) Mistakes, which are requiring rectification
2) Production of items that no one wants such as inventories and remained goods
3) Processing steps, which are not useful and needed
4) Movement of employees
5) Transport of goods from one place to another without any purpose
6) Groups of people at downstream activity standing around waiting, because an upstream activity has not delivered goods or materials on time

7) Goods and services, which do not meet customer needs. (Womack & Jones 2003, 27.)

4.3. Lean Value Streams

Value is a starting point of Lean thinking. The value is clarified, when it meets all customer needs. Value stream can be seen by looking through all steps of precise production process. Value identification means that every individual action inside the process should be detected and measured. The initial objective is to map and sort these actions into three groups. Actions can be recognized as follows:

* Value creation actions, which are perceived from the customer side
* Actions needed by product development/production/operations/systems or actions needed to fill orders
* Non-value adding actions as perceived from the customers. (Womack & Jones 2003,85-86.)

After mapping, actions can be separated and divided into groups based on their value:

- Group A. Value added - holds truly value adding actions (serving customers)
- Group B. Muda I, is a category 1. waste and this type has to live for a while, before final elimination, because these actions serve some other important function. When this action based function stops, action will be eliminated.
- Group C.) Muda II is a catalog for category 2. waste. These actions can be deleted immediately. When it is the time for waste elimination activity, it would be easier to start from category 2. waste and then move ahead removing non-value creating actions and steps using Lean principles from 1 to 5. (Womack & Jones 2003,85-86.)

Value stream is then cleaned from the waste and documented. However, value stream should be measured and tested carefully, before new process launch. Womack and Jones (2005) presents a set of six additional principles what they call Lean Consumption, which is an idea to introduce consumer based process from Lean- production process. Additional principles listed below:

1. Solve customer's problems completely by ensuring that all the goods and services are taken into closer study and work together
2. Don't waste customer's time
3. Provide exactly what the customer wants
4. Provide what's wanted exactly where it's wanted
5. Provide what's wanted where it's wanted exactly and when it's wanted
6. Continually aggregate solutions to reduce the customers time and hassle. (Womack & Jones 2005.)

4.4. Lean Methodology Concept

Lean methodology concept contains tools and techniques. Sometimes Lean tools are presented separately in different contexts, but actually these two definitions are synonyms for each other.

4.4.1. Lean manufacturing tools implemented by enterprises

Getting the big picture about how organizations are using Lean tools, can be confrontational and seems that the common truth is vague. The question what would be the most used Lean tools is really interesting? Also reasons for implementing can vary among organizations. It seems that actual tool selection has a connection with attributes of Lean enterprises. These attributes like physical appearance, operational continent, organizational culture and industrial field could affect how enterprise would choose and use Lean tools. Kuha and Luoto (2016) states that Finnish software development and IT-service companies do not often use Lean tools like 5S or Value Stream Mapping, or even PDCA-cycle in order to help their production or process development. Interesting observation is also the divergence between public and private sector. Lean tools are used more often in private sector.

Commonly industrial enterprises have shown many implementation strategies. Stadnicka and Antosz (2013) explain the usage of Lean in large enterprises and investigated how enterprises apply Lean manufacturing tools and what tools they are intend to implement in future. This survey covers 46 companies based on the amount of returned questionnaires. The results show that most applied tools were 5S, FIFO, 5Why's, Standardization, Team work and Poka-Yoke. Problem solving methods like A3 was one of the intending to implement tools just as SMED and Waste detection (7waste).

Table (picture 21.) shows percentages of 'implemented tool' and 'intending to implement tool' classifications among companies. Tools like 5S, work standardization, Poka-Yoke, FIFO, 5xWhy's, Team work, Kanban system and Root cause analysis (RCA) were applied only by companies, which has been using Lean longer than five years (Stadnicka & Antosz, 2013).

LEAN MANUFACTURING TOOLS IMPLEMENTED IN THE ENTERPRISES AND INTENDED TO IMPLEMENT

Lean Manufacturing tool	Percentage of the enterprises where the tool was implemented	Percentage of the enterprises intending to implement the tool
5S	97%	0%
FIFO	82%	5%
5xWhy?	79%	0%
Work standardization	79%	8%
Poka Yoke	79%	3%
Team Work	76%	0%
Kanban System	71%	11%
TPM	71%	11%
Kaizen	68%	11%
Visual management	63%	5%
Value Stream Mapping	58%	8%
RCA (Root Cause Analysis)	53%	3%
Just in Time	47%	5%
Taktu Time	45%	3%
SMED	45%	11%
One piece flow	42%	8%
3P (Production Preparation Process)	39%	3%
U-shape line	34%	3%
Gemba walk	32%	5%
Andon	26%	3%
OEE	24%	13%
TQM	24%	8%
Milkmancourse	16%	8%
Global 8D	16%	3%
ChakuChaku	16%	3%
Gemba/Gembutsu/Gengitsu	13%	5%
7 Mudaidentyfication	11%	11%
Hejunka Box	8%	3%
Jidoka	8%	0%
A3 problem solving	5%	13%
HoshinKanri/Policy deployment	3%	3%
Kaikaku/Reengineering	3%	3%
Jishuken	0%	3%

Picture 21.) Usage of Lean tools (Stadnicka & Antosz 2013).

The Society of Manufacturing Engineers SME (2012) decipher statistics related to larger organizations and how these enterprises embrace Lean as a philosophy. Results are in line with than other researches. This survey data is based on 68 questionnaires representing small, medium and large sized manufacturing entities in Great Britain. To gather more accurate data, extensive case studies were proceeded with the help of seven companies. (Bhasin 2012, 349.)

SME's extensive case study (pictures 22 and 23) show that most applied tools were Kaizen (continuous improvement), 5S and Visual Management (observation), 7 wastes, process mapping (VSM) and Total Productive Maintenance (TPM).

Tools embraced through interviews.

Interview schedule responses from managers regards the Lean tools embraced within their organisation	
	%
Step change/Kaikaku	21.4
Single Minute Exchange of Dies (SMED)	25.7
Supplier development – activating links with suppliers	26.4
Cellular manufacturing	35.7
Single piece flow operations	39.3
Kanban systems	43.6
Supplier base reduction	47.9
Total productive maintenance	57.9
Attacking value and the seven wastes	58.6
Process mapping	59.3
5's and general visual management	65.7
Kiazen/continuous improvement	69.3

Picture 22.) Lean tools implementation based on interviews (Bhasin 2012, 353).

Survey – tools embraced.

Survey responses regards the Lean tools embraced within their organisation	
Step change/Kaikaku	33%
Single Minute Exchange of Dies [SMED]	41%
Supplier development – activating links with suppliers	42%
Supplier base reduction	43%
Single piece flow operations	48%
Cellular manufacturing	61%
Kanban systems	64%
Total productive maintenance	65%
Process mapping	65%
Attacking value and the seven wastes	75%
5's and general visual management	81%
Continuous improvement/kaizen	83%

Picture 23.) Lean tools implementation based on Survey (Bhasin 2012, 354).

4.4.2. Differences between Lean and Six Sigma

Lean methods, tools and techniques can be used in many terms. It is good to know at least the basic theory of Lean principles and compare it with Six Sigma. A good question is how organization have enough knowledge about these approaches and choose the right one to serve their implementation program? Stone (2012) presents by Seddon and Caulkin (2007) interpretation about confusion, where numerous implementation approaches surrounds

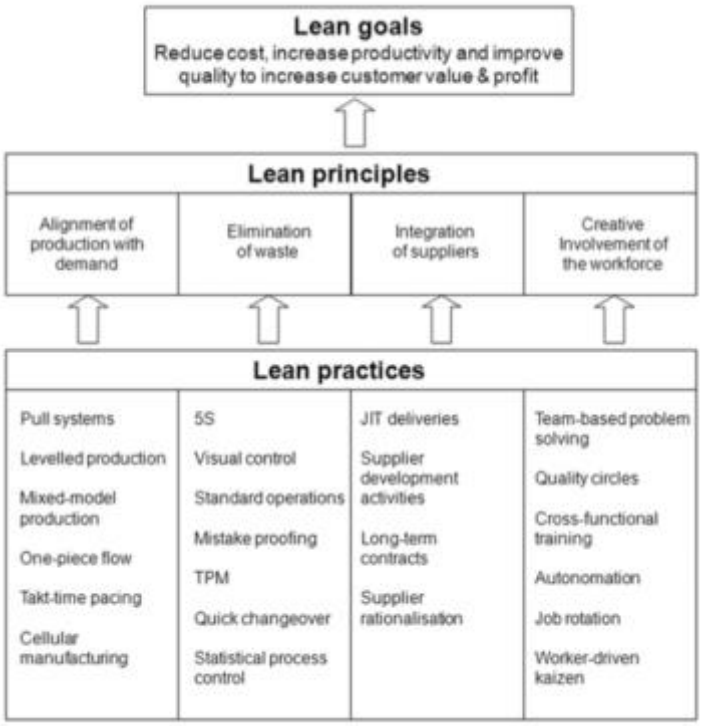
Lean startups. These startups have a short life, because of misguided information and useless efforts to use Lean only as 'a toolbox' feature to gain better efficiency rather than understand the philosophy

Arumugam, Antony and Douglas (2012, 275-276.) presents Lean and Six Sigma as a form of process improvement methodologies. Quoting Antony and Banuelas (2002) and Kumar et al. (2008) they state both methodologies contains widely noticed tools and techniques, so these two approaches should be viewed as 'business improvement strategies' instead of set of techniques and tools. It makes a justice to call them business improvement strategy methods, which call appropriate tools and techniques when needed. Their study explains the difference between Lean and Six Sigma is quite clear. Lean takes care about speed and efficiency and Six Sigma guides to look about precision and accuracy**.** Their nature is supplemental and when using Lean and Six Sigma together, their sum up will support process in the forms of inefficiency (Lean) and –variation (Six Sigma). When looking about these methods together in process, Lean is in charge eliminating non-value adding steps and any other non-value activities and Six Sigma has a target to reduce variation from remaining value-adding steps. Arumugam et al. (2012, 275-276) present by George (2002) the result is Lean Six Sigma – a breakthrough improvement combining best practices together.

4.5. Lean tools – a systematic approach to fix problems

Whatever business improving strategy is used, effective tools are needed to solve problems and used technique can vary depending on the case. Needless to say, some tools and techniques are quite complex to use and require learning activity and some experience for using them before applying. The elements, tools and techniques, are not solutions for problems, they are used in order to give help to solve problems at different situations. Project scope should be obtained well and then with the help of these tools and techniques, there is a possibility to achieve desired objectives. Some Lean tools can be used together with Six Sigma methodology and its toolkit. Lean tools are needed when looking for non-value adding activities. The most important part is to find origins of waste, after that eliminate waste and speed up the process to gain better efficiency after improving activities. (Arumugam et al.2016, 275-276.)

Lyons, Vidamour, Jain and Sutherland (2013) explain that Lean principles should be divided into applications as classification of Lean practices. This classification is introduced with four classes of Lean principles instead of presenting five or six 'de facto' Lean principles.



Picture 24.) Classification of Lean tools and methods Lyons et al. (2013) and Clotet (2015).

Some tools (methods) and the descriptions are presented at subtitles 4.5.1 - 4.5.12, based on their ranking on most applied tools list. Thus, other tools are presented based on their 'interest level' informed by companies.

4.5.1. 7 Muda 'Identify waste'

Shingo System declares that activities like Source Inspection, Poke-Yoke (mistake proofing), and SMED (quick changeover) systems belongs to the collection of improvement strategies. This collection of strategies is based on efforts to find and eliminate waste, actually seven types of waste. (Hales & Chakravorty 2008.)

Waste identification represents very basic methods of Lean. Waste can be identified and practiced using observation or visual management method. 7 Waste are described earlier in pages 45-46. According to Lean Manufacturing Tools (n.d.) short memory rule, WORMPIT, would help to remember these seven wastes:

1. Waiting
2. Over production
3. Rejects
4. Motion (Excess)
5. Processing (Over)
6. Inventory
7. Transportation (Lean Manufacturing Tools n.d.)

Shingo (1987, 18-19) states that "*Unfortunately, real waste lurks in forms that do not look like waste. Only through careful observation and goal orientation can waste be identified. We must keep in mind the greatest waste is waste we don't see."*

4.5.2. Observation Genchi Genbutsu 'See problems and detect waste'

Observation is a simple tool, but very important as it needs to be practiced effectively. It can help organizations to see problems and detect waste during identification. Liker (2004) present Shigeo Shingo's statement, the paradox of waste: "*The problem is not elimination of waste, but identification of waste"*. Liker (2004) mention Taiichi Ohno's observation practice ''5 Why's'', an asking technique to find out problems based on analyzing method of four: seeing, questioning, analyzing and evaluating. The idea is to observe production floor with an empty mind and ask why five times per observed matter and target the root cause. Shingo and Ohno, the architects of TPS developed observation to be used with term 'Genchi Genbutsu' which means to go and see the workplace (actual location - Genchi) to fully understand the situation in production (Genbutsu). Often seen term 'Gemba' means also the workplace. The purpose is to develop responsibility for people to find the facts and investigate the issue until it will be clear for solutions. After that they can talk these findings with others and they are in charge what exactly they are going to report. According to Liker (2004) observation is conducted with deep understanding of the process and gathers knowledge to make reasonable decisions. All the way it helps company to become a true learning organization. (Arumugam et al.2016, 279.)

4.5.3. 5 whys 'Detect the root cause'

5 why's is a tool based on question and asking method. Like earlier described it is very useful method to detect the root cause of problem. Jimmerson, Weber and Sobek (2005) state that great practical understanding about the process is a must when facing the problem. When the process is deeply known the cause of the problem is easier to understand. When problem is recognized, first question (1. why) would be asked. If the answer is not enough to solve the problem and gives a hint for other linkage to the problem, this linkage problem should be raised up to answer for next question (2^{nd} why). This chain of asking questions is continued further until the cause of the problem, the root, is finally found to tackle the original problem. However, this chain of five questions do not mean operator should ask all 5 why's. The purpose is just to find the root cause and then stop iteration of these questions. (Machado & Leitner 2010, 390.)

4.5.4. Value Stream Map ‘Analyzing current designing future state’

Machado and Leitner (2010, 385.) suggest that value stream map is the primary analytical tool in lean transformation by Koning et al (2006) “*an extended process flowchart with information about speed, continuity of flow and work in progress that highlights non-value- added steps and bottlenecks”*. This analytical tool helps to understand precise product flow from supplier to customer end.

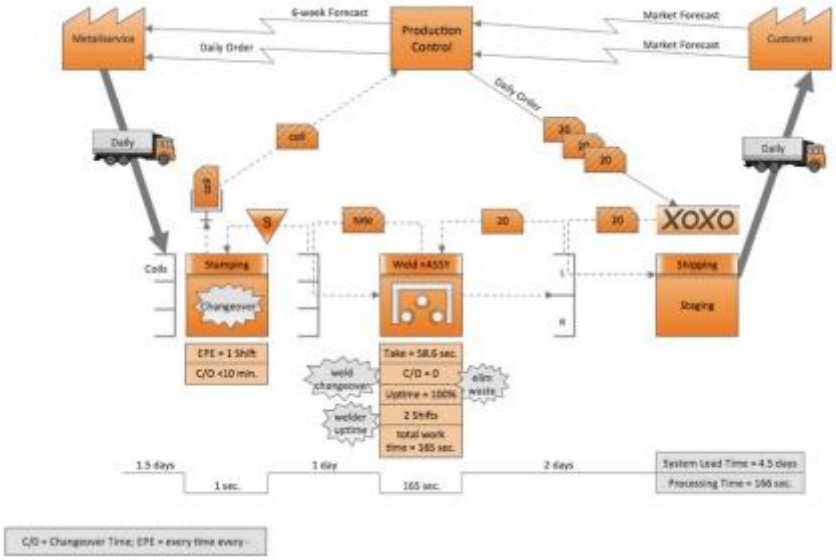
Value stream mapping,’ ‘’flow –level Kaizen’’, is effective method, where its purpose is to analyze the current state of process or service and later help operator to design the future state map, which will be used to determine e.g. how product or service could be produced and delivered to the customer in best possible way. The value stream includes all activities starting from raw material creation till the ready-made output to the delivery for the customer. Value stream mapping is just about identifying value adding activities and non-value adding activities and after that, eliminating non-value adding steps, which are not really needed. Value stream mapping should be treated as a planning tool, it can be used to identify waste and sources of waste for a given value stream. It helps organizations systematically create a lean future state without waste or reduce waste. The tool helps companies to plan future state and implement the process. Determining value stream activity creates information map and product flow for a given value stream. The mapping is executed in a way, that allows visualization to be made from current state and help to design wanted future state with measurable goals. (Dolcemascolo 2007; Dolcemascolo 2015a,2015b; Wroblewski n.d.)

Dolsemascolo (2015a, 2015b) describe the tool itself helps people to understand a.) how processes are connected and b.) to identify waste and sources of the waste. VSM forces people to think why things are done in certain way and it gives opportunities for improvement, particularly when developing the future state of the process. Obviously, before developing phase, the current state has to be cleared out to get a decent view about the process e.g. identifying bottlenecks or sources of the waste. VSM-tool gives a possibility for structured way of thinking and helps to display especially bottlenecks and time consuming steps, which do not create value for customers. Map creation activity could be divided for disciplines of four:

1.Map the process flows
2.Add information flows to the Value Stream Map
3.Collect process data and add it to the map
4.Add the time line / time flow to the bottom chart

Value Stream Map is a widely used improvement tool, which helps organizations to understand clearly the state of processes. It can show the process status but also its value - how process parts are connected or what separates process functions and perhaps why they are needed. Then process owners can view how whole entity should be executed and how to lead it. Once the overall understanding is generated, the planning phase will take place considering what results need to be defined in order to satisfy decision makers. Then the team and decision makers could make conclusions what is needed to meet the target and what are those possible places for improvement. (Piirainen 2015.)

Future state mapping is a Lean process method, where organizations can identify and plan wanted future state. This future state could inform the organization about the context of continuous flow in manufacturing, where it might be possible to use, how to level out the production and it could give information about FIFO-lanes, where continuous flow is not possible. Finally, the organization has enough information to identify the type of process improvements, which have to be done to reach the future state. After defining targets, the future state, most critical part would be designing the implementation plan. Based on the future state map, this implementation plan identifies each required activity to be proceeded before future state is possible to achieve. Also implementation plan shows, who is in charge, it might be responsible team or individual, and the due date. Implementation plan and its activities includes Kaizen events and Six Sigma types of activities. Targeting such activities improves their bottom-line effectiveness, since each activity leads to value stream improvement. (Ritamaki 2015.)



Picture 25.) Value Stream Map-example (Conceptdraw n.d.).

The picture above shows the value stream in manufacturing process, it clears out control the production and shipping processes. The map shows particular process and current steps from the manufacturer into the customer. It will inform possible delays and information flows required for delivering the target product or service. Mostly used maps define production flow, where raw materials are delivered to the customer or design flow from new concept production or just diaphragm from product launch.

4.5.5. 5S ‘Five steps for perfection’

Very basic Lean tool is 5S and the meaning comes from chain of words: Seiri – Organize (Sort), Seiton - Orderliness, Seiso - Cleanliness, Seiketsu – Standardize and Shitsuki - Discipline. These words define five steps to create workplace transformation. The purpose of this approach is to make

the workplace clean and organized. It holds some standardized activities for creating efficiency instead of waste. 5S reduces space used from storage areas and organizes the work area and the same time it improves maintenance, safety and quality. 5S is the foundation of Lean tools. (Machado &Leitner 2010.)

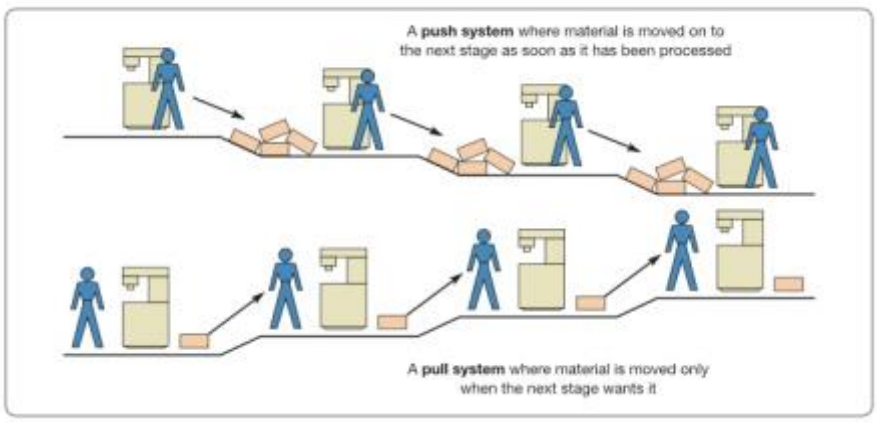
5S can be used when there are needs for waste elimination from poorly organized working area, storages, desks or service areas:

a.) Sorting means just eliminating the waste, which is not needed
b.) Set-In-Order comes next when remaining items are going to be organized
c.) Shine, when it is time to clean and inspect work area
d.) Standardize, this phase takes care about documentation and standardization (of items, places etc.)
e.) Sustain, represent regular checking, which apply standards created in previous phase (Lean Production n.d.)

4.5.6. JIT 'Just-In-Time'

Toyota Global (n.d.) define JIT as follows: to make only 'what is needed, when it is needed and the amount needed'. When manufacturing plant should produce great amount of products like automobiles containing parts about tens of thousands, it is very important to create effective and accurate production plan with great details including parts procurement, to eliminate waste and all inconsistencies.

There are two types of production control systems, push and pull mechanisms. Materials Requirements Planning (MRP) represents push systems and Just-In-Time (JIT) is based on pull mechanism of production. MRP translates production and its schedule – Master Production Schedule- to match with end products. Also it calculates these schedules for all levels in production based on sales forecasts of final products. Whole production chain is then pushed to the next level. MRP activity is based on forecasts, not actual demand like JIT. Furthermore, JIT is based on demand and exact production level only happens if there are requests based on customer needs. (Gökce 2007.)



Picture 26). Push and Pull mechanism (Slack, Chambers & Johnston 2010,290).

Comparison to MRP, where every worker operates maximizing their output and making products as many as they can, in JIT worker try to do what is needed based on order, a customer need. Workers are only working when they get signal to produce.

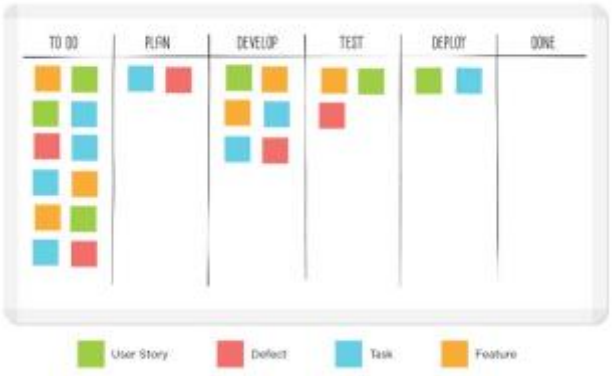
Just-In-Time production's primary objective is to save space in warehouse, get rid of unnecessary cost-carrying and to achieve better efficiency. In production 'efficiency' means that deliveries of component parts should be organized and placed to workplace just before the workplace needs them. This flow is possible to reach when deliveries are ahead of time and delivery function would operate only when ordering signal comes through Kanban board system or reporting system, which forecasts parts usage. In car production, JIT makes possible to build cars based on orders and every part or component systems are perfectly made to be fit for the setup. If not, there is no alternative. Any problem during the process will pop up immediately and production has to fix the problem as soon as possible. (The Official Blog of Toyota GB 2013.)

4.5.7. Kanban, 'Signboard'

Kanban can be translated as a 'signboard' and it has physical presence of a board or display, which shows clear scheduled signs how to guide the production and any aspects from logistical chain activities. Main function is just to optimize production levels. Kanban is mainly used in manufacturing hence it is an information flow system. Originally Kanban was basically a system used to mirror the information between processes and parts ordering system. In production, every item or group of items flowing through the production process, have a Kanban card of their own and this card, for example informs how many items have been used or transported or just sent back to wait for additional orders. Kanban can be used in many ways. The goal is to reach Just-in-Time production and Kanban serves it by measuring actual consumption and harmonizing inventory levels. In Toyota Production System, Kanban has six guiding rules: 1.) Do not pass defective products 2.) Use and take only what is needed 3.) Produce only with exact and required amounts 4.) Measure the production 5.) Use 'fine-tuning' to sharpen the production 6.) Stabilize and rationalize the process. However, Kanban could be used in many ways for different purposes and it can display multiple type of information. Simplest form is to use it for displaying how many items (or products) are at input-, process- and output-phase.
(The Official Blog of Toyota GB 2013.)

Kanban can be used also for visualizing purpose, to display the work, process or project work flow. It can be manual physical board with post-it memos or just a whiteboard with magnets.

Picture 27.) Kanban display in manufacturing process (The Official Blog of Toyota GB 2013).



Picture 28.) Kanban board defining the workflow (Leankit 2015).

Kanban works tightly with Just-In-Time to pass information between the processes and keeps material moving showing the status of materials all the time.

4.5.8. SMED ‘Single Minute Exchange of Die’

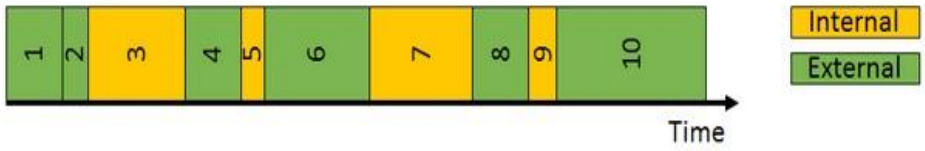
Single Minute Exchange of Die (SMED) is a method to describe changeover time between equipment change. Machine or other equipment change consumes time. During production these changeovers could be completed in sequences of time, for example in minutes and seconds. Changeover time should be short as possible, because the waiting time is treated as a waste. Producers tend to use more time than it is necessary and customers would like to get their products produced with economic batch quantities. Customers would like to reach better economic scale and in production their request could be referred with a ratio between production time and changeover time. This ratio informs how effective actual process would be. For example, when production time is stable and producer streamlines changeover time, the process turns to be more effective and improve its efficiency. (Kaizen Institute n.d.)

Improving changeover time

When trying to improve changeover time, whole process should be measured. In manufacturing process, the changeover starts right after last part is produced and ends when next first part is produced. Producing should be established in full speed. During changeover there are many activities, which might get overlooked e.g. machine speed is slower than it should be or some adjusting work is going on even machine is running. Also other activities before and after changeover could be possible, so careful observation is necessary during the change. (Roser 2014.)

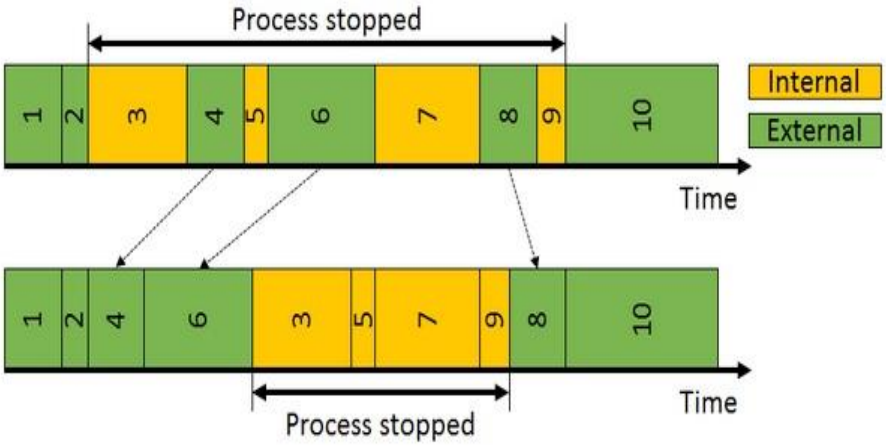
Actual SMED-process starts with observation and the continue with detailed SMED-activity below:

1.) Whole process will be measured and divided to steps – all steps should be recognized and time measured using e.g. video, timer, memos and so on. Video stream would be very helpful for identifying the steps and also for measuring time. Observation should cover more than one changeover, recommendation is three times, because the length of changeover could be different for some reason or workers can vary during the change. At the end, the changeover steps should be listed down and all steps have measured length or their average time. (Roser 2014.)
2.) After drawing a blank sequence chart with sequence numbers, next phase divides these sequences for internal and external elements. Below elements describe when equipment (action) is stopped and when it is under running state. External sequence represents the running state and Internal sequence informs stopped state. (Roser 2014.)



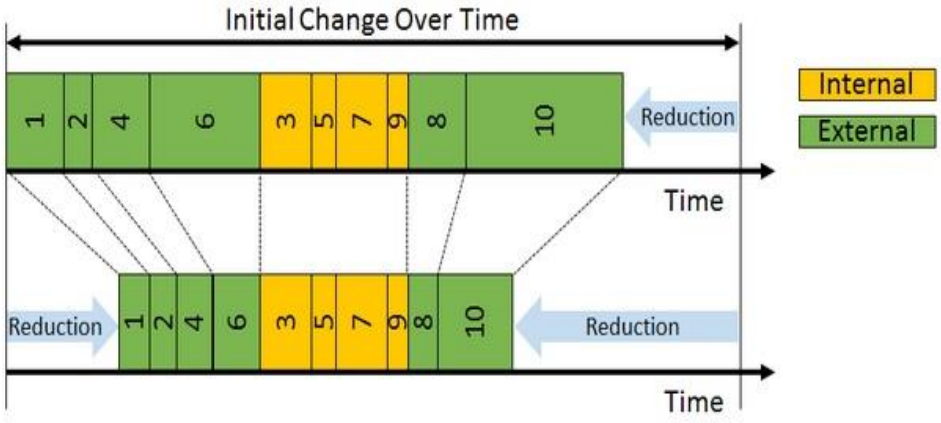
Picture 29). Identifying External and Internal elements (Roser 2014).

3.) Then all external steps are combined together. Usually changeover time will occur, when process activity stops. This is often caused by human activity like searching parts or tools. All this type of changeover time could be prevented simply by doing it when process is still running. After combining external steps, the stop-time is already minimized. (Roser 2014.)



Picture 30). Combining elements (Roser 2014).

4.) Next phase would be shortening the time of 1.) Internal Elements and 2.) External elements. First attempt would be directed to shorten the stop time (internal elements) and after that shorten any external elements. Shortening running state (external element) do not reduce process stop time, instead it could reflect to overall changeover time and workload reducing time. (Roser 2014.)



Picture 31). Shorten combined elements (Roser 2014).

5.) Last phase is reserved for activity to standardize and maintain new procedure instead of old one. All process activity should be maintained well and treated as a standard. Every changeover should be done in same way. New procedure has to be documented carefully and operational work before-during-after the changeover should be trained well and all relevant workers should have same information. Regular procedure check is good to be sustained from time to time to make sure that standard work is still valid. This phase needs an accurate management and attention from workers. (Roser 2014.)

4.5.9. Takt-Time ‘Accurate time interval’

Before Second World War Toyota had studied their competitors to find out any manufacturing methods, which could give them new ideas for

development purposes. On that time Toyota delegates visited in Germany to observe Focke-Wulff's aircraft production and they were introduced to the 'Produktionstakt' method. This method was later developed and named the 'takt-time' method. (Hollweg 2006, 421.)

German word 'takt' means accurate time interval. In original presence it was used to inform the time phase, when aircraft were transferred further to the next production stage from previous one. The 'takt' time can be calculated using formula: '*'available production time per day / customer demand per day'*', and the result is time unit like seconds. (Lean Enterprise Institute n.d.)

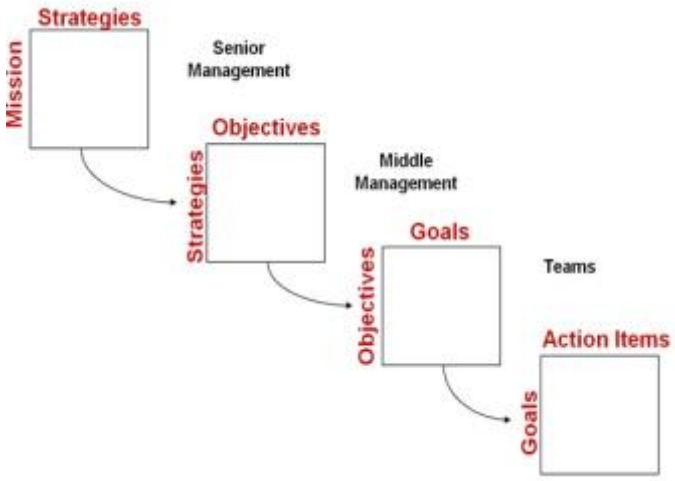
Flinchbaugh (2012) states 'takt' time should be called as 'Customer Demand Time' where its purpose is to maintain stable process so it will meet customer demands. The process still can include its waste, then manufacturer or producer will work with the waste trying to eliminate it.

4.5.10. Hoshin Kanri 'Policy Management'

This method is not so popular among other methods in western companies, it is a strategical tool and contain many elements. According to Page (n.d.) Toyota and other Japanese companies have been using Hoshin planning policy since 1960s and later some top western companies like bank of the America obtained significant progress with it. Löfving, Melander, Andersson, Elg and Thulin (2014) quote by Akao (1991) that Bridgestone Tire Company used Hoshin Kanri in order to integrate management system with Total Quality Control and by Watson(2005) Hewlett-Packard used it so successfully, that it spread to US.

This policy management 'Hoshin Kanri' simulates compass, its translation means "a course, stewardship'' or just like a showing the path of management. Seven steps of Hoshin planning displays this vision compass, Hoshin planning is needed when organizations have to face situations like: organization have too much projects (good ones or bad ones)on their scope, there are long lead times for improvements, budgeting and forecasting are not accurate or they are constantly failing, leaders vision are not connected with other organizational activities, annual goals might be informed too late, annual plans have no connection (year to year) or when workers do not feel they belong to the team or continuous improvement do not meet aspects with executing strategy. (Waldo n.d.)

Löfving et al. (2014) quote by Witcher and Butterworth (1999,324.) Hoshin Kanri is a strategy management, which integrates strategy work, product management and product development together. *''Hoshin Kanri provides an organizational architecture and transparency, which is necessary if strategy and daily management are to combine in their use of TQM*".

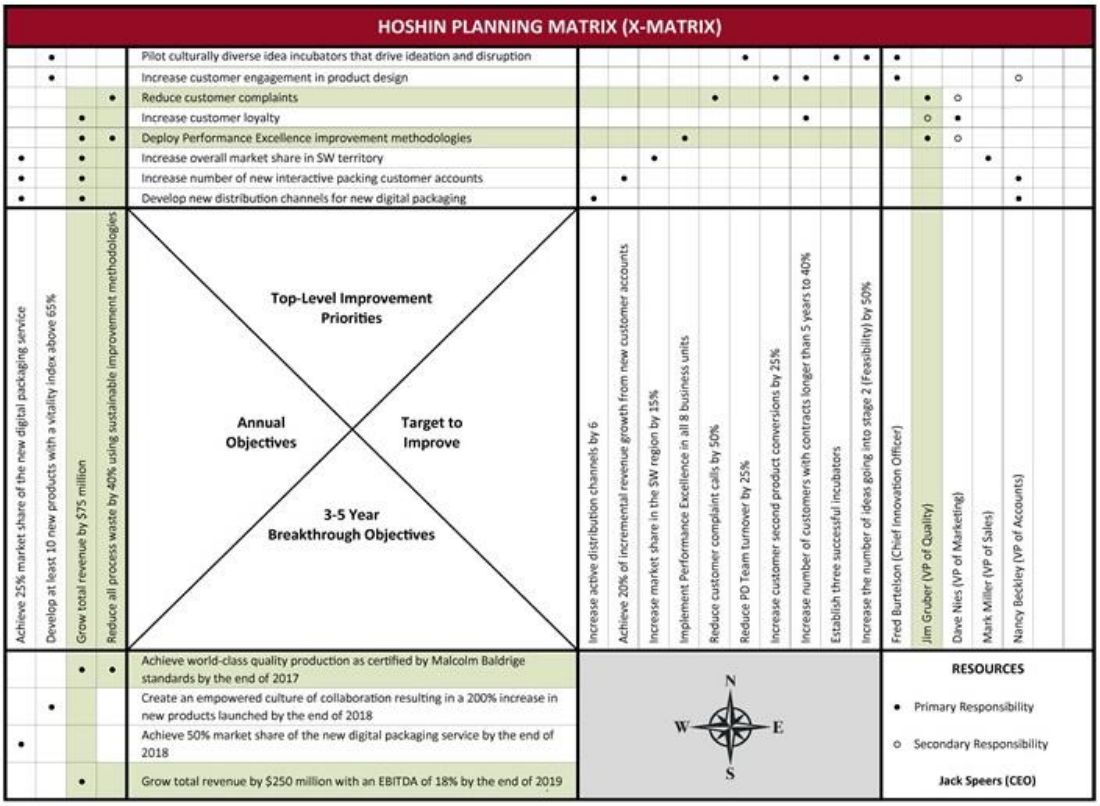


Picture 32.) Hoshin Kanri ‘’catch ball’’ environment (Akao & Roberts n.d.).

Hoshin Kanri (above picture) has four phases, which creates breakthrough objectives deployed through organization (top down). The process combined with continuous improvement (kaizen) improves organizations planning and executing abilities.

Hoshin Kanri by Akao (1991) is a change management tool which creates step by step planning, implementation and review process activities. It has a connection and common base with PDCA methodology. (Löfving, Melander, Andersson, Elg & Thulin 2014.)

Hoshin Kanri planning offers some benefits for users, mainly because it is systematic and disciplined process. Hoshin Kanri X-matrix can be formed using phases from 1 to 4. First phase supports the question: what are our long term goals for next three to five years? After determining long term goals, in phase 2. organization can ask about short term goals and answer to the question; what are our annual goals? At third phase it is time to find out key processes and ask how organization could actually launch improvement activities?’ At phase 4. Clear decision and right questioning activities are needed, for example, which targets would be in scope and what operations are going to executed and when exactly? Employees should participate to this process by helping to set the targets and also for maintaining the schedule of improvements. One of the greatest benefit is that, every member of particular organization would see determined goals and understands them. Every phase has to be maintained well and leaders should support two-way communication between leadership, middle management and line management. (Page n.d.;Waldo n.d.; Manos 2010.)



Picture 33.) Hoshin X-matrix (Waldo n.d.).

4.5.11. Heijunka 'Smooth production'

In terms of production Heijunka is a method, which would smooth overall production supporting Just-In-Time. It means to produce leveled amount of products against customer demands. Against customer demands means that customers have a tendency to vary their request based on their needs, like the amount of products per time schedule, so production leveled with Heijunka meets customer demands in total quantity (levelled amount) and production is more predictable than without it. (Toyota Blog UK 2013.)

4.5.12. Poka-Yoke 'Avoid mistakes'

Poka-Yoke is used to prevent mistakes, the goal is zero errors or mistakes and it is possible to reach with careful designing e.g. by checking and maintain physical devices or plan procedures so simple that there is no possibility for fail. The method has two features: 1.) Mistake Proofing, which have sub-principles: i.) to prevent mistakes from occurring, ii.) to stop activity and prevent error to spread for further processing and iii.) warn others and spread information when error has occurred and 2. Error Proofing, which has principle of careful design to prevent any errors in

assembly or other similar kind of setup activities. As a matter a fact Poka-Yoke is a process improvement method to prevent any kind of defect to happen and it can be used e.g. at Health and Safety management to prevent injuries and machine damages or just in order to prevent production of faulty products. (Quality Magazine 2008.)

4.6. Lean Implementation and transformation process

Successful Lean implementation needs many issues to be solved before executing phase. Kilpatrick (2003) propose some obstacles for successful implementation based on the observations when companies tried to attempt Lean. Companies should be aware about these obstacles and difficulties presented below when adapting Lean:

I. Financial statements and improvement results should be conducted to each other. Often this connection is broken and organization should present improvement added with a monetary measurement. Otherwise implementing part of the organization does not get enough support and operation would be halted.
II. Using wrong sequence, when organization tries to do implement building blocks. Organization tries to reduce changeover time after decreasing batch size, when typical changeover time is lengthy, it causes machine utilization to drop and customer serving ability will face difficulties. Lean adaptation are in danger.
III. Organization will choose too difficult project to start with or take a project under scope, which outcome is estimated to have low-impact features. Applying Lean is not difficult, but picturing all variables and taking care about the communication is challenging. The company can efface Lean adaption if first project aborts or it produces tiny return of investment. After that at least the support from decision makers is questionable for further projects.
IV. Overlooking administrative areas might be a problem, when there are not enough opportunities to improve for example in high-volume continuous manufacturing processes. In that case Lean implementation will not provide anything but tiny improvement, so it is waste to develop something that is not improvable by means of return of investment.
V. Training overdose comparing to other activity. Simply choosing wrong place to start or the activity is not enough ‘doing’ or instead of doing organization trains too much.
VI. Supply chain is not included at Lean implementation. Organizations should take about their suppliers into the continuous improvement program. Supply chain hold the needs for JIT delivery of materials, inventory minimizations and just as the company with Lean, the customer needs high quality products and services. When delivering time is not on time as it should be and quantities are too big, Lean benefits could be diminished. Financially, taking supply chain into part of Lean implementation is really beneficial to the company even the development work might take some time, brains and investment actions.

VII. Magnitude of the change could be a surprise and the company is not able to cope the change. Lean challenges everyone in every function and department at the organization. Lean thinking will change present organizational culture when doing it right. However, this change might face resistance and discomfort.

VIII. Lean implementation might take some time and especially in large organization it can take years to do the change.

IX. People e.g. decision makers, managers, accountants might not have enough knowledge about Lean concepts, which are totally different than traditional concepts. Company could face a real challenge, when planning the change. (Kilpatrick 2003.)

Liker (2004, 290.) describes that adapting Lean can be one of the hardest challenges for companies and presents this dilemma through a question '*'how to create an aligned organization of individuals who each have the DNA of the organization and are continually learning together to add value to the customer''*. Adaption needs patience such as long-term development work, self-discipline to stay in with program and ongoing efforts for continual improving work.

Concept	*Traditional Organization*	*Lean Organization*
Inventory	An asset, as defined by accounting terminology	A waste – ties up capital and increases processing lead-time
Ideal Economic Order Quantity & Batch Size	Very large – run large batch sizes to make up for process downtime	ONE – continuous efforts are made to reduce downtime to zero
People Utilization	All people must be busy at all times	Because work is performed based directly upon customer demand, people might not be busy
Process Utilization	Use high-speed processes and run them all the time	Processes need to only be designed to keep up with demand
Work Scheduling	Build products to forecast	Build products to demand
Labor Costs	Variable	Fixed
Work Groups	Traditional (functional) departments	Cross-functional teams
Accounting	By traditional FASB* guidelines	"Through-put" Accounting
Quality	Inspect/sort work at end of process to make sure we find all errors	Processes, products, and services are designed to eliminate errors

**Financial Accounting Standards Board*

Picture 34.) Comparing Traditional and Lean organizations (Kilpatrick 2003).

Above picture shows categorized differences between traditional organization and Lean organization.

In realization, Lean implementation have some tool related issues. For example, when using value stream map tool, it is essential to know that the best knowledge about the process can come from internal source. Flow map should be drawn with the help of internal person from actual organization. The process (flow) is easier to see with own 'internal' eyes ensuring that improvement work is based on real situation. Kim et al (2007,11.) and Fillingham (2007,6.) states it might be a good idea to test the process with other eyes, then every party can contribute in to the problem solving including the customer. This is called as team orientation. Learning Lean

together using effective teamwork is very important. (Machado & Leitner 2007, 385.)

4.6.1. Lean Transformation

Before actual transformation could start, it is better to have a good plan to find out any obstacles and to see the big picture. In lieu of concentrating to improve single disconnected steps in the process, it is better to study complete process, because this will give a possibility to see all impacts during transformation. When using Lean tools to solve problems it would be reasonable to take care overall lean transformation process, which displays also different single steps. Covering whole process, the transformation identifies tooling aspects e.g. when it should to be applied, what tools should be used and also it helps to find out what other steps there should be covered. Studying whole process helps to bring out preparation issues and possible post-processing steps. (Machado & Leitner 2010, 390.)

Phases of four define the transformation:

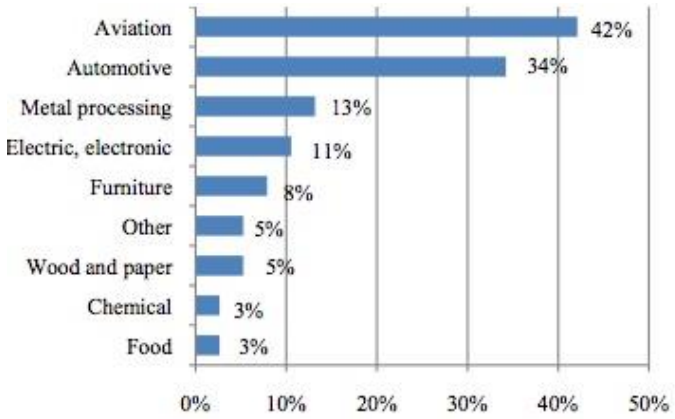
1. **Understanding current state-** it might be the case, when all processes are just impossible to be taken care at the same time and still follow a step by step process. It would be better to start from most important processes e.g. which have biggest costs or which are not efficient at all. Another option for the startup could be key processes, the most vital processes to the organization
2. **Defining future state.** Based on results from first phase, it is possible to divide phase one for steps of activities and for waste. Simply, which are value adding or not value adding ones such as inventory, over processing, transportation. These belong to the group of 7 wastes presented at sub topic 4.5.1. Now the goal is to reduce not value adding steps or possibly eliminate them all. It might be tricky to solve out how to eliminate these steps by Jimmerson, Weber and Sobek (2005,9.), but using root cause analysis like 5 Whys this operation could give more answers about problems and offers a way for possible problem solving. After finished root cause analysis, there is a chance to draw ideal future state map, a perfect target condition for Lean transformation process. This means, future state map would turn to be next current state map and ready for new Kaizen activities.
3. **Implementing in action** means simply turning vision from presented future state map to change activity, where the process is going to be re-designed towards to the form of new standard operation. Designing this new standard way of operation could take some time, because it should be tested many times and maybe redesigned again many times. All the way, the change needs good co-operation and communication between the design team and actual process workers. By Persoon, Zaleski, and Frerichs (2006) implementation phase needs supportive daily meetings and information sharing, so the people can test new operational standard and give feedback.
4. **Sustaining new standard way of operation.** When targets are met based on phase 1, there has to be a constant follow up for this new standard way of operation. It means the team, and line organization should ensure that improvements are going be sustained and operational activity is not returning back to the previous state. Often people will go back to their

‘normal’ state, the same state before lean transformation took its place. By Ben-Tovim, Bassham, and et al. (2007) the change have to be controlled and sustained and this is possible to reach only with a strong commitment by managers and employees. Lean way of doing have to be reminded many times through continuous cycles. (Machado & Leitner 2010, 390-391.)

When redesigning the process, in other words making improvement plan, it is good to bear in mind that the use of Lean tools may give better results and help to see and find other problems as well during this design process. Also Lean principles will help organization to keep the big picture on top of people minds like customer needs. (Machado & Leitner 2010, 391.)

4.6.2. Lean Implementation – Reasons and goals

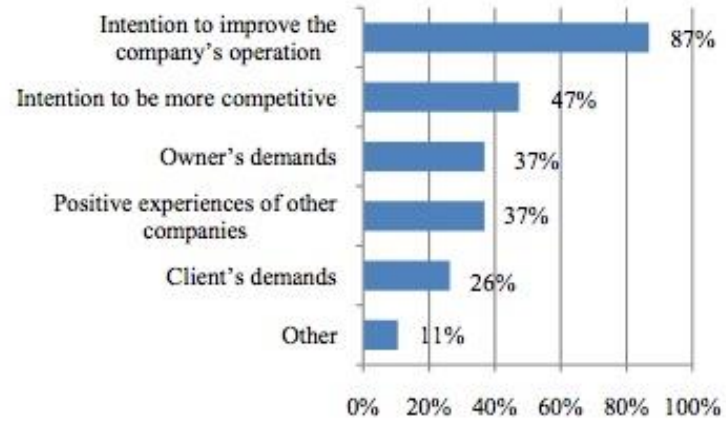
Organizations might have different reasons for Lean implementation projects. There could be particular reason or problem to solve and also accurate needs for the change. These reasons can vary depending on the case. Organization might see they should improve their production or organization would like to cut their operational costs. Stadnicka and Antosz (2013) studied Lean implementation and their survey was targeted get implementation information from large enterprises, which represented different industrial fields. The aim of the survey was to find out how aware these companies are identifying waste, and what is the status of their Lean implementation. Other aims were to solve which are the most implemented Lean tools and how what kind of implementation these enterprises have. Companies represented different fields: 42% came from aviation industry and 34% from automotive group. 27% of companies were big-batch manufacturers.



Picture 35.) Distribution of survey companies (Stadnicka and Antosz 2013).

According to Stadnicka and Antosz (2013) companies pointed out their special needs, which influenced into their decisions to adapt Lean and start the implementation work. Most reported reason was their intention to improve company operation by 87% of the companies. Runner-up was intentions to be more competitive by 47%. 11% of the companies informed other reasons like cost reductions, savings, facilitating the work and so on. Companies were also asked with a question about their main goal(s) regarding to Lean implementation. Elimination of waste was the main goal

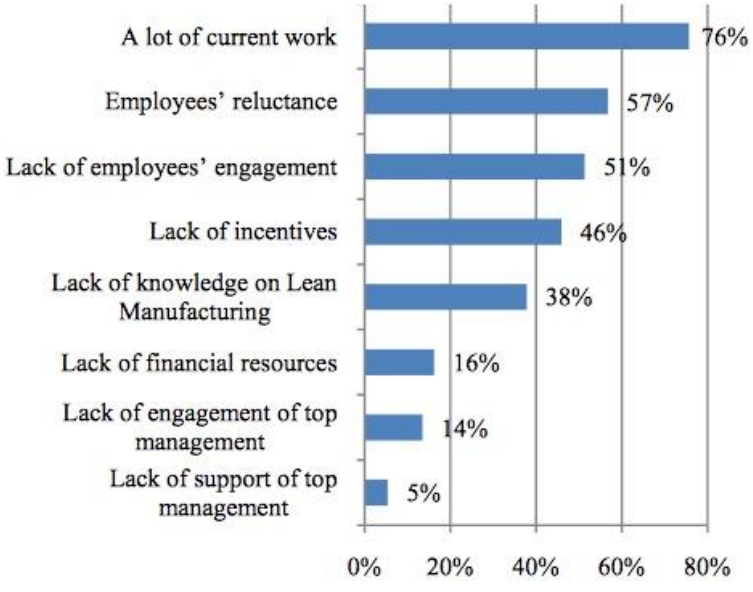
by 93% of companies. Second popular goal was the need for minimizing changeability by 15%. Other indicated goals were ‘’the need of increase company’s effectiveness, provide an unchanging pattern, recurrence of the processes/ production, employees’ satisfaction, reducing internal stocks, reducing inventory and facilitation of processes, minimization/ optimization of production costs (11%).’’



Picture 36.) Lean in Large Enterprises: Reasons for implementing Lean (Stadnicka, Antosz 2013).

4.6.3. Lean Implementation challenges

According to Stadnicka and Antosz (2013) 76% of enterprises pointed out difficulties during Lean implementation (picture 37 below). The main problem was the amount of current work. These companies informed other difficulties such as 57% of companies faced unwillingness, 51% companies saw engagement problems and 46% of them noticed about lack of incentives from the side of their employees. Moreover 38% informed about the lack of Lean knowledge. The study pointed out that engagement problems denotes the workers might need more education and information about Lean concept and also better motivating.



Picture 37.) Lean implementation difficulties (Stadnicka & Antosz 2013).

Cheah, Wong and Deng (2012) presents 1- 9 challenges, when implementing Lean manufacturing into practice (picture 38.) at Malaysian manufacturing companies. The most ruling challenge is the lack of common vision and how to tackle this challenge. Hierarchical relationship model (HRM) was introduced to maintain and explain relationships through Lean implementation challenges. *''Therefore as a remedy, communication channels both vertically and horizontally should be enhanced to facilitate continuous flow of feedback, knowledge, policy and strategies between employees and the organization.''*

Code	Challenges of Lean Manufacturing Implementation
1	Uncertainties in demand
2	Pressure from customer
3	Pressure from top management
4	Non effective method (e.g., inventory management)
5	Projects implementation
6	Knowledge and information transfer (effective communication)
7	Training
8	Lack of common vision
9	Non lean behaviour (increase flow time, increase waste)

Picture 38.) Lean challenges (Cheah, Wong and Deng 2012).

According to Kovacheva (2010, 18-19.) and Crute, Ward, Brown and Graves (2003) there are five factors to be noted when thinking about Lean implementation:

1. **Change strategy should be targeted and have a holistic approach**, which means the process should be planned as a whole, an adoption of the entire system. It is not a technique based implementation meaning picking up the tool and trying to solve one problem
2. **Company culture,** when management have a strong control it reflects to the organization structure and makes it more bureaucratic. This prevents or makes it harder to make changes e.g. from current way of doing to the new mindset way of doing things in other words it affects negatively to the way of working. When employees have a possibility to use different approach for doing the work, they will start to think differently and are more willing to accept improvements and common changes which are influenced by leaders.
3. **Product focus** should be targeted to the product value stream when using Lean thinking. Lean improvement team have a control to the results.
4. **Senior management should have a commitment** and a good cohesion when driving changes into to account. (Kotter 2007)
5. **Correct timing is necessary for performance improvements**. Right timing is essential when considering organizational changes and companies should carefully prepare the transformation. During the change, some implementation activities may need some risk taking ability and fast reactions from decision makers. Consequences have to be taken care later. (Crute et al.2003)

Dyrina and Gavrigova (2015) present that main concern is the vision, it means organization should understand what they precisely want from Lean production. Correct prioritizing is really important and it should operate hand in hand with systemization of Lean tools and the actual use.

Priority	Toolkit
Time	Shortening order execution or production (Just in time, Kanban, Map the flow of value creation, Visualisation, Standardisation, Hejdzhunka, etc.)
Staff	Increased productivity (5S system, Map the flow of value creation, Visualisation, Standardisation, Program improvements (SWIP), etc.)
Premises	Optimal use of space (Map the flow of value creation, Milk run, Hejdzhunka, etc.)
Equipment	Improving the efficiency of the equipment (Total Productive Maintenance, Program improvements (SWIP), SMED, OEE or Overall Equipment Efficiency, etc.)
Cost price	Cost reduction (Kaizen, FIFO principle, Planning of material requirements, MRP system, etc.)
Defect	Reducing the level of defect and improvement of product quality (Andon, Poka-yoka, Jidoka, etc.)

Picture 39.) Usage of Lean tools (Dyrina & Gavrikova 2015).

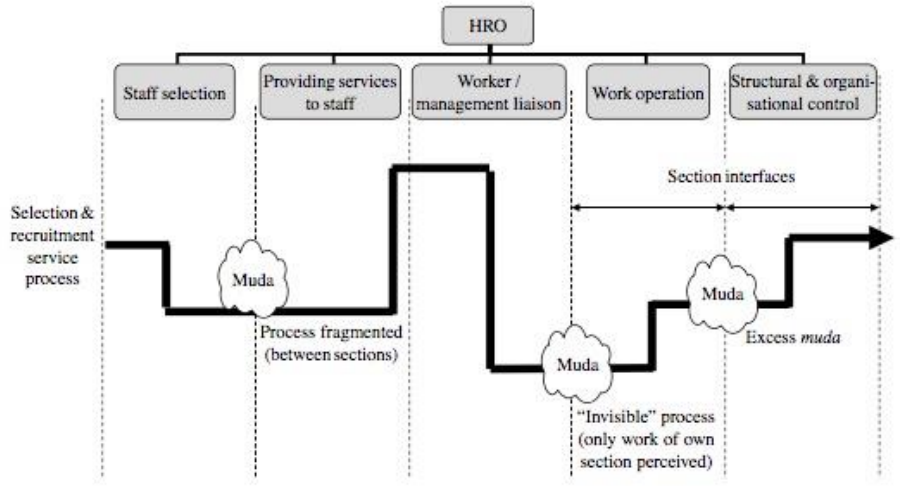
Above picture present how to understand and prioritize Lean tools and toolkits. Some of these tools could have many elements (priority) like Kanban, which has some features supporting it to be used in staff and workload planning or for instance reducing time as a waste.

Theoretical framework (Lean implementation) determine methods and techniques, and these two could be presented through Lean production algorithm. This algorithm could be proposed with six steps:

1. Identification - objectives and priorities
2. Learning - rules and guidelines of Lean production
3. Studying - Processes and activities, determining customer values
4. Finding - search bottlenecks
5. Linking problems and methods (tools), choosing correct tool for priorities
6. Activating – using the method (tools) and measuring results. (Dyrina & Gavrikova 2015.)

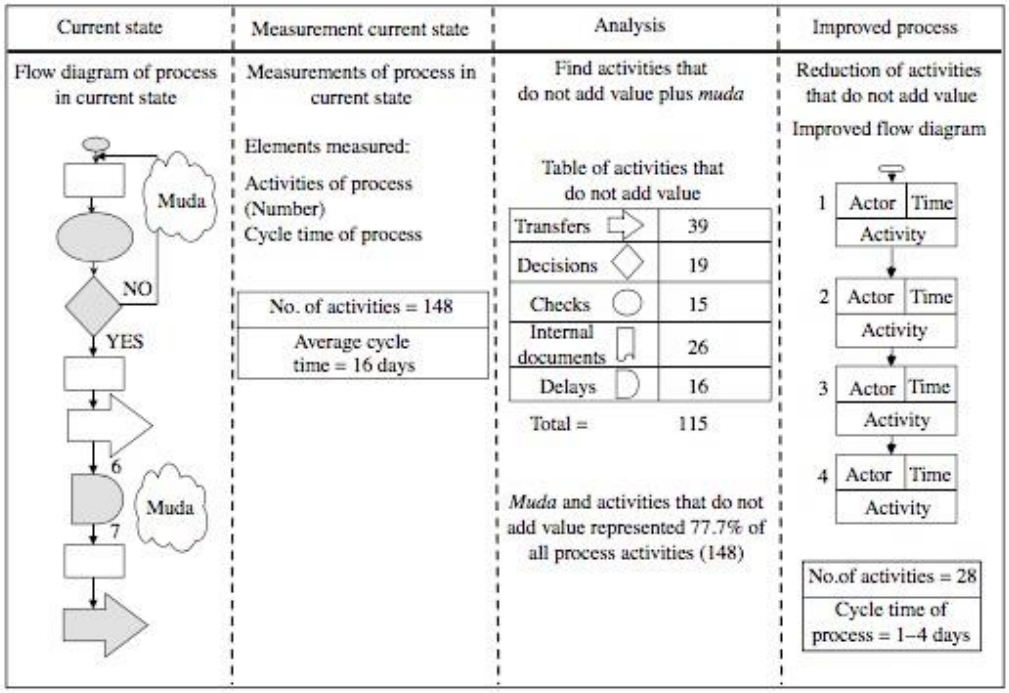
4.6.4. Lean-Kaizen implementation in Operation Management

Lean implementation could help organizations to identify possible places for improvement. Lean methodology is not meant to be suitable only for manufacturing or used in production platform, it can be very versatile and very adaptable in operations platforms too. Chapter 4.6.4 gives a fine example how creativeness supports Lean thinking and how well it serves operations management. Suarez-Barraza and Ramis-Pujol (2010.) presents illustrative example from operations management, the human recourse case, where public service organization used Lean-Kaizen methods to tackle problems in their HR-service process. Particular problem was that organization had inefficient selection and hiring process, which got lots of complaints from internal customers. The process had a very long cycle time, actually 16 days and the process did not satisfy internal customers and their needs. Main customers represented several technical areas of that public service. The whole organization suffered bureaucratic organizational structure and related management system. The goal of this change was based on organizations own conclusion about customer feedback and how largely this problem affected to their daily work. Main target was to focus on management system and actions to improve it in a way that delays could be minimized in that specified hiring process. First action was to draw a map from organizational structure and plan a strategy from that work area (hiring) and derive a vision, mission and values. After that came the policy definition phase, where these policies were turned into strategic objectives. Actually these strategic objectives were ‘’the case’’, because they served activity to improve their selection and recruitment process. Very important part when developing this process further, was the action of listening customers and their opinions to get more accurate data. These customers informed employee recruitment process should not take more time than five working days. They set up the ‘Gemba’-study as a workplace evaluation and Lean-Kaizen group was founded including five members e.g. head players from recruitment and operations added with two employees, who had a wide knowledge about the process. Fifth member was the manager from strategic projects and continuous improvement section.



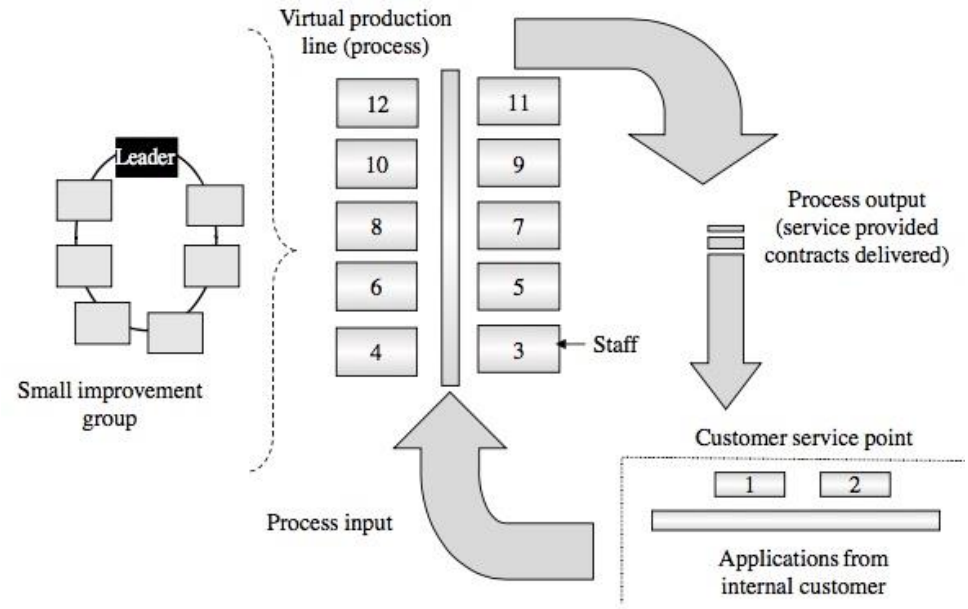
Picture 40.) Organizational structure and a process flow map (Suarez-Barraza & Ramis-Pujol 2010).

Conclusions were evident: ‘’*The human resource selection and hiring process was a core process that was essential for the public service organization, which directly affected the operation of its core process (in time and costs) and the satisfaction of internal customers.*’’ ‘’*That this process was in fact a micro-process, and so could be analyzed and improved by a Lean-Kaizen redesign methodology*.’’ (Suarez-Barraza & Ramis-Pujol 2010.)



Picture 41.) Implemented Lean-Kaizen process (Suarez-Barraza and Ramis-Pujol 2010).

After 400 hours of Lean-Kaizen training, the group had two main tasks: a.) go and see the ‘Gemba’, in other words, do the observation and study ongoing service process in practice b.) waste identification. During that phase, they interviewed employees on that process to gather any opinions about how to improve the process. Groups observations and employee opinions then turned to be the information source for Lean-Kaizen improvement work. A flow diagram (picture 41.) was planned and drawn to be as: ‘’*a guide for the staff involved in the process to estimate the cycle time of the service process before being redesigned’’*. After workplace study, the group implemented in virtual production line example, which helped the group to re-design the process. (Suarez-Barraza & Ramis-Pujol 2010.)



Picture 42.) Virtual plan (Suarez-Barraza and Ramis-Pujol 2010).

The group discovered the main problem, a waste, from that point where the process 'flow' changed its interface. It means the point of organizational sections. Precisely when the activity was transferred from 'Providing Service to Staff''-section to next section like ''Worker/Management liaison''. Findings proved that these 'inter-section' barriers should be eliminated, so the group implemented the virtual production line (picture 42). Now the objective was to improve 'customer–supplier' relationships, a way of working, where each sections should think and treat other sections and employees working there as a customer and this should be constant behavior in all organizational processes. All activities, which did not add value to the customer and to the process, would be eliminated. Guidelines below were discovered in order to eliminate waste. Organization executed also these guidelines:

i. Any creation of internal documents like official letters, progress notes, intermediate reports etc., which do not add value, should be eliminated
ii. Any internal transfer actions with unnecessary delays, which do not add value (between sections or employees) should be eliminated
iii. All actions, where documents are not given to other colleagues should be eliminated
iv. Physical working places (sitting places) should be set again so, that people should be sitting opposite or beside with their colleagues without any organizational or physical boundaries. (Suarez-Barraza & Ramis-Pujol 2010.)

Organization re-shaped operations and got more productive process into their new standard of HR services.

5 OPERATIONAL EXCELLENCE (OE)

The nature of continuous improvement can give some explanations about its probability rate to reach excellence. Its nature, the systematic approach can help us to understand how to reach superior performance. This journey to the excellence means something special, the result could be ascending business growth and better profitability, but also it means high quality products, services and better customer satisfaction, actually notified approval from customers. Usually, the term superior performance informs that operations are well planned and executed. Worldwide example of Operational Excellence can be introduced through Toyota Motor Corporation's success story - this automotive company has reached the success not once, but several times.

All actions, where the target is to leverage business and its operations to get actual business growth must be based on planning. It means that organization should decide what is their goal and what actions are needed in step by step to reach Operational Excellence. This process could be described as a journey, which will lead to the OE or to the point, where every company employee recognizes the flow and its value to the customer and is able to fix the flow before its breaking point. In fact continuous improvement would be a never ending journey, simply because organizations will try to improve their business all the time. During this journey the organization will learn, develop, plan and execute their business operations in terms of continuous improving cycles to get better results and also maintain it in order to reach long lasting phenomenon. In traditional context the outcome is just trying to fix errors and get over it. Setting the goal for improvement(s) reflects to the operation and its future state. In above traditional situation company may turn to be more efficient and could reduce some costs, but the business is not growing even with help by these 'improvements'. Also the success needs to be punctuated with customer demands from supporting market and also other 'real' reasons for improvement to turn the business more efficient and profitable. However, there might be a case where customers do not want or especially do not need products anymore without a doubt of the excellence of it. (What is an operational excellence 2012.)

Often companies are outsourcing their production and keep some parts of production with themselves doing less than before. This means all interested partners in this specified supply chain should have a kind of voluntary alliance for each other to oversee non-integrated value streams. These alliances will live longer such as their products, if they carefully examine and maintain product specified value creating steps. The time for value creating activity might be long and it depends about the product type. In software application business the product lifetime and its development time could be quite short, but in automotive industry it can take a decade or more. Activity to create alliances or just a common language between these companies requires 'out of the box'- thinking. When creating lean enterprises, it is a time for new cultural relationships, where companies can establish common and shared principles to maintain their behaviour with each other taking care a good transparency through all steps when they enter to look about their

common value streams. Acting this way every participant has a chance to verify, how their partners are acting with agreed principles. (Womack &Jones 2003, 36-38.)

Studying company values, we can learn about the company culture and visions with goals, which might give us hints about their desired Operational Excellence. Studying economic figures, it is possible to estimate how successful the business would be in near future or in which phase the business is now in towards to reach the success, the Operational Excellence. When looking through information about alliance companies, this chain might have common values and operational similarities, which tells something about their cultural dimensions. When operational excellence is just a phenomenon of successful business, there are multiple reasons behind the success. If looking through CI-context in wide perspective, most of known successful cases underlines the importance of organizational culture and leadership.

5.1. Organizational culture (OC)

Culture itself is an abstraction, it has a context derived from social and organizational environments. Forces derived from these environments creates this abstraction. These forces are powerful and we need to understand them to get right answers, which will help us to explain many things happening inside organizations. (Schein 2010, 7.) A close study to the culture and leadership shows they are close relatives to each other, but representing two sides of the same coin. Cultural norms define the leadership such as a same way, even inside the nation or corporate company or similar type of organization. Actions presented by leaders creates and manages the culture, they even might have an ability to work with the culture, understand and develop it further. This can be seen also from dysfunctional view, where leadership can even destroy the culture. (Schein 2010, 10-11.)

Schein (2010, 23-24.) presents that culture is possible to divide in three levels:

I. The level of artifacts.
- this level describes visible artifacts like organizational processes and physical offices, facilities or even observed behavior

II. Level of espoused values
- presents ideals, goals, values and missions

III. Level of underlying assumptions
- performs such issues like unconscious beliefs and values (taken for granted), which would affect people behavior and feelings. This level of theory states that organizational culture is a paradigm controlled by group of people, which will see it as a standard for the current.

These three levels can be used to measure and study culture in any forms of groups or organizations. Truly important is to understand basic assumptions and after that to come to the stage of understanding espoused values and finally how to interpret first level, the artifacts. It is good to know, that artifacts might be easy to observe, but unwrapping the context of artifacts is difficult. Level II, espoused values and beliefs might mirror only about rationalizations or aspirations. Leadership is based on beliefs and values, and

these aspects determine how people deal with problems, internally and externally. As a matter of fact, leader's assumption regularly turns to be a common and shared assumption. When shared assumptions are realized through organization, the group gets its identity and character. Then group of people and individuals could create cognitive resistance mechanism against these assumptions processed by leaders. Groups and individuals have a natural tendency to seek meaning and stability. It is much more difficult to change basic assumptions, than use defense mechanisms like denial, projection or rationalization to tackle intentions, which comes from the leaders. (Schein 2010, 27-33.)

Traphagan (2017) declare that typically organizational culture would be presented as a unifying force, which gathers people together to work towards to obtain organizational targets, but this is not so useful determination anymore. OC has also a feature of division, which means a culture is not a set of shared values. People could understand values differently and disagree this abbreviation through their personal beliefs. Instead of shared values culture is just something what people use in common to achieve their goals. Common values can be seen as an exercise of power, *''People will react to that expression of power in different ways depending on the extent to which the values associated with the organizational culture resonate with their personal beliefs''*. According to Traphagan (2017) culture is more like 'web' of power relationships and people are using its features to maintain their personal goals, but also to setup their personal goals to be as collective goals. It may also affect to their abilities not to obtain these collective goals, because people have differential access for resources. Any difference in power could affect to the way what people think about shared values and how they will respond into it.

In real life leaders would define first development steps for wanted organizational culture, which could lay on and represent their personal visions, beliefs, values and goals. All these are assumptions about how things should be in this organization. However, it can be said that leaders own activity does not automatically proceed wanted culture further, rather it can generate some compliance among followers when executed. If this 'to do what leaders say'-activity reaches success and members of the group operates well under these ordered actions and feels good about group relationships, then leader's original beliefs and values would be confirmed and be strengthened. Right after these beliefs and values are going to be recognized as shared assumptions such as a 'correct way to do it' form of activities. If these activities fail to get success, members of that organization would start to find any beliefs and values from direction of other leadership, and this activity could lead them back to the right track of success creating the new cultural formation. If success continues these values and beliefs will change their form to be non-negotiable assumptions. Again, if this organization would gain more success, these assumptions would grow more to 'be taken for granted' and people then have more trust into it. This reaction will launch a new identity for the group and under this identity they feel and act together such as a way what leaders are waiting them to do. (Schein 2010, 19.)

5.2. Connection between cultural factors and successful Lean implementation

Prevalent literature, including many research studies, states that most of Lean failures are just pivotal expressions of change management actions and connected to corporate culture. Najem, Dhakal and Bennett (2012) quotes by Wong (2007), that successful lean implementation needs cultural adaption, simply it is the key for success ‘*’The main condition for building and achieving an excellent lean enterprise is an organizational culture, which should be built on empowerment of people, partnership with stakeholders and continuous improvement manner where all employees participate in day-to-day decision making process.*’’ (Najem et al. 2012, 125.)

According to the Society of Manufacturing Engineers SME survey, targeted for large British companies, it seems there is a connection between failures and cultural factors. Based on survey results, at least companies knew this fundamental aspect in reflection to above Wong’s statement. The survey presented an issue with related questions about the context: ‘*’The organization promotes a culture which maintains the challenges of existing processes by proactive systems such as Standard Operating Procedures’’* were asked from participants (companies). Results showed that 77% of large organizations supported this statement by scoring 7–10, 57% of medium sized organizations scored a 7–10, and 42% of small organizations scored a 7–10, where options were scores from 1 to 10 (10 as totally agree). (Bhasin 2012, 352-353.)

Liker and Hoseus (2010, 34-50.) mention that the base element of Toyota’s success lays on corporate organizational culture, which have supportive pillars of two – Continuous Improvement and the People. Toyota’s organizational culture takes care also about partners through their 4P-model. Every worker is called as a team member and the people with their teams are included in Toyota’s annual plan and long perspective future plans. This way people are committed to maintain company’s philosophy, principles and practices.

Gao and Low (2015, 156.), Toyota Way internal document (2001) and Liker (2004) present that people are the most valuable resource and the corner stone of Continuous Improvement. People includes also suppliers, network of partners, teams and all leaders. This culture supports people and stays behind on them.

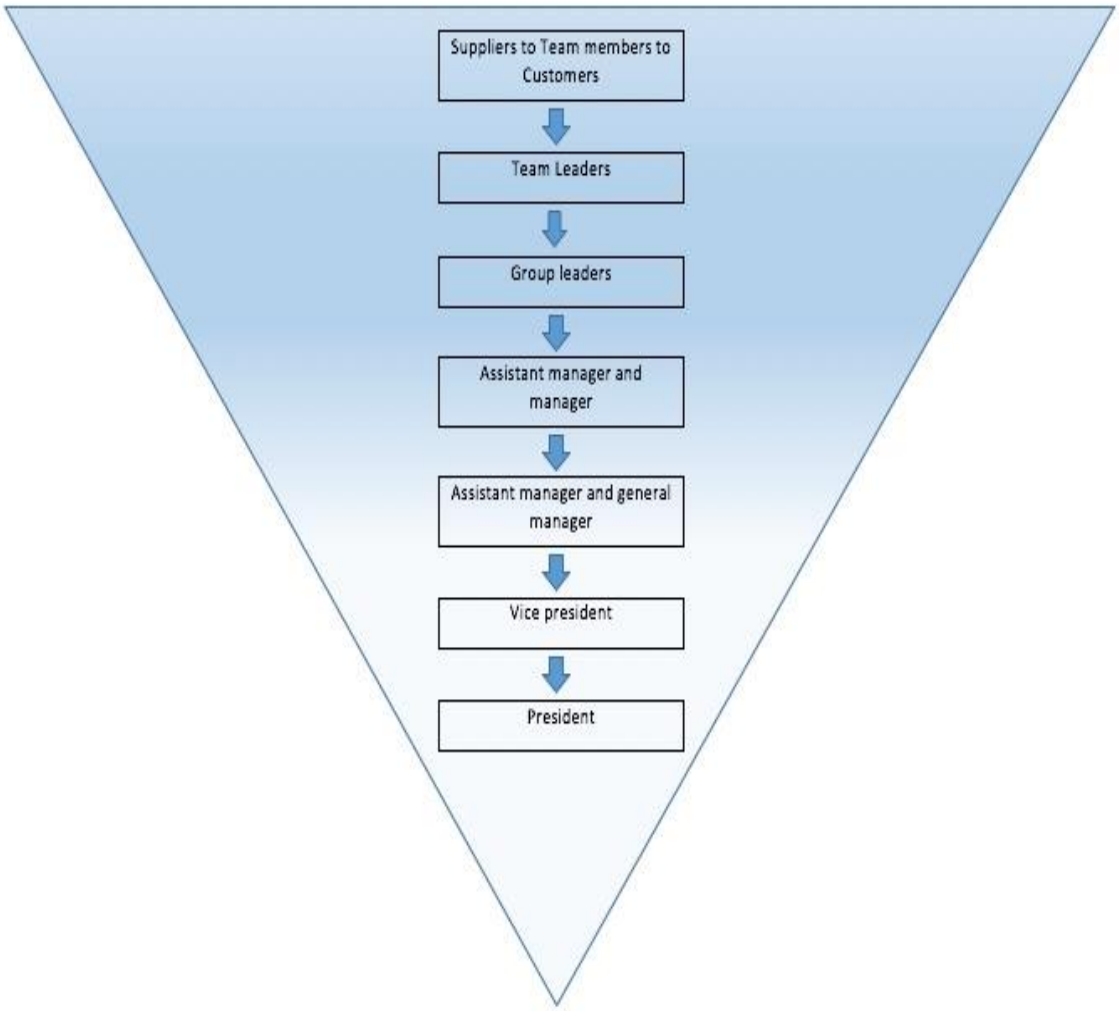
According to Al-Najem et al. (2012, 122.) by Dahlgaard and Dahlgaard-Park (2006) successful Lean adoption is only possible to reach by an organization, where all levels of people are supported to participate like senior management, middle management and shop floor employees.

5.3. Leadership supports Operational Excellence

When organization would like to turn their presence from traditional company into Lean organization, they have to think about their leadership again. Womack and Jones (1996,147.) present organization should have three types of leaders: ‘’ *someone who is committed to the business for the long term and can be the anchor that provides stability and continuity; someone with deep knowledge of lean techniques; and someone who can smash the organizational barriers that inevitably arise when dramatic change is proposed.*’’

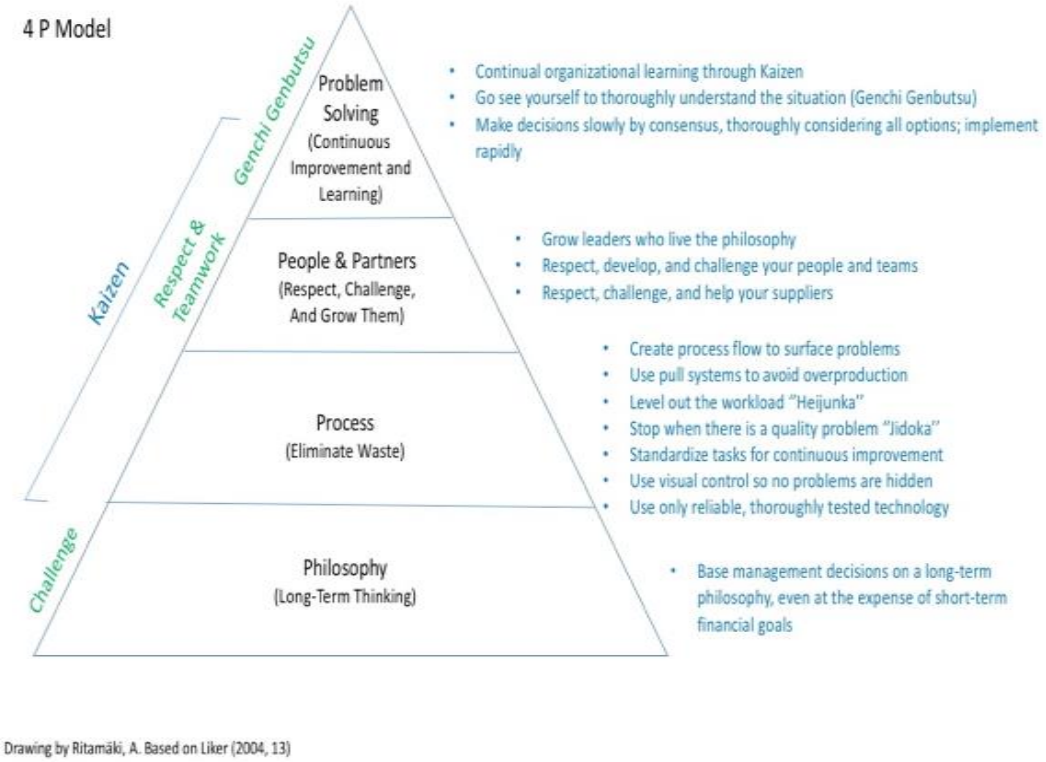
According to Al-Najem, Dhakal and Bennett (2012,122.) introduced by Larsson and Vinberg (2010) the culture and leadership together are really important matters when organization tries to route their business towards to the success. The success has a strong connection with leadership behavior. Lean manufacturing system sustain leaders who can inspire other people and encourage them by leading with their own examples. This type of leader would affect to whole organization and its performance. Al-Najem et al. states (2012, 122-125.) by Nwabuezea (2011) there are ten important attributes for describing a good leader. These attributes are very important when leader deals and communicates with business colleagues and employees. A good leader can be described through key attributes like a sense of a good command and good planning skills, but also he or she should have an open personality, controlling skills, strong mind and be a good organizer. In addition, other recommend attributers are listening skills, hands on ability, team playing and he/she should present high level integrity. Good leader also has skills to setup healthy organizational culture based on triangle model. This model considers leadership, senior management and employees and courage organization to plan activities together.

Toyota uses leadership model called a Servant Leadership. It means that thoughtful leaders would create a culture, which can support them to achieve superior results with the help of trusted team members (all people). This concept was confirmed by Toyota Motor Manufacturing Kentucky’s (TMMK) Mikio Kitano, who turned their organizational chart upside down and also prioritized team members to be on top and leaders to be down side on that model. The idea is simply to recognize any value adding work – building the car is the main process and team members would add value on that specific process. Leaders would add their value only when they are supporting team members, which are still most active part for adding value to that main process. In the perspective of traditional organization, leaders are presented on top and people believe they have all knowledge and all value adding capacity. (Gao & Low, 157-158.)



Picture 43.) Servant Leadership drawn from picture by Liker and Hoseus (2008).

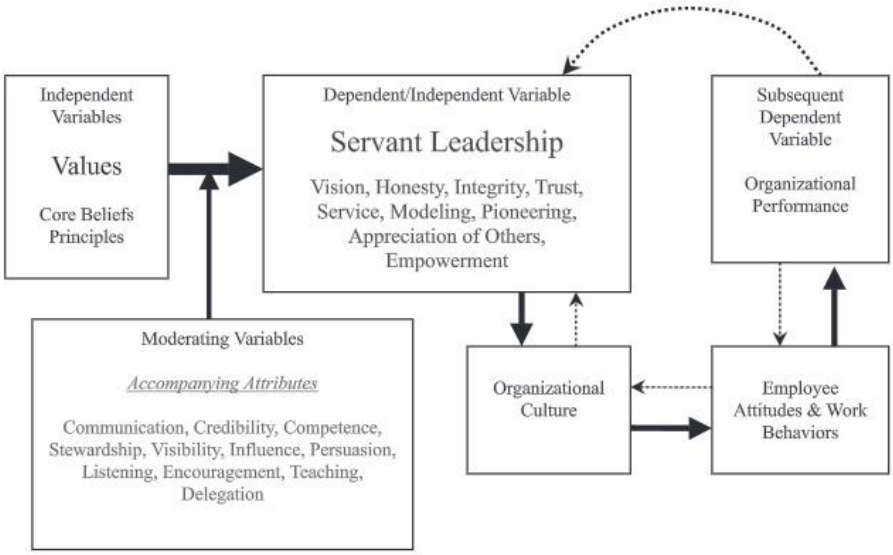
Liker (2004, 13.) states Lean leadership could be drawn and presented also through 4P-model, where leader should make attention to long term philosophy even against for short term financial goals. People management has a very important part, when reaching to the success. At 4P model people are the most important asset. According to Gao and Low (2015, 159.) Toyota leadership model highlights that leaders should have in-depth knowledge about the work, decent development ability to guide, mentor and lead people. Developing people and their skills effectively leads to the improved performance and this ongoing cycle will lead to the success. Toyota expect leaders to continuously develop people and to constantly grow capable skilled workers.



Picture 44.) 4P-model of principles drawn from picture and text by Liker (2004, 13).

5.3.1. Leadership during the change

Good organization realizes there is always a possibility for fail and there could be numerous issues behind the fail itself. Shimokawa and Fujimoto (2009,92.) presents this possibility by Taichi Ohno's sentence "*Learning from mistakes is a common sense. You also need to learn from what you've done when you're successful and put it to work in tackling new challenges. When you've just attained a target, that's no time to pat yourself on the back and relax."* Any improvement activity needs support from the culture. The culture and leader's effort enables the change towards to its success. Leaders will enhance the change closer to the state of Operational Excellence and then it can be connected into business results. When the change is ongoing, it must be maintained right. Actual maintenance work has many forms – learning is one them. Under right CI philosophy, learning reflects actual doing in the workplace. If there is a problem, it should be fixed and then learn from it. If there is a chance to do it better, why not to update the form of doing and to teach it for others. Maintaining daily work and doing regular follow up checks with superiors will develop teamwork and supports motivation. (Shimokawa & Fujimoto 2009,254-260.; Liker 2004, 303-304.)



Picture 45.) Servant leadership model 2 (Russell & Stone 2002).

Russell and Stone (2002) explain how leaders can change the organization by using Servant Leadership model. As an independent variable it affects to whole organizational performance. Cache variables like employee attitudes, work behavior and organizational culture could affect into Servant Leadership and especially its intensiveness and productiveness. However, it is a concept in order to escalate personal and organizational transformation. As a concept it can revolutionize organizational life and develop interpersonal relations further at workplaces.

5.3.2. Leadership Commitment

Leadership commitment means that specified Lean mindset should be present in every phase of activities like making decisions or phasing a problem or when there are new opportunities to deal with. This is only way if organization would like to be a true Lean facilitator. There are leaders who come from different kind of context and they have been taught to do run budgeting, decision making or just checking the status for example. Also there are leaders who think they are fully representing Lean commitment, but in reality their 'lean' is managed through traditional form of project or program based work. (Rosenthal 2010.)

Many cases prove that successful Lean implementation should start from viewing and discussing about company strategy and what role Lean has that overall strategy, so it can support the company aim. It seems that if leaders do not have clear understanding how to deal with Lean, even they might have a commitment to run Lean methods and tools, their commitment and drive would start to fail and all this positive change energy will go down. When continuous improvement programs or strategies fail, in most of cases the root cause for fail is the lack of leadership commitment. However, when leaders have this commitment, there are still examples of fails and then the reason is

behind complexity of Lean. Actually, there might be loose information e.g. some missing parts in strategy level or tactics. Overall Lean thinking might look like a tools or method set, which can be driven pretty straight forward. Thus, company leaders might find themselves in the middle of hard implementation problems and they do not exactly know how to cope or fix it for further. After these experiences leaders could easily declare that they tried to adopt Lean, but it did not suit in their business operations. Common problem is just missing basic knowledge of Lean foundation and limited information how to implement it. Before possible adaption organization should carefully study what elements and dependencies there should to be taken care. (Bohan 2016.)

Liker (2004, 292.) present Lean as journey and therefore suggest any organization should test their leaders commitment using a flow map, which can be used to test commitment before Lean journey. This flow chart gives some hints for leaders what kind of commitment is needed.

5.4. Culture and Leadership enables the change

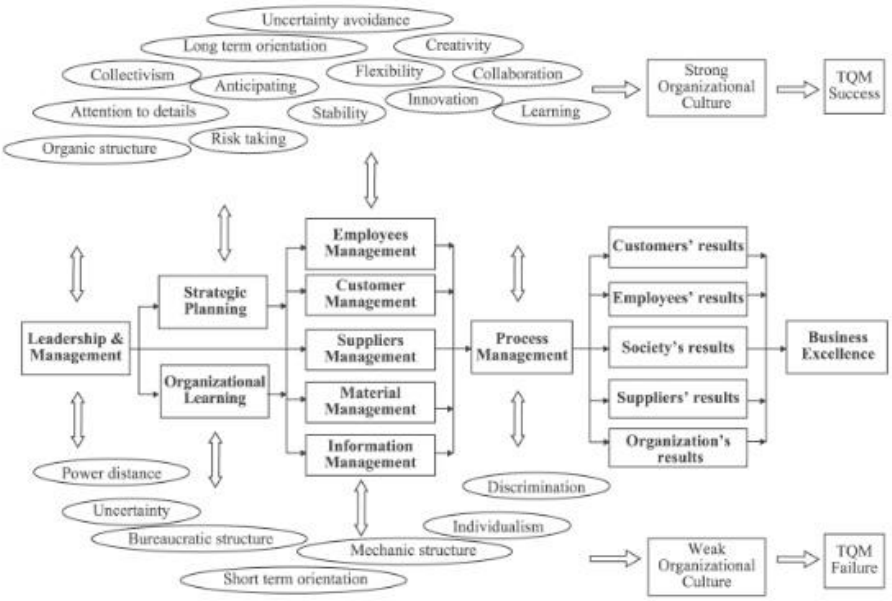
The search of improvement will engage the organization relentlessly to make things better than before. Organization should define the target and the plan, which has a strong priority to enable pursuit of perfection in order to reach operational excellence. (Miller n.d.)

After Lean implementation organization have to find their footsteps to sustain the change. The change needs a transition where culture supports this change in all levels such as a commitment like leaders should support it. It seems that after first results have been achieved and performance indicators are illuminating slight rising steps on curve, business unit leaders think they are all right now and this momentum will automatically continue. This belief turns their attentions for something else and they are not nurturing the change anymore. Nevertheless, the transformation has just begun and the change just needs leader's engagement more than ever so that attained change can continue positively. Lean program needs maintaining and care so it can drive organization to gain positive long term results. Below memory list helps organization to sustain the change during its first three years after implementation:

- Current performance analytics and follow up should be discussed widely
- Employee motivation should be taken care and seek constantly new ways to improve it
- Training and learning should be supported regularly
- Leaders should involve and show interest all the time and participate directly in any Lean efforts. (Noonan & Panebianco 2013.)

Improvement work can be challenging, it needs constant support from great leaders, capable managers and skilled workers. It is not just a tool related operative action. Also it cannot be organized or trained into people. Instead it needs cultural transformation, where every employee is committed every day to make tiny changes, sometimes larger ones. In fact, all organizations are in changing state, which means some kind of ongoing transformation process. This transformational state can be known or unknown. The point is

what would be the state, where company is being transformed and who are the architects behind this transformation? These questions do not arise, when leaders have their personal responsibility and knowledge in use to guide and architect the culture of continuous improvement. One of the trademarks of successful organization is based on leader activity – they should lead the transformation and get responsibility of it. Then Operational Excellence would become a state, which is the consequence of practices based on ideal behaviors. Behind these behaviors are principles, which are guiding all activity inside the organization. All these activities, the core work, should include these practices, behaviors and principles. Changing the culture is not possible without changing behaviors *'' When leaders anchor the corporate mission, vision and values to principles of operational excellence and help associates to connect and anchor their own values to the same principles, they enable a shift in the way people think and behave.''* (Miller n.d.)



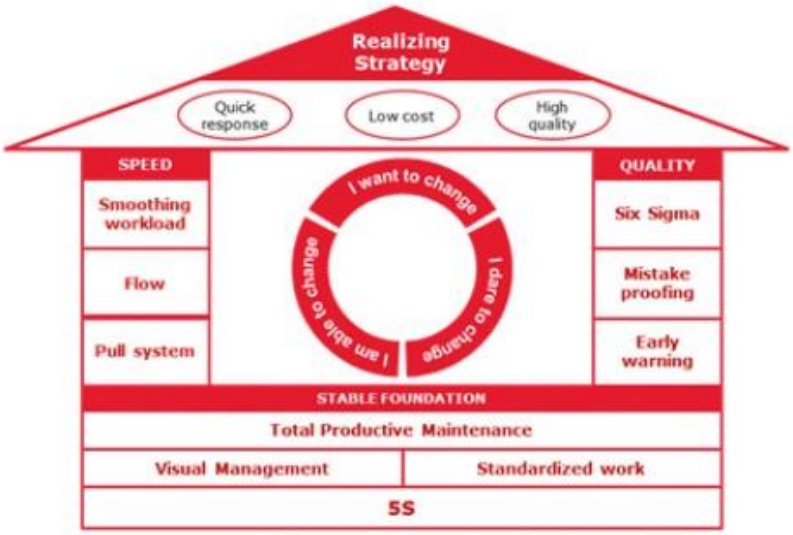
Picture 46.) The impact of organizational culture on the successful implementation of total quality management (Rad 2006).

Rad (2006) presents the link between quality improvement through TQM and organizations ability to provide culture to serve and maintain the change in above picture 46. Organizations ability to change is better, especially when members feels that transformation during the change is not conflicting with the organizational culture. Organization with strong organizational culture has a better chance to gain success and to survive when facing problems. In the case of Total Quality Management best results can be reached when TQM has a connection with organizational culture, which is open, collaborative and co-operative to serve new approaches. Senior managers have to take care about the culture and make sure that *'' the organizational structure, management style, training, communications, compensation and promotion systems, and systems, procedures, and processes reflect TQM values and principles.''* Employees should contribute continuous improvement activities and programs, so above cultural operatives are necessary to be taken care.

5.5. Operational Excellence Strategy (OES)

After replying to the question why, most likely, organizations have all different setup or starting point for the change. Good questions would arise like: what does this transformation means or what we have to do to achieve wanted situation and how to build up our way into the success? Before executing activity, there should be a reason and goal articulated very carefully before applying anything. Just saying we want to get better results is not relevant enough nor just cutting costs. Answers should be more accurate and reasonable. Before strategy or planning phase, real visions and goals should be discussed clearly. (Groover n.d.)

It seems that only way to reach sustainable results is to connect Operational Excellence into the Organizational Culture. It should be constructed like an integrated connection, where organization gives attention to processes and the people, whole organization surrounding them. In order to achieve results all over again, 50% of all efforts should be targeted into change management. Common mistake is to focus too much on methods and related aspects. OE-plan should be taken into consideration before doing anything. It means that improvement work could start by taking attention into organization and its goals and then realizing decent strategy. After that work design phase could start and it would be followed by planning, execution and realization phases. (Operational excellence n.d.)



Picture 47.) Structured approach (Operational excellence n.d.).

A good plan seems to be evident, above model shows how OE-strategy has a connection with other layers. Continuous improvement cycle is in the middle of the house describing all that activity.

Operational Excellence Management System (OEMS)

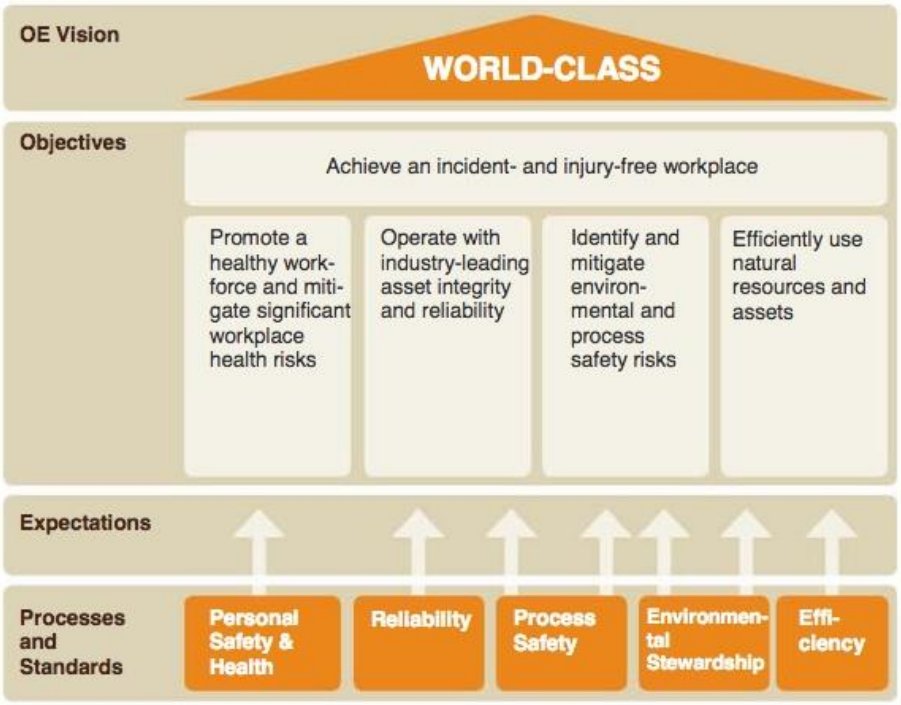
Operational Excellence is more possible to reach when all activities are based on systematic behavior whether it has a focus in planning, operations, selling,

purchasing, projecting, processing etc., it means that people in that organization should have a clear focus whatever they do. OE can be a strategy, which has a vision and objectives.

Chevron as a worldwide energy company group reflects strongly with OE presenting their strongholds: The Chevron Way, Operational Excellence, Leadership and Culture, which works together supporting each other as a strategy. Chevron (n.d.) states ‘ *’Our success is driven by our people and their commitment to getting results the right way – by operating responsibly, executing with excellence, applying innovative technologies and capturing new opportunities for profitable growth’’*

Every organization could have their own expression and description about Operational Excellence, and it should be connected heavily into the vision and goals. There has to be a clear reason for CI activities, so people can align their work and their presence at the workplace.

Chevron (2010) describe their OE-vision and its five objectives: “*the systematic management of process safety, personal safety and health, the environment, reliability, and efficiency to achieve top performance.”* Chevron use their own vision and goals combined into OE-system, where leadership works in close contact with the culture. Their OE Management System defines three elements: Leadership Accountability, Management System Process and OE Expectations. Organization has very detailed, and standard operational approach and the target is to achieve world class performance, which is possible to reach by systematic work and continually improving processes.



Picture 48.) OEMS by Chevron (Chevron 2010).

6 RESEARCH QUESTIONS AND GOALS OF THE THESIS

The aim of this thesis is to understand continuous improvement and its connection to the success and produce operational manual type of collection of specific guidelines from continuous improvement targeted for small and middle sized companies, which are thinking their transformation from state A to state B using any continuous improvement philosophy or methodologies in order to help their overall change e.g. improve their business, add more value to the business, reduce costs or improve their production and projects. This study concentrates topics of continuous improvement and how to transform the business in able to achieve the success? Thesis research scope concentrates analyzing continuous improvement strategies, -processes, -methods and how possible success is in connection with organizational culture and leadership. Looking through the authors side in order to find answers for above context, the best way was to get attention for large theory base and also ask questions from organizations, which have implemented continuous improvement into their businesses.

6.1. Thesis goal and objectives

Thesis primary goal is to find out what are the success factor(s) of continuous improvement and second goal is to clear out what role organizational culture and leadership have in that transformation to the success. Thesis objective is to form and produce operational manual type of guideline set, which can possible give some information about continuous improvement for small and mid-sized organizations, who might have needs for business improvement.
As a part of the case study and research, the goal was also to find out any possible problem and suggest a possible solution for the problem.

6.2. Main research questions

Research questions will help actual research work to obtain the goals of the thesis. Main themes (questions) of this thesis are presented below:

What are prevalent current theories and models of continuous improvement as a CM discipline through Lean and related philosophies?'

How to develop the change management proactive and pervasive; knowing that the responsibility for initiating change needs to be syndicated across the organization?'

How to improve leadership during the change? As known 80 to 90 per cent of change management is leading people and only 10 to 20 per cent for leading substances

How organizational culture and leadership impact to the change management and possible success and how CI could be implemented to organization culture and daily business so It can ensure a permanent change in journey to the excellence?

In order to find answers for main research questions, supporting questions are presented below. These secondary questions would help to maintain interviews and when searching fact based information from large theory base.

•What are the main reasons for CI based change management failures/success?

•Why the goals are often disconnected from reality or reached partly?

•How well the organizations know about the connection between organizational culture and leadership and take these issues into account when using continuous improvement tools and methods in their change management process?

7 METHODOLOGY

This chapter determinate used methodology in this research. The methodology of this research displays its strategy, methods and also research implementation. This research as a case study is following formula of qualitative research study and it gathers together authors own analysis and material from data sources.

Hirsijärvi, Remes and Sajavaara (2002, 123,194-197.) states a case study presents the subject in detailed level and needs realistic data based on natural environment. The subject can be single case or just present small group of issues. This research is based on interviews with planned themes. Themes are based on supportive questions, which is one characteristic of structured interview.

However, normal discussion around themes were obtained and this helped to get more detailed information about the subject. Questionnaire with closed questions was first data source from the case and it helped to plan themes and subtopics in order to help and support coming interviews with company representatives. Also this questionnaire was sent to other companies as well to get comparable data about the subject. Other companies were using also CI methodologies in their businesses. Also supportive interviews were established with some of these companies. Thesis theoretical framework covers known theories and variety of known natural cases, which helped to bring out own analysis and to develop themes with questions.

7.1. Data collection

The primary data source used in this study was the case study organization and its representatives. The author believes the data based on interviews has not been introduced earlier in public. Theoretical framework presents known data collected from prevalent literature, researches and articles, which have been gathered during this study for different purposes. Also particular, supportive research was executed using questionnaire, which has not been

used before. The material data for this study was gathered in order to help researcher to find answers for research questions.

Main data collection methods were case study interviews and a web survey (questionnaire). Also few interviews were established to get supportive data from small number of companies. These companies also answered to the questionnaire.

Web survey was made during fall 2016 and early spring of 2017.

7.2. A qualitative research using case data

Qualitative research is a type of scientific research and in general it can be used in terms of investigation, which tries to find answers to a question or questions. This method's nature is naturalistic, emergent and purposeful for studying real world situations and possible cases for study. It helps researcher to find answers to the questions and collects evidence based on research problems or questions. Also researcher is open for findings which were not possible to evaluate upfront. One of the benefits of this method is that it gives a possibility to find specific information about the leadership and organizational culture which have a context of human behavior, -values and other related social content related to organizations, which uses continuous improvement. (USC Libraries 2017a; 2017b.)

Based on known theories and prevalent literature there is a possibility to get a decent picture about continuous improvement. Furthermore, planned research will get more detailed and practical information about the context. That is the reason for choosing qualitative approach. This research presents a case study from organization MC, which is using CI as part of their everyday work. This case data is based on many interviews and questionnaire data. Also author will use same basic questionnaire to gather data to get some information about the status of CI in other organizations.

7.3. Questionnaire

This thesis questionnaire is a closed list of questions, which are identical for every party to be answered. This questionnaire was also used with a case study to gather information about the status of CI in that organization. It implicated the direction for interviewing specified company people later. Interviews were meant to be events which will go deeper in the subject to get meaningful information and answers for research questions. Same questionnaire as mentioned above, was used to collect supportive information about how other operative companies in Finland proceeds CI in common including questions how they see the link between operational excellence and organizational culture with leadership during the change. All answers are evaluated as a background information to get some information how organizations would think about operational excellence if using CI as a main method.

Denscombe (2010, 165-166.) states questionnaire can hold two types of questions, a closed type or open type. Closed ones are typically presented with choices that respondent can pick up. It means that answers are going to be categorized, because they are pre-determined by researcher. Open questions give a chance for variation, so respondent can decide the context what to answer.

In order to get unique and comparable data, this study used closed and open questions. For finding out the situation how company think about their situation at CI journey, closed questions were mainly represented in that questionnaire. Although, in the end of closed questions there were open textboxes to answer without any restricts. After questionnaire, open questions were mainly used in case interviews to gather unique data based on their experiences during CI journey.

7.4. Validity of the research

Research should focus on meeting those objectives what were presented to be measured and find answers in such a way that research has a validity. In qualitative research, the validity is more reliant with respondent's authenticity and in the way how researcher treats the data and validate results based on interviews and possible questionnaires. Golafshani (2003) presents by Eisner (1991, 58) and Stenbacka (2001, 551) that a good qualitative study *''could help to understand a situation what otherwise could be enigmatic or just confusing''* and if looking qualitative study as a quality concept, it has a purpose of generating understanding about the subject.

Validity can be proceeded after each interview by presenting the summary of that interview and respondent would notify if it is valid or not. In similar way, researcher can ask validity and member check sending case study results to respondents of that case organization. Herani and Advani (2016, 14.) presents validity by Lincoln and Guba (1985) who described how it can be proceeded using methods like ''member check, interviewer corroboration, peer de-briefing, prolonged engagement, negative case analysis, auditability, confirmability, bracketing, and balance". Validity checking in this thesis research would be proceeded by member checks and corroboration and also comparing results for those researches, which has been published already.

8 RESEARCH RESULTS

This section reflects within the information from theoretical framework part of this research. Research analysis collect findings and related information from the case study and considers known information and tries to connect theoretical data with this research data. Within this approach, there is a possibility to produce also new information about continuous improvement e.g. leadership and cultural aspects behind it. Therefore, analysis have a strong connection for organizational culture and leadership and how these two topics impact to change management and its possible success. This information, which is gathered from interviews, are based on discussions with representatives of the case organization, will be analyzed and reflected with the data from theoretical framework. The aim of this analysis is to find answers for research questions, strengthen, patch or produce theoretical information about the subject. Also author would search for a possible problem if possible from the case company's business operations and produce new information or possible solution about the problem and recommendation from the case material.

8.1. Operational Excellence – A Case Study

All case study material is based on interviews, discussions, company material and email correspondence with delegates PL and AV from the case company. References would be attached so it supports anonymity by their own will.

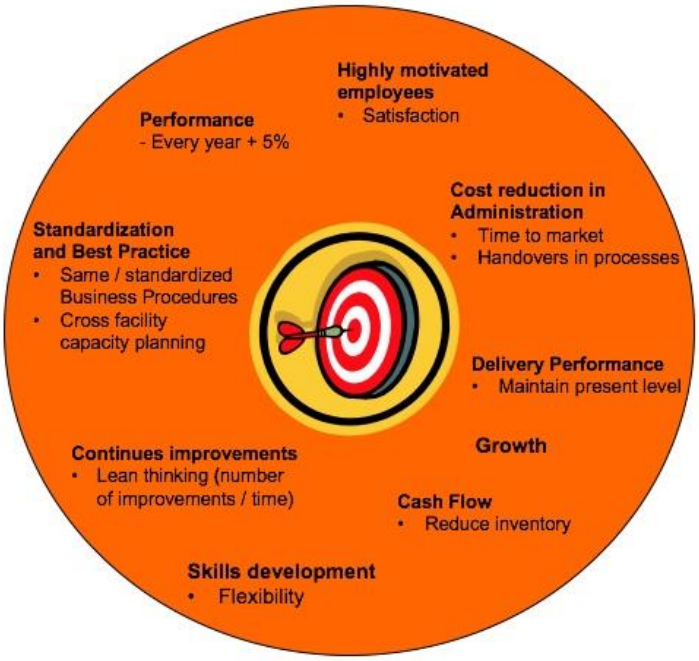
The object of this case study is manufacturing company abbr. as MC, which was founded 1960 in United States. The company got a stronghold position mainly at their domestic market (US) before internationalization phase. Early '90s company invested in to Europe and today as a worldwide company group, it employs around 20 000 people. Company have locations across North America, Europe, Asia and Australia. These sites are mainly manufacturing plants and distribution centers. Two of the key success drivers, which led to stronghold business position, were their circumspect decision to use all raw resources as well as possible to support high value business and company's ingenuity to manufacture quality products. Strategically MC's diversified facilities supports local standards and other regional preferences, but also effective use of resources. Worldwide location also helps company to minimize transportation costs. (PL, interview 21.11.2016; company website 2016.)

8.1.1. Introduction

This firm has been 3-5 years in their way of journey to the excellence, actual measurement depends about the branch. According to company's 2013 CI-program plan the objective was to obtain 6 million euro in better results expected to be realized during next three years. The only way to catch up this objective was to work consistently and continuously detect improvement possibilities. It was also important to look for problem areas that can be turned into beneficial opportunities. In general, the objectives of the CI program were to gain process improvement such as ' *'Efficiency (productivity*

improvement), Quality improvement, Flow improvement, Inventory reduction, Waste reduction, Delivery improvement, Transactional improvement, Foundation and Capacity''. Cost reduction was expected to be realized in forms of new raw material implementation and better material utilization. (PL, interview 21.11.2016; company website 2016.)

In January 2015 company stated over two hundred small CI-projects were completed and multiple projects has been running for more than ten factories. Departments like sales and purchasing had their own specialized projects. One of the key elements was that factory designed CI-boards were implemented in total of 11 factories. This improvement activity caused potential checks to be identified and estimated over worth of 20 million euros. Company CI-program reached positive cash flow during their second quarter of 2014 and program investment got break even during third quarter of 2014. Program related organizational hierarchy grew larger and on that time all eleven factory plants had their own steering committee and 120 operational CI-agents were trained. In above mentioned hierarchy level 30 committed CI drivers were trained to help executing CI-projects. Company had two main Lean/Six Sigma specialists and one administrative specialist on board. CI-program had six different tracks to be executed to serve continuity of this mission e.g. program management, recruitment, skills development, leadership, local execution and communication. The status of these tracks were followed constantly. CI program itself had two mandatory methods, 5S and CI board, which can be seen as a catalyst for an implementation process. (PL, interview 21.11.2016; company website 2016.)

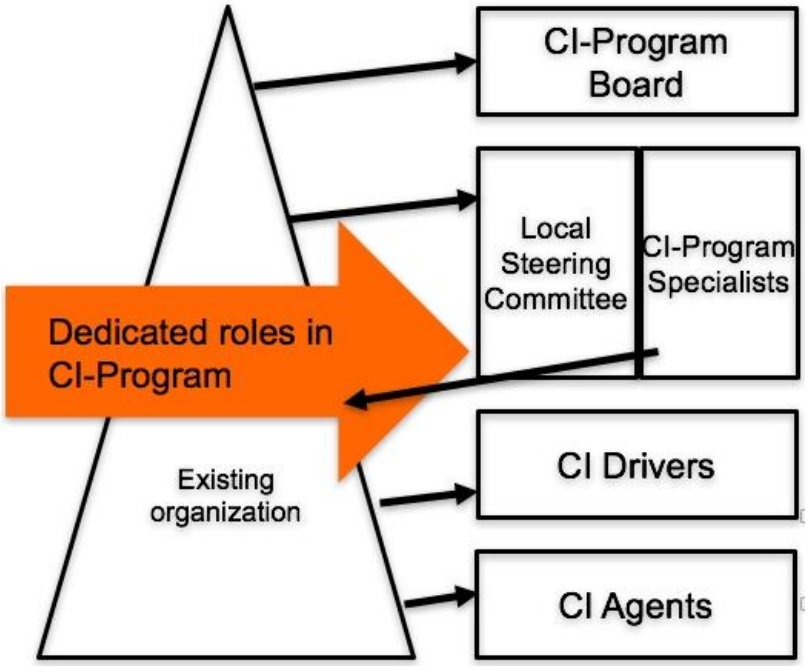


Picture 49.) Overview of the CI-program (PL 2016).

The case company realized that continuous improvement is a powerful methodology to share knowledge, gain results, improve performance and achieve cost reduction. According to company representative the company's vision, values and objectives supports all development activity towards into

customer oriented approach. However, company would like to strengthen their operational services and connect their clients more into it through development of sales and marketing. (AV, interview 3.12.2016)

Company realized they need new organizational dimension over line hierarchy model in order to support continuous improvement and transform the culture. Below picture shows this new program dimension.



Picture 50.) CI Program organization (MC internal material 2016).

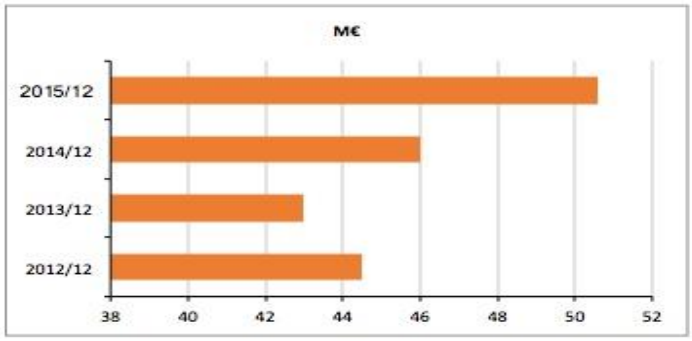
CI-Program board is responsible for guiding CI program and its progress and results. The board defines overall project allocation time and its cycles and follow and measures accumulated achievements. Local steering committee has been formed of local and cross functional representatives, which have their responsibility to attach priorities and objectives. Every project has the owner, a member who represents project sponsor in that committee. CI-Program specialists are persons who have Lean and Six sigma expertise and they support CI-drivers in order to help projects whatever is needed. CI-drivers are resources for leading initiatives and they support project 100% of their time. They will get guidance from program specialists. CI-agents are organization members representing employees. They have been introduced and trained into Lean thinking and have their own work in the shop floor e.g. administration, process operator or other similar kind of duty. In some case CI-Agent might not be the member of the project team itself or he/she is not involved in overall project work, but they support other colleagues in projects and help any projects, when improvement activity is taken into daily work. (MC internal material 2016.)

8.1.2. Background

Before CI activity started according to AV (interview 3.11.2016) organization was one of the traditional way operated company among others. After understanding total framework of CI, organization understood the fact, that all processes are not possible to be taken into scope of CI they decided to use partial approach by taking production for under development cycle. In a big picture organization set the definition for future state, what they should pursue and by what kind of implementation cycle they need for this phase. The scope is really important for setting operational standard to serve target condition. Also sustaining this new standard is very challenging and like Ben-Tovim, Bassham, Bolch, Martin, Dougherty and Szwarcbord (2007) define, the change has to be controlled and sustained with care and all operation activity needs a strong commitment from the organization.

Company representative AV (interview 6.1.2017) explain a situation, when CI improvement work focuses only within projects, it means possible results appears to be momentary improvements and this improvement would be adopted only inside of a small group. Continuous improvement should be a combination of daily, systematic work, participated by almost all team members according to their job description.

When turning traditional processes into set of improved processes by redesigning them with PDCA principles, company realizes quite soon that using lean activity instead of traditional approach, it will give better results and help to recognize other problems. During this spinning lean journey, local factories were gaining strength by tackling problems one by one at the time. Even at implementing state, there was some activity to sustain already learned and tested methods. During early development phase whole CI - puzzle was at construction state, but overall change took place everywhere. In 2014 one of the local factories reached actual savings worth of appx. 100 000€ during Q1, Q2 and Q3. All that effort and patient work were going to pay back during its first nine months. (MC internal material 2016.)



Picture 51.) Revenue chart, MC local entity (Author 2017).

Above picture shows local entity's revenue statistics during 2012 – 2015. Operative income was slightly negative during years 2012, 2013 and 2014, but year 2015 was strongly positive, over 1m€. Profit margin indicated positive signs and this was a rising trend in other entities too. CI based daily activity displayed significantly better business figures in 2015 and 2016.

8.1.3. In retrospect - Lean implementation

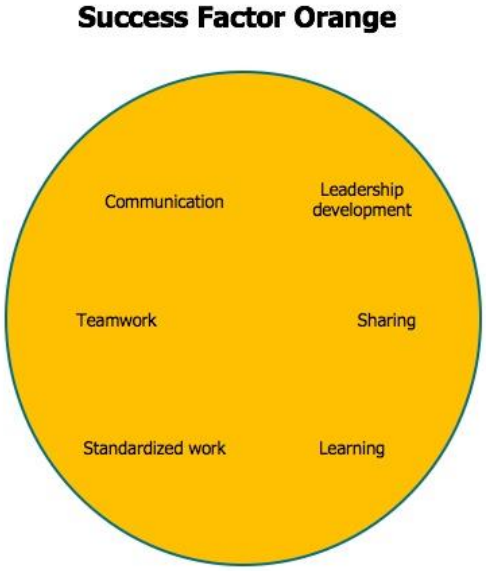
Looking through the company journey from the perspective of its local northern factory, there were some development ideas presented before Lean journey actually started. The aim behind these ideas were just to find some balance to reach better quality and to add total effectivity and productivity. During that time figures were not indicating good results, operational work was not systematic enough and communication needed improvement. Local operative manager felt that something would have to make and he got an idea about systematic development. Incidentally, corporate leaders had the same kind of idea about improvement necessity and these two forces started to think about common continuous improvement as a company strategy. Company as a whole started to plan their own change management journey using continuous improvement and Lean thinking as part of their operational philosophy. The work started with actions where the aim was to create new policies and guidelines as a part leadership and culture development work. (AV, interview 6.1.2016)

In the perspective of local operatives, it seemed that the change could be started with the help of global leadership development program and its other actions which aim was to raise employee awareness, improve communication and gain overall responsibility. Corporate leaders decided to develop a new leadership model and operational strategy, so they took methods like standardized work and team work as their main tools in order to improve operational activity. First major steps were taken and methods like continuous improvement (Kaizen) in communication, Teamwork, Standardized work, Leadership development, Learning and Sharing were included in to development work. Thus, more was coming and methods like 5 S, Gemba walk, VSM, Visual Management, Root Cause Analysis, CI board were introduced collectively to factory employees. During first implementation steps it seemed that most of the people were reluctant for the change, but after climbing into to the ladders of communicational development, constant training and executing practical teamwork, employee engagement started to rise. First signs of results were seen quite soon after the program launch and in common this activity led to better understanding and motivation around the local factory. (AV, interview 18.11.2016; 6.1.2017)

Overall approach is very important when applying continuous improvement strategy into the action. It means that there has to be commitment for careful planning and a vision where to go. The case company had a strategy for this implementation, and a vision. It seems that their approach was divided into four steps. First step is to detect possible potentials for improvement. This means actions to separate and divide potentials and find out the most productive candidates among others. Second step is planning and here is the place to divide potential improvement project in to the phases. Each project has their time allocation such as 3 months. Step three produces project estimation and checkup, a mandate, where all dependencies are considered with the people. After approval process, detailed consideration and boundaries check, it is time to turn into last step, which is the project execution. This operative step would be monitored carefully.

The case company used external consultants and also their own internal specialists. According to company representative AV (interview 6.1.2017) there should be a right balance between these two resources. In common there is no need to invent wheel again and the change by it all means has to be realized and executed internally. Internal knowledge is very important when building up the culture. It is wise to plan an exit strategy in the case of consultants before CI program kick-off. However, it is important to keep in mind CI program needs resources from every level of actual organization and also there has to be specialist resources who could give advices and mentor people during early stages.

8.1.4. Success factors



Picture 52.) Success factors

There are many reasons behind the success, the change management could not be executed and routed correctly without a vision and overall realization about the environment. It means there has to be a platform for communication and methods how to share new information. If looking this aspect through local entity perspective, the change already had a momentum before leaders decided to execute their companywide program. Remarkable was, that local entity people and leaders had common aspiration and aim for development, it means their operational framework was ready to the change. It started from communicational and process development needs in order to gain more efficiency and quality. Local entity had started their improvement already by developing and improving their leadership modelling. Group company introduced and launched standardized work and teamwork to build up a new working culture. These methods changed the way of working and broke foxholes between employees and management. Once before, management had all responsibility in their shoulders, but now everyone has a collective and personal responsibility to take care about the work but also responsibility to develop it for further times. Lean teamwork was really important success factor together with improved dialog between employees and management.

It can be seen that employees were participating into development in every level. The whole change process started to run after changing the leadership model and sharing responsibility for everyone. It can be said that these success factors are connected to each other, there is no singular key factor or decision to be named as reason for this success, instead all these factors together would make it possible. In perspective of the local entity, inspiration was found when all these factors came into surface. These success factors can be seen together as an empowering force to reach success (picture 52). (AV interview 6.1.2017; MC internal material 2016.)

This empowering framework of force will gain more positive activity and leads into the cultural development and its total change. As a chain reaction it will give a birth for coaching and mentoring, which would be a natural development of growing organization. Born chain reaction gives a good possibility to grow, it touches leaders and supervisors as well as specialists or skilled workers – it means they will learn together and are able to form united and well balanced organization. Case organization learned also about making mistakes, they understand that mistakes could happen, instead of neglecting mistakes management would like to guide people to learn from the mistakes and get that as an opportunity for continual improvement work. Company delegate AV (interview 20.2.2017) states *' ' people have to give up thinking like - we get this finished, when we do a few things yet – it is not like some moment of time, until the same thing again needs improving. Employees needs to have some courage and ability to search mistakes too''.*

According to company group deputy PL (interview 21.11.2016), organization has been on the right track to reach success, thus it is clear that present stage of CI journey needs continuous efforts to sustain the change. The work is simply not done, even the program has shown successful outcome. It is a new strategy, completely new way to think, live and work together. Company feels that their first success factor has been and still is overall high level commitment. Top management have shown very good involvement and dedication, in retrospect, they have had a clear economical focus for improvements from project day one. Other significant success factor has been well defined governance structure, where everyone has a clear, detailed role and responsibility of their own. Other success factor can be competent CI drivers, who have 100% dedication to lead and execute initiatives, but the amount is limited for maximum three initiatives at the same time. Moreover, other key issues are individual goal settings, prioritization, resource allocation, focus and speed, celebration after executing and good operation with external consultants. (MC internal material 2016.)

Company has now a new upgraded CI program under execution. When first CI-program set the targets and started company's lean journey, second program was generated to sustain the change and develop it further to serve better company's mission, values and new targets. New CI-program, Excellence Model would change actual viewpoint, binoculars are now set into processes. First program concentrated mainly for projects, now there would be a new perspective for larger issues and this change will sustain the culture by it all means. Their aim is now to sustain employees work, coach their determination and skills. This program is especially designed for people called as drivers, who are in close contact with improvement work every day.

Organization has now reached the mature state, where practical knowledge about implementation would be combined with theoretical intelligence about CI development. New cluster projects are in the air and cross functional projects maintains collective development and execution. This means also that extended methods and tools are implemented into to the improvement work. Globally, this means common procedures and teams are starting to resemble for each other. Customers will get benefits through more improved operational processes, better transparency and because of more standardized operations. (MC internal material 2016; AV, interview 6.1.2017)

8.1.5. Customer satisfaction

Customer satisfaction is common target for every department and it has been introduced as a company value. Company has attached customer satisfaction to be part of their innovation policy, where the aim is to inspire customers and take a good care about their necessities. Local entity trusts heavily into their reliability of deliveries, ideally in close to 100% and also would like hear their customers regularly. In 2015, local independent research organization carried out the customer feedback survey in order to find out dealer's brand images and customer experiences about different suppliers in that precise field. This survey evaluated twelve different brands on that field, where case company MC was operating as a manufacturer. Dealer representatives ranked the company for number one position in several survey classifications such as overall impression, significance in terms of trade and overall recognition. The company got recognition for the best overall image of the industry eight time in a row and it was the most famous and most important supplier partner. More than three out of five representatives of the trade rated company as a significant supplier. In addition, company's overall awareness was strongest in that class. The strengths include overall product quality and very informative website, which helped dealers to find details about the products. In addition, the product quality and the speed in product rotation together with delivery time promises were in top 3 class. Also the price level of the products and activity of sales reps were evaluated better than the industry average. In total, the company got first position in supplier ranking based on average results. (AV, interview 6.2.2017; MC customer survey 2015.)

8.1.6. Present state study – local entity

Analyzing possible key problems - Customer behavior

If looking through local entity as country operations and their customer satisfaction, there is one interesting phenomenon in respect of customer habits. This might be a problem to the company and its product development. According to company deputy AV (interview 10.1.2017) local customers appreciate price options more than other elements such as a good customer service, product quality and overall product assortment. Also it seems that regular local customers appreciate more about supplier's reliable delivery service and claim handling process than above mentioned other elements. On

the contrary, customers from other entities (territory) respect more these other elements and are willing to choose a product based on its features.

Obviously product assortment is very important at these markets. There might be a need for market study and customer behavior analysis including dealers and end-customers. If there are above mentioned differences between these territories, there might be a possibility and real potential to increase sales and of course this would affect to profit margin. At this point, arising question is how well local entity's sales and market department know their customer lifecycle stage?

8.1.7. Contribution - Proposed solution

The key question might be how to develop customer relationships, marketing and sales, in order to achieve better sales figures and better profitability. Overall product quality is very good and product assortment is enough wide giving many possibilities for the customers to choose exact product, looking at Lean retrospect of 'what they need', 'when they need' and 'how they would need' the products. It might be a good idea to spread solid information about products and raise customer's knowledge about the goods, so they can think overall product lifecycle and quality matters instead of trusting the price element. When looking customer behavior trends, in general, today customers are more individualists and they certainly have more information and different view than before. Simply they would like to have more options. In any case customer expect to get personalized customer service, which appreciates them and serves them on unique way – personalized way. This expectation means that supplier sales and marketing functions have to treat customers differently and divide them into to the segments based on their values. Before this could happen, sales and marketing departments should collect information about customer lifecycle stage, which means every customer should be measured and mapped into the lifecycle stage chart. Customer stage can vary from time to time, but correct CRM system can give some support to maintain this data and especially drawing the trend of each customer. Customer alignment, the status based on their data representing each customer is a crucial element.

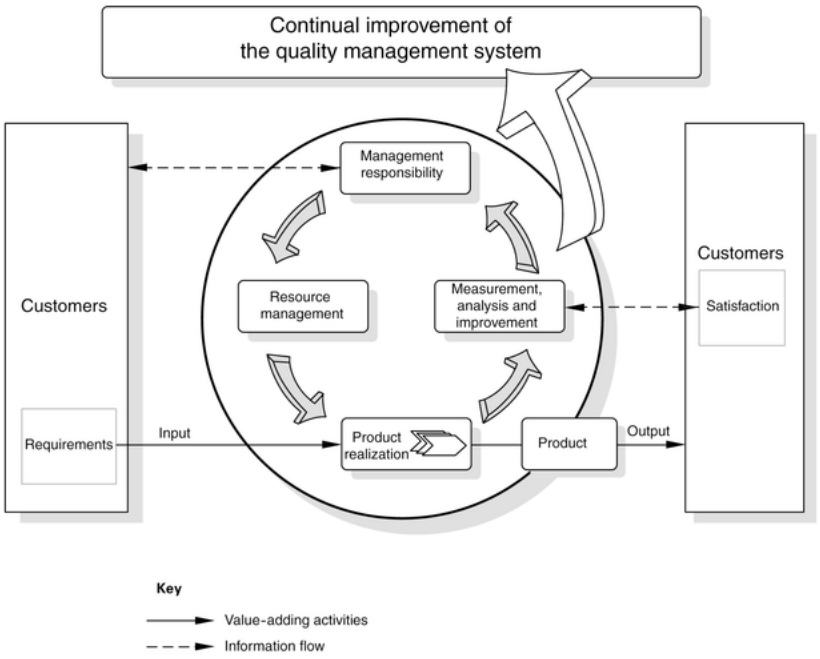
According to Hwang, Jung and Suh (2004) customer relationships management (CRM) can be described with a sentence of *''Managerial efforts to manage business interactions with customers by combining business processes and technologies, that seek to understand a company's customers''.* This means all those actions to establish structural categories based on customer information, especially information about their values, is very essential. Customer value can be divided into categories. First category represents customer's present state value, second is customers potential value and third one is based on customer loyalty. Customer relationships management handles all active processes, which are in relation with customer acquisition, -cultivation and -retention. Customer segmentation and their value data are critical parts, when reaching to better understanding about customer habits using CRM. Customer value can be raised by selling them similar products than before, 'an upselling', and just selling products which are new to them, 'cross selling', and finally using any efforts to keep them,

'a retention', simply affecting to their loyalty. (Hwang, Jung, Kim, Suh 2006.)

Possible solution for this case can be found studying customer cultivation and issues around the products by questioning how these existing customers could be cultivated so they would be more profitable for the supplier. The retention issue is also very important to study in order to evaluate further marketing and sales operations. In any case, prevalent customer data has to be analyzed together with detailed information about customer values. The data means exact purchasing history and any sales or marketing data related to particular customer. After checking integrity of all data and its authenticity is possible to find out missing information and solve out the problem. It can be investigated which are those actions needed towards to raise customer's knowledge about the goods, and how to change their purchasing behavior. After possible re-segmentation, careful customer relationship strategy planning work could be started together with careful sales strategy and marketing planning. This development activity could be transformed into the form of an operative guideline, which tells what actions are needed to control, guide, inform and coach customers at precise segments. There could be two different modules for dealers and end-customers. Anyhow, first target is to find what are those real reasons behind this problem. Product coaching can be delivered for customers and vice versa active data acquisition from customers are needed activities. Then there is a chance for active information interchange between supplier and customers. This partnership offers better platform to meet the targets such as product selection and product development.

Using Lean methods there is a possibility to gain more value realized by customer. In this case there is a possibility to affect customer habits, investigating what kind of products customer needs or would like to buy, because it is not certain that customer knows what other options they might have. Actual development work in cycles starts backwards, from customer side based on Lean principles. As a remedy option, there are possibilities to find out if there is missing information e.g. customer habits and then analyze how it impacts. First, it might be good idea to map whole sales process and marketing actions in order to find the root causes. There could be multiple root causes or just an inappropriate process or perhaps many variations from the current process. Sales persons often have a tendency to operate by their own 'best practices' and this can be the reason for multiple variations in that work flow. Root-cause-analysis can be established to find out customer values and after that it is a place for a closer study of value streams. A3 and VSM-analysis can be drawn to find out current state, thus there might be some amount of processes, so the target is to find reasonable way to do that process in practice. It means actions to recognize at least some standard or systematic way and after this has been found, it is time to identify the waste. After finding some standard there is a possibility to measure it. Visual management can be used to measure any single or group related performance issues and also to detect places for improvement. All this activity should be made visible to find out the waste. Whole development process can be done using PDCA, A3 and Visual Management to make sure to find out e.g. any bottlenecks, missing information or waste. After measuring work there is a chance to eliminate any activities, which are not value adding activities. Any

work task should be visualized and make visible for all, in personal wise and in group wise. This will help to measure and identify non-value-adding activities and to see and recognize the big picture. Performance indicators should be based on measurements. Outcome can be a strategy plan, an improved future state map and then a project, where this future state can be reached. It might need many iterations from actual state into the future state This improvement work would be carried on until the target state is reached. Final situation could be an operative platform, where the process finds out the excellence and starts to pay back. In a big picture, customer relationships management meets product life cycle management and partnership development.



Picture 53.) Quality management system process (ISO/TS 16949:2009).

Above picture from ISO/TS Quality management system shows how customer satisfaction can be connected with the quality, the Quality Circle. Customer actually measures the quality of the product and gives feedback to the supplier. Sales and marketing should have this information too in order to get up-to-date data from customers. This stage of operations might need some development work, where the outcome could be e.g. operational guideline for communication purposes to serve also production and customer resource management taken care by sales and marketing department. Author presents communicational guideline at Chapter 9.

Using Lean philosophy and methods, the result could be seen as a productive chain, where 'end customer-dealer-supplier' participants have the same process in use based on pull system. Every participant will benefit with it, because it will support better transparency and quality, maintain deliveries and just what firms like, reduces costs. Economical wise, this process would improve the business increasing client consumption, because they know better what possibilities they have and would pass information for supplier and dealer. Anyhow, it means wider product portfolio, better product

development and not only satisfied customer, but committed too. A customer oriented approach would turn to be more like quality wised customer promise or brand promise, where the supplier would meet the needs and think about each customer's lifecycle and lifetime value. Customer lifecycle can be estimated based on earlier history data and its aim is to maximize customer lifetime value. The key information is to know in what stage the customer is on that lifecycle curve.

This lifecycle curve has four stages, that is to say, segments that inform the status of the customer. There is an 'acquisition stage' for new customers and after some engagement activity, this new customer is in 'growth stage' turning slowly into the 'advocacy role', which is the most profitable state for the supplier. Anyhow, customers tend to change their interests and feel attrition, so they might turn into the 'retention' stage. If customer do not get enough care or attention at this stage, then customer might lose interest and fall to the 'win-back' stage and for supplier or seller, this stage eats money lots more than other stages. Then there is a possibility to lose that customer and brand faces the end by customer exit. After that any marketing and sales actions would eat more money if supplier would like to get this customer back. (Schmidt 2015.)

8.1.8. Contribution - Recommendations

The case company truly have a unique step by step process. CI has shown it strengths already. A big change has been made, the cultural change is a fact. After this victory, it is important to keep on going and sustaining the change When implementing this change for further, it needs three ongoing activities at the same time: i.) sustaining activity ii.) learning new skills and iii.) finding new targets for implementation. The challenge is to find suitable resources for all these activities. There might be some needs for new resource management activities to improve better resource allocation and finally to update this suggested new strategy for customer relationship- and customer life cycle management into action. At least there are already second version of CI-program in the air, which shows how determinant the case company is. As a recommendation there might be a room for operational guideline for communicational purposes. This guideline proposition is described in next chapter, 'Discussion / Contributions'.

Main recommendation, in theory level, could be an objective to study and clear out marketing and sales processes using Customer Relationship Management-(CRM) and Customer Lifecycle Value (CLV) as an approach. These processes can be under same development cycle, which has a cross-functional view. This recommendation is presented mainly for local entity, but it can be analyzed and use in in company group wise. One minor issue to be recommend is the job rotation. When applying and developing organizational supported Job rotation function, it could give more insight to develop skills, increase productivity and maintain the culture. It might sustain employee satisfaction and motivation to the next level and create more business opportunities.

8.2. Questionnaire – Secondary data

The questionnaire (web-survey) is a list with closed questions, but it gave possibilities to answer with open text, because this feature gives a chance to get more detailed information. Questions were identical for every participant. In common, gathered information from the survey was treated and evaluated as a background information. At the time of the survey, November 2016, the goal was to reach eight organizations in order to get wanted amount of background information. Number of four companies took part in the survey. Common problem was that companies were not sure who would be the right person to answer these questions. Some companies informed that they just recently started 'CI-based program' and unfortunately could not give any information this time. Despite this problem there some interviews were possible to be made with these companies. However, this possibility helped with an overall view on the subject.

Analysis

All participant companies have quite unique business type, Company K is a manufacturer and also international player with large dealer network. Company Q also is mainly a manufacturer and operating in international business, but has also service functions (operations). Company W is purely a system and a device manufacturer and helps other manufacturers to improve their productions. Company A is a service operator. These companies, whether they belong into to the classification of production management or operations management, have their unique way to use continuous improvement methodology. Generally, they are operating under principles of CI regardless what is their 'main' philosophy such as Lean, Kaizen, Six Sigma, or Agile.

These companies have been implementing continuous improvement for 1-2 year, 1 year, 3-5 year and 6-10 year. This implementation time is not comparable with above company segment description. When asked 'how well you have been managed to use the program or method so far', most of the companies informed they have been moderately successful.

CI-utilization rates were: 100% of the organization, 5 -15% of the organization, approx.50% of the organization and 5 -15% of the organization. This means the amount of internal departments and units, the people, who are connected to with CI-program. Below is a short snapshot, a collection from their answers divided by different themes.

Theme 1. Measuring continuous improvement.

<u>Participant 1.</u>
Monitoring development of Economics, 1-4 times per year
Measuring Efficiency (output indicators, the time, resource efficiency, profit, profit margin etc.)
Following cost savings (material resources, the number of customer returns, logistics, etc.)
Following Production statistics (based on input/output, process time etc.)

<u>Participant 2.</u>
Monitoring development of Economics, 1-4 times per year

Measuring Efficiency (output indicators, the time, resource efficiency, profit, profit margin etc.)
Checking Employee motivation (queries, feedback, ideas etc.
Following Production statistics (based on input/output, process time etc.)

Participant 3.
Measuring Efficiency (output indicators, the time, resource efficiency, profit, profit margin etc.)
Resource allocation (raised amount in customer value adding work)
Customer satisfaction (amount of reclaims, queries, additional orders, amount of new customers, market information)

Participant 4.
Monitoring development of Economics, 1-4 times per year
Measuring Efficiency (output indicators, the time, resource efficiency, profit, profit margin etc.)

It is quite obvious that companies have needs to follow up the progress and what exactly they will benefit when using CI methodologies as a part of their daily operations and product management. Following economic indicators, a kind of business barometer, they will get better realization about their production and how CI is affecting to their core business. Counting efficiency is very important, because it will show exact state of the production or operation. Following day to day production and service statistics, firms will get details about actual production and their operational activity

Closer study under this theme brings customer satisfaction into the surface. In common, one of the CI-principles recommend that Lean startup, means planning and implementation design phase, should start from the customer side in order to answer what the customer really wants, referenced with section 4.2 - Lean thinking.

1.Specify Value Stream
2.Define the Value Stream
3.Create or Improve Value Flow
4.Pull the Value reacting customer demands

Participants did not report about the importance of customer satisfaction, so the outcome left this theme obtrusive. Perhaps, some organizations would like to start their CI-journey concentrating only for internal issues and later extract their interests into the customer side.

Theme 2. The results achieved (using continuous improvement in the business)

Participant 1.
Operating profit has increased
Production efficiency is incrementally rising
Cost savings have been achieved
Process speed has increased (turnaround time)
Product Quality is better than before

Participant 2.
Cost savings have been achieved

In generally our business is more efficient

Participant 3.
Operating profit has increased
Production efficiency is incrementally rising
Cost savings have been achieved
Customer satisfaction is better than before
In generally our business is more efficient

Participant 4.
Less variance in production or in services
*Less waste
Raised employee satisfaction and motivation
*Our work is in the middle of implementation state, just begun, so we are keen to see other results

This theme brings out how important matter is the cost reduction overall. It can be interpreted that 'less waste' means cost savings too. All participants have some monitoring activities to detect waste and it is evident that their purpose is to decrease costs. Identifying waste and cost reduction might be first visible phenomenon and illuminating over other aspects during CI implementation process. Generally, every organization are keen to see that. Another observation is production efficiency, which has a direct link for cost reduction and waste. Efficiency means that costs should be minimized and this activity leads for other efforts where the target is to maximize profits for that precise level of output (amount). Also it affects into the use of resources. Companies have a tendency to increase their number of products produced, reduce waste and optimize resources, so their production would be more efficient.

Theme 3. The organizational culture: a relationship between company (organizational) culture and CI

Participant 1.
Continuous improvement is listed in company values
Education from the subject (CI, methods, tools etc. is given to all managers and employees)
We are using Lean, Kaizen and other CI- related tools/methods in our production (organizational culture)
Continuous improvement is not directly related to the business objectives and visions

Participant 2.
A company way of working and team culture supports continuous improvement
Guidelines and practices supports continuous improvement
A way of working (continuous improvement) takes into account in Operational planning

Participant 3.
A company way of working and team culture supports continuous improvement
Guidelines and practices supports continuous improvement
A way of working (continuous improvement) takes into account in Operational planning

Participant 4.
A company way of working and team culture supports continuous improvement
Continuous improvement is listed in company values * in some way
Education from the subject (CI, methods, tools etc. is given to all managers and employees
We are using Lean, Kaizen and other related tools/methods in our production (organizational culture)

*Our strategy and vision considers CI-culture

All participants informed they do understand how important company culture is when applying continuous improvement in order to achieve results. However, it seems that the connection to the organizational culture is loosely described in some cases and CI-penetration rate depends about the unit or department. All firms informed they do not have full coverage, which means units supporting CI. Based on participant interviews, firms know that implementation takes time and strategically is better to concentrate for one process per time to get results and then continue to the next process and reach another departments or units.

Theme 4. A relationship between CI and Leadership (incl. management)

Participant 1.
Leadership and continuous improvement are in relation (tied up)
Our organizational culture asks leaders and managers to act and support continuous improvement through organization
Continuous improvement program / method / tool is available only in certain processes (not all)
Used methods (in management) can vary between CI and traditional way and depends about the project
Operational method depends on unit and its supervisor

Participant 2.
Continuous improvement program / method / tool is available only in certain processes (not all)

Participant 3.
Leadership and continuous improvement are in relation (tied up)
*Our organization culture enables continuous improvement to be a part of leadership
Our organizational culture asks leaders and managers to act and support continuous *
Continuous improvement is implemented in a comprehensive and long-term basis as an integral part of management

Participant 4.
Continuous improvement program / method / tool is available only in certain processes (not all)
Our leadership system supports CI-education, use of tools and techniques as a part of everyday work
Used methods (in management) can vary between CI and traditional way and depends about the project
Operational method depends on unit and its supervisor
*Our organization culture supports continuous improvement to be used in leadership

Based on participants answers leadership and CI have a strong connection with each other in their organizations according to their similar type of answers, which describe that leadership have a strong influence for continuous improvement. Continuous improvement can be drawn as a company value, a strong definition describing also company culture, which guides the leadership as well as all employees to act with CI-principles. Their endeavors with CI might be stated clearly at their guidelines, but current realization do not support this definition completely or they are living at the situation, where implementation work is clearly on process phase. Some companies might have a partial scope for developing

continuous improvement activity and their aim can be e.g. costs reduction or other production improvement activity. This phenomenon is quite evident when companies informed that continuous improvement program is available only in certain processes (not all) and operational method depends on unit and its supervisor.

8.3. Observations regarding the empirical research

Results from operational case study shows there are multiple reasons behind the success of change management. A realization about the change or its direction is essential. Interesting point is to know especially from where that impulse for change would come and by whom? This thought about the need could be born simultaneously in many places inside the organization for example leaders, operatives, employees and even customers can inform some necessities to change. Market situation sometimes totally asks organization to change. First, clear communication is necessary in order to start the change, a communication channel for sharing information should be open, then there is a room to discuss about the change and its direction and momentum. According to the case company representative whole change process started to run after leadership supplied responsibility for everyone. Continuous improvement as a change management method is a very systematic way to deal with issues and that is significant benefit for the firms. Circular method allows to make errors too, but the best part is that it reveals errors and display places for improvements. The company culture should support this activity and it is simply not possible to reach without guiding leadership.

Case company delegate presented such a strong statement: ‘*’the impulse should come from somebody representing leadership, without that the change is not possible’’.* Dialog with the delegate proved that continuous improvement methodology needs ‘*’strong support from organizational culture and this culture means that all internal activity inside the company reflects the culture, a way of doing, but actually leaders are the most responsible persons for sharing and caring the culture’’. (*AV, interview 10.2.2017)

This information can be clarified through research’s theory section 5.4 Culture and leadership enables the change, where it describes that changing the culture is not possible without changing behaviors.

This research study confirms the theory, there is no singular success factor, instead there can be many factors affecting together for aims to reach the success. These factors in this case were *communication, teamwork, standardized work, leadership development, sharing and learning,* which helped the case organization to obtain their targets. This research confirms that high level commitment from overall organization is needed, when obtaining the success. Culture has own meaningful part in that cohesion, which creates collective commitment. Every employee has a role and responsibility of their own, which means common objectives and supportive real teamwork. Case study data replicates with theory section data, that leadership should have a strong dedication and involvement and finally, all

improvement activity should have an economical focus, which will maintain sense of direction. Any improvement work should be measurable and followed, otherwise possible results from development work cannot be traced and it would be hard to follow value adding activities.

9 DISCUSSION

The aim of this thesis was to understand Continuous Improvement and to determine the possible success factors and their connection to Organizational Culture and Leadership. Operational excellence is the target state where each enterprise would like to see themselves to be some day. Discussion part of the thesis discusses about the total framework. First, all objectives were met and this study work produced an operational manual type of information base from Continuous Improvement.

Author hopes this study will give more insight about challenges when applying and taking Continuous Improvement into account. Author also wishes this study would give some support to those organizations, which have aims to start CI development and implementing work in order to develop their business further e.g. to add more value to the business, reduce costs or improve their production-process-project chain. Furthermore, this study might give some valuable information for those parties who are already at their implementation phase.

Theory section of this thesis describes quite thoroughly the connection between Continuous Improvement and the success – Operational Excellence. The success is a phenomenon, a desired result of an attempt or series of attempts, and this result can be reached by choosing the right strategy, and after careful designing, executing these planned activities at the right time. Continuous Improvement is rotary development model, even it is described as a philosophy, methodology, leadership system or something else, but for organization it gives a chance to systematically search for the best approach to achieve business objectives.

Rotating or circular model, such as PDCA as a platform helps organizations to find problems, but it also gives a chance to fix them - it is a real development process, where planning and executing supports each other.

The theory part, including respective research's and practical examples from known cases will support interpretations, with an emphasis on the importance of organizational culture and leadership as part of continuous improvement.

First research question '*What are prevalent current theories and models of Continuous Improvement as the CM discipline through Lean and related philosophies?'?'* was answered extensively the theory part. There is a quite good amount of information presented using sources like: theoretical literature, reviews, articles, other researches and known cases. The study reveals some common trends especially when adapting these theories and methods in to practice. These typical adaptions have a kind of marching order. It seems that organizations tend to adapt some methods before others. One reason for this trend may be that organizations would like to start from

the easiest part and then collect some evidence, so they can continue safely for next part and so on. In a way, playing it safe in order to continue their journey to excellence. Today, a process or project cannot live long without showing positive output, it means that leaders tend to stop development work soon, if they do not believe to see positive results.

In this respect, it would be logical to start from easiest process or platform, which could give positive signs quite soon rather than difficult ones. This kind of reasonable selection will increase overall confidence and opportunities to achieve implementation success. According to Stadnicka and Antosz (2013) 93% among all 46 companies submitted that waste elimination is their main Lean implementation goal. This means companies overall would like to follow Lean principles quite closely. All actions should add value and same time, like Womack and Jones (2003, 29-59) states, reduce waste and improve quality, when operated in accordance with Lean principles of five. Lyons, Vidamour, Jain, Sutherland (2013) explain that Lean goals should be divided into principles and practices under classifications. Looking through this classification it seems very logical that methods concentrating for waste elimination are just those methods, which are typically first used, like 5S, FIFO, 5 Why, Work standardization etc.

Second, quite comprehensive research question *'How to develop the change management proactive and pervasive; knowing that the responsibility for initiating change needs to be syndicated across the organization?'*
was replied thoroughly the theory section of this study. Moreover, research section of this study confirmed this issue; the change itself needs a good support from the culture, a dedication and an involvement are essential features when developing and executing change management programs, processes or projects. The case study pointed out that change management requires careful planning and proactive vision, but also very systematic follow up, constant development work and sustaining activity. Interviews supported the theory well enough and also this question, however some answers gave a picture that above described determination and systematic activity is not completely understood yet. Theoretical part of this study and research results gave quite reasonable view from the most common challenges when adapting CI. Common challenge, the amount of work is necessary to face when considering CI. However, it should be recalled that the work is rewarding and knowing also the fact that during first implementation steps there will be some issues of reluctance among employees, so it is good to keep in mind that possible flack is not coming only from employee side. Anyhow this information would help organizations to attach their vision and its direction. The case company faced similar experiences during their transformation. It can be said the barriers were already there before the transformation, and during first steps of implementation common reluctance was quite evident. When the staff got enough theoretical knowledge and practical experience, resistance began to slowly fall away.

Also a challenge might be organization's ability to understand what CI needs, meaning that Continuous Improvement methods are not just tools to be used to fix problems. Communication is one of the toughest challenge despite there is a lot of information about the deep essence of communication.

Organization should possess the dialog all the time and that's why decent communicational plan is good to have before implementation starts. This helps organization to share information correctly and develop a dialog and also support to build up Real Teamwork inside the corporation.

Third question *'How to improve leadership during the change*? As known 80 to 90 per cent of change management is leading people and only 10 to 20 per cent for leading substances. The change need to be supported by good leadership for sure, because it is a fact that organizational culture must change too. Organizations must be noted that culture change needs attention. In this case, coaching and mentoring are those tools which can cut down the barriers. Leadership behavior is essential part when improving leadership, because leadership should inspire people, train and encourage them in sustainable way. Leaders should take a new scope and lead people with their own examples. Servant leadership model shows how leaders can add value into operations by supporting other team members, because team members are most active players for adding value into the process and the business. Instead of using servant leadership model, the case company established a completely new dimension into their organizational model and this model made possible to cut down 'hierarchical' way of working. This organizational model increased the amount of teamwork by taking people in to the process development. This CI supported organizational model helped leaders to build up a bridge over barriers. Everyone had some new tasks and this moment was a turning point – the people got a possibility to involve, which simply creates motivation. Unlike traditional leadership, this new scope of teamwork and leadership together makes possible to: develop new skills, enhance orientation and improve communication. Aftermath, together with cured overall motivation and improvement oriented working style, leadership just changed its gown. Now it serves business better than before and the results improved progressively. It can be said that one of the core values is the ability to rely with people, and good example of this how the case company confess that world class company needs skilled workers. they are willing to tempt, support and keep these excellent people and they would like to see organization to grow further together with them supporting the community. Continuous improvement is also one of the company values, it defines the way of working. Leadership counts on these company values and the company expects leaders to follow these values and other CI-definitions at their work.

Fourth question. *How organizational culture and leadership will impact to the change management and its potential to attain success and how CI can be implemented to organization culture and daily business to ensure permanent change in journey to the excellence?*

Looking back to the theory section, it says '*all actions, where the target is to leverage business and operations to get actual business growth must be based on planning. It means that organization should decide what is the goal and what actions are needed -step by step- to reach operational excellence*.' (Operational excellence n.d.)

When applying Continuous Improvement philosophy in use, it should fulfill above sentence, so there has to be a very structural approach in use, and also

decent understanding about the context plus a very strong intention and dedication. Before, there has to be a strong core strategy and capable leaders, who can develop the strategy and build up the culture of CI – it would be a transformation from state X/Y into state X/Y/Z with third dimension. Organization's value system is an important source of information when defining how big effort is needed for this change overall. Leaders should have a deep business understanding and experience from human motivation and people engagement, so they would be able to develop CI leadership, teamwork and the culture. Author believes the culture has to face a transformation and when leaders admit that, this is the point where owners should be taken into discussions about the direction and the depth of change. Organizational Culture makes Continuous Improvement possible, leadership and management cannot supply it well without this cultural presence, because the culture is the ground layer for Continuous Improvement. Leadership may try to implement it without using cultural presence, but after there might be a situation where change has to be justified over and over again. It would be like buying something without a guarantee. Organizational culture is kind of manuscript followed by the employees know what is expected of them and how they operate. The case company developed step by step process where their values and rules and principles are just intended for all. Factory managers would expect people to work and develop their work further, and also demand is the same for themselves. According to Schein (2010, 10-11.) actions presented by leaders creates and manages the culture. Some leaders do have an ability to work with the culture, understand and develop it further, but this can be seen also from ''*dysfunctional view, where leadership can even destroy the culture*.'' CI is not just like picking up right tools and then trying to solve problems with them. The journey to the excellence needs a triangle strategy, where Continuous Improvement methodology is supported by Organizational Culture and Leadership. Operational Institute (2012) describes this process like a journey, which will lead to the Operational Excellence or to the point, where every company employee will recognize the flow and its value to the customer and also they would be able to fix the flow before its breaking point.

The contribution of the study was to clarify what issues should be taken into consideration if applying CI as a main philosophy and what are the success factors behind the curtain. Answers were discovered to match above research questions through literature studies presented at theoretical framework, my own experiences and from the case study research.

9.1. Strongholds - turning challenge to Success

During research author discovered some strongholds, which are actually derived from challenges. These strongholds can be recognized by studying known cases of Lean implementations. When taking a closer look for difficulties and challenges during these implementations, we can learn a lot. Crute, Ward, Brown & Graves (2003, 922-925.) present these challenges as key strategic factors. The case study shows some strategic factors have a meaningful touchpoint with implementation strategy. It seems that strategic factors treated as challenges need a decent strategy, so these issues can be solved. Case study research supports this observation well. The case company

had quite impressive plan, actually it can be named as a 'CI strategy', which represents the first stronghold (success factor). This strategy plan was based on holistic approach – it means all strategy targets were practical and understandable. Company's intention was to spread CI activities for all departments inside the company, but first CI objective was the production. As shown in research chapter, the company allocated suitable amount of time and resources to support better communication, in other words, to build up second stronghold – a good 'Organizational Communication'. The aim was to develop real culture and supportive behavior. Real culture expects that all people have their own responsibility about the work, which affects to the way of working. Methods such as teamwork and visual management supported organization to build up this activity. When employees are invited into the development work, people will start to act differently and are more interested to accept improvement setups and other changes too. Sharing and learning from each other are visible characteristics of 'Real Teamwork', the third stronghold. Fourth stronghold could be the 'Product focus' e.g. all changes are targeted through product value streams. It means teams should concentrate to those activities, which can add value and remove possible waste. Crute et al. (2003, 924.) describe how important is to get overall support from leaders in order to maintain the change. This fifth stronghold is quite evident, the case company feels that their first success factor was and still is overall 'High level Commitment'. According to company deputies and their internal material top management have shown a very good involvement and dedication topped with clear economical focus - declaring the target and its follow-up well. It can be said that company's defined governance structure supports their business objectives well. Sixth stronghold is 'Correct Timing' for improvements. Good timing includes careful planning and preparation work for scheduled transformation activities. Case company MC is using 12-week allocation time for each project and this period of time is monitored accurately. The challenge here is how to face unknowns, and sometimes fast reactions and ability to take risks are needed from decision makers.

9.2. Traditional approach versus Continuous Improvement

Internally, traditional approach means simply that the company have functional departments, organizational job descriptions and business management uses their power to declare operations and tasks. These operations and tasks are controlled by supervisors and workers have no other roles, but to execute the tasks inside the operations. Development responsibility has been given to development department and after development phase, this department will hand over this new task or approach to the line organization, which has now all responsibility to execute and command this task for further. Traditional organization have a tendency to keep people busy all the time and it assumes that executing employee are not in charge for developing work. CI approach like Kaizen underlines that process or the way of working is never going to be perfect, there is always a space for improvement and employees have a right and obligation to develop their work and look about any potential improvement probabilities. Traditional approach assumes that leadership and management add value to the business. Instead of this, CI approach states that the most value added activity will take a place at shop floor driven by workers and management's

role is to support team members. Traditional approach supports also team work, and these teams might be formed of persons who represent different line organizations or team can be a combination of cross cultural dimension of that organization, but there are still organizational boundaries, which could affect to the work itself. CI approach supports real teamwork where result oriented activities and improvement work are tied up. Internally, it means that the people and departments have both customer roles, and these roles in specific chain creates automatically raising efforts to improve quality. Case study research revealed this fact. At organization, which uses CI teamwork people work better together. A perfect example of this was the moment when barriers were dissembled down during their first implementation phase. People just noticed what is the difference. Lastly, it can be said that real transformation phase begun when people realized they actually could affect to their own work and took that as an opportunity to develop it further. Generally, CI organization measures all improvement work and it has a plan and allocated schedule for developing and executing improvement processes. However, at first stage, learning organization can study the subject and use project based improvement work as their standard, but later they can switch it to the process driven approach. Theoretical framework and literature supports this example and reflects well within this observation. However, PDCA cycle should be obtained very well before any implementation work can start. A challenge might be how to find suitable resources and how to allocate their use.

9.3. Communication

Communication is one of the key elements, in fact the change needs a good co-operation and communication. Customer case material shows that clear communication is necessary in order to start the change and also during the change. Communication has a role in Quality Management, it reflects QM values and principles. However, taking care about communication is quite challenging and needs good planning – and very determined support. Companies often reports that internal communication is really complex to improve and even manage or employees do not feel that they are being listened. It can be said that in today modern communication have many operative channels and people are using these channels very differently. Some companies do not have any communicative guideline. Companies should think more about communicational strategy and improve their efforts to establish structural guidelines and spread their communicational principles internally and also externally. Lean thinking can be used also to tackle these problems. For example, Hoshin Kanri, as a strategy and a policy management method, can be used in order to develop communications and its operational platform, because it supports systematic approach and presents a disciplined process handling method.

Picture 54.) Description of Communicational Guideline (Author 2015)

Above picture shows the outcome of Communicational Guideline and Preferences, which can be used in order to help internal communication and also external customer oriented communication. Shortly, all people should be connected to communicational strategy to achieve the flow, whether it is internal or external framework. Same kind of process is possible to design together with QM and as a part of customer relationship management. Even today many organizations confess that their overall communication should be improved. Some of these communicational obstacles could be avoided using systematic approach and planning cultural communication guideline. Workers should also be able to participate in the planning.

9.4. Leadership and Organizational Culture

Leadership has an important role when planning and implementing well designed change strategy into practice, but also leadership should ensure that cultural aspects are present in every phase of that change, so that people can identify themselves to be part of the change. A good CM strategy connects human behavior aspects to the organizational culture and actual change management operating pattern. Case company representatives mentioned the importance of organizational DNA – a footprint of company culture and values – it means that team member knows what is the code of the work and also acknowledge its principles. The DNA is a seedbed for real teamwork, every team member recognizes their responsibilities and take cultural codes to be used in daily work and when executing continuous improvement objectives. Case company realized that if they want to grow people who would have this specified DNA, it means they have to train, coach and mentor these people, so they build up their own comprehensive training program, where employees have a possibility to study continuous improvement methodologies and real teamwork together.

Good leadership supports any relevant activities to create cultural DNA, it means that leaders should have a strong commitment and ability to create cultural cohesion. Leaders should take active contact with employees and maintain holistic approach to minimize any internal barriers. Leaders must know also their weaknesses and have a will to develop and train themselves. Leaders should study more about underlying beliefs and values to understand more about the organization and the people. Leadership is not one man job, like Womack and Jones (1996,147.) claimed, organization should have three types of leaders: '' *someone who is committed to the business for the long term and can be the anchor that provides stability and continuity; someone with deep knowledge of lean techniques; and someone who can smash the organizational barriers that inevitably arise when dramatic change is proposed.*''

Leadership and culture are paired together, according to Schein (2010, 10-11.) bad leadership can really destroy the culture. Literature knows some corporate acquisition examples where leadership model and leaders were insourced from somewhere else and this model did not take the company culture into the account enough causing previously successful business to collapse. The culture can be a vital part of successful business. According to Gao & Low (2015, 159.) well known Toyota leadership model highlights the fact, that leaders should have in-depth knowledge about the work and also abilities to guide, mentor and lead people. Developing people effectively leads to the improved performance and regular training and nurturing this activity leads to the path of success. Toyota still expect leaders to develop people continuously and growing capable workers constantly to make sure their journey to the excellence would continue.

9.5. The importance of Real Teamwork

Author has noticed how important Real Teamwork is, traditional top down approach is still very well represented in companies and these organizations have strict boundaries that will prevent them to grow. There might be expressions of team work, but it is not a Real Teamwork. Command and control are isolated from actual way of working, it means management creates pressure assuming that would create and guide motivation. Employees have a working code where they have a belief that management knows better what to do and how to do it. Often motivation is based on employee's personal perspectives. People management should be connected into company culture, but unfortunately these two elements sometimes do not have a real connection. Case study research shows how company MC turned their traditional leadership and working culture into Real Teamwork culture. In that perspective, communication and teamwork are jointed together – combining these elements represents first steps of transformation to be taken care. Lean teamwork is the core work culture and it is a base element of that organization. Team members should be flexible and have natural will to work with other team members. It means there should be some sort of natural tendency to work together, but leadership has to share also responsibility and take also coaching attitude to develop this tendency. Functional teams need capable members too, and maybe it is good to have different roles with different specialties. Case study also shows how company MC succeeded to

turn their traditional working culture into Continuous Improvement (Lean) teamwork culture. This moment was really important success factor together with improved dialog between employees and management. An undeniable proof of this phenomenon is their improved performance e.g. increased efficiency and cost reduction results. Improved business figures and customers' opinion about the company and its products undoubtedly supports this notion fine.

It can be said if all successful sport teams are more than willing to rehearse and play the game using real teamwork attitude plus they are keen to improve all the time - why so large quantity of business organizations are still working with the way of top down traditional approach? One characteristic of these organizations is that they often claim about their ongoing struggles with information flow or their intentions to cut costs from development and people. Theoretical framework shows also what kind of results can be reached using the Real Teamwork. More can be achieved if this teamwork is connected with Servant Leadership and 4P model, which recommend leaders to pay attention for long term philosophy and reasonable goals even against short term results and other financial goals. People management has a very important part when reaching to the success and 4P model highlights that people are the most important asset.

9.6. About the approach to achieve Operational Excellence

In addition to issues dealt in Chapter 8 and 9, it might be truthful to say any approach can be useful when obtaining Operational Excellence, but it has to be purposeful and systematic enough. Continuous Improvement is well structured approach, it is based on philosophy and it offers total framework - set of methods, and the user just adapts these methods into practice. However, it needs to be connected with the culture, and often it would be better to start first from cultural change. Otherwise, there are many examples of fails. It is not just picking up right tool and improve some part of production or operations. CI activity should start from the change itself, determining what is the depth and extent of that change, in other words describing and valuing the needs. Then it would be possible to develop transformation, taking cultural and leadership development into account and create a connection between these two assets and continuous improvement methodologies. Like Machado and Leitner (2010,390-391.) states by Ben-Tovim et al. (2007) the change has to be controlled and sustained and this is possible to reach only if leaders and managers have a strong commitment. Lean way of doing have to be reminded many times, it means continuous sustaining work. Many people know what is Deming's or Shewhart's PDCA circle, but there might be a slight chance that people do not know actually how PDCA can be used in their daily work. According to Martin (webinar presentation 19.8.2013) people do not necessary get the point of PDCAs phases, the reason is that PDCA has to be explained, what does it mean and why the context is so effective? Below picture explain detailed steps of different PDCA phases.

PDCA Cycle		
Phase		Detailed steps
Plan	Develop Hypothesis	1. Define and break down the problem 2. Grasp the current condition 3. Set a target condition 4. Conduct root cause and gap analysis 5. Identify potential countermeasures
Do	Conduct experiment	6. Develop and test countermeasures 7. Refine and finalize countermeasures 8. Implement countermeasures
Check	Evaluate results	9. Measure process performance
Act	Refine Standardize Stabilize	10. Refine, standardize, stabilize the process 11. Monitor process performance 12. Reflect and share learning.

Picture 55.) Detailed PDCA steps drawn from chart presented by Martin (webinar presentation 19.8.2013).

These PDCA activities, namely an iterative development is suitable to be used in continuously changing environment. It covers the meaning of CI. Like Chapter 4 explain, Lean thinking is in most effective stage, when teams are working with principles, but also when they will turn their focus from waste reduction into the activities of recognizing and attaching value. Understanding PDCA and then using Lean principles gives an opportunity to turn focus for activities which would add value. Organization could develop their way of working and culture by learning how to monitor the workplace and bringing contents of the work more visible rather than using final results as their only meter to describe their development work. Like PDCA, Lean principles can be also explained through a classification of Lean practices.

Picture 56.) Lean tools and methods classification Lyons et al. (2013) and Clotet (2015).

When the author worked and got to be close interaction between Japanese culture and business acumen, it gained me some thoughts and observations about Lean thinking and then I realized how important is the cultural aspect. One interesting phenomenon, what is kind of forgotten sometimes, is Job

Rotation, which have some point of contact with the culture and Real Teamwork. During project work in Japan, author realized this feature in many ways. Previous picture (56.) presents Lean tools and methods classification and its last column describes principle of Creative Involvement of the Workforce. One of the Lean practices under this category is Job rotation.

Japanese companies have a tendency to rotate management employees and specialists into new tasks repeatedly from time to time. These rotations will last from one to five years. Job rotation is used for employee development purposes. Heathfield (2016) states job rotation can be used to find a career paths for employees when promotions are not available or employee see other possibilities than promotion or management path. In spite of this view Bouville and Alis (2014) present by Doolen and Hacker (2005), Liker (2004), Fullerton et al. (2003), Perez and Sanchez (2000), Panizzolo (1998), Forza (1996), Karlsson and Åhlstrom (1996) and Womack et al.(1990) that workers representing Lean production experiences quite high amount of job rotation. Bouville and Alis (2014) mention by Mohr and Zoghi (2008) *‘’job rotation contributes to an increase in job satisfaction’’* and propose by Jorgensen et al. (2005) and Hsieh et al. (2004) that ‘’ *Job rotation is positively related to’’*: a.) job satisfaction, b.) health at work and c.) intent to stay.

Unlike in western business culture, Japanese business culture has an approach to develop management for direction where broader skills and abilities are more important than specialization and particular work experience. Using this approach Japanese business functions rotate employees so they can gain wide understanding about the enterprise and its culture. Companies will reward those employees, which have shown the ability to create harmony (‘wa’) and consensus. (Amin 2012.)

Harrod (2008) states that in Western world workers typically represents worker groups with one skill, mainly because of industrial relations, and they belong to craft unions and obviously represent these groups.

When combining Job Rotation aspect with Lean, as above slightly noted, companies can adapt more skilled people and enhance overall communication developing better cohesion inside the company. It means also that corporate values are then better supported and identified. Principle of Creative Involvement of the Workforce also includes other Lean practices (picture 56.) such as Team based problem solving, Quality Circles, Cross-functional training and Worker driven Kaizen. Quality circles developer Kaoru Ishikawa states Job rotation is not only for rotating jobs, but workers within their teams should be part of quality improvement activity. Activity to develop individual capabilities causes that workers can search and resolve problems better executing their work from customer perspective point of view. This way the organization have a possibility to accomplish the most cost effective operations. (Watson 2004.)

In this context there might be a good reason to coach people well in order to achieve multiple capabilities, so they can support any organizational aims for better improvement and productivity. Job rotation supports improvement based thinking and connects people together and gives better possibilities to create effective cross-functional teams. When looking this issue from northern business perspective, Job rotation could be taken back to the table to be a part of actual employee strategy recalling management to share a same objectives and participation.

Applying Continuous Improvement requires broad understanding about the work and detailed information how work is done at the workplace. Organization's success depends on people at the work, so it is essential to coach people and go deeper taking small steps rather than taking big steps. Organization taking these steps has to maintain a good communication and develop their organizational culture and leadership at the same time. All activity should also be viewed from customer and stakeholder point of view including internal customers. Like Ramis-Pujol and Suarez-Barraza (2010) present by Wisniewski and Stewart (2004) and McAdam et al. (2005) that service or production is the outcome from customer and stakeholder oriented approach. Also case study reveals that actions in order to identify whole process and efforts to break barriers are important when organization creates metamorphosis from traditional culture to Lean culture. Holistic thinking is in top priority list when starting this transformation. Case study also proves that developing a system for activity measurement purposes is also in top priority list. Every improvement then is measured by economic follow up. Careful measuring gives also new possibilities to create and detect improvements.

Chapter 1, section 1.2 presented that overall productivity e.g. operational and cost efficiency in operations or in production are prerequisites for competitive business. This also means that the company or society can make an investment that is growing in a controlled manner. More profitability means more income.

According to news channel YLE1 (2017) the Bank of Finland's Chairman of the Board Liikanen states that especially now in difficult times, increase in productivity should be based on the paradigm, how to get more done with the same resources. Productivity growth curve has been downward for some time, but also the exchange ratio (imports and exports) has weakened for a long time. It seems that innovation activity has not been very growing. In simple terms the most important thing is what is achieved by, for example, in one hour, this specifies the value added or increased productivity. In this situation, the value added can be obtained by better technology exploitation and use of skilled resources.

Chapter 1, section 1.2 also described how Japanese industry was struggling after Second World War and had no extra money in cash registers to raise up their fallen industries. However, back then the basic idea was similar like above interview and its statement adduces. Picking up this statement, it clears out that:

'*Increase in productivity should be based on the paradigm, how to get more done with the same resources*'

In this respect Japanese industry rose again from scratch and experienced a metamorphosis using Continuous Improvement. The above phrase and its message should give some ideas to the business of life to this day. It is good to bear in mind, if the situation at the time was a disaster as seen in Japanese, so this economic situation in Finland is much better.

Finally, author see this study succeeded to answer for above presented research questions and the study obtained and acknowledged author's assumptions about Continuous Improvement. Research's primary goal was to find out what are the success factors of Continuous Improvement and second goal was to clear out what roles Organizational Culture and Leadership have in this change in order

to reach Operational Excellence. Determining success factors is not so unambiguous as we might think, there can be a different and multiple reasons and combinations behind the success. That being said the case research supported common literary well, but it might be so that other deviations in the business could effect to the results and assess again these factors behind the success. Case company delegates underlined that presented success factors were behind their success story, but they admit that without systematic approach and actual systematic executing work this could not been possible. However, the business results proved that company's plan to reach full metamorphosis using Continuous Improvement methodology was successful in every way, but delegates would like to remind that CI's full potential has not been exploited yet.

In summary, it can be said that Continuous Improvement is a methodology by which organizations can develop their business effectively in order to reach competitive results, the state of an Operational Excellence. The best thing around CI is a combination of round thinking and systematic approach, which offers:

I. detailed information and instruction about how to develop business operations

II. practical instructions how to build up step-by-step improvement based process platform

III. guiding principles and methods library to be used as an aid when planning the strategy for success.

Furthermore, is good to keep in mind that success does not come for free and Continuous Improvement needs long time perspective, supportive culture and straight dedication from organization.

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