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LAPPEENRANTA UNIVERSITY OF TECHNOLOGY
Faculty of Technology
Department of Industrial Management

MASTER`S THESIS

Increasing value add in white collar work using lean methods

Instructor: Prof. Timo Pirttilä
Supervisor: MSc. Kaija Seppälä

Helsinki, August 22, 2016
Heini Augustin

ABSTRACT

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The efficient indirect office work brings competitive advantage for companies in a rapidly changing business environment. The direct work methods in factory floors have been developed already for decades, but the office work is an area where the potential to improve the value add has not been studied and utilized systematically so far.

The first objective of the thesis work is to find useful method for identifying and managing value add using literature. The usefulness of the method is validated in the case company`s environment. The second objective of the work is to understand what kind of effort is required to create more efficient target setting for the white collar employees. The operative level targets should be linked more tightly to the company strategy.

Lean methods are selected as a tool for the improvement, since they are widely used in all kinds of industries and they are already familiar in other functions in the case company. Based on the literature review, suitable improvement methods are selected. The core of the lean is to identify the value add of a customer and eliminate the waste. Also visual control, cross functional work team, flow office and continuous improvement are used. The methods are tested in one production line and the results and feedback indicate that methods are useful in the studied environment.

TIIVISTELMÄ

Tekijä: Heini Maria Augustin

Työn nimi: Toimihenkilötyön arvoa tuottavan osuuden lisääminen lean-metodeja käyttäen.

Osasto: Tuotantotalous

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Diplomityö. Lappeenrannan teknillinen yliopisto.
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Hakusanat: Lean, lisäarvo, toimihenkilötyö, suorituskyvyn johtaminen, strategian jalkauttaminen

Muuttuvien kustannusten tehokas hallinta tuo kilpailuetua yrityksille nopeasti muuttuvassa liiketoimintaympäristössä. Kokoonpanotyön toimintatapoja on kehitetty jo vuosikymmeniä, mutta toimistotyö on alue, jonka arvoa tuottavan osuuden kehityspotentiaalia ei ole vielä tutkittu ja hyödynnetty systemaattisesti.

Ensimmäinen tavoite tutkimukselle on löytää hyödyllisiä toimintatapoja arvoa tuottavan osuuden tunnistamiseen ja hallintaan kirjallisuutta hyödyntäen. Toimintatapojen hyödynnettävyys vahvistetaan kohdeyrityksen ympäristössä. Toinen tavoite työlle on ymmärtää millaisia toimia tarvitaan tehokkaamman tavoiteasetannan tekemiseen toimihenkilöille. Operatiivisen tason tavoitteet tulisi olla tiukemmin sidottu yrityksen strategiaan.

Leanin toimintatavat valittiin kehitystyökaluiksi, koska ne niin laajasti käytössä kaikenlaisilla aloilla ja ne ovat jo entuudestaan tuttuja kohdeyrityksen muilla osastoilla. Kirjallisuuskatsauksen perusteella valitaan sopivat kehitystoimenpiteet. Leanin ydin on asiakkaalle arvoa tuottavan osuuden tunnistaminen ja hukan eliminointi. Myös visuaalista ohjaamista, funktioiden rajat ylittävää tiimityötä, virtausta toimistossa ja jatkuvaa parantamista hyödynnetään. Toimintatapoja testattiin yhdellä tuotantolinjalla ja tulokset ja palaute viittaavat siihen, että ne ovat hyödyllisiä tutkitussa ympäristössä.

PREFACE

This master‘s thesis is made for ABB Oy, Drives in 2016. The purpose of this research was to find out methods to improve the value add time of the white collar employees. This was an interesting research topic with new perspective and I would like to give special thanks to ABB Oy, Drives about this opportunity.

Supervisor of the work was System Modules Production Unit Manager Kaija Seppälä. Thank you Kaija for motivating, challenging and showing the right direction in the thesis process. Special thanks belongs also to Elli Kalliokoski, Hanna Keski-Kasari, Janne Nieminen and Janne Mäkelä. You gave valuable information and support through the process. Also other colleagues and team members have given a huge impact to my work and motivation. Thank you for that!

In addition I am also grateful to my instructor, Professor Timo Pirttilä, for the guidance. I got very good advice from Timo that helped me go ahead with the work. Finally, I would like to thank my family and friends for all of your support during my studies in Lappeenranta University of Technology. It has been fascinating and really fast two years.

> *“What a person does on his own, without being stimulated by the thoughts and experiences of others, is even in the best of cases rather paltry and monotonous.”*
>
> *~ Albert Einstein*

In Helsinki 17.08.2016

Heini Augustin

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GENERAL DEFINITIONS

Lean

> A long-term commitment, a process. People are seen only guides and the most important thing is how company's own people develop their ability to lead continuous improvement. (Liker and Franz 2011, p. 15).

Non-value

> Any activity that adds cost but no value to the product or service is seen through the eyes of the customer. (Lean Enterprise Institute 2006, p. 97).

Order-delivery process

> The process which contains the operations needed delivering the products to a customer, such as order booking, order based engineering, production planning, order specific material procurement, factory logistics, assembly and testing, packing and outbound delivery. (ABB Intranet 2016).

PDA

> The Performance & Development Appraisal (PDA) is ABB's global process for appraising talent and performance and is a core element of employee development at ABB. The PDA process consists of two components: The Year-End PDA and the Mid-Year Review. (ABB Intranet 2016).

Productivity

> Defined as an output to input ration. The straightforward measure of resource utilization can be calculated by putting the outputs on the top and the inputs used to produce those outputs on the bottom. Ruch (1982, p. 416).

Value

Lumijärvi (1993, p. 70) says that in the end the customer has the power to determine the real value of business. It is that part of the chain what he is willing to pay. The value of a business is as much as the sum of the parts which add value. Usually it is less than half of the total costs in the chain. Lean Enterprise Institute (2006, p. 97) determines the value-creating as any activity that the customer judges of value.

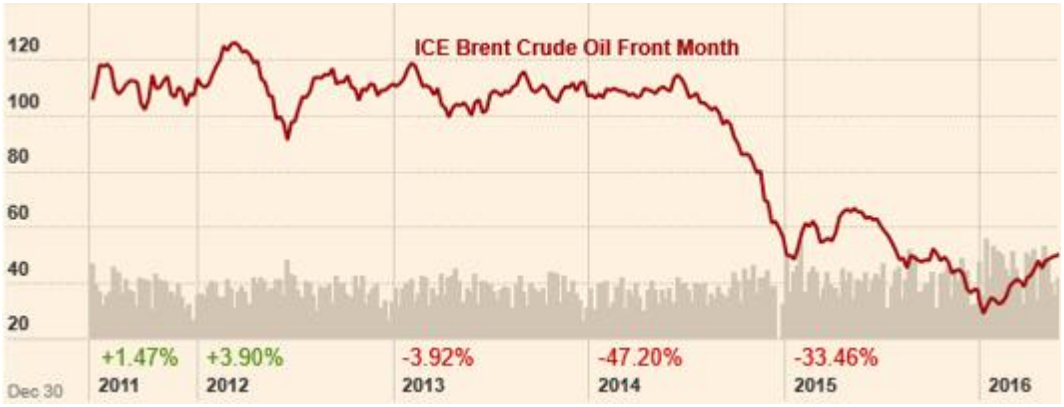
White collar work

Office work can be defined in a number of ways. Usually definitions include the idea that office work has to do with processing information. Office work can be grouped according to whether the work is mainly specialist work or assisting work. In industrial companies office work is more supportive function by nature. (ABB Production Technology Laboratory 1997, p. 6).

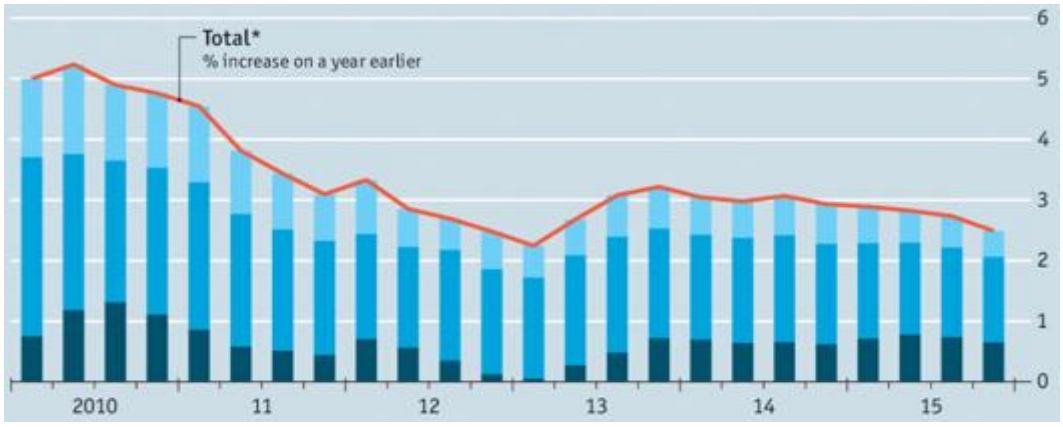
1. INTRODUCTION

1.1. Background

The global environment is under constant change. During the last five years dramatic change has happened especially in oil price (picture 1) and in global gross domestic product (GDP) (picture 2). The globalization in increasing rapidly and the markets are more open than ever. The supply chains are getting longer when the companies are focusing on their core business. The company structures are also changing from multi-level and fixed organizations towards process managed, self-learning and self-motivating teams. All of these changes require companies to enhance their efficiency and performance all the time.



Picture 1. The oil price development since 2011 (ICE Brent Crude Oil Front Month 2016).



Picture 2. The development of global GDP since 2010 (World GDP 2016).

To respond to the tight competition, companies have been developing manufacturing processes and methods already for years. Improvement guidelines and tools are implemented in factories and production lines. The work done in the production floors is measured with several criteria's and the production employees have daily targets. There are 5S, poka yoke, six sigma, one-piece-flow and several other methodologies in use. The assembly work is standardized and it is possible to balance resources inside and between production lines. Also the order-delivery processes are enhanced and streamlined. The constraints have been identified and processes optimized accordingly. In addition, a lot of development attention is paid on efficient and agile project work, especially in Product Development departments. Projects are split into smaller targets and tasks which can be followed regularly.

The area where the productivity has not been followed and measured systematically so far, is white collar or office work. According to Ruch (1982, p. 416) white collar is a broad term that has appeared in the literature with a variety of meanings while seldom being explicitly defined. It can refer to anything from clerical workers to engineers and scientists, foremen, salesmen, trainers, material handlers or the CEO. Some equate white collar work with indirect labor. Others would say that any employee in a service business is a white collar employee. The crux of the problem is trying to use one category, white collar, to include such a diversity of jobs with vastly different sets of authorities, responsibilities and duties. In this research, term white collar refers to all office employees in the case company, whereas the production workers are called blue collar employees. As in any company, there are lot of different roles and responsibilities within the office employees and therefore the research scope will be introduced more detailed in the beginning of the chapter 3.

Ahmed et al. (1991, p. 33) explains that the reason why major efforts in measurement of productivity have been concentrated only on blue collar employees, is since in the past, the number of blue collar employees as a proportion of total work force was significant. Also, it has been relatively easy to measure the

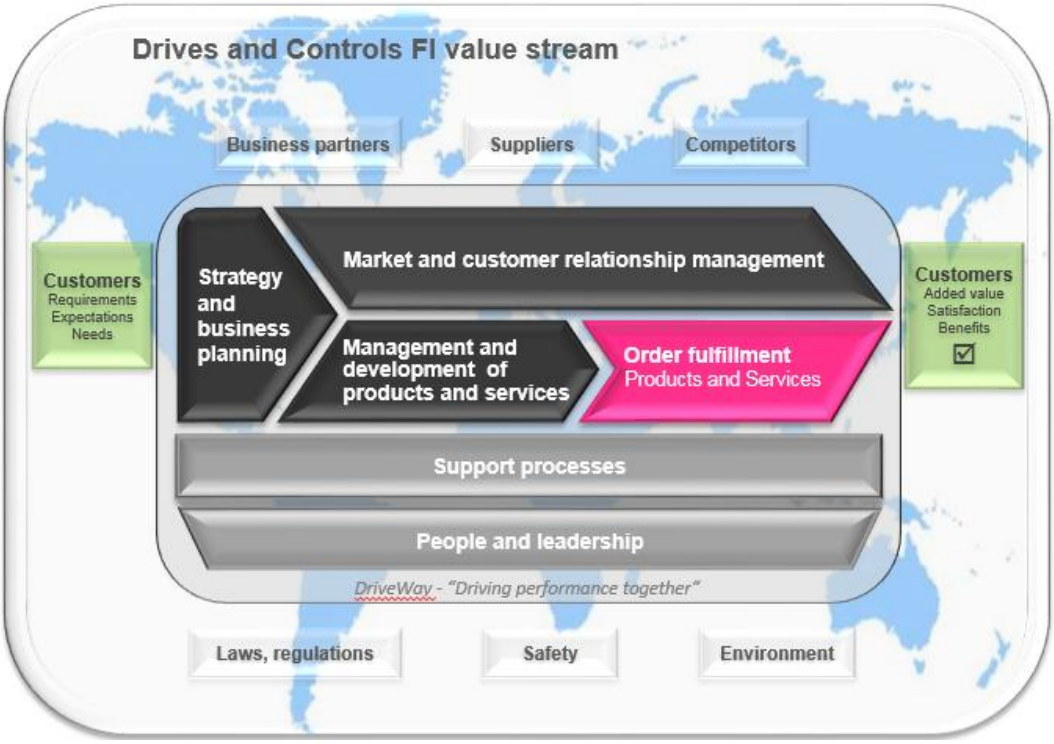
inputs and outputs for blue collar employees as they are generally well defined. This is not similar with white collar employees. While measuring white collar productivity might be complex and difficult, it is nonetheless important. Any future prosperity and competitiveness will mainly depend on the performance of the white-collar workforce.

There is not same kind of standardization system in white collar work as there is in production work. It can be hard, or even impossible, to measure white collar productivity since it is difficult to identify where the office process starts and where it ends. The “product” in the office is not necessary visual and work phases might not be as clear as they are in the production, which causes that it is difficult to measure the trough-put time of the office work. When it is difficult to measure, also follow-up and improvement is hard for the white collar employees themselves but also for their supervisors and upper management. One challenge is the difficulty of identifying the value add of white collar work. Value add in assembly work can be measured based on the time what the assembler uses assembling a product, but what is the true value add of the office work?

The performance of white collar employees cannot be managed the same way as the blue collar employees is managed. The target of the white collar productivity is to understand what brings value for a customer and make that efficiently by following continuous improvement. Initially, it is important that the company’s strategy is relevant and important towards the value add of a customer. Following that, the operative targets need to be linked to the strategy. If the operative targets are not linked to strategic targets, it might lead to situation where the targets of the white collar employees are not guiding towards the value add of a customer. The impact might be that the office employees are really busy, but they are doing non-value adding activities and the customers are not satisfied. The assembly work, project work and certain daily tasks are already being improved, but office work, which is seen more as supportive function, has not yet been streamlined. That is why increasing value add by implementing lean methods to this thesis’ target group is new and originate novelty value.

1.2. Objectives and limitations

Caused by the constant change in business environment and the trend towards limited amount of resources, it is essential to create more effective ways to receive value add in companies and renew the measurement system regularly. The currently used yearly cycle for the target setting is inflexible since some of the targets can become outdated during the cycle. Even though improvements are needed in all areas of business, this thesis will discuss the key aspects of the order-delivery process, which is one of the most significant processes of the case company. The case company has specified four main processes; strategy and business planning, market and customer relationship management, management and development of products and services and order fulfillment (picture 3). Also two additional key processes are identified; support processes and people and leadership. In the picture 3 the order fulfillment, which is called later in this thesis as order-delivery-process, is illustrated with pink block. The order-delivery process has very essential part of the customer satisfaction. Customer requirements, expectations and needs are to be fulfilled within the order-delivery process, as a form of products, which are eventually creating value add, satisfaction and benefits to a customer. Order-delivery process consists of deliveries of products. It includes all operations needed between customer order and the delivery, such as order booking, order based engineering, production planning, order specific material procurement, factory logistics, assembly, inspection and testing, packing and outbound logistics.



Picture 3. Main processes of the case company (ABB Intranet 2016).

The main objective of this study is to recognize and manage the value add of white collar employees by linking strategic and tactic levels more effectively using lean methods. Lean is selected to be the improvement method, since it is widely used in all kinds of businesses both in manufacturing operations and white collar functions. Other reason for selecting lean is that it highlights the value add for the customers, which is critical in order to be successful in the changing business environment. Lean is also emphasizing bottom-up management and responsibility of the employees and teams. Additional expectations for the research are faster and more effective strategy implementation process and transparency in all organization levels. The improvement requirement is not only for white collar employees, but since the working methods of blue collar employees have been improved already for years, only white collar employees are selected to be the scope of this study. During this research, a model for increasing value add will be created with one white collar team. In future, the model can be utilized by other teams and departments.

The research question is:

> *How to increase value add of the white collar employees in the order-delivery process?*

The sub-questions helping to answer to the research question are:

- What is the value add of the white collar work?
- How much of the white collar working time is value add currently?
- How to manage value add of the office work?
- How to set targets for the white collar employees?
- How to ensure that all strategy based actions are to be done?

Even though production employees are not in the scope of the study, they are used as an internal benchmark. The target is not to maximize the productivity of one white collar employee, but the whole team. The value add of individual employees can be really high, but if they do not share common targets, the whole team's value add is not necessary high. The target is to study how to manage the target setting system from the value add point of view, not from the measuring viewpoint. The management methods and leadership are also studied from the value add perspective, so the inclusive leadership approach is not on a scope of this study. The challenge is not with the definition of the white collar employees, so the role definition and the responsibilities are not either on a scope of the research. Also the strategic planning process and studying the quality of the strategy are out of the scope.

1.3. Research process and methodology

All material regarding the case company are provided by the case company's personnel. All other materials required in the study are acquired from publications in both written and electronic forms. This research is carried out as a qualitative study and the following research methods are chosen to collect primary information to help the analysis of the results. With the help of the chosen methods; observation, semi-structured interviews, unstructured interviews, workday activity lists and

internal benchmarking, a detailed viewpoint of the present state of the white collar work can be reached and possible improvement ideas can be perceived.

According to Hirsjärvi et al. (2007, 186- 215) observation as a research method can be divided into two parts: systematic observation and participative observation. Since systematic observation method requires a professional researcher to take the full advantage of it, focus in this thesis will be on the participative observation method. Participative observation is very useful in gathering primary information and in this study primary information is crucial in order to gather an authentic view of the case company's order-delivery process and the white collar work related to the process. In the thesis, participative observation is carried out so that the author is acting as an observer on the team meetings, so that a realistic picture of the current situation and the improvement status can be gained. The author is working in the background, asking questions and guiding the improvement journey forward without providing solutions or participating on the idea generation process.

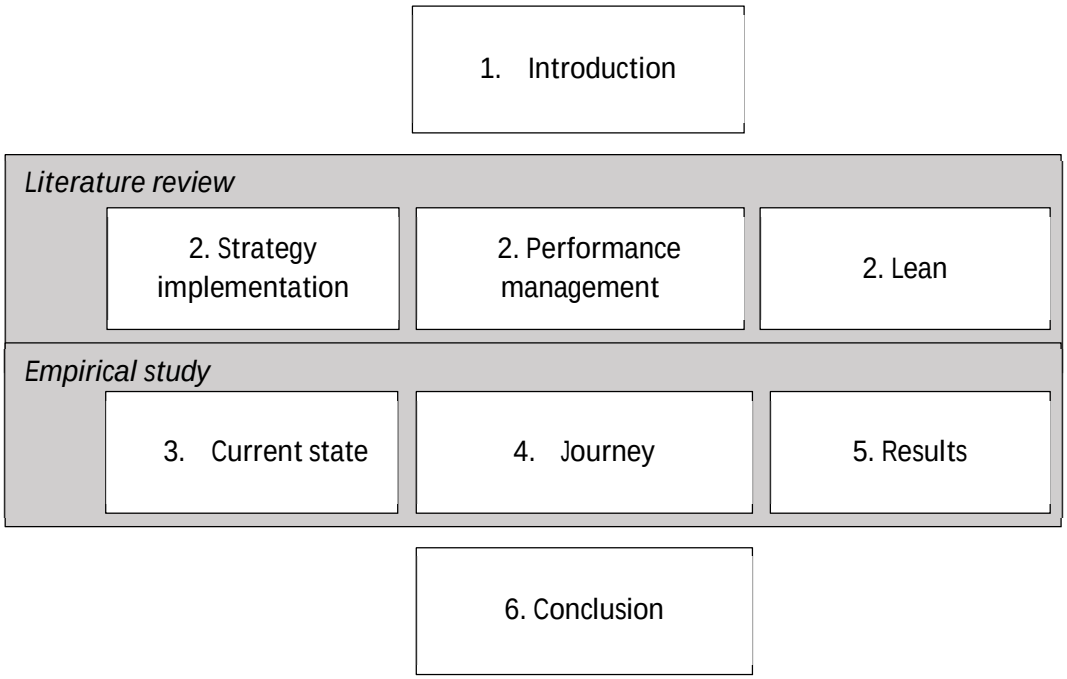
Hirsjärvi et al. (2007, p. 207) states that interview as a research method will help when an inside look of the work processes is wanted. However, this method will not provide a fully realistic picture. Interviews tend to give information of what people think about their work, rather than providing an authentic picture of what people actually do. Both unstructured and semi-structured interviews are used in the modelling phase of the order-delivery process to give a better understanding of the possible problem areas. The interviews are made as individual and group interviews. In the idea generation phases of the study, two Production Unit Managers are interviewed separately and together several time to specify and launch the project. To form a bigger picture and to define the phrases used in this thesis, also Human Resources Manager and Program Manager specialized in lean are being interviewed. Most of the interviews are conducted in the beginning of the thesis process to achieve a good understanding of the improvement needs and targets. To keep track of the progress, monthly meetings are arranged with the Production Unit Managers.

Workday activity lists as a research method can be seen as a type of a questionnaire where employees write down all of their tasks and activities during the working days within one week. The preparation process of the workday activity lists is as important as creating of a normal questionnaire. First version of the workday activity lists, made by the author, is reviewed and modified by the pilot team. Altogether 15 white collar employees are participating on the workday activity list study. The activity lists are personally presented and advised to the white collar employees by the author. Workday activity lists used in this thesis are attached in the appendix 1.

Benchmarking is essentially a comparative research method and it is a valuable tool in process analysis. Hölttä and Savonen (1997, p. 21) explain that benchmarking is generally divided into three groups; internal, external and operational. A company's processes can be compared to another company's or another functions parallel processes. The aim of making a comparison is to improve both companies' and functions' processes. In this thesis, benchmarking is conducted as a comparison of the selected lean methods between the case company's order-delivery process and other processes of the case company. The comparison aims to provide an additional viewpoint to the analysis of the case company's process and to help the idea generation of the improvement suggestions. The benchmarking is performed by reviewing the use of lean methods in other functions and departments.

1.4. Structure of the report

The research consists of four different sections and six chapters (picture 4), of which the first chapter is an introduction to the topic. It gives a short overview to the research topic, the main targets of the study and how the study is conducted. The second chapter is a theoretical part which will look into literature and present current knowledge of the area of this research. The actual research problem is defined by identifying the gaps of knowledge which are to be filled. The performance management, lean and strategy implementation will be presented and linked to white collar productivity.



Picture 4. The structure of the research.

After the problem is defined the research continues to the empirical part. The third chapter is an introduction of the empirical study. The empirical part aims to add practical knowledge to answer the research questions. The third chapter also presents the actual current state analysis, including a discussion of the main problems which came up with the study. The case study examines the current ways of working at Drives. It will also seek to find out what kind of external and internal customer expectations there are. The goal of the case study is to eventually improve the work efficiency of the order-delivery process members and in the meantime, adjust the tasks to be better suited to the expectations of the customers. After the current state has been defined, improvement areas can be identified and following that, piloting and implementing can start, which are presented in chapter four. Chapter five contains the results of the study. It will answer to the research question and provide solutions of the case company. In chapter six final conclusion and further research topics are provided.

2. THEORY

In this chapter, the literature framework will be presented. Performance management and lean will be linked to strategy implementation. Organizational performance is a result of the interaction of strategy, organizational context and individual behavior (Myers 1996, p. 2). Conceptually the study can be divided into two segments. The first one describes “what”, meaning that it identifies the things what should be done and the other segment of the study describes “how”, meaning identifying the methods how to conduct the improvement work. The content, “what”, comes from the company strategy and lean gives the way, “how”, implementing the strategy.

2.1. Strategy implementation

An organization’s strategy describes how it intends to create value for its shareholders, customers and citizens. All organizations today create sustainable value from leveraging their intangible assets – human capital, information systems, high-quality processes, customer relationships, innovation capabilities and culture. Because an organization’s intangible assets may easily represent more than 75 percent of its value, the strategy formulation and execution need to explicitly address their mobilization and alignment. The strategy map, a visual representation of the linked components of an organization’s strategy, is as big insight to executives as the balances scorecard itself. (Kaplan and Norton 2004, p. 10-11).

According to Kaplan and Norton (1993, p. 4) today’s managers rarely think of measurement as an essential part of their strategy. Executives may introduce new strategies and innovative operating processes intended to achieve breakthrough performance, then continue to use the same short-term financial indicators they have used for decades, measures like return-on-investment, sales growth and operating income. These managers fail not only to introduce new measures to monitor new goals and processes but also to question whether or not their old measures are relevant to the new initiatives.

Most companies' operation and management control systems are built around financial measures and targets, which bear little relation to the company's progress in achieving long-term strategic objectives. Thus the emphasis most companies place on short-term financial measures leaves a gap between the development of a strategy and its implementation. Communicating and linking lets managers to communicate their strategy up and down the organization and link it to departmental and individual objectives. Traditionally, departments are evaluated by their financial performance and individual incentives are tied to short-term financial goals. The scorecard gives managers a way of ensuring that all organization levels understand the long-term strategy and that both departmental and individual objectives are aligned with it. (Kaplan and Norton 1996, p. 2-3).

2.1.1. Strategy tools

Strategy map is one of the widely used methods to create business aligned strategy providing valuable insights to business executives. It provides concepts that executives can use to discuss the directions and priorities of their company. However, problem with strategy map method is that it is not easy to use which can lend itself to various interpretations. This is because linkages between the strategic objectives in the four strategy map perspectives are not explicit which makes it ambiguous. (Babar et al. 2010, p. 16-17).

Kaplan and Norton (2004, p. 12-13) represent that the strategy map is based on five principles:

1. Strategy balances contradictory forces
    - The starting point in describing the strategy is to balance and articulate the short-term financial objectives for cost reduction and productivity improvements with the long-term objective for profitable revenue growth.
2. Strategy is based on a differentiated customer value proposition

- Strategy requires a clear articulation of targeted customer segments and the value proposition required to attract and retain targeted customers.

3. Value is created through internal business processes
    - Companies must focus on the critical few internal processes that deliver the differentiating value proposition and that are most critical for enhancing productivity and maintaining the organization's franchise to operate. Internal processes are classified into four clusters:
        - operations management
        - customer management
        - innovation
        - regulatory and social.
4. Strategy consists of simultaneous, complementary themes
    - Strategies should be balanced, incorporating at least one strategic theme from each of the four internal clusters.
5. Strategic alignment determines the value of intangible assets
    - Learning and growth describes the organization's intangible assets and their role in the strategy. These include human, information and organization capital.

Strategy map identifies the cause-and-effect relationships among the objectives in the four perspectives; financial, customer, internal processes and learning and growth. Internal perspective identifies the critical internal processes that an organization must excel in so as to deliver the strategic outcomes. Learning and growth perspective identifies the human and organizational capitals along with technology assets necessary to support the value-creating internal processes. The relationships in the four perspectives provides greater insight to executives how the company's tangible and intangible resources must be aligned to create value both for the customers and the company. (Babar et al. 2010, p. 16-17).

The balanced scorecard was introduced in 1990's as a performance measuring system to quantify intangible assets, and it offers a framework for describing strategies for creating value from both tangible and intangible assets. Kaplan and Norton (2000, p. 1-2) explains that when the balanced scorecard measures the company's performance from four perspectives, a strategy map is a visual framework for the corporate objectives within those four areas. It puts focus into the sight between the corporate strategy and what the employees do every day, significantly enhancing collaboration and coordination. When attempting to implement their business strategies, top executives give employees only limited descriptions of what they should do and why those tasks are important. Strategy maps provides a tool which helps people to understand what they are expected to do. They give employees a clear line of sight into how their jobs are linked to the overall objectives of the organization, enabling them to work in a coordinated, collaborative fashion toward the company's desired goals. The maps provide a visual representation of a company's critical objectives and the crucial relationships among them that drive organizational performance. Strategy maps show the cause-and-effect links by which specific improvements create desired outcomes. From a larger perspective, strategy maps show how an organization will convert its initiatives and resources into tangible outcomes.

Kaplan and Norton (1993, p. 3) have listed aspects what makes a balanced scorecard special:

- It is a top-down reflection of the company's mission and strategy
    - The measures most companies track are bottom-up: deriving from local activities or ad hoc processes which are often irrelevant to the overall strategy.
- It is forward-looking
    - It addresses current and future success. Traditional financial measures describe how the company performed during the last reporting period without indicating how managers can improve performance during the next.
- It integrates external and internal measures

- This helps managers see where they have made trade-offs between performance measures in the past and helps ensure that future success on one measure does not come at the expense of another.

· It helps the company focus

- A balanced scorecard requires managers to reach agreement on only those measures that are most critical to the success of the company's strategy. Fifteen to twenty distinct measures are usually enough, each measure custom-designed for the unit to which it applies.

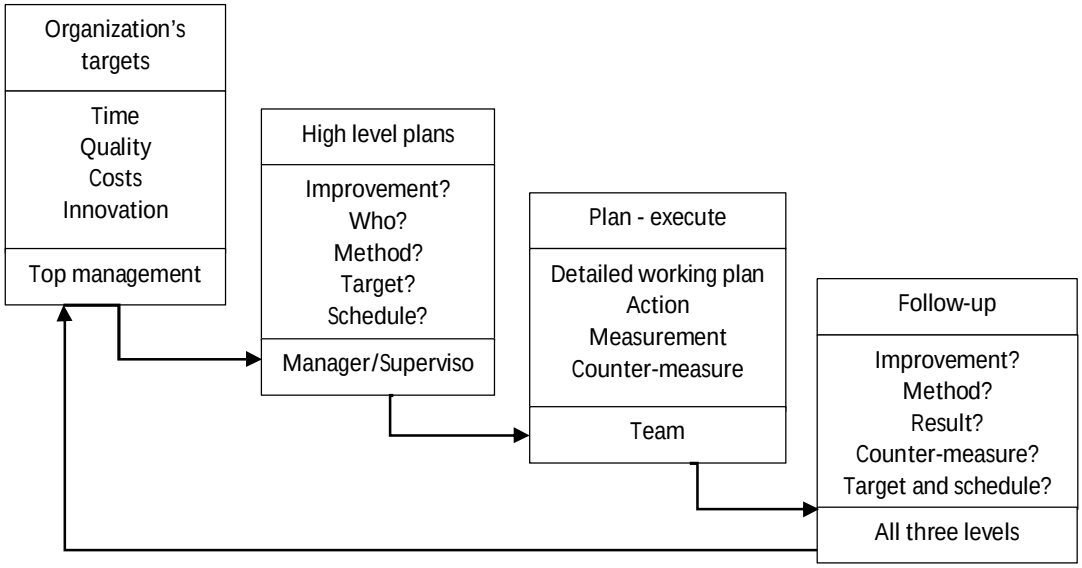
2.1.2. Hoshin kanri

Hoshin kanri is a strategic level framework. Witcher and Butterworth (2001, p. 652) explain that in Japan practitioners have claimed that Hoshin kanri provides a basis for successful organization-wide management. Hoshin kanri as a systematic approach to organization-wide management was based on the idea that unity and organizational purpose could be managed. It is a means to pull together the forces within a company and to unite the minds internally, to perpetually improve its performance by adjusting quickly to change.

Hoshin kanri is an organizing framework for strategic management. It is concerned with four primary tasks. First it focuses an organization's attention on corporate direction by setting, annually, a vital few strategic priorities; secondly, it aligns these with local plans and programs; thirdly, it integrates them with daily management; and internally it provides for a structured review of their progress. The need to manage strategy as directions to guide local decision-making and daily working is a concern at the heart of strategic management. This is particularly so for work which stresses the importance of organizational transparency to the implementation and self-management of strategic intent and the development of core competencies through a facilitating organizational architecture. It has stirred a renewed advocacy for enabling forms of leadership which are consistent with ideas about the learning organization and ideas based upon incremental and emergent approaches to strategy formation. Hoshin kanri is consistent with many of the

conclusions of this work, and it has been used in most large Japanese companies to provide a core capability which integrates strategy and daily management. (Witcher and Butterworth 1999, p. 323).

Hoshin kanri is a process in Toyota, where the targets are moving ahead from the organization management downwards to team level. The aggressive targets start from management level and each level after that determine measurable targets for that year, which are supporting the targets of the management level. The targets need to be measurable and very concrete. The process is presented in picture 5. (Liker 2004, p. 262).



Picture 5. Hoshin kanri (Liker 2004, p. 262).

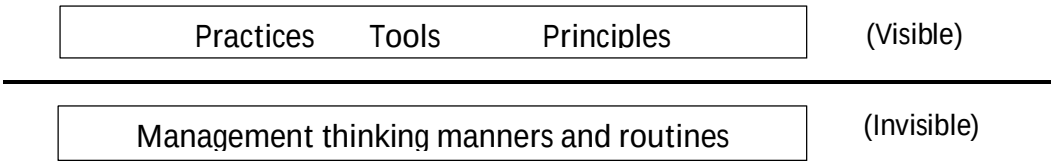
2.1.3. Toyota kata

Toyota kata is a tactic level framework. Mike Rother (Liker and Rother 2011, p. 2) who has spent years researching how Toyota does what it does and how to better teach companies that are on a quest for excellence, summarizes what he found in the concept of the improvement kata , which he suggests underlies striving to meet challenges at Toyota. A kata is a well-rehearsed routine that eventually becomes second nature. In this case, the routine is the process for making improvements. The

difference between the visible and invisible purposes lean tools is the difference between attempts at implementation of tools, and using the tools as part of deliberately practicing a routine for continuous improvement.

Toyota's improvement kata and coaching kata go beyond than the most of the result oriented management methods used nowadays. Toyota believes strongly that the improvement and adaptation routines of an organization determine the way to competitive advantage and longtime success instead of quantitative and financial targets. The danger is that financial targets can be reached in many ways, from which many have nothing to do on process improvement. Toyota does not appreciate numeric targets. The kata model is based on how the product is manufactured. Numeric targets are important but more important are the ways how they are reached. The focus is on management by means instead of management by results. (Väisänen 2012).

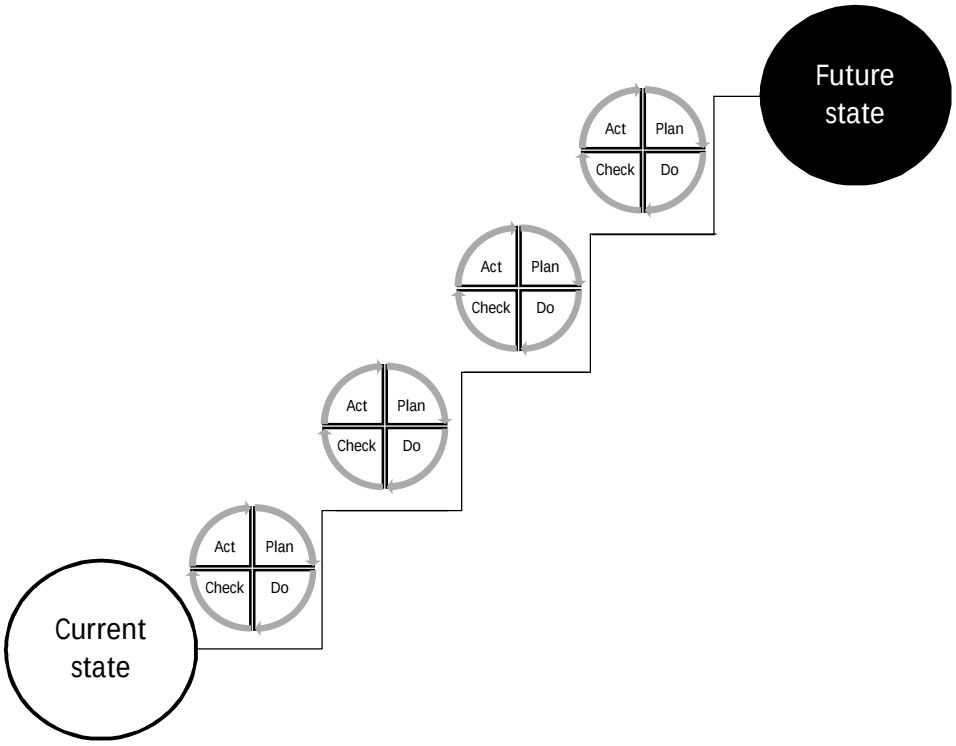
Toyota's behavioral models (picture 6) are not visible since those cannot be described in documents. The Toyota tools and techniques, meaning the things we see are based on invisible thinking and action routines. The techniques do not work properly and do not produce continuous improvement and adaptation without the Toyota background logic, which is out of sight. The challenge is not to get managers to use new production and management techniques or adopt new principles, it is to reach systematic continuous improvement in the whole organization by developing applied behavioral routines repeatedly and consistently. These routines are called kata. (Väisänen 2012).



Picture 6. Toyota visible and invisible parts. (Väisänen 2012).

The improvement kata is a way an abstract vision can be broken into a series of descriptive target conditions, and through striving to achieve them both develop and utilize the creative powers of people. It involves teaching people a standardized, conscious means of grasping the essence of situations and responding scientifically by working iteratively. The improvement kata is a routine to teach and learn capability to achieve desired conditions. The improvement kata is a way to achieve things that you do not know how you are going to achieve. (Liker and Rother 2011, p. 3).

At first there are only three thing what has to be known for sure: where we are, where we want to get and what are the ways we should use when proceeding in the uncertain area between these two states (picture 7). The end is meant to be somehow uncertain, since it is impossible to see to the future. The road from current state to desired state is like a grey area, full of unpredictable obstacles, problems and questions which can be found only when proceeding on the road. The best way to handle the uncertainty is to own methods which enables to handle the unsecure road to new desired state even though it is not known what are the content, steps and the results of the actions. The desired results are reached when focused to improve the process systematically, instead of doing occasional improvement projects. The success of Toyota is not based on perfectly prepared decisions and plans beforehand. Many things become clear on the road when reaching towards the target, not through beforehand planning. Thousands of PDCA (Plan, Do, Check, Act) cycles towards to target are the key for Toyota to increase its cost, quality and market share step by step. (Väisänen 2012).



Picture 7. Future state is reached by numerous PDCA-improvement phases (modified from Väisänen 2012).

2.2. Performance management

Changes in the business environment create new opportunities. To efficiently implement the customer expectations, performance management on employee level is needed. Laamanen (2005, p. 12-13) state that those will manage the best, who have the best information in use and can utilize it fast and flexible. In order to be fast and flexible, the decision making needs to be decentralized. Myers (2006, p. 56) argues that the delayering and down-sizing trend was initially triggered by the need to reduce costs. The potential consequences of delayering are intended to be faster response to competitive and market changes, larger spans of control, increased workloads and a broader range of assignments and roles for individuals and groups. One of the expected benefits of flatter hierarchies is the organisation's ability to become flexible and responsive by reducing the time lag between decision and action, enabling faster response to market.

2.2.1. Traditional performance management

Organizations need to continually consider answers related to performance management questions, since according to Otley (1999, p. 365) the context in which the organization is set is constantly changing and new strategies need to be developed to cope with new operating environments. The questions are as follows:

1. What are the key objectives that are central to the organization's overall future success and how does it go about evaluating its achievement for each of these objectives?
2. What strategies and plans has the organization adopted and what are the processes and activities that it has decided will be required for it to successfully implement these? How does it assess and measure the performance of these activities?
3. What level of performance does the organization need to achieve in each of the areas defined in the above two questions, and how does it go about setting appropriate performance targets for them?
4. What rewards will managers and other employees gain by achieving these performance targets (or, conversely, what penalties will they suffer by failing to achieve them)?
5. What are the information flows that are necessary to enable the organization to learn from its experience, and to adapt its current behavior in the light of that experience?

According to ABB Production Technology Laboratory (1997, p. 6) it is much more difficult to measure productivity in offices than in production floor, and there are not many metrics known for measuring office productivity. It is often considered an area which is not worth measuring because it would be difficult or very time consuming. Lumijärvi (1993, p. 112) argues that the performance should be measured with different measurements in different organizational levels. Measurements should be such where the employee can effect on his/her own actions. Modig and Åhlström (2013, p. 22) claims that an important characteristic of a process is that you can define its start and end points however you want; you

determine the system boundaries. It is important where the system boundaries are set, as this determines the critical measure of throughput time.

In order to make remarkable improvements, creativity and new ways of thinking are needed. Instead of asking “Is this done effectively?” one should ask “Why we do this? Should we do this at all?”. Companies tend to find solutions to bottlenecks by automating that part of a process. Of course, IT will help making the process more effective, but non-necessary things should not be done in the first phase. (Lumijärvi 1993, p. 73-74).

Rummler and Brache (1990, p. 15-19) have found that everything is an organization’s internal and external “ecosystem” (customers, products and services, reward systems, technology, organization structure and so on) is connected. To improve organization and individual performance, we need to understand these connections. The way to understand the variables is through the three levels of performance:

- Organizational level – emphasizes the organization’s relationship with its market and the basic “skeleton” of the major functions that comprise the organization. These include strategies, organization wide goals and measures, organization structure and deployment of resources.
- Process level – when looked beyond the functional boundaries that make up the organization chart, there can be seen the work flow – how the work gets done. It must be ensured that the processes are installed to meet customer needs.
- Job/performer level – organization outputs are produces through processes. Processes, in turn, are performed and managed by individuals doing various jobs. These include hiring and promotion, job responsibilities and standards, feedback, reward and training.

The second dimension comprises three factors – performance needs – that determine effectiveness at each level:

- Goals - each level need specific standards that reflect customer's expectations for product and service quality, quantity, timelines and cost.
- Design - the structure of each level needs to include the necessary components, configured in a way that enables the goals to be efficiently met.
- Management – each of the level requires management practices that ensure that goals are current and are being achieved.

Combining the three levels of performance and the three performance needs results in the nine performance variable (picture 8). These variables represent a comprehensive set of improvement levers that can be used by managers at any level.

		THE THREE PERFORMANCE NEEDS		
		Goals	Design	Management
THE THREE LEVELS OF PERFORMANCE	Organizational Level	Organization Goals	Organization Design	Organization Management
	Process Level	Process Goals	Process Design	Process Management
	Job/Performer Level	Job/Performer Goals	Job Design	Job/Performer Management

Picture 8. The nine performance variables (Rummler and Brache 1990, p. 19).

Organization management and process management includes also interface management in addition to the already mentioned three other levels. The interface management refers to the "white space" between functions and process steps, especially those that pass between functions. As at the organizational level, where the greatest opportunities for improvement lie between functions, the greatest process improvement opportunities often lie between process steps. Effective management of performance requires goal setting, structuring and managing each

of the three levels of performance. It is also important to understand that the three levels are interdependent. Any attempt to implement organization goals will fail if those goals are not supported by processes and human performance systems. (Rummler and Brache 1990, p. 19).

The traditional management approach to managing large, complex systems is to split up the system into individual components or processes. The individual processes are then studied in detail, with the intent of instituting efficient operations. In business context, this method reduces the enterprise into smaller units and establishes financial goals for each of those units. This system of operating businesses was very successful after World War II. Policies, procedures, performance metrics and other elements that define organizational structure and function were based on this implied belief in local optima. Such an approach, however, effects decision making in a negative way and produces a number of undesirable consequences. Promoting isolated efforts that focus on improving specific functions ignores the interactions between those functions. The lack of systems perspective invariably leads to metrics, policies and produces that promote local rather than global optimization. (Srinivasan 2012, p. 31-32).

2.2.2. Process management

Processes are at the heart of any organization's performance improvement activities. They provide the means of harnessing peoples' energies and talents to improve business performance. The choice of process performance measurements is critical; they should relate to and be conditioned by the stakeholder-related measurements. (Lascelles and Peacock 1996, p. 110).

In the office environment, internationally recognized quality management standards were stimulated by the increase in international trade and because of the fear of a variety of different national standards would complicate the international trade. ISO 9000-standards, which are a series of quality management standards, were accepted in 1987 by International Standard Organization (ISO). According to

ISO 9001-standard (SFS 2008, p. 17) process approach emphasizes the importance of

- understanding and meeting requirements
- the need to consider processes in terms of added value
- obtaining results of process performance and effectiveness
- continual improvement of processes based on objective measurement.

Laamanen (2005, p. 28-41) introduces challenges and risks related to performance management. Measuring generates wrong kind of activities, wrong things are measured from the strategy point of view or measuring things which one cannot affect, to mention couple of them. He also mentions that the efficiency will not be reached by management decisions, it is a result of well-defined processes. The organizational efficiency is generated in co-operation, so information of the process performance is needed. With the processes, it is possible to find out what practical changes are needed for strategy implementation. Processes provide a way to focus the actions of a team towards customers. Without processes teams might turn towards inside and start maintaining their own wellbeing. The processes are the basis for the operational efficiency.

When the meaning of the processes are determined, the critical phases need to be identified. Every process consists of hundreds of stages and tasks. For some tasks it is not relevant how they are done, as soon as they are done, from the process performance point of view. Some tasks have bigger influence on process performance. These tasks should be managed more strictly. The development activities should be focused on these critical phases. The critical phase might be a bottleneck of the process, the phase which generates lot of benefit, a phase which requires lot of expertise, time or resources or includes lot of risks. It is important to understand how to act in the process in terms of critical phases to reach the targets. (Laamanen 2005, p. 167-168).

Process management is more than breaking down barriers between functions. To be effective, process management depends on developing a process view of the entire business – throughout the business – around facts-based management. Developing a process culture – an environment in which everyone is process focused because of the following:

- Processes are visible.
- There is a clear process structure.
- There is a framework for understanding how the business's processes provide value to customers.
- Process improvements priorities have been determined and are clearly explained.
- People are encouraged to think process rather than function.

(Lascelles and Peacock 1996, p. 124).

2.3. Lean philosophy

Lean gives a method for strategy implementation and performance management, and it is the "how" the targets are to be reached. Lean is widely spread philosophy nowadays and a lot of researches are published since the beginning of 1990`s. This performance improvement system is growing rapidly around the world and there are experiences available from several decades. Lean practices are applicable to all organization levels and to different industries. Liker and Franz (2011, p.12) say that the focus of lean is always on the customer and the value stream. It is a pursuit of perfection by constantly eliminating waste through problems solving.

2.3.1. History of lean

Henry Ford systemized lean manufacturing during the early nineteenth century when he established the concept of mass production in his factories. The Japanese adopted lean manufacturing and improved it. This methodology is a systematic approach to identifying and eliminating waste through continuous improvement by following the product at the pull of the customer in pursuit of perfection. In the

1950s, the Toyota Motor Company first implemented Quality Circles within the production process itself. As the Second World War came to an end, Taiichi Ohno, former executive vice president of Toyota, was given the task of developing an efficient production system for the manufacture of automobiles in Japan. Learning a great deal from Henry Ford's assembly lines, and customizing a production process to suit the needs of the Japanese markets, which called for lower volumes of cars, Ohno pioneered and developed the world renowned Toyota production system, also known as lean manufacturing and now used throughout the world. The methodology is designed to maintain a continuous flow of products in factories in order to flexibly adjust to changes in demand. (Bhuiyan and Baghel 2005, p. 763).

The aim of lean manufacturing is the elimination of waste in every area of production and includes customer relations, product design, supplier networks and factory management. Its goal is to incorporate less human effort, less inventory, less time to develop products and less space in order to become highly responsive to customer demand while producing top quality products in the most efficient and economical manner possible. Waste is defined as anything for which the customer is not willing to pay. Lean manufacturing results in the ability of an organization to learn. Mistakes in the organization are not generally repeated because it is a form of waste what the lean philosophy seeks to eliminate. The lean toolbox is used to eliminate anything that does not add value to a process. The three principles of lean manufacturing are: improve flow of material and information across business function, focus on pull by the customer and commitment of organizations to continuous improvement. (Bhuiyan and Baghel 2005, p. 762).

2.3.2. Lean methods

Traditional process improvement is focused on improving the local efficiencies. The result might be remarkable improvement on that particular process, but have only small effect on the total value chain. There are relatively few value add steps in most of the processes, so improving those phases does not have big impact. Without lean thinking most people do not see the huge opportunities decreasing

waste by removing or reducing non-value add phases. In lean process improvement the major part of the improvement comes from eliminating the non-value add phases. At the same time value add time becomes smaller. (Liker 2004, p. 31).

How a lean operations strategy will be implemented will depend on the context. A solution that suits one organization or environment will not necessary be suitable in another organization or environment. Lean is a strategic choice for all organizations. Organizations in all environments can benefit from better flow efficiency and also increase their resource efficiency in the longer term. (Modig and Åhlström 2013, p. 126).

According Modig and Åhlström (2013, preface) the core of lean is simplifying. It is waste of time to optimize something what is too complicated to understand. It is better to simplify the operations to truly understand them. Lean is about seeing the whole in order to avoid island thinking and focusing on real customer needs. Lean methods can be used to improve the performance management. Singh et al. (2006, p.1404) have listed a number of Lean tools which are shown in picture 9.

1. Five step housekeeping	14. Jidoka	31. Setup reduction
2. Five W1H (when, why, what, where, who, how)	15. Kaiku	32. Skill matrix (I, L, U)
	16. Kaizen events	33. Small lot production (one piece flow)
3. Five why's	17. Layout change	34. Standardized work
4. Andon boards	18. Levelled production	35. Statistical process control
5. Batch size reduction	19. Line balancing	36. Suggestion schemes
6. Cellular manufacturing	20. Morning market	37. Takt time
7. Continues flow	21. Point of use storage (POUS)	38. Team preparation
8. Cross functional work team	22. Poka yoke	39. Theory of constraint (TOC)
9. Failure mode and effect (FMEA)	23. Problem solving	40. TOC TP (thinking process)
10. Failure tree analysis	24. Production control boards	41. Time and motion study
11. Flow production	25. Pull/kanban systems	42. Total productive maintenance (TPM)
12. Danger management	26. QS 9000	43. Visual control
13. Internal communications and relationship management	27. Quality at source	44. Waste elimination
	28. Quality circles	45. Material handling analysis
	29. Quality function deployment (QFD)	
	30. Schedule stability	

Picture 9. Lean toolkit (Singh et al. 2006, p.1404).

From the toolkit, visual control, flow production or in this case flow office, cross functional work team and waste elimination are selected as the tools to improve the value add of the white collar employees in this study because with them it is possible to increase transparency and add co-operation. Also continuous improvement is seen as an important part of implementing the new learning culture. These methods will be presented next more detailed.

Visual control

With visualizing the targets of each employee, it is clear for everyone what really is done in the organization. Not too often, people think why certain things are done in the way they are and why some functions even exists. Functions create a lot of different kind of documents which are never used. After time it is hard to finish the document creation. (Lumijärvi 1993, p. 137-138).

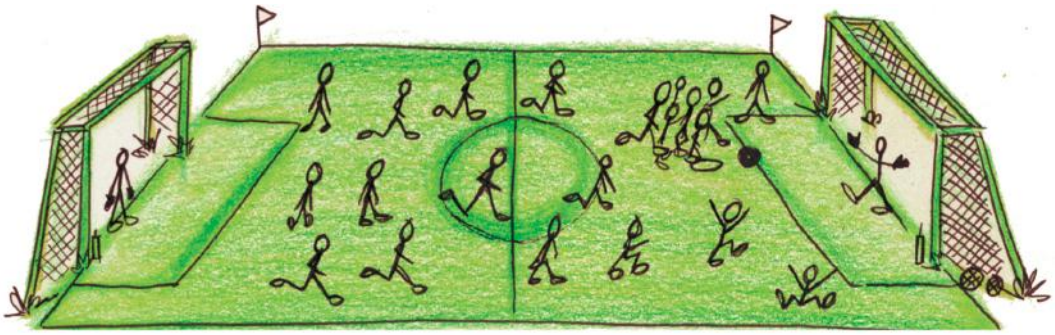
Visual management is a communication tool used in any working environment, which tells at a sight how the work should be done and if it differs from the standard. It helps the employees to see immediately how their work is going. It might show where the things belong, what is the standard way of doing something, the work status of a process and many other information relevant for the working progress. In larger scale, visual management means all kinds of “just-in-time” information, which is needed to ensure fast and proper performance of an operation and a process. Visual management means more than just making targets, deviations, different kind of charts and tables visible. Visual management enables to take a glance at a process, equipment, warehouse, information or employee and see immediately what is the standard used at the work and the possible deviation from the standard. Daily updated, well-planned tables and charts can guide the projects visually in the offices. (Liker 2004, p.152).

One of the Toyota Production System’s biggest innovations on visual management is obeya (large room), which was used in product development. The room has lot of visual tools, which are managed by responsible person of different functions. All team members can evaluate the tools. All deviations from schedule to performance

targets are shown in obeya. It enables fast and accurate decision making, improves communication, upholds having a common line, makes information gathering faster and creates important common spirit. (Liker 2004, p.156).

Modig and Åhlström (2013, p. 133-134) use a football match as a metaphor when talking about lean operations strategy. In addition to all the players being able to understand the rules and their own team's strategy, all the players, from all positions on the pitch, must always be able to:

- see the pitch, the ball and the goal
- see all the players on the pitch
- see the score
- see how much playing time if left
- hear the whistle
- hear their team members and the crowd (picture 10).



Picture 10. A football pitch (Modig and Åhlström 2013, p. 133).

Every player can see and hear and is aware of everything that is happening all the time. Based on this clear picture they can make decision about how, together, they can score a goal. If any player makes a mistake or if one of the teams scores a goal, the referee blows his whistle. Everyone can see everything all the time and the referee can stop the game within a second. Modig and Åhlström (2013, p. 134) comment that today's organizations are built like a football pitch covered in hundreds of small tents, where matches are played with many different balls at the same time (picture 11). The players are rewarded for kicking the ball as many times

as they can and think they score a goal when they succeed in kicking the ball out of their own tent. They play at different times and barely know the names of the other players. No one sees the big picture. No one hears the whistle.

Picture 11. Today's organizations illustrated as a football pitch (Modig and Åhlström 2013, p. 134).

Visualization allows organization to see the whole football pitch all the time. It is impossible to control a whole organization. But it is possible to standardize and visualize everything we do. Through visualization, the organizations can be controlled by just controlling the deviations from the standards. (Modig and Åhlström 2013, p. 137).

Resource and flow efficiency

Resource efficiency, the traditional form of efficiency, involves utilizing resources as much as possible. A basic principle in this industrial development is to divide an incoming job into smaller tasks, which are carried out by different individuals and organizational functions. Resource efficiency focuses on the resources an organization needs in order to produce a product or deliver a service, such as staff, sites, equipment, tools and information systems. Resource efficiency is a measurement of how much a resource is utilized in relation to a specific time period. At an organizational level, resource efficiency indicates how well an organization

is utilizing all of its resources and whether the resources are adding value add or ‘standing still’. (Modig and Åhlström 2013, p. 9- 10).

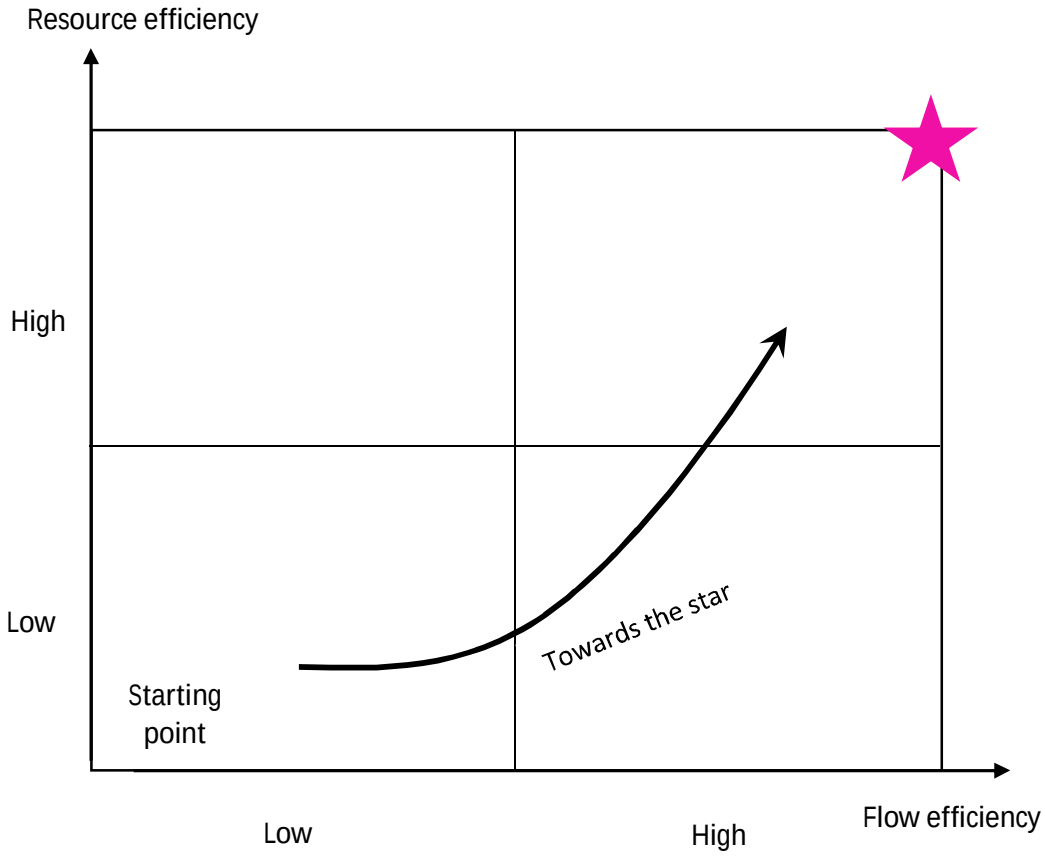
Modig and Åhlström (2013, p. 13-14) have defined flow efficiency as a new form of efficiency. Flow efficiency focuses on ‘the unit’ processed in an organization. In manufacturing, the unit is a product comprised of different types of components that are processed in various stages to make the product. In services, the unit is often customer whose needs are met through different activities. Flow efficiency is a measurement of how much a flow unit is processed during a specific time period. The time period is defined from the time a need is identified to the time it is satisfied. It is assumed that the waiting time does not add value.

Resource efficiency is the dominant form of efficiency. As a general rule, organizations are therefore organized around specific functions and specialized around resources. While it is important to use resources efficiently, it is also important to meet customers’ needs efficiently. In order to have both high utilization and satisfied customers, resource efficiency and flow efficiency are both important. The best way to understand why it is difficult to score high on both forms of efficiency and how it can be done is to understand how processes work. Flow efficiency is created through processes. A process is a collection of activities that, together, create the path for and fulfil the need of a flow unit. (Modig and Åhlström 2013, p. 15-16).

Flow efficiency concerns the share of the value-adding activities in relation to the throughput time. However, it is also possible to improve customer value by increasing (or decreasing) the speed of the value transfer. Flow efficiency is not about increasing the speed of value-adding activities. It is about maximizing the density of the value transfer and eliminating non-value-adding activities. Removing waste and superfluous work can improve resource efficiency. A focus on flow efficiency therefore fosters an improvement of resources efficiency. It is crucial to note that a lean operations strategy involves focusing on flow efficiency before

resource efficiency, not the other way round. (Modig and Åhlström 2013, p. 28, 125).

Picture 12 illustrates what Modig and Åhlström (2013, p. 124) mean when talking about lean operations strategy. It involves moving the organization to the right in the matrix by increasing flow efficiency. The first priority is clearly to focus on flow efficiency. By focusing on flow efficiency, an organization can reduce a lot of superfluous work and waste. Removing them can improve resource efficiency, which helps an organization move up in the matrix. A focus on flow efficiency therefore fosters an improvement of resource efficiency. Modig and Åhlström state that it is not possible to reach the theoretical state of perfection (the star), which means that a lean operations strategy implies always striving to get closer to that state though continuous improvement.



Picture 12. Resources and flow efficiency (Modig and Åhlström 2013, p. 124).

Cross functional work team

The purpose of every system is to support the value add work of a team. The teams do not make the value add, individual employees do. The teams coordinate the work, motivate and learn from each other's. In most cases it is more efficient that the individuals do the detailed work required producing the product. The needs to be a balance between individual and team work and between personal excellence and team efficiency. If the team work is the foundation of the company, individual employees will give their best to the company success. (Liker 2004, p- 185-186).

Since no one can achieve the targets alone, Womack and Jones (2003, p. 20-21) argue that Lean thinking must go beyond the firm to look at the whole: the entire set of activities entailed in creating and producing a specific product, from concept through detailed design to actual availability, from the initial sale through order entry and production scheduling to delivery and from raw materials produced far away into the hands of the customer. The organizational mechanism for doing this is called a lean enterprise, a continuing conference of all the concerned parties to create a channel for the entire value stream. Creating lean enterprises requires a new way to think about firm-to-firm relations and transparency regarding all the steps taken along the value stream.

To see the big picture, a production analysis board can be an important visual management tool, particularly as a firm begins its transformation to lean production. However, it is important to understand that the appropriate use for the board is for identifying and solving problems, and not, as often misunderstood, a tool for scheduling production. The tool is sometimes called a production control board, a progress control board, or a problem-solving board. (Lean Enterprise Institute 2006, p. 73).

This study aims to find areas where to increase the value add of a white collar employee. According to Jones and Womack (2003, p. 30) from the end customer's standpoint none of the information processing steps created any value. To test this assertion, just ask yourself whether you would be less satisfied with a product if it

could be ordered and delivered to you with no management of production and logistics information. Obviously you would not be less satisfied. Indeed, you would be more satisfied if the cost savings from eliminating information acquisition and management could be passed along to you. In fact, information for control of operations is necessary waste.

It is impossible to imagine a process without variation. Variation is particularly difficult to avoid when the flow unit is a person, as all individuals are unique and have individual needs, especially indirect needs. People introduce a natural variation that is very difficult to avoid. It is not possible to standardize how we deal with people in the same way as we can standardize how we deal with material or, to a certain degree, information. In fact, it is impossible to imagine a process without variation, although the degrees of variation will differ. (Modig and Åhlström 2013, p. 42).

Waste elimination

The core of the Toyota production system is a waste elimination (Liker 2004, p. 27). Liker (2004, p.87-88) argues that it is impossible to measure the value add of a white collar employee visually. It can be noticed by following the progress of a product or service he/she is working with. Only a minor part of their work is value add, meaning have an effect to the end result. In most of the processes 90 % is waste and 10 % value add. Since the value add is relatively really low, it is practical to decrease the non-value add work rather than trying to improve the value add work.

The seven wastes identified by Toyota Production system are transportation, inventory, waiting, defects, over-processing, excessive motion and over-production. To identify areas in a system where improvement is needed, the seven wastes needs to be identified and measured. While most of these wastes are visible and easily quantifiable in a manufacturing environment, they are more difficult to be distinguished and measured in an office environment. (Chen and Cox 2012, p. 17).

In addition to these seven wastes, the eight waste is identified to be underutilization of people and in particular their ideas and creative input for improving the processes and practices. (Hicks 2007, p. 237).

Since traditional eight wastes are originally identified in production, McMahon (2013) has defined what they would mean in the office environment:

- Defects & Inspection
    - A work that was thought to be complete but requires to be touched again or inspection. *Example: different kind of human errors, lost files, missing information.*
- Over Production
    - Producing more than what the customer wants instead of providing what they need or actually paid for. *Example: Producing reports that no one reads, making extra copies just-in-case, memo or email to everyone.*
- Waiting
    - A time delay while expecting something to happen. *Example: waiting for approval, all attendees are not on time in a meeting, slow system response time.*
- Non-Utilized People or Knowledge
    - People's skill, abilities and knowledge are not effectively or appropriately used. *Example: Bypassing procedures to hire a favorite candidate, not providing opportunity for professional development, inadequate training available.*
- Transportation
    - Moving a product to somewhere when moving does not change fit, form or function. *Example: No signs identifying departments, multiple hand-offs or approvals, bad area layout.*
- Inventory
    - A common result of multi-tasking and otherwise unbalanced workloads. It can be found in e-mail inboxes, to-do lists, product

development pipelines and resource assignment charts. *Example: Excessive office supplies, files piled up between desks, obsolete files.*

- Motion
  - People having to walk to office equipment or having to walk to find people. Meetings are motion in the sense that they are work without producing, unless a decision is made or information is produced during the meeting. *Example: Looking for items without a defined place, searching for files on computer.*
- Excess Processing
  - Results from the creation of multiple versions of a piece of work that now must be reconciled into the true work. *Example: Multiple signatures, unnecessary information collected, re-entering data, expediting.*

ABB Group (ABB Intranet 2016) has also defined the 8 knowledge wastes under four different categories:

- **Scatter** – Actions by people and things that make knowledge ineffective by disrupting its flow
  1. Communications barriers between people.
     - Too much tacit knowledge in people's heads and not made explicit for easy access.
     - Searching for information that is not ready.
  2. Poor tools
     - Tools are not useful anymore.
     - Tools that are hard to use and are slow.
     - Incompatible systems.
- **Hand-off** – wastes related to handoff between tasks
  3. Useless information
     - Wasting resources creating knowledge with no customer value.
     - Over-processing.
     - Waiting for information to develop consensus.
  4. Waiting for knowledge, information and for everyone to come together for a decision.

- § Or delaying start.

5. Making-do
   - § Starting a task even though all necessary knowledge is not available.
   - § Leads to waiting, multitasking and rework.

2. Knowledge loss

6. Testing to specification
   - § Not knowing the limits of a design.
7. Discarding knowledge
   - § Promotions, retirement, quitting and dismissals without capturing knowledge.
   - § Poor knowledge capture and management in general.

8. Multitasking

- § When you work on more than 1 open task concurrently.
- § The more you try to do the less you get done (table 1).

Table 1. Relation between number of open tasks and non-value add (ABB Intranet 2016).

Number of open tasks	Non-value added time
2	20%
3	35%
4	55%
5	70%
6	85%
7	> 95%

Continuous improvement

Bhuiyan and Baghel (2005, p. 761-762) define continuous improvement as a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization. It involves everyone working together to make improvements without necessarily making huge capital investments. Continuous improvement can occur through evolutionary improvement, in which case improvements are incremental, or though radical changes that take place as a result

of an innovative idea or new technology. Major improvements often take place over time as a result of numerous incremental improvements. On any scale, improvement is achieved through the use of a number of tools and techniques dedicated to searching for sources of problems, waste and variation and finding ways to minimize them. Over the decades, as the need to continuously improve on a larger scale within the organization became an imperative, a number of continuous improvement methodologies have developed based on a basic concept of quality or process improvement, or both, in order to reduce waste, simplify the production line and improve quality. The best known of them are:

- lean manufacturing
- six sigma
- the balanced scorecard
- lean six sigma.

(Bhuiyan and Baghel 2005, p. 762).

3. THE CURRENT STATE OF THE CASE COMPANY

The empirical part of the study begins in this chapter. First the case company presentation and background information of the studied environment is described. Then the current amount of value add in white collar working time is studied and analyzed. The time analyze is piloted with the white collar employees of one Production Unit and it is assumed that similar findings will arise also from other Production Units. This chapter includes also internal benchmark examples.

3.1. Case company ABB Oy, Drives

ABB Group is a multinational corporation which operates in power and automatization technology areas. ABB was established in 1988, when the Swedish company ASEA and the Swiss company Brown Boveri merged their electro technical business functions. ABB has operations in around 100 countries with approximately 135 000 employees and reported global revenue of 36 billion US dollars for 2015. ABB Group‘s headquarter is located in Zurich, Switzerland. ABB Group is divided into four different business divisions. These divisions are Electrification Products, Discrete Automation and Motion, Process Automation and Power Grids. (ABB Intranet 2016).

Drives and Controls Business Unit is one of the four Business Units of the Discrete Automation and Motion division. Other four Business Units are Motors and Generators, Power Conversion and Robotics. Drives’ main business is frequency converters and the factories are located in Finland, Estonia, Switzerland, Poland, Germany, United States, Brazil, China and India. LV Drives employs over 6000 people in 80+ countries in 2016. It is divided in four main Product Groups including Low Power Drives and Automation, LV High Power Drives, Medium Voltage Drives and Drives and Controls Service. Drives manufactures frequency converters in the power range from 0.18 kW to 100 MW. ABB Oy, Drives (later in this document referred only as Drives) which is the Drives’ factory located in Helsinki, is the object of this study. (ABB Intranet 2016).

3.2. The drivers for the change of the case company

The global changes presented in the first chapter are affecting heavily also to the case company. To succeed in the tight competition it is important that in addition to variable costs, also the fixed costs can be adjusted constantly. In this research the white collar employees are seen as fixed cost. Even if the sales or production volumes are changing, the amount of white collar employees is relatively stable. Therefore there is need to found ways to improve the value add without increasing the amount of white collar employees. Next the case company's main business drivers, in addition to the cost pressure, are presented.

Strategy implementation to next level

Currently there is extremely good capability to do strategic shift in Drives. The global trends and forth industrial revolution drove ABB Group to launch Next Level strategy in 2014. The Next Level strategy is based on the company's three strategic focus areas of profitable growth, relentless execution and business-led collaboration.

In the end of 2014 ABB Group launched seven 1 000 day programs to support the Next Level strategy.

> *"The 1,000 day programs will be focused on high-impact, strategic ABB-wide priorities, such as accelerating our growth momentum in a key business field, entering a new market, driving down our net working capital and stepping up white-collar productivity."*
> Ulrich Spiesshofer, ABB CEO (ABB Intranet 2016).

Performance management

One of the seven programs is called White Collar Productivity. The Program Owner, Haider Rashid, says: "From total of 140 000 employees 100 000 is white collar employees. There is need to do similar kind of improvement for them what is already done to blue collar employees. The organization needs to be more

streamline, agile and less complex. Everyone needs to be involved and collaborate in a new way. Organizational simplification is needed both geographically and functionally. Every part and functions in ABB must improve." (ABB Intranet 2016).

So far, the actions in Drives due to this program have been more or less organizational changes. The amount of Business Units has been decreased by combining them. Also some functions have been combined, for example the Technology department was merged into to Product Development and Product Engineering departments. Some other actions have also started in certain white collar functions. Those will be presented later in this chapter as an internal reference. In addition to strategic perspective, during the past couple of years Drives has not been hiring new white collar employees as much as previously, so it is important to find ways to do the same work with fewer amount of employees. There is a need to make more outputs and gain results with less white collar employee input.

Lean

Since there is need to improve white collar performance and productivity, the case company has selected to use lean methods in order to reach the target. From numerous amount of lean methods, continuous improvement, visual control, cross functional work team and waste elimination are the selected improvement tools in this study. The target will be reached by clarifying the focus of doing in addition of eliminating things which cause frustration such as lack of communication or information sharing, removing silos and enhancing meeting practices. From company's point of view, one impact is that the resources should be focused on reaching the strategic targets. On company level the target is to increase the value add output of resources and on personal level all employees should know what is expected from them. For example when recruiting Development Engineer, the manager knows what is gained with that resource. And the Development Engineer itself knows what his/her targets are.

3.3. Performance management

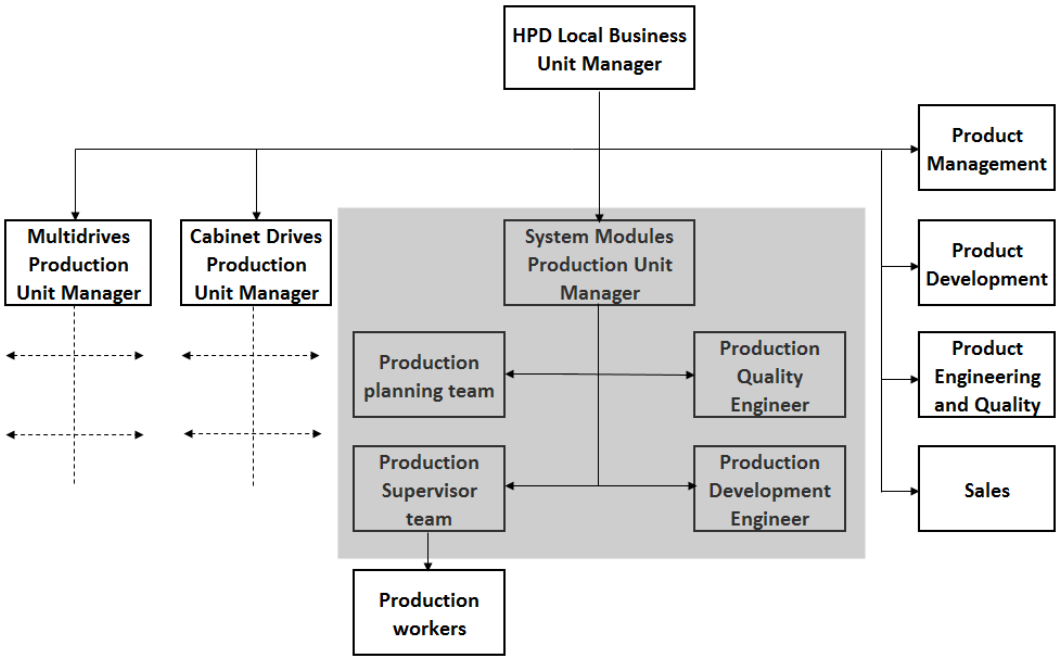
The top level corporate strategy is created in ABB Group. This long-term strategy is usually made for five year period and modified yearly based on the present needs. Based on the group strategy each Local Business Unit create their own action plan on yearly level. Action plan typically consist of five top level targets. Each person are given personal targets based on these yearly action plans. Currently in Drives, the targets for each employee are set once a year and followed twice a year in Personal Development Assignment (later in this document PDA).

According to yearly employee satisfaction survey, two topics are causing dissatisfaction in Drives year after year. Those are “Equal share of work load among the employees” and “The meaningfulness of own work”. The work load is difficult aspect especially in the office work, since the amount of work is not as visual as it usually is in the production. It is impossible to see how much work a colleague has. Someone might feel really exhausted even though someone else has more work and does not feel any pressure or stress. A big impact to the work load and employee’s performance, is the amount of value add actions, which is the key object of the thesis. The meaningfulness will be improved by linking everyone’s own tasks and the corporate strategy. If the linkage is not clear and recognizable, it might cause frustration and dissatisfaction.

Case company structure

Drives has three Local Business Units from which High Power Drives is the scope of this study. The Local Business Unit is the lowest level which reports the profitability to head of the corporation. Under High Power Drives Local Business Unit, there are three Production Units: Multidrives, System Modules and Cabinet Drives. The pilot group in this study is System Modules, and the idea is to create a common tools and systems which can be multiplied to other Production Units, Local Business Units and also to other functions under the Local Business Units. All the Production Units have similar kind of organizations and share same kind of responsibilities (picture 13). The only difference is that the products and production

processes (make-to-order, configured-to-order or engineered-to-order) are different.

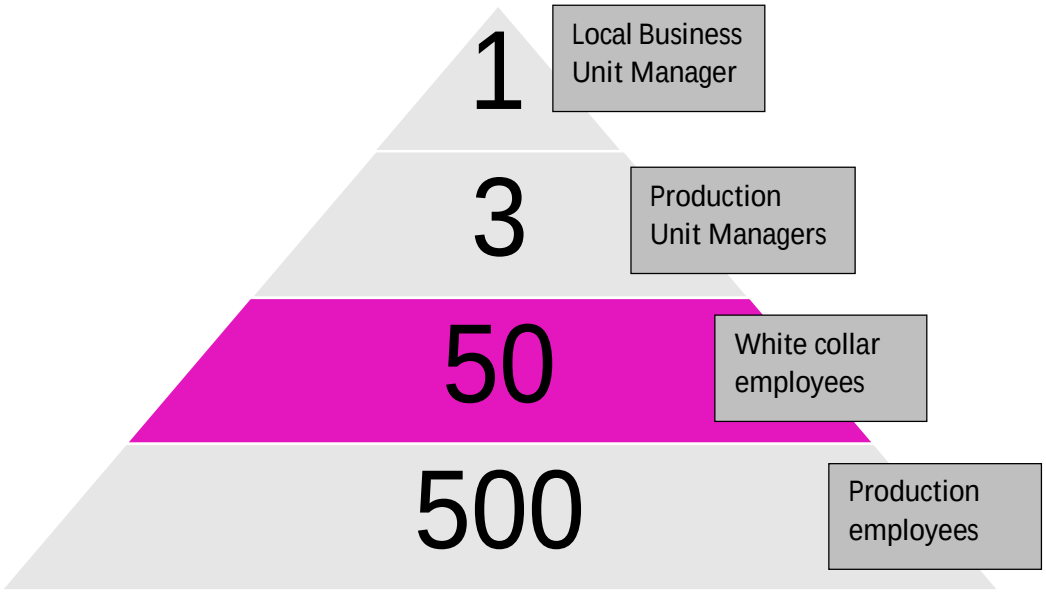


Picture 13. The organization chart of High Power Drives Local Business Unit.

The office employees of System Modules (grey section in picture 13) are the pilot team in this study, since it is one of the biggest working groups, where employees have similar kind of roles and responsibilities. There are altogether approximately 50 white collar employees in these three Production Units of High Power Drives Local Business Unit. Big benefits will be gained, if improvements and areas for standardization are found. Production Supervisors are the closest link to the production lines, where the improvement activities have already been made, so therefore it is natural to include this role to the study.

Local Business Unit Manager has clear targets based on the strategy of ABB Group and modified by local financial and legal requirements. The key performance indicators are followed on monthly level in management meetings. The production blue collar employees have also clear and detailed weekly, daily or even hourly assembly related targets which are followed every day. For office employees there is no additional follow-up. They have their personal targets set once a year and they

are familiar with the yearly action plan and production employees' targets. If the white collar employees, especially Production Supervisors, do not know what they should do, it is effecting to a huge amount of production employees also. The ratio between the managers, white collar employees and production employees can be seen in picture 14. When the white collar employees have clear targets and methods derived from the customer requirements, it enables an efficient work of the production employees. The white collar employees enable both the strategic targets of top management (from down to top) and also the daily key performance indicators targets in production (from top to down).



Picture 14. The ratio between different organization levels in High Power Drives Local Business Unit.

The white collar employee team of System Modules consists of following roles:

- Production Line Manager
- Production Planning Manager
- Production Planners
- Production Supervisors
- Quality and Development Engineer

All white collar employees have two different roles. They all have daily tasks and routines to manage the order-delivery process but in addition, a part of their role is to develop their own work, the order-delivery process and IT systems. They all participate to separate improvement projects when needed, but the development task is part of their role description. The amount of time used for development varies depending on the role, but also depending on week. At some week it might be even up to 80 % of total working time, but sometimes only 10%. Since the workload is not visual to others, it is important to increase communication and visualization to make the team to work more efficiently. When the workload of one person is not visual, others might get frustrated and wait without knowing when the colleague has time.

At the moment, white collar employees do not have standardized routines and rules within one Production Unit, not to mention all Local Business Units. It is challenging to substitute a colleague, since the other white collar employees, even if they have similar tasks from the order-delivery process point of view, do not know how the capacity is managed in other lines, what the blue collar employees are doing and what is their knowledge and capability. Even though the role should be similar, it is not possible to move for example a Production Supervisor from one production line to another without some training. Currently, the tasks are aligned to employees and some of the tasks are traditionally designated for certain roles. For example it is thought that the Production Planners handle the capacity management, the Production Supervisors manage the efficiency in the production and the Quality and Development Engineer creates and updates the quality control plan. All of these tasks are such which cannot be handled by one person or even one function. Co-operation and overlapping is needed. The targets are given individually, even though the tasks cannot be reached alone.

To add complexity, the environment where the team is working is changing all the time. The lead times are short, which is causing that the production load is changing every day. At the moment, Drives is establishing new product generation, which is causing additional challenges to manage two product generations in the same

production line. Even though the team is relatively local, the work is very much global. The production capacity is shared with parallel production line located in Estonia. The orders come from all over the world. The everyday work includes co-operation with multinational team in a multi-level business environment.

3.4. Internal benchmark of lean

Some departments in Drives use already lean methods daily. Those are benchmarked and in this chapter the results of the internal benchmark will be presented. Two examples are introduced from the point of view what the other departments have done and how.

Research and Development (R&D) department has done actions in order to shorten the through-put time of R&D projects. R&D had previously challenges on estimating how long each project will take and delivering the projects on time. It was not possible to predict when a new product will be ready and the sales can start for the customers. R&D is using lot of visualization during the whole project and they are splitting the targets into small and short tasks, which can be performed and followed on weekly basis with project management boards (picture 15). Scrum is used as a project management tool in software development. The role of the project team is crucial, especially in scrum teams. The product owner (or any other project or process owner) provides only the target level and the team defines the ways how to get there. The team creates the tasks and follows that those will be reached. They also evaluate if the tasks are reached on acceptable level or not.

Picture 15. Example of project management board in R&D department.

Participants in the projects meetings are:

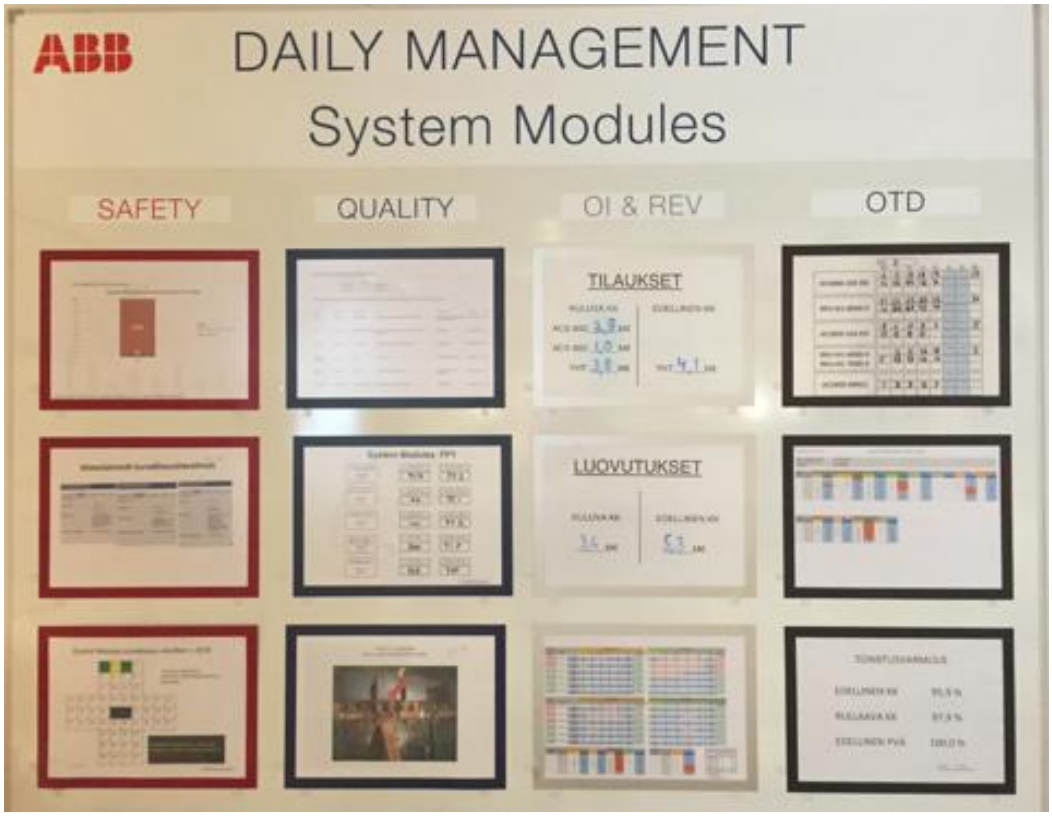
- Project Manager
- Project Members
- Product Managers
- Other participants when needed.

In addition of being able to estimate when the R&D projects will be ready, nowadays all the tasks have a target date which is known by all participants and the tasks finish at the planned time. For example, previously the electrical design might have been ready two weeks before the mechanical design. If mechanical design is changed in the last minute, the electrical design, like circuit diagrams, had to be re-done since the physical measurements were changed. This was causing waiting, re-work, overrun of the schedule and frustration. With the help of lean tools, such as visualization and standardized work, R&D has managed to increase the predictability and reliability of the projects.

The second internal benchmark is from manufacturing, where, as already mentioned, lean methods have been in use already for years. The daily management

meeting started in production in year 2014 and it is working effectively in all production lines. The key performance indicators (picture 16) gone through in production daily management are:

- Safety statistics
- Quality measurement
- Order intake and revenue numbers of current month
- OTD result.



Picture 16. Example of daily management board in manufacturing.

In addition to the key performance indicators, also mid-term measurements and actions, such as material shortages, 6S statistics, safety themes and long-term targets, such as yearly targets, mission and values as well as general information and news are presented on the boards. A lot of information is shared, both short- and long-term related. Also here, the visualization adds communication and everyone knows what the situation is and what is expected from them.

Participants in the daily management meetings in the production floor are:

- Production Unit Manager
- Production Line Manager
- Production Planners
- Quality Engineers
- Production employees
- Participants from other functions when needed, for example from purchasing if there are specific material shortage issues.

3.5. White collar employee current time usage analysis

In order to improve the value add of white collar working time, one target of this research is to check where the working time of office employees is currently used. When it is known where time is used, it is possible to remove waste and increase value add. The time management of white collar employees will be studied in two steps:

1. Are employees using their time on doing correct things?
2. Do they do the correct things effectively?

The first step into knowing if correct things are done, a workday activity list study is made. The pilot team for the time usage study is decided to be only the Production Supervisors of System Modules Production Unit. Before looking more detailed at the actual target group, the Production Unit Manager and the Production Manager make first pilot of their use of time. They consider that making the pilot by themselves first, it encourages the Production Supervisors to really put their heart into the pilot.

Before the actual pilot week, the first task is to evaluate what kind is the ideal working week and what are the things the time should be used to. The tasks what are considered to be done within an ideal week are listed with a simple pie chart. The pie chart of managers (picture 17) is divided into five equal pieces:

- *20 % of long term planning and development,* which includes strategic vision making and elaboration.
- *20% of follow-up and support of ongoing projects,* which includes taking part of project meetings as a member of a steering committee or as a sponsor.
- *20% of short term actions and key performance indicator follow-up,* which includes corrective actions and small deviations.
- *20% of Leadership,* which includes group and personal discussions and communication about short and long term targets.
- *20% of daily routines,* which includes e-mails, phone calls and other running tasks.

Picture 17. Production Unit and Production Line Managers' ideal time usage presented as a pie chart.

Production Supervisor's ideal pie chart (picture 18) has only three pieces, which are divided as following:

- *10% of HR routines,* which includes daily working time settings and approvals, resource checking and other supervising tasks.
- *10% of daily routines,* which includes e-mails, phone calls and other running tasks.

- *80% being on production line*, which includes daily management, ensuring production line efficiency and productivity and helping assemblers performing their work.

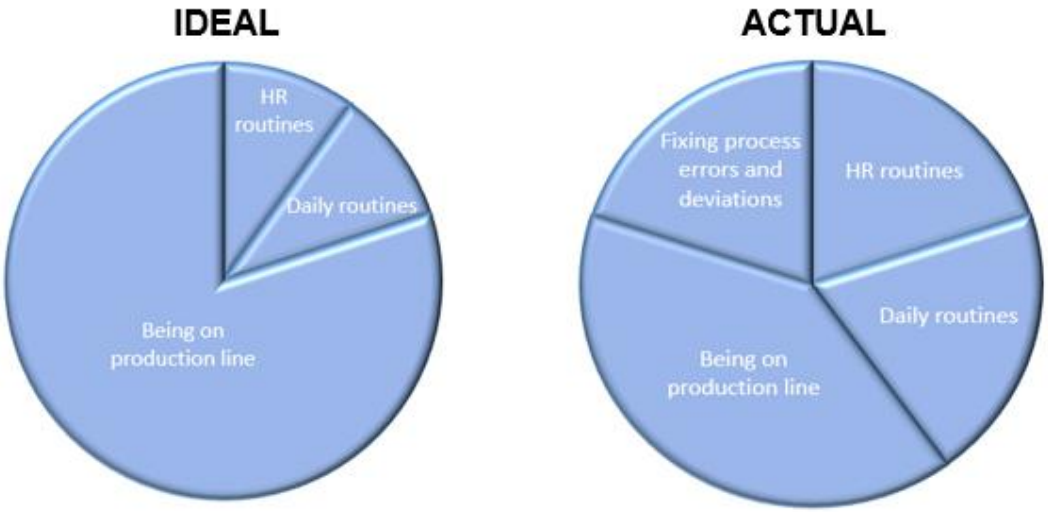
Picture 18. Production Supervisor's ideal time usage presented as a pie chart.

Where managers have bigger focus on long-term planning and strategic actions, supervisors have more short-term actions in their ideal week. The discussion during listing the ideal week actions, reveals that is obvious that managers are able to group their activities more detailed than the supervisors. Managers identify the strategic aspects and tasks for ensuring targets of the key performance indicators. Whereas the supervisors are not able to categorize to which targets their tasks are related to. They do not see HR routines as a part of human wellbeing and development, they feel them more like mandatory tasks that do not add value to anybody.

After forming the ideal week, managers and supervisors follow one week all things and activities they are actually doing. There is a questionnaire what everyone personally fill during the week (appendix 1). In addition to listing and counting the amount of activities they also evaluate how many of them are value add. The value add is defined as an action what a customer is willing to pay for. With the first pilot with Production Unit Manager and Production Line Manager, the questions and categories are tested and adjusted a bit for the supervisors.

When listing the activities it is possible to compare the ideal week to the actual week. As a result, new pie charts are created. Since the managers are able to identify and plan their actions, their actual week pie chart is almost exactly like the ideal week (picture 17 illustrating both ideal and actual week of the managers), but the supervisors have quite a different results. On picture 19 the left-hand chart is illustrating the ideal week and the right-hand chart the actual week. The actual pie chart has more slices, which are divided as following:

- *20% of HR routines,* which includes daily working time settings and approvals, resource checking and other supervising tasks.
- *20% of daily routines,* which includes e-mails, phone calls and other running tasks.
- *40% being on production line,* which includes daily management, ensuring production line efficiency and productivity and helping assemblers performing their work.
- *20% of fixing process errors and deviations,* which includes handling all interruptions and deviations in the production line to keep the line flowing.



Picture 19. The ideal and the actual working time of a supervisor in a normal week.

More time is used on ad-hoc things, such as calculating the working hours for the production employees, since the tool which is used to store working hours do not

support two shift working calendar and a lot of manual fixing needs to be done. Also a lot of material availability and quality problems were handled by the supervisors during the pilot week. It is also noticed that just reading e-mails takes a lot of time, since the amount of received e-mails is huge (even 400 e-mails for one person within a week).

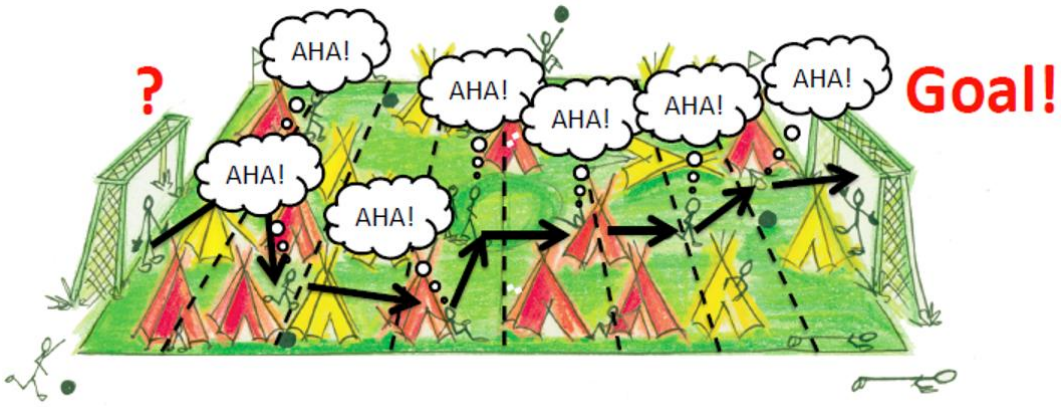
Now, when it is known where the time is spend, other part of the time management study, identifying if the correct things are done effectively, can start. That study will start in the next chapter and it will be called an improvement journey.

4. THE IMPROVEMENT JOURNEY TOWARDS THE TARGET STATE

This chapter includes more detailed observations from the current state analysis and introduces the improvement steps towards the target state, which is seen as a journey. Understanding the need of a customer and defining the end-to-end flow is the starting point of moving towards operational excellence. Customer orientation must drive all improvement activities. The target state is that all of the goals are open and common and the employees can effect on them, same way as the clear football pitch, without the tents around each player, which was described in picture 10 in chapter 2. The metaphor, made by Modig and Åhlström (2013, p. 133), of the football game can be transformed to office work:

> *Every employee can see and hear and is aware of everything that is happening all the time. Based on this clear picture they can make decision about how, together, they can do the work. If any employee makes a mistake or there happens something unusual in the process, the process will be stopped. Everyone can see everything all the time and the work can be stopped within a second.*

To be able to score a goal, the tents need to be removed around the players and help them to see the game (picture 20). This same should be applied in the white collar employee team in the case company.



Picture 20. Removing the tents around the players and helping them to see the game (modified from Modig and Åhlström 2013, p. 133).

4.1. Strategy implementation

Strategy is the "what" a company should focus on. It gives a baseline to all operative actions. Since the supply chains are getting longer and the final customer might be invisible or far away from the supplying company's employees, it creates a risk that the true value of a customer is not clear for all employees. Typically the Drives' products are sold to original equipment manufacturers (OEM's) or other kind of third partners, where the Drives factory or even sales department are not in a direct contact with the final customer. If the final customer is not visible in the company's everyday activities, it is possible that the focus of the work turns towards the internal processes than to the customer.

Jones and Womack (2003, p. 30) state that drawing the current state map is fun but entails no real commitment. It is when you get to the,

"What are we going to do today about the waste?"

question when you get the hard issues arise. This question is used as a motto in the improvement journey. The question includes three essential elements, which are guiding the journey. First, "the waste" is the key thing what needs to be identified and eliminated. Second, "we" indicates that the improvement work is done together and in teams, not as individuals. And third, "today" means that the improvement

actions needs to be done and evaluated every day. Monthly or less frequently follow-up is not frequently enough.

One outcome of the workday activity list study is that a lot of time is used with non-value add activities. To make the customer value bigger, the targets need to be clear and support the customer needs. Jones and Womack (2003, p. 30) emphasize that it might be hard to determine precise timing of the later states now, but writing down all of the necessary steps and the specific target dates for achieving the steps has the highly useful effect of converting vague information and huge projects into concrete, trackable tasks. Small steps at the start create essential groundwork for making big leaps later.

4.2. Performance management

A finding from the workday activity list study (the overall results from all of the 15 white collar employees are presented in the appendix 2) is that e-mails and meetings create a lot of non-value add activities. White collar employees use lot of time just reading e-mails, from which some are send to them as a copy and no actions are ever required. It is hard to recognize the urgent messages which need actions, when the inbox is always full. Also the amount of meetings is huge. As an average, white collar employees spend almost half of their working time in meetings. That time is away from the normal tasks, especially when noticed that the majority of the meeting time is considered to be non-value add. This indicates that the meetings are either too long or the participation is needed only on a certain part of the meeting.

Some improvement actions decided to be taken right after analysing the workday activity lists; in the future, the team agrees to send e-mails only when printed material is really needed and the distribution is only to those persons who really need the information or whose action is needed. Best ways of avoiding huge amount of e-mails is to call, talk face-to-face or contact the other person with instant message system instead of e-mail always when applicable. It is faster to make a call than write and read. The phone calls usually do not generate misunderstandings

what can easily happen with written text. The communication is also better in all other methods than in e-mails, which is always one way communication. The team also decided to participate only to those meetings which have clear agenda on the meeting invitation and it is clearly stated what is expected from all of the participants in the meeting. Previously all Production Supervisors have been participating in the same meetings and in the worst case, noticed in the middle of the one hour meeting that the topic is not relevant for their production line. If there is no agenda available, it will be requested from the meeting organizer. To be able to follow these changes, discipline is needed from everyone.

4.3. Lean as an improvement method

Lean gives a way "how" to start the improvement journey. It provides methods and tools to set up a new process for linking strategic and tactic levels. Jones and Womack (2003, p. 81-101) say that the trick towards to ideal state is to take a walk together so everyone can see the whole. It will not happen all at once and that happy land of completely frictionless cooperation will probably never be reached but the challenge is to get started, fain some initial successes and not look back. It is often hard to imagine how to install lean principles in the organization without a clear example of successful practice to follow, a template for action. This needs to be specific enough to show the real nuts and bolts, but broad enough to keep the big picture in view.

In addition of increased transparency, it has been noticed that telling to others the tasks and their schedules, it increases performance and commitment. According to Parry and Turner (2006, p. 77) the visual communication tools truly drive operations and processes in real time and act as an extension to metrics and may be considered as a dynamic measurement system, as they provide instant feedback and can be used to predict a probable outcome if no action is taken. The learning and themes that have made these implementations successful is presented and collated into a set of guidelines for consideration when implementing visual process management tools.

The journey to the lean thinking is very essential. A team must be empowered to develop their own visual process management boards as imposing a standard board upon a team does not bring the same level of benefit. Subtly different systems bring greater ownership and avoiding a 'one size fits all' board recognizes that each team/department has different goals. A visual control system is more than just a collection of metrics. On each board the process is clearly presented and progress through the process is made visual. Metrics are secondary and are presented as such. Visual management systems must be kept simple. Only information which adds value to the management of the process is displayed and teams using the board must not be tempted to display information just because it is to hand. The visualization also brings assistance, as bottlenecks in a process are more quickly revealed and suppliers and customers can often react to recover the situation. The data may also be used to bring leverage for investment or resources. (Parry and Turner 2006, p. 84).

Next, the steps taken during the journey are presented. The white collar employee's weekly review meeting is adopted and modified from production floor and R&D department by the result of an internal benchmark.

Step 1 - Sharing more information

As introduced in the second chapter, the development activities should be focused on the critical phases, from which one option is the bottleneck of a process. The value add received by a customer is as much as the weakest link of the process. If some part of the process is over-exceeding, a part of it should be transfer to the bottleneck. It is useless of having an individual excellent employee in a team, if the whole team is not on the same level or having one highly productive function, if all of the whole process partners are not on that same level. According to Srinivasan (2012, p. 34) improving the performance of every subsystem in isolation will not improve system performance and improvements in subsystem performance must be gauged only through their impact on the whole system.

According to Merja Fischer, one of the researchers on the research report collection made by Hämäläinen and Saarinen (2004, p. 89), the key success factors in managing a change are:

- Understand your system, who are involved and what their perception to the subject is.
- Do not underestimate the need of sharing the big picture and vision. This gives the people the opportunity to see themselves in the whole.
- Build an environment where different perspective are collected and listened and let the interaction take place openly.
- Create tools to visualise and simulate the change and the steps to the vision.

Based on the theoretical findings, the first action of the journey is starting to share more information within the white collar employee team. Previously, the office employees were saying that there is a lack of transparent information. It was decided right in the beginning of the journey to establish a weekly meetings with office employees to share everyone's tasks and to learn what the others are doing. The meeting is decided to take place on Wednesday morning right after the weekly key performance indicator review, which is hold to follow the business numbers and results. The performance review takes 30 minutes and so does the new meeting also. This new meeting is called "Office weekly review" and it is established for information sharing within the team about the status of mid-term and long-term actions. It will concentrate on how the targets are to be reached. So, the team will spend one hour every week going through first business figures and then after that team level performance review.

In the production the bottleneck of the process is usually visible from an inventory which is generated before it. When the inventory grows too high, resources are immediately directed to the bottleneck. This should be applied in the office also. It is important that the bottlenecks are carefully determined. From the order-delivery process point of view, the bottleneck cannot be different in the office than it is in the production. If the constraint in the office is separate, it might lead to part

optimization, which can add costs and decrease the value add for customers. The overall order-delivery process constraint need to be made visual also in the office.

The participant in the office weekly reviews are:

- Production Unit Manager
- Production Line Manager
- Production Planning team
- Production Supervisor team
- Quality and development engineer.

Step 2 - Sharing everyone's tasks

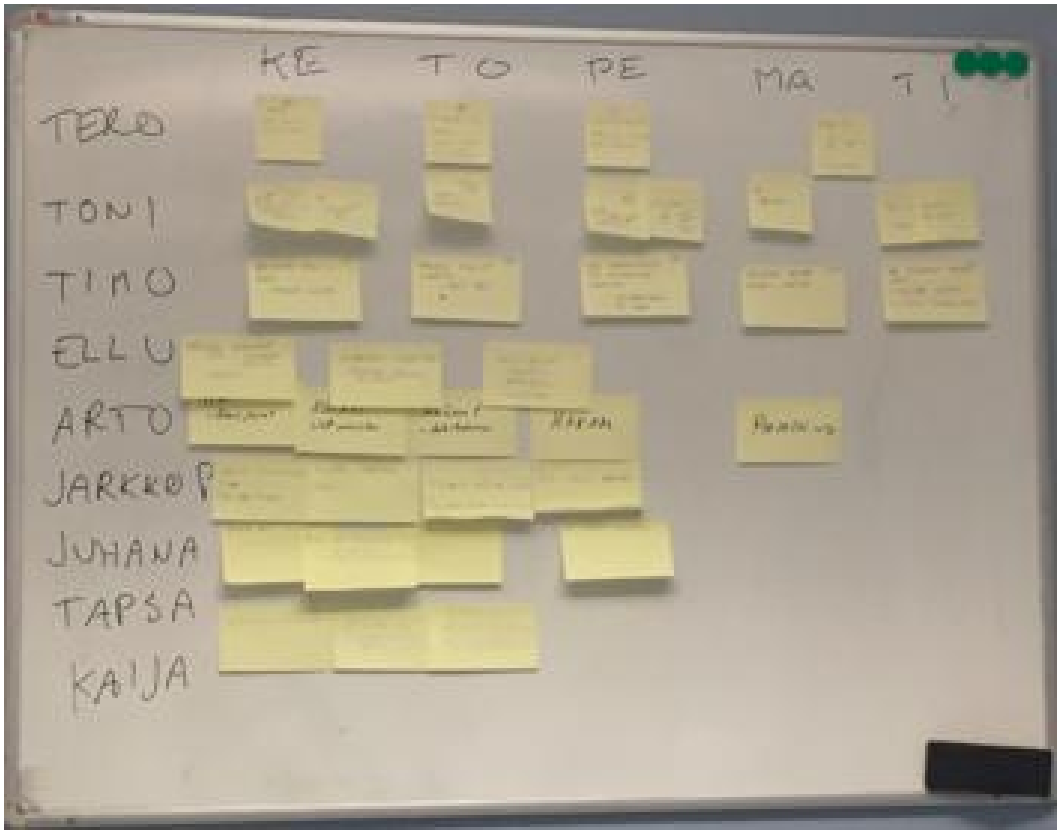
The first step towards visualization starts with sharing the tasks each employee have for the following week verbally. People tell to each other what kind of meetings they are going to participate and what kind of deadlines they have. It is noticed that some people find it difficult to identify single tasks of their work. Some of the employees say that the normal routines fill all of their day without being able to identify what those normal routines are and why they do them.

Step 3 - Sharing tasks with notes

Womack and Jones (2003, p. 122) say that transparency is required to create a lean enterprise. Visual control makes it clear to everyone where the company stands. The process in the office melds thinking and doing, planning and acting, just as it does in the plant.

To add the transparency and visual control, the next step of the journey is that all the tasks are written on post-it notes and presented on the weekly review board (picture 21). It is decided to use a physical wall boards for the visual presentation since the advantages of them compared to computers and screens are that everyone can see them at the same time, everyone has access to them, it takes only one sight

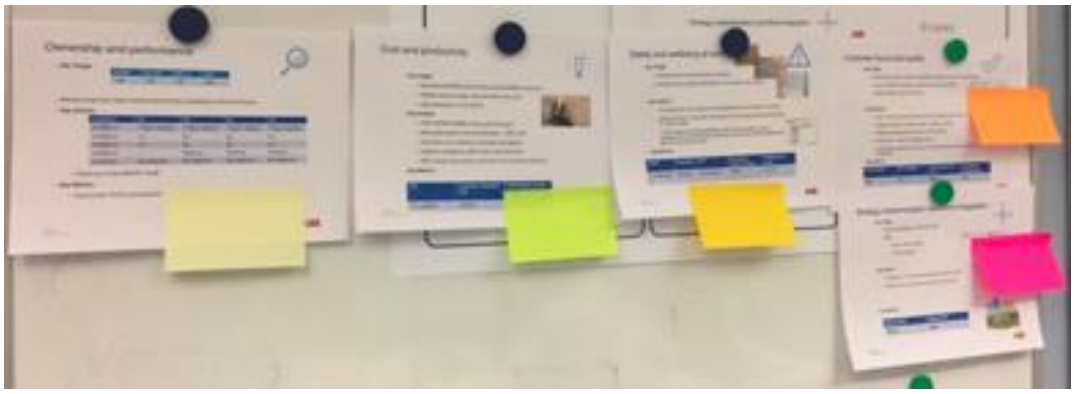
to see what the situation is and it does not need no reservations or rooms (Parry and Turner 2006, p. 84).



Picture 21. First step of the office weekly review board.

Step 4 - Linking tasks to strategy

To understand which kind of tasks people spend their time with and to where those are related to, it is decided to link the tasks to yearly action plan. All of the key targets from the action plan are color coded in order to link each task to a specific strategic action (picture 22 and 23). This helps to identify how many actions are made towards each key target and to categorize the task.



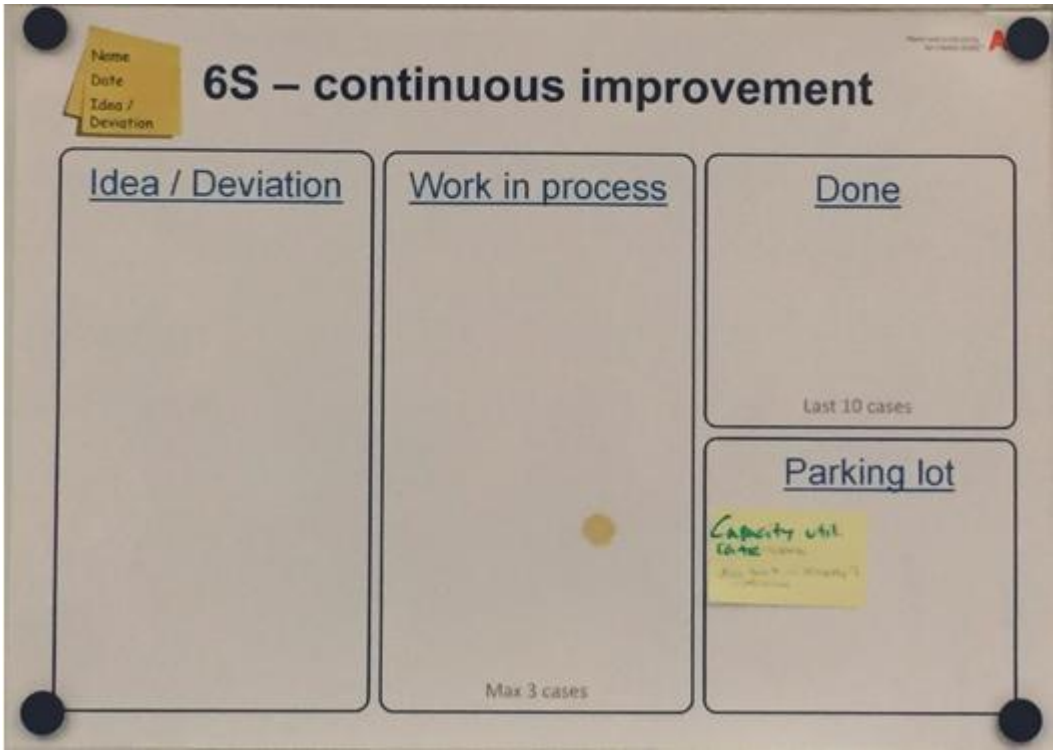
Picture 22. Color coding key targets.

Picture 23. Color codes in printed form.

The colors are:

- Light yellow – Ownership and performance
- Green – Cost and productivity
- Dark yellow – Safety and wellbeing at work
- Orange – Customer focus and quality
- Pink – Strategy implementation and Wind integration.

In addition to the task board, also a continuous improvement board is established (picture 24), where the post-it notes can be stored when they are done. There is also a place for new ideas, if no one has started working with them yet and a place for tasks which are under work, work in process. The parking lot is meant for tasks which are waiting for something, like approval or other task to finish first.



Picture 24. Continuous improvement board.

If a task is not related to any of the key targets from the yearly action plan, it needs to be evaluated if that task need to be performed at all. If an employee has no special tasks reserved on some day, it will be presented with an extra color, blue, note. On that day the person can start new tasks which are located in the continuous improvement board in the idea box or help the tasks located in parking lot or work in process. Also the team will discuss if someone needs help and some tasks can be transferred to the person, who has free capacity on a certain day.

Step 5 - Tasks linked to the strategy

When tasks are linked to the strategy (picture 25), weekly follow-up is up and running. In this point, it is noticed that sharing the tasks is already much easier for all of the white collar employees. When people have to think what kind of tasks they are doing and why, they start to identify the links between daily routines and targets better. In the beginning of the journey someone said: "I have to do these blue collar employee yearly evaluations and it is frustrating since it takes so much time." After running the office weekly reviews already for couple of months, the tasks are presented with the reason, for example: "I do these blue collar employee yearly evaluations, since it is important part of their wellbeing at work. If the evaluation is not done in time, they will not get their salaries in time and do not receive the feedback how they are working". The employees understand better what the causes of their actions and tasks are. It is also visible that they have started to respect their work more than before the journey. When one is able to link own work to a bigger picture, it increases the feel of importance and appreciation of own work.

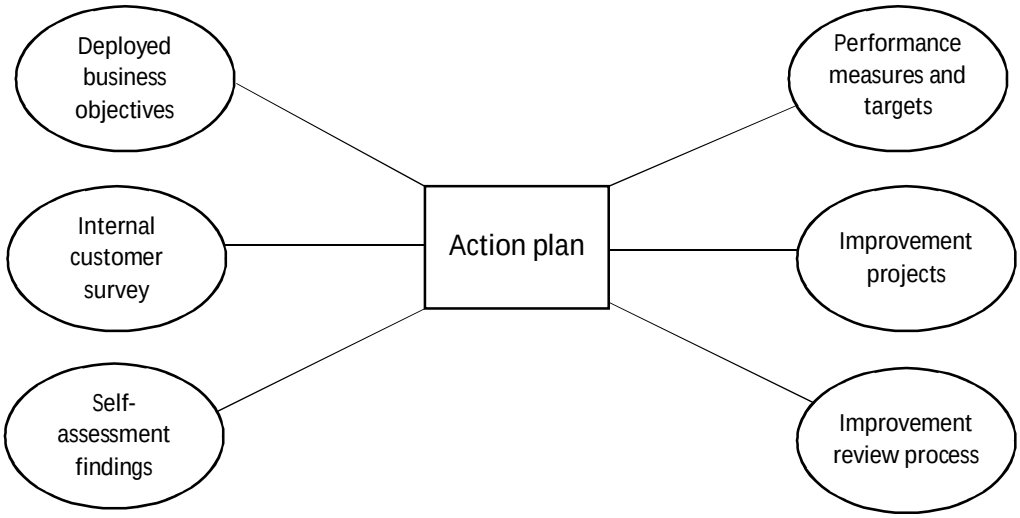
Picture 25. Office weekly review board in use.

The weakness of the office weekly review in this stage is, that the tasks what the team introduces are checked from calendars. Everyone tells what meetings they are going to participate and creates the tasks to the board based on those. The problem is that the meetings do not necessary create any value add. If no change or decision is made, the meeting might be waste of time. More important is to think what should be done, not in what meetings the employees are invited. The workday activity lists showed that the white collar employees have lot of meetings which are partly or fully non-value add. As Lumijärvi (1993, p. 73-74) stated in chapter 2 it is really important to ask each time when doing something: “Why we do this?” and “Should we do this at all?”. This same applies to meetings and other occasions, which might seem to be obligatory. But who else is generating those non-value adding meetings than the white collar employees themselves? This is why the next step needs to be taken.

Step 7 - Quarter follow-up in teams

The weight of the team is increasing all the time and the responsibility of the team has bigger impact than previously. According to Lascelles and Peacock (1996, p. 123-124) the team action plan (picture 26) is developed from three inputs:

1. the team improvement opportunities arising out of the top-level business improvement objectives
2. the opportunities to improve the service to internal customers
3. the opportunities to improve business excellence.



Picture 26. Team action planning (Lascelles and Peacock 1996, p. 124).

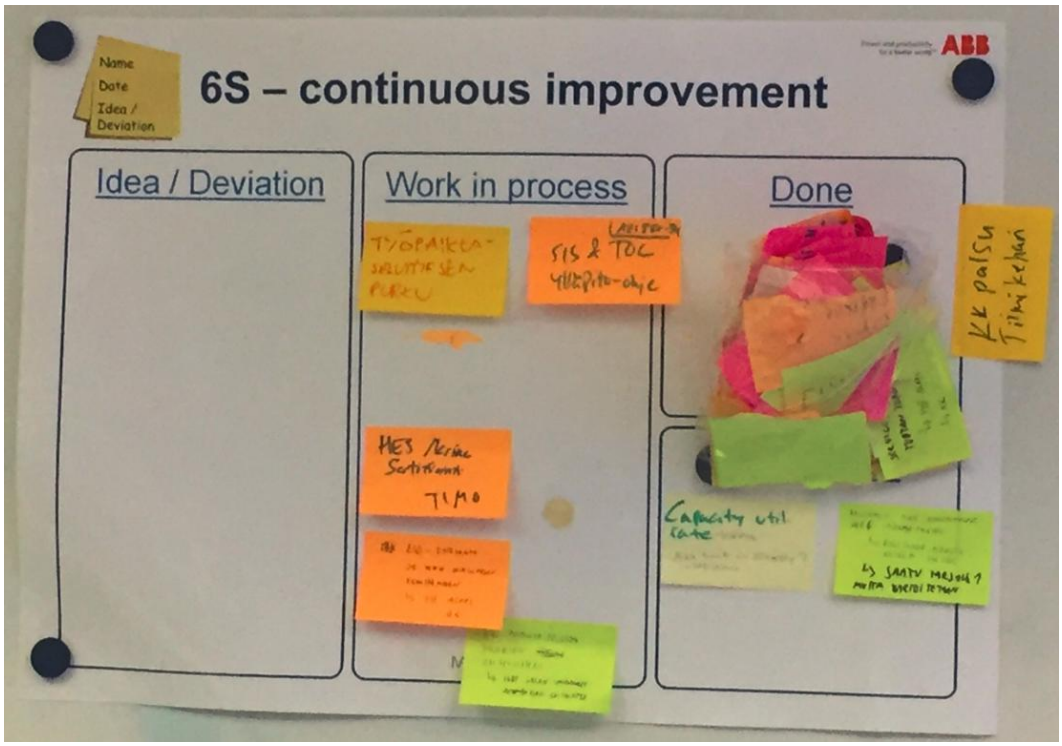
Based on the literature, the action planning will be started to be made on team level, which mean that the responsibility of the team is increased. In addition that the tasks are done on team level, also the follow-up is done on team level. It is the team's responsibility to create and evaluate the tasks towards the target or the optimum stage, which was presented as a star in picture 12 in chapter 2. The tasks and steps towards the star are not relevant, only reaching the target is. The gap to next achievable level will be reach with daily steps, the tasks. Same as in football, all the players are responsible on doing their own tasks and controlling their own role. The target is to maximize the value add of the whole team, not an individual white collar employee. The value add of one person can be really high even the whole team's is not. Or the value add of one team/function can be really high even the whole company's is not. Instead of optimizing single employees it should be asked why the team exists and what are the closest strategic actions related to the team.

Since the previously used yearly cycle is not fast enough, the follow-up will happen on quarterly level. The targets from the action plan are reviewed and evaluated each quarter and the team will set up and update the tasks how to reach the targets. The management will not dedicate the tasks beforehand like previously, the team is responsible for creating the steps for reaching the targets.

Step 8 - Continuous improvement

The core of the lean is continuous improvement. Even though the journey project is finished, the journey itself never ends. The basic idea of continuous improvement is that there is always room for improvement. This is rational also due to the changes happening in the surrounding world all the time. The methods used today might not work anymore tomorrow. This is why after each office weekly review, it is analysed how the meeting can be improved next time. It is important that the participants engage on improving the meetings in order to get the meeting useful and effective. The improvements can be like how to make the meeting faster, how to share more information or who to invite to the meetings. A good way to test and check the meeting procedure is to ask if the Production Unit achieves the key actions with the tasks already done, ongoing and planned. Is the direction correct and is the speed enough.

In addition of going through what the white collar employees are currently working and what they will do, the office weekly reviews are a place where each employee introduces shortly what they have been achieved. All the done tasks are filed on the continuous improvement board in “Done” section (picture 27). This helps the team to see all the things they have achieved. Also the “Parking lot” and the “Work in process” are reviewed on each meetings. New ideas are stored in “Idea/deviation” section until someone starts to work with them.



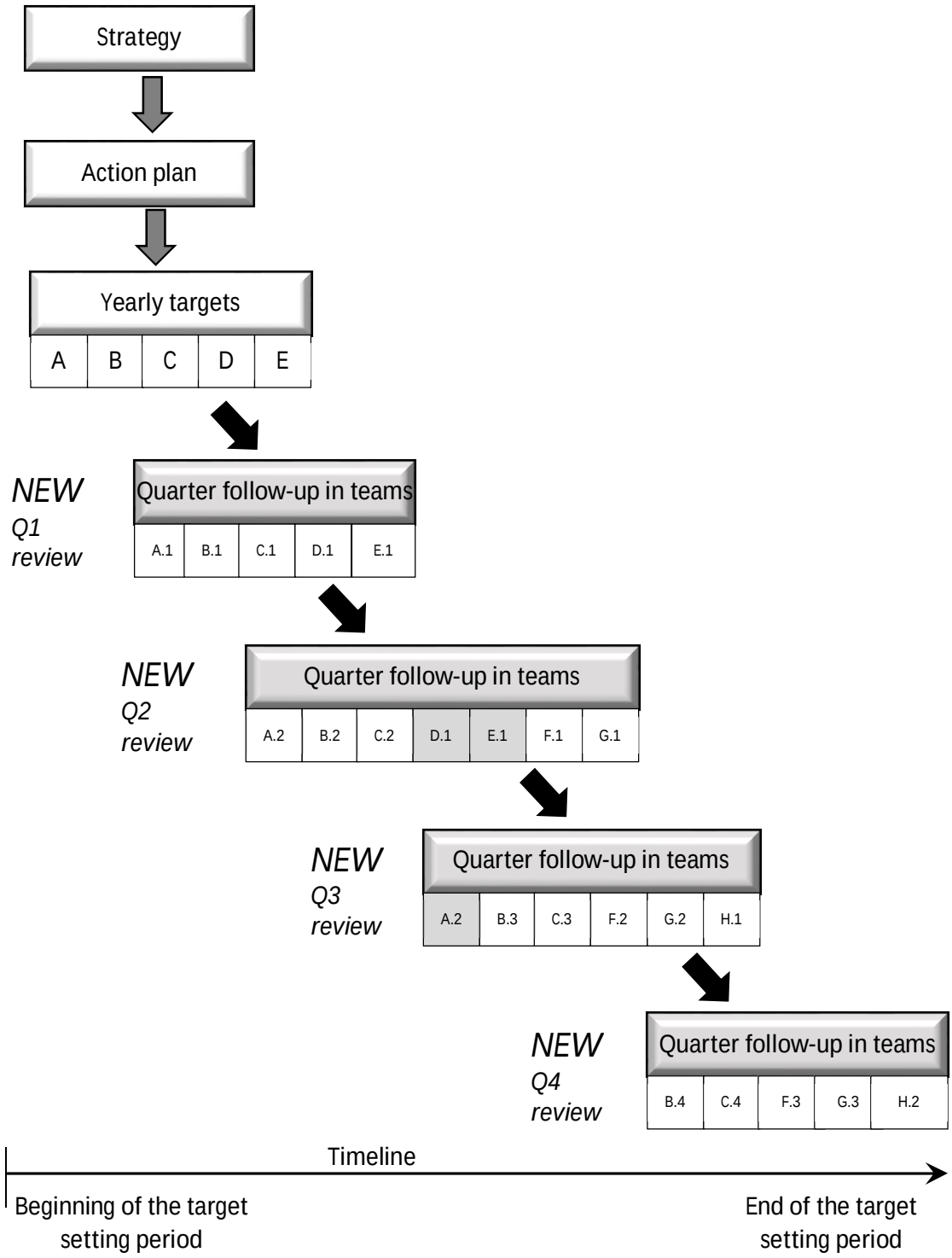
Picture 27. Continuous improvement board after couple months of office weekly reviews.

5. RESULTS

In this chapter, detailed results of the workday activity list study are presented and the discussion of the future target setting process continues.

5.1. Strategy implementation

Currently, the target setting is done on personal level. Based on the new process created in this research, it will continue systematically with quarterly check-ups which are done in teams. Picture 28 includes all the checkpoints, from which the four grey bottom ones, quarter follow-ups, are new.



Picture 28. The target checkpoints in one target setting period.

Since there are changes happening all the time in the business environment, the targets generated based on the yearly action plan need to be reviewed and updated quarterly. The targets set in the beginning of the year can become outdated; there can come new targets which were not seen in the beginning of the year or some of

the targets need to be managed with different schedule than originally planned. Picture 28 illustrates the quarter follow-up system within one year. For example, from the original five key targets (A, B, C, D and E), all might be relevant still in the first review (A.1, B.1, C.1, D.1 and E.1) but two of them have become outdated in the second follow-up checkpoint (D.1 and E.1), so those will be removed and two new ones (F.1 and G.1) will be added. In the next quarter checkpoint one original target has become outdated (A.2), so that will be removed and a new one is added (H.1). In the end of the year, only two original target from the beginning of the year are remaining and three new ones have been generated during the year. This regular follow-up process guarantees that the guiding key targets are up-to-date all the time. It is possible that all of the targets set in the beginning of the year are still valid in the end of the year, but the process ensures it by making a new revisions of each target on the follow-up checkpoints. This way the targets are always accurate and updated.

5.2. Performance management

Performance management has been previously in Drives on job/performer level. With future team level follow-up it is monitored also in process and team level (the picture 8 introduced in the chapter 2). This is a great improvement since according to Rummler and Brache (1990, p. 19) the greatest opportunities for organizational level improvement lie between functions and the greatest process improvement opportunities often lie between process steps. Effective management of performance requires goal setting, structuring and managing each of the three levels of performance.

Lascelles and Peacock (1996, p. 120) state that to set goals there must be intelligent performance measures by which to monitor and steer the progress, which is called SMART. ABB is already using SMART guideline when setting the business goals on the employee's PDA. SMART comes from:

- *Specific* - relate to one and only one objective.
- *Measureable* - focus on objectives which can be quantified

- *Achievable* - by the people who can best influence a successful outcome
- *Realistic* - take into account priorities and time and resource constraints.
- *Time-bound* – everyone is locked onto the current priorities and understands not only what is required of them but by when it is required.

In addition to SMART, there are rules that each person should have two different kind of targets; targets related to business (change) and targets related to way of working (leadership). And also some additional instructions:

- The clearer the targets are, the easier is to make the performance evaluation in next year
- The targets set a basis for next year total performance evaluation
- Personal targets need to be in line with organization targets
- The targets need to support the strategy or projects which support the strategy
- Prioritize the targets. (ABB Intranet 2016).

Even though these rules are intended for individual employee's PDA, the same instructions are applicable also when setting the team targets and should be taken into consideration. For illustration, the example of the personal task introduced in chapter 3 will be reviewed. The case was such where traditionally was though that only Production Planners handle the capacity management. This traditional way will now be changed into team task so that the capacity management is done in co-operation with the whole office team. The Production Supervisor informs each day how many working hours are available in the production lines. Quality and Development Engineer updates the first pass yield information for each product so that the maximum volume is known. Based on these information Production Planner can adjust and manage the production capacity to meet the daily demand. With this clear co-operation everyone knows what is expected from them, when and why. The targets are common and the goal is the same.

5.3. Lean

Currently, the challenge is that only the employees and their supervisors can see everyone's personal targets. The picture of the football pitch with tents around each player describe the situation well (picture 11 in chapter 2). All the employees have their own targets which the other employees cannot see. The co-operation cannot be optimal without knowing what the targets of the other players in the same team are and especially without knowing if the targets are directed to the same goal. By guiding the company culture towards more open and transparent actions, it will help removing the tents around the employees. No one is actually building the tents, at least on purpose, but the current target setting systems drives for it.

According the lean literature, the process improvement is not only tools and techniques, since it proposes to start with action in the technical system and follow quickly with cultural change. The culture and people are the most important asset instead of the tools. A permanent improvement into processes requires that people from all organization levels are engaged. Engaged employees are necessary for ensuring that implemented changes are sustained and the process does not slip back to the old way of doing. In lean literature it is proposed to start by creating a social system and culture of continuous improvement to support this behaviour. With the team level target setting and follow-up the cultural change is achieved.

5.4. Results

In the study visual control, flow office, cross functional work team, continuous improvement and waste elimination were selected as the tools to increase the value add of the white collar employees. Table 2 presents several other benefits which will be also gained if the actions which were developed during the journey are implemented.

Table 2. Change in team target setting.

	Current state	Future state
Performance management	PDA set once a year	Personal PDA set once a year and team PDA quarterly
	Follow up of PDA once a year	Quarter checks and weekly management
	Top level targets	Targets split into clear tasks
Lean	No visual management	Visualization of tasks and follow-up
	No feedback	Active feedback
	No transparency	Transparency
	Silos	Big picture
	Separate tasks	Flow in office
	Improvement projects	Continuous improvement
Strategy implementation	No information sharing to other team members	Open information sharing within the team
	No understand of what other team members are working with	Continuous communication of open tasks
	Management does not have clear picture if the targets will be reached and what actions are ongoing to reach them	Faster two-way feedback loop between the management and the team
	Targets might get outdated during a year	Targets updated according to changing environment many times a year
	Individual person/ function efforts	Building and clarifying interdependencies

Also some additional team results will be achieved, which are more general, but can have huge impact on the company culture and performance. From the performance management point of view the know-how will be on better level, employees will be multitalented, appreciation towards own work will increase and management support will be better and happens on earlier stage. From strategy implementation perspective employees can see the big picture and link their daily tasks to the strategy, product in the office is made visible and actions happen faster and easier. Enhancements such as amount of e-mails is less and the quality of meetings is better can be considered as lean improvements.

The biggest improvement is the feedback loop. Management can guide and coach the white collar employees immediately when they are sharing their actions, so that

the employees know what they should concentrate on and which kind of things to ensure. On the other hand, the employees can show the possible challenges and bottleneck faster to management and ask for guidance and help. The feedback loop in both ways is much faster than previously.

With current target setting and follow-up system the value add and strategy implementation result will not be as good as it can be with the future way of management. Creation of a Quality Control Plan for a product, is used as an example to describe the differences:

- **Current way of management:** Quality and Development Engineer would have been nominated to create the Quality Control Plan and a task would have been written on his/her PDA. A target date for the creation might have been set, but the next follow-up would have been after six months in the mid-PDA review. The student syndrome drives people to perform the tasks in the last minute. So, the actual creation of the plan would have happen most probably just before the target date. When doing so, the purpose of the target might have been forgotten and requires time to refresh a memory when starting the task. When assigning tasks to individuals, it created silos between people and functions. If and when the Quality and Development Engineer would need help from others, it requires time and resources to explain what he/she is doing and why input of others is needed. The management does not see the work in process and cannot see if it is going to right direction. They also cannot estimate when the work is done.
- **Future way of management:** The team will be assigned to be responsible to create the Quality Control Plan. The follow-up for the task happens in the office weekly reviews and the progress can be seen all the time. Even if the Quality and Development Engineer would do the main work on creating the plan, when assigning tasks to teams, everyone knows what others are doing and when. The co-operation will be easy and efficient.

The research question was:

> *How to increase value add of the white collar employees in the order-delivery process?*

The journey and its results presented in table 2 give an extensive answer to the research question. There certainly is potential to increase the value add for white collar employees and the ideal value add level is not reached based on the workday activity list study. One additional finding is that the white collar employees have noticed, that already having to think what they should work with and what is the value add for a customer, has changed their time usage. Only the awareness of the customer and its value add has changed their behavior. Even if the employees would not have to report their actions to anyone they feel that the amount of non-value add activities is less nowadays. The sub-questions and the answers to them are presented in table 3.

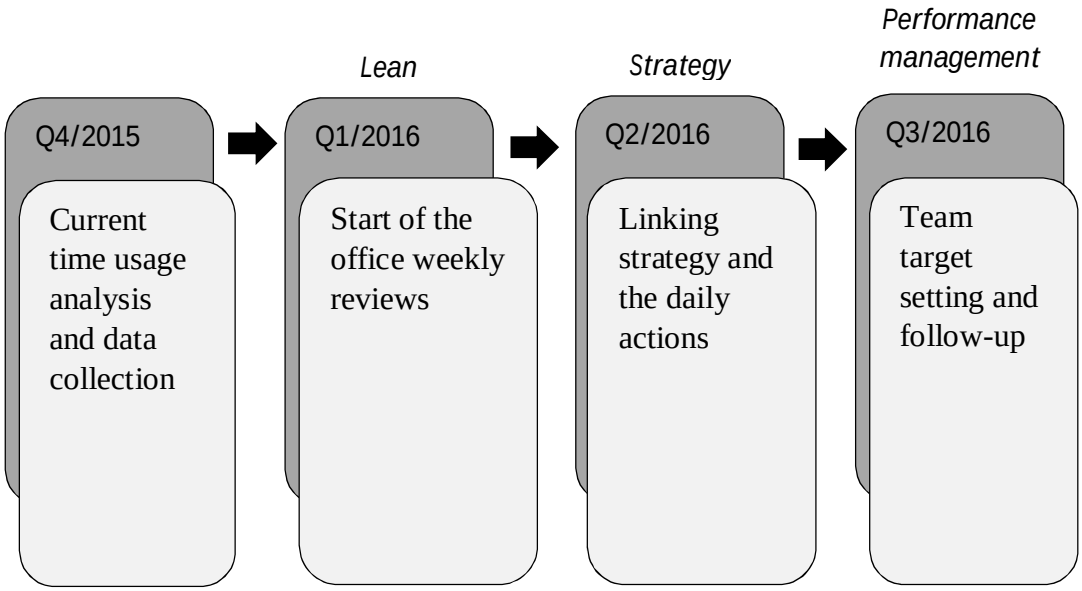
Table 3. The answers to the sub-questions.

Sub-question	Answer
What is the value add of the white collar work?	Need to be seen as supportive function, same constraint as is in production.
How much white collar working time is value add currently?	Workday activity list result: less than 50 % from ideal level.
How to manage value add of the office work?	With selected lean methods: understanding the value from customer point of view and eliminating waste.
How to set targets for white collar employees?	SMART targets on a team level.
How to ensure that all strategy based actions are to be done?	Weekly and quarterly follow-up on a team level.

6. CONCLUSION

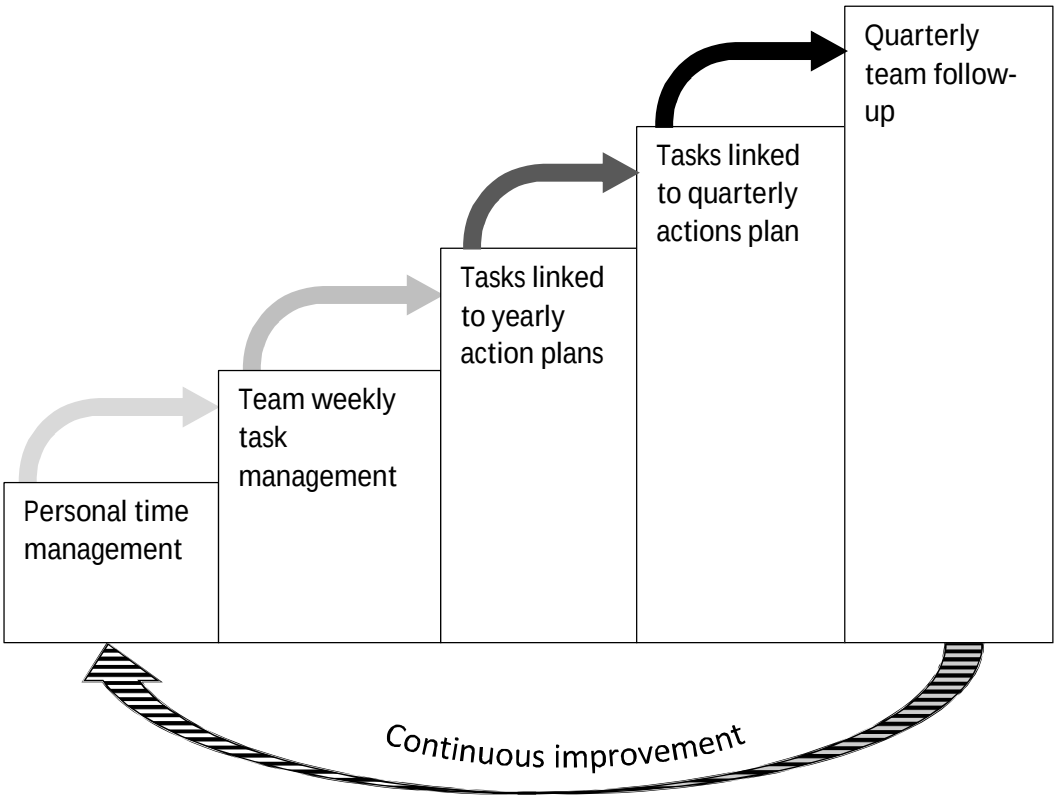
The objective of this study was to find out if there is opportunity to improve the amount of value add on office employee level. After the literature view, the case company and its drivers for the improvement were introduced. The workday activity lists were generated to find out where the time of the white collar employees is used. The improvement journey started after that. The implementation of the new team level target settings and follow-up have started. The study was split into two sections, where strategy brought the content to the journey and lean the methods for it.

The duration of the study was nearly one year (picture 29). The theoretical data collection started at the same time with the current state analysis in the end of 2015. The current state analysis started with workday activity list study and the first changes to team work were done in the beginning of 2016. In the spring 2016 the weekly review process was running smoothly. The challenge was that the tasks were not linked to strategy well enough. That is where the next step started. The daily actions were linked to strategic themes. The biggest change is that team targets are created and a quarter follow-up for them started. The result of this study is that the team action plans are created and reviewed four times a year. The white collar employees feel that the visualization and communication have been improved. In the office weekly reviews, the general atmosphere is noticeably positive. People present their tasks more like opportunities than problems or faults.



Picture 29. The timeline of the study.

The previously used yearly cycle in target setting is not flexible enough in current business where the changes are happening in all areas all the time and companies need to respond to customer demands in all situations. It is possible to measure assembly and project work and certain individual tasks, but supportive office function has not yet been measured and followed systematically. That is why implementing the lean methods to this thesis' target group is a new application. The result is open and co-operative white collar team. The process during the journey was maturing all the time. Like visualized in picture 30, each action was done on top of the previous one. The process is never ready, since due to the continuous improvement loop, it re-starts always from the beginning. All of the phases can be enhanced continually.



Picture 30. Steps during the journey and the continuous improvement loop.

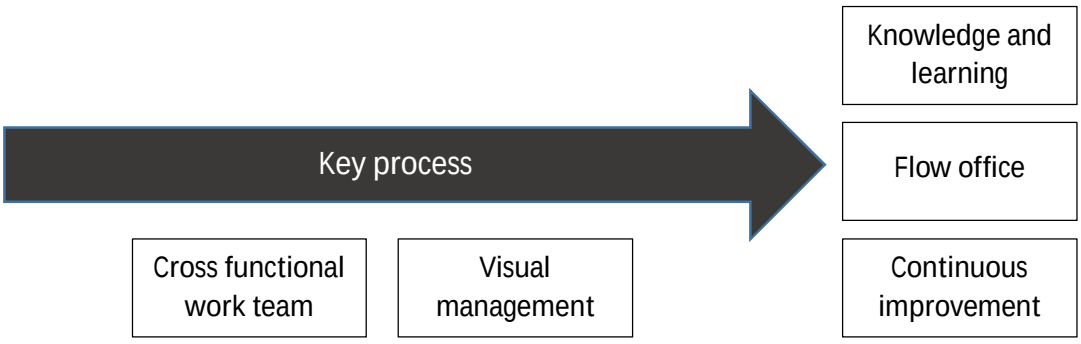
6.1. Evaluation

The research was made for one white collar team of the case company. The development trend of the companies organizational structures towards decentralization and the positive results of the journey indicate that the results of this research can be implemented to other white collar teams in another areas of businesses also. The office weekly review boards were developed to help the team achieving its business goals and the team was empowered to develop its own boards. The boards are based on the key processes, the order-delivery process in this research, not single functions. The visual control tools bring process discipline by bringing transparency to the process. The target is that the management does not need to participate in all office weekly reviews since the team will become self-guided. In practice, the benefits will be gained on all organizational levels, on individual employee level, on team level and on management level.

The weekly review boards can be seen as a map for a white collar employee to understand:

- Why I'm working here – Why my team is working here
- What I need to do – What my team needs to do
- What I need to change – What my team needs to change
- If I do that, the customer will get this – If my team does that, the customer will get this.

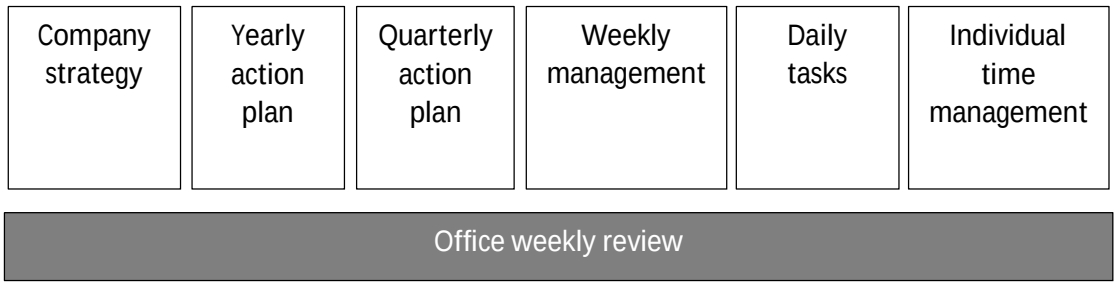
Lean tools have a key role of the office weekly review. Same as in the production management, new office work into the system should be released at the rate at which the system can perform. This action guides towards a flow office, which was selected to be one of the lean tools used in this research. The others were cross functional work team, waste elimination and continuous improvement. Picture 31 visualizes how the cross functional work team and visual management support the key process and lead to knowledge and learning, flow office and continuous improvement.



Picture 31. Applying lean tools to the key process lead into knowledge and learning, flow office and continuous improvement.

As mentioned in the limitations, the problem was not measuring the white collar work, it is taking and sharing responsibility. The office weekly review is linking and combining all levels of follow-up schedules together, starting from the company strategy to the time management of an individual employee. It is the glue

of the white collar employee strategy implementation system (picture 32). The improvement process is useful, since the process will automatically keep top level targets updated.



Picture 32. Office weekly review as a glue of target setting process.

At this point when the research is ready, the solutions made during the journey seem like simple and obvious. According to lean and performance management theory involving people and letting them to see the big picture leads to operational excellence. The improvement journey was build step by step with the support of the office weekly reviews. A major benefit is received especially from the eight lean office waste, underutilized people skills. The biggest change is the way of doing together and no roles set up beforehand. The power of the team is remarkable. It includes doing more as pairs and teams, not individuals. It does not produce partial optimization, but creates true value for a customer. The target is to do right things at the right time and increase visibility and transparency.

6.2. Future proposals

Even though the team has the main responsible following the improvement system and creating the tasks, the role of the management cannot be underestimated. The power of the managers is not disappearing, it just changes its form. The managers supervise the processes and their role is changing from a boss to a coach. The managers' task is to enable successes to their team members. As Väisänen (2012) argued, coaching kata role is needed for management to follow how the steps are progressing from competitive advantage and long-time success viewpoint. The

focus is on management by means instead of management by results. It is recommended to pay attention and study the management and leadership side of the strategy implementation in next studies.

Also the management and leadership should be standardized, since, for example, the Production Unit Managers are responsible for similar kind of business targets and they should guide the Production Supervisors similarly in order to get same kind of results from the production lines. Also job rotation and moving from one Production Unit to another would be easier if same rules and processes are used in office work in the entire Drives factory. The waste in management work should be also identified and eliminated, such as waiting, not getting information, getting wrong kind of information, not finding information, the person who should make a decision is away, not getting an answering from someone. If an e-mail is sent but no one answers or a meeting is held but no decision or change is made, then the e-mail and the meeting can be considered as a waste. It should be clear who have authority to make the decisions to minimize the waiting time. Also the aspects of change management could be studied. It requires the full support from the management to launch and implement the visual management tools. With the help of this thesis, it is easier and faster for other teams and functions to start the improvement process. It would be interesting to see the results of the ongoing quarterly team target settings and see how much it has impact to the employee satisfaction survey in longer period.

As the heart of lean is continuous improvement, the topic of this research is never ready and new areas for improvement can always be found. There is always waste to remove and the value of the customer can always be further enhanced. The ideal state will never be reached. Regular, weekly follow-up and clear steps used with continuous improvement however bring the target closer all the time.

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APPENDIX 1: The templates of workday activity lists

	PCS		PCS
How many e-mails you received?		How many of them were value add?	
How many e-mails you send?		How many of them were value add?	
How many calls you received?		How many of them were value add?	
How many calls you made?		How many of them were value add?	
How many meetings you participated?		How many of them were value add?	
		How big part of them were value add?	
		How much you made other work during them?	
How many times you were interrupted?		How many of them were value add?	

	Hours		Hours
How long time you spend thinking and planning?		How much of that was value add?	
How long time you spend with other functions and departments?		How much of that was value add?	
How long time you spend in production line?		How much of that was value add?	
How long time you spend for searching information?		What information?	
How long time you spend for waiting?		Waiting for what?	
How long time you spend on breaks?		How much of that was value add?	

APPENDIX 2: The overall results of workday activity lists

	PCS		PCS
How many e-mails you received?	150	How many of them were value add?	45 %
How many e-mails you send?	50	How many of them were value add?	80 %
How many calls you received?	10	How many of them were value add?	100 %
How many calls you made?	7	How many of them were value add?	70 %
How many meetings you participated?	15	How many of them were value add?	70 %
		How big part of them were value add?	50 %
		How much you made other work during them?	10 %
How many times you were interrupted?	50	How many of them were value add?	70 %

	Hours		Hours
How long time you spend thinking and planning?	4 h	How much of that was value add?	70 %
How long time you spend with other functions and departments?	4 h	How much of that was value add?	90 %
How long time you spend in production line?	2 h	How much of that was value add?	80 %
How long time you spend for searching information?	1 h	What information?	Lots of answers
How long time you spend for waiting?	0,5 h	Waiting for what?	Lots of answers
How long time you spend on breaks?	5 h	How much of that was value add?	100 %