Gard Johannes Gauteplass

LEAN PRODUCT MANAGEMENT

Enhancing Puma's profitability through customers' needs

Master's thesis in Economics and Business Administration
Supervisor: Terje Berg

June 2020

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Preface

This master thesis has been written as the final part of a master's degree in economy at the Norwegian University of Science and Technology (NTNU). The research has been conducted the spring 2020, but the process to get Puma to participate in this thesis started already in autumn 2018. The author has specialized himself in financial management, with extra courses in finance during his master's degree.

I want to use this opportunity to thank several key individuals that have helped me with guidance and support through this challenging but yet interesting semester.

I would like to thank my supervisors from Puma, for giving me the opportunity to get an insight in their organization and conduct this master's thesis research. Furthermore, I would like to thank associate professor Terje Berg for important input and good advice throughout my thesis.

Last but not least, I would like to thank my friends and family for help and motivation along the way.

Gard Johannes Gauteplass

Geilo, June 2020

Summary

The idea about Lean thinking has roots all the way back to early 1900, where Henry Ford began to standardizing parts and the assembly line production. Since then, Lean has been further developed in manufacturing companies as Toyota to shorten the lead time, better quality, lower the cost and enhance the company's profitability. This study focuses on the profitability of Lean thinking in product management as a case study in Puma SE. "Profitability" is defined in the Google dictionary as "The degree to which a business or activity yields profit or financial gain". This thesis therefore seeks to examine the connection between Lean thinking and product management, and how an implementation will affect the company's profitability. For this purpose, it was collected data through a survey, as well as interviews with managers from different departments within Puma. The results generally show that there are some major challenges in the company's product management, Lean users appear on individual level, which indicates that Lean thinking is currently not implemented and prioritized in Puma's management practice. Moreover, there is a big variation in how the different Lean tools and methods are interpreted, understood and utilized in their different regions and Business Units. Overall, the results indicate that Puma can increase its profitability by applying Lean practices to the challenges that the product management face. Based on usability, the most suitable Lean practices for Puma's product management are: Value Stream Mapping, Kanban and KPIs.

Sammendrag

Ideen om Lean thinking har røtter helt tilbake til begynnelsen av 1900, der Henry Ford begynte å standardisere deler og samlebåndsproduksjonen. Siden den gang har Lean blitt videreutviklet i produksjonsselskaper som Toyota for å korte ned produksjonstiden, bedre kvalitet, senke kostnadene og forbedre selskapets lønnsomhet. Denne studien fokuserer på lønnsomheten til Lean thinking i produktstyring som en casestudie i Puma SE. "Lønnsomhet" er definert i Google-ordboken som "I hvilken grad en virksomhet eller aktivitet gir overskudd eller økonomisk gevinst". Denne avhandlingen søker derfor å undersøke sammenhengen mellom Lean thinking og produktstyring, og hvordan en implementering vil påvirke selskapets lønnsomhet. For dette formålet ble det samlet inn data gjennom en spørreundersøkelse, samt intervjuer med ledere fra forskjellige avdelinger innen Puma. Resultatene viser generelt at det er noen store utfordringer i selskapets produktstyring, Lean-brukere vises på individuelt nivå, noe som indikerer at Lean thinking foreløpig ikke har blitt implementert og prioritert i Pumas styringspraksis. Videre er det en stor variasjon i hvordan de forskjellige Lean-verktøyene og metodene tolkes, forstås og brukes i Puma sine forskjellige regioner og forretningsenheter. Totalt sett indikerer resultatene at Puma kan øke lønnsomheten ved å bruke Lean-praksis på utfordringene som de står overfor i produktstyring. Basert på brukervennlighet er de mest egnede Lean-verktøyene for Pumas produktstyring: Value Stream Mapping, Kanban og KPIs.

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Nomenclature

APAC	ASIA PACIFIC
B2B	BUSINESS-TO-BUSINESS
B2C	BUSINESS-TO-CONSUMER
BSC	BALANCED SCORECARD
BU	BUSINESS UNITS
EEMA	EASTERN EUROPE, MIDDLE EAST AND AFRICA
HQ	HEAD QUARTER
KPI	KEY PERFORMANCE INDICATOR
LATAM	LATIN AMERICA
LGM	LOCAL GENERAL MANAGER
NVA	NONVALUE-ADDED
OC	OUTSOURCED COMPANY
PDCA	PLAN-DO-CHECK-ACT
PLM	PRODUCT LINE MANGER
PLC	PRODUCT LIFE-CYCLE
PM	PRODUCT MANAGERS
RQ	RESEARCH QUESTION
TPS	TOYOTA PRODUCTION SYSTEMS
VSM	VALUE STREAM MAPPING

X

1   Introduction

1.1   Background of the thesis

Through the last three decades manufacturing companies have had an enormous demand for greater knowledge about Lean thinking. Companies have used a lot of resources and effort to make their processes as lean as possible, but when it comes to the adaption rate, they have somewhat accepted that inefficiency is a part of the everyday work routine (Klethagen, Madsen, Stenheim, & Storsveen, 2016). However, it's important to acknowledge that Lean thinking has spread to every country in the world and that leaders has also beginning to adapt the tools and principles beyond manufacturing. Still Lean thinking is a fairly unknown concept, where companies struggle to utilize the Lean principles in manufacturing.

Product management is a crucial part of company's success due to the envelopment in strategic planning and tactical execution, when it comes to the company's new and existing products. "*Product management is the process of the strategically driving the development, market launch, and continual support and improvement of a company's products (ProductPlan, 2020)*». Product managers (PM) have a big responsibility, where they have to look on a product from a lifetime perspective and consider it up to customer requirements. It's a complicated task where they have to manage a multidimensional product function, with different inputs in different stages of a Product Life-Cycle (PLC). No matter if it's a small company or a large, PM also has to work closely with all the functional teams on the different products and the company as a whole, which makes the job more complex.

Puma is a big multinational Business-to-Business (B2B), as well as a Business-to-Consumer (B2C) -company, that wants to extend and improve their product management function as a world-class operation. In order to generate any value for the customer, they have to achieve an agile, efficient and profitable product management (Schäffer, 2019). They have to identify all "waste" that is taking the time away and that doesn't create any value to the consumer and eliminate it. Puma is currently using Lean methods in its production. This thesis explores how they use the methods in their company and how they can utilize lean tools and methods also to their product management department in order to be more profitable.

1.2   Research Objectives

There has been conducted some research about utilization about Lean thinking in the management accounting function (Fullerton, Kennedy, & Widener, 2014). The main aim of

this thesis is therefor to go deeper into product management and how company can successfully use Lean tools and methods from a production viewpoint into their office environment. Product management has an important role in the work cycle of a company, and its therefor important that it is being run as efficient and productive as possible. To reach this goal, it's important to have a deeper understanding on the problems with product management and to find the most suitable Lean tools and methods to solve the different issues.

The main RQ in this thesis is;

- **How do Puma apply Lean tools and methods for product management purposes to improve profitability?**

The main RQ is divided into two sub-questions;

- *Can Lean tools and methods for product management purposes be applied for improving profitability? (RQ1.)*
- *How can Puma measure the results of Lean implementation in the product management function? (RQ2.)*

This thesis will provide PUMA with valuable information about their current status quo of their product management function. It will get into some of the core challenges the company regularly are facing, that will undermine the PM efficiency and ability to create value to their customers. In the end this research will also suggest some practices that would help the company in getting more Lean in their product management. As a result of this thesis, Puma and other manufacturing companies with a product management department will have a deeper understanding of their challenges and have some guidelines in their lean transformation.

1.3   Structure of the thesis

The structure and issues of the study are shown below in Figure 1.1. The thesis consists of 7 chapters. Chapter 1 consists of the introduction of the thesis, which presents its purpose and structure. Chapter 2 presents the theoretical foundation for the thesis and the model for the study. Chapter 3 will explain and justify the choices of methods, as well will the reliability and validity of the thesis be discussed. Chapter 4 will show the empirical findings were chapter 6 will analyze the findings. Chapter 6 will discuss findings and discuss research implications of the findings and give an insight to the study's limitations. The final chapter, chapter 7, will conclude the thesis.

Chapter 1. Introduction

Purpose; Explain the pupose of the research and set the research questions

Chapter 2. Theory

Lean tools (2.1)

Main Principles | Identifying eight types of waste | Lean office and Lareau´s 20 Keys-approach

Lean Tools

Question 1. Can Lean tools and methods for product management purposes be applied for improving profitability?

Product Management (2.2)

Strategic role of product management | Tasks during the product life cycle | Challanges

Question 2. How can Puma measure the results of Lean implementation in the product management function? (RQ2.)

Model for the study

Chapter 3. Method
Research design (3.1)   Object of study (3.2)   Data Collection (3.3) Reliability and validity (3.4)

Chapter 4. Empirical Findings
Puma (4.1)   Lean maturity (4.2) Product management challanges (4.3)

Chapter 5. Analysis
Challanges vs. Lean (5.1) Chosen Lean tools & methods (5.2) Measurment driven product management (5.3) Kanban (5.4) Standard work (5.5) Information flow (5.6) Summary (5.7)

Chapter 6. Results, limitations and research implications
Results (6.1) Limitations (6.2) Research implications (6.3)

Chapter 7. Conclusion
Conclusion (7.1)

Figure 1.1 Structure

2 Theory

This chapter presents the theoretical foundations of the study. The theory part helps to answer the questions that are raised in this thesis. Furthermore, it's the theory that forms the basis for the study's hypotheses, and for the design of questions for the interviews.

2.1 Lean Production

2.1.1 Main Principles

Lean thinking is a philosophy that strives to find value for the customers with less possible resources. The basic idea of Lean thinking is to always meet customer requirements for perfect quality, exact quantities, at the exact time and place and at the lowest cost possible. From a historic perspective, Lean can be traced all the way back to early 1900, where Henry Ford began to standardizing parts and the assembly line production. Toyota took it a step further after the second world war, but since all the terms where written in Japanese, Lean thinking as a term didn't became known before early to mid 90's (Wilson, 2009). The two bestsellers; *The Machine That Changed the World* (Womack, Jones, & Roos, 1990) and *Lean thinking* (Womack & Jones, Lean Thinking, 1996), describes how Toyota as an automobile manufacturing has been recognized as the production system behind Lean production. Toyota Production Systems (TPS) acquired the knowledge to shorten their processes lead time by eliminating waste in the different phases of the production line which resulted in better quality and lower cost while improving the employees safety and satisfaction (Liker, 2004). TPS is based on 5 key steps that are depicted in figure 2.1 below.
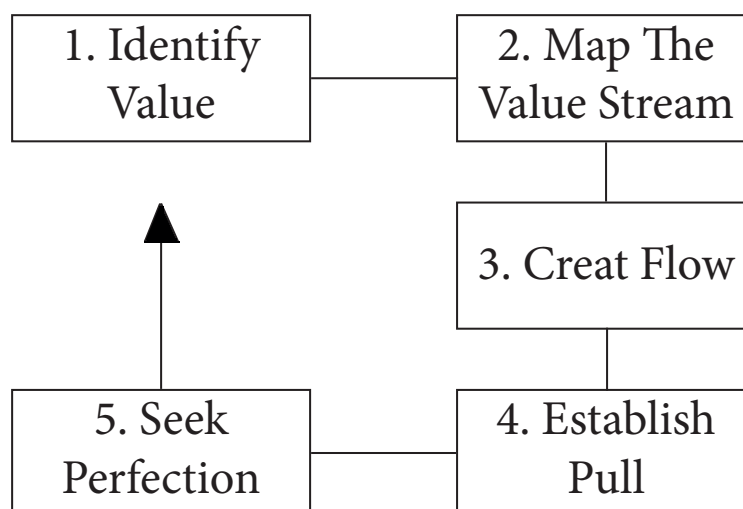
Figure 2.1 Five key steps of TPS

When a company wants to find out what customers want, it's important to study the process from the customers perspective to know their particular value (Liker, 2004). From all the activity that is within a company, there is a small percentage that actually goes to generate value for the end consumer. In theory all other activities can therefore be considered as waste, and something that should be eliminated by the particular process. By defining the value stream, the sum of all the activities and processes, will give the company a possibility to identify a product or service that meets the customers' needs and wants. The value stream will help in visualizing the potential waste, and in which process the waste has the biggest potential. By eliminating waste, the manufacturing process will be running more smoothly and create a "flow" from being raw material towards a finalized product (Lynn, 2020).

In a Lean approach, the customer's orders "pull" production through the processes when needed in a synchronized way without creating buffer inventory. The customer is given exactly what it wants, when it wants and as much as it wants (Liker, 2004). To cope with the customers demand, it's important to have an internal process that can understand and respond to it. When the customers value is identified, taken a value stream of the processes in the company, reduced waste and pull control is implemented, the cycle is starts all over again, until a state of perfection is reached (Lynn, 2020).

2.1.2 Identifying eight types of waste

Lean thinking has as a goal to identify, analyze and eliminate waste that doesn't generate value from a customer's point of view. To continuously improve the key steps of TPS, everyone in an organization should take part and contribute to identify and eliminate waste. Waste can be defined as activities that do not contribute to the value creation of the product to be delivered, but still require time and cost. There are several definitions of waste, but the best known comes from TPS and Ohno Taiichi classification of 7 different types of waste (Ohno, 1988). In the last 15 years some have begun to consider an 8th type of waste, personnel skills (Liker, 2004). As we shall in this thesis, it's important to also look into the administrative waste. This is a phase in the production and in the company where only 5 per cent of the work that is laid down will turn into value added, the rest will be defines as nonvalue-activity (NVA)(Fabrizio & Tapping, 2006). If we look at the bigger company, we see that 50 per cent of the work in the office environment will turn into value added.

All the NVA-activities should therefore be identified and eliminated to reach the TPS state of perfection. Kremer therefore provided the classical "manufacturing waste" perspective with an

administrative one, a perspective that include the personnel skills (Kremer, 2006) & (Fabrizio & Tapping, 2006).

1. **Overproduction** – production of goods or production at an earlier stage than what the customer demands is seen by Ohno as the worst of all types of waste, as this is the root to many problems and other types of waste. This destroys the flow of production and causes high lead times and a lot of work. This type of waste can be found in an office environment when an employee treats an order and sends the order to wrong customer, or that he forgets to send the order. It's important to have a good communication with the customers to understand how they are using the provided information, to reduce this type of waste. To know what the customers need and wants, it's easier to reduce waste in terms of NVA work.

2. **Waiting** – maybe the most obvious type of waste that everyone can relate to. Waiting can be related as waste in different kinds; waiting for information, delivery, machines, persons, emails or material. From a production point of view, waiting is often referred to when production worker has to wait for another phase in the production to finish. In an office environment, we see waiting occurs due to slow machines and printers, or that a management team (A) has to wait for the other functional team (B) to finish their tasks, before team A can pursue their tasks. Communication is an important and necessary component in an efficient office environment, and it's often the factor that leads to misunderstanding and overlap in workloads.

3. **Waste of motion** – Occurs when the company has a little appropriate layout and system in the workplace. All the extra motion, or movement, an employee has to do during a workday can be considered as a waste of motion, and therefore time. This time of waste can be identified when an employee has to move in different floors of the building to get to the printer, or to find different tools that he needs for a phase in the production. This type of waste is often referred to as inefficient production layout. In an office environment we can say that all types of movement of a person, emails, paper, messages that doesn't add value, can be considered as waste.

4. **Unnecessary Transport** – Handling of goods is a waste of time and increases the risk of damaging the product. Transport is an essential part of the production line and is often a type of waste most of the companies looks into. Optimizing layout to move processes closer together, as well as improving transportation methods and organizing

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the workplace can reduce this form of waste. In offices all unnecessary transport of documents either if it's in paper or electronically, will be considered as waste.

5. **Unnecessary processing** – it's about the focus to keep the processes simple and to not over processing the product that exceed the customers' demands. Ineffective of incorrect handling of the products will also be considered as a waste. When it comes to the office environment, it's important to have a good understanding about the customers value. Demands for the products and the basic functions of the production is the base line for what type of jobs and activities that ad value. All other processing on an administrative level that exceed these customers value and that they want to pay for, will be considered as waste.

6. **Unnecessary inventory** – Large procurements or too much work in progress can cause lead time, binding of capital, storage and transportation costs and are often a factor that makes it hard to discover errors. Overstocking is often a problem for delayed deliveries or long setup times from det supplier. If we look at it from an administrative point of view, this type of waste is mainly files.

7. **Defects** – will disrupt the flow of production and it will become more expensive the further out in the process before the error is detected. In the worst case, the customer will get a product with defects. To handle defects in terms of producing new products or repair the old ones cost a huge amount of time and effort. Redoing, correction or inspect the works, are different time of waste that we find in the administrative workflow. The inspection process doesn't add any value to the customer, and it can be avoided by doing the job carefully and correct from the beginning.

8. **Non-utilized talent** – Is a waste that both factory and office environments apply to. Talents, good ideas, time and learning opportunities can be waste, if the other employees doesn't engage or listen to them. This is also something that can affect and give poor utilization of creativity and experience among the employees. One mistake many people make in connection with this is to not engage employees in processes that can improve the work processes.

2.1.3   Lean office and Lareau's 20 Keys-approach

Many companies have successfully added Lean thinking to their production and manufacturing processes, but less have manage to implement the same philosophy to the administrative workflow. The common error is that companies have their focus on the concept about Lean and not the pursue of it. They fail to change old work methods (Locher, 2017).

To successfully implement Lean into an office space, alignment is crucial for success. The business key objectives and strategy had to be aligned with the Lean office's effort in order to get an expected result. Without this cooperation between these two components, the management will be discouraged, and the expected result will not be reached. Locher arguments that if a company focus on the main business processes that are able to generate value for the end consumer, the Lean office efforts will almost immediately get benefits on their experiences. He also believes that the customer will notice the change and see the results (Locher, 2017).

5S techniques is popular by many companies as an instrument to implement Lean thinking in the office. These organizations struggle to implement the core of what Lean methods is about; standard work, flow and level pull. They argue with that administrative work is more variable, has a more degree of creativity and multi-tasking compared to the more standardized work in the production process. Surprisingly, Locher have found that most of the variable workload are created of the company themselves and not by external factors. Unstandardized work therefore creates more problems with misleading information which results in extra time to address and correct than room for improvement or creativity (Locher, 2017).

Lean implementation can be summed up in 4 basic steps; Stabilize, standardize, visualize and improve. The steps follow each other chronologically, where one is dependent on the other. This circle of steps will lead to shorter lead times, lower costs and better quality (Locher, 2017).

The stabilization step has a goal to ensure expectable and repeatable outputs. To ensure this output, there must be a common understanding on how they should ensure the best process for the visualized outcome. If the process and routines are poorly defined, workers and staff members are left to themselves to figure out how the job should be done in the best possible way. This will create volatility when it comes to the outcome, depending on who performs the process. Standardization is a work tool to ensure that the workers follows and have a consistently understanding of the process. With standardized processes it makes it easier to discover nonstandard conditions without much of a lead time, and to measure efficiency of the process (Locher, 2017).

A key point for the organization before moving into Lean or further down the scale, is to know where their business is compared to the world-class standard. Lareau introduce through his book, 20 key-approaches that is specifically designed for an office environment. His vision is to provide methods and techniques to ensure to-class performances and a visual understanding

on how to reach and strive for world-class state. Each of the 20 keys includes five performance levels, ranked from lowest (one) to highest (five). Based on the total amount of points, it will get divided into three categories;

- 25-35 points – The work is characterized as decent
- 35-45 points – The work is characterized as very well-run
- 45-100 points – The work is characterized as excellent

This approach can have many positive effects on a team or in an office environment as a whole. It helps a team to communicate better and more truthfully about the performance, tracks their performances and in that way giving the administrative and management better tools to set higher and better goals for the team. Lareau means that through these steps, a team should be able to take control over their own workflow and work towards their desirable performances (Lareau, 2002).

2.1.4 Lean Tools

Value stream mapping

The founder of TPS, Taiichi Ohno, stated; *"All we are doing is looking at the timeline, from the moment the customer gives us an order to the point when we collect the cash. And we are reducing the timeline by reducing the non-value adding wastes".* The value stream is all activities, both value-creating and non-value-creating, needed to take a product from raw material from supplier to a finished product to the customer.

VSM is a tool for mapping this value stream. Using VSM, you can visualize and analyze the production process and the product's flow of information and materials through the value chain, from customer to supplier. In this way, it's easier to identify what actually gives value and what are the sources of NVA and therefore waste. This way of thinking in the production process is transparent with the office environment, to look at the presents and try to lower the costs and improve service and quality in the future (Keyte & Locher, 2004). The biggest difference of those two are the actual value stream, in production this is referred to as material in an office this is information that is needed to complete a certain task. Against this background, one should try to draw up a map of the desired and improved future situation with regard to flow and reduction of waste.

The VSM process consists of four steps (Figure 2.2). Preparation is the first an important step, the organization has to decide on which process to map. The product management could for

example, map how long it takes from an idea to the prototype is ready in the development phase. It's important to set a start and stop time for the mapping. The timeline could start when an idea is presented to the board and end when the prototype is done (Poppendieck & Poppendieck, 2006)
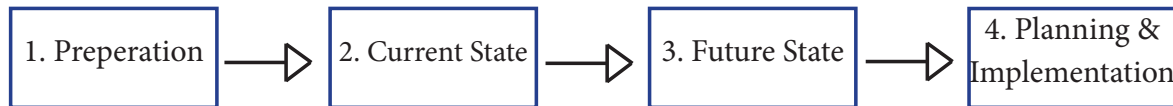
Figure 2.2 VSM (in an office environment)

When the company has created a state map as below (Figure 2.3), it's easier to see where in the value chain we can identify delays and waste. Delays in an office is created when a team is overflooded with work or that a specific team is just not ready for the task. Churn in business perspective, can happen when for example products requirements gets to detailed to soon in an early stage. Many other types of waste can be identified when mapping the value stream (Poppendieck & Poppendieck, 2006).

	REQUEST		APPROVE		TECHNICAL ASSESS-MENT		CODE & TEST		VERIFY		DEPLOY	31% Efficiency
		E-mail Supervisor		E-mail Tech Lead		Assign Developer		To Verification		To Operations		
VALUE	5 MIN		2 MIN		10 MIN		2 HOURS		10 MIN		3 MIN	150 MIN
WASTE		2 HOURS		2 HOURS		1 HOUR		20 MIN		20MIN		340 MIN
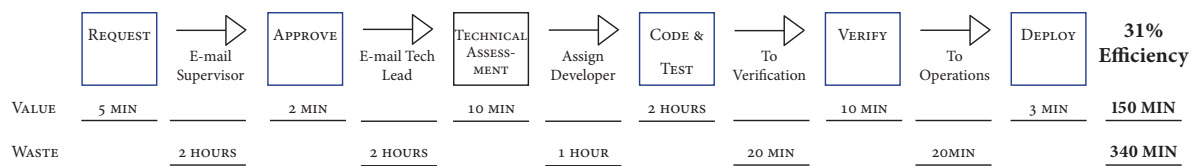
Figure 2.3 Example on a current state map (Poppendieck & Poppendieck, 2006)

The third step in VSM process is an important step, and there is no point with the two first if you don't pursue the future VSM, which is a visualization of how and what kind of waste they will eliminate. VSM has therefore no point, if it isn't used to identify and eliminating waste, then it will just be another NVA and a type of waste in the office environment. After having a future state map, the last step will be finalizing the planning and implement the changes (Poppendieck & Poppendieck, 2006).

In an office environment, Keyte &Locher says that an organization should start identifying one or two value streams. Value streaming in an office is more complex compared to a product, because the information that's targeted is more loosely structured and follows more informal systems for communication. Administrative units and teams also support different value streams that can follows different products, which makes it even more complex to identify the different workflows for each value stream.

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5S

5S is a tool for standardizing and keeping track of the workplace. The goal is to create an appropriate organization by having what one needs readily available at all times and eliminating all that is unnecessary. This will make it easier to make the right choices and correspondingly difficult to make mistakes. In order to succeed with 5S, it is important that all employees contribute to finding new and smart solutions for organizing the workplace. When wrongs and problems are handled in the wrong way, there will over time build up to an incorrectly acceptance as ordinary practice in the organization. The 5S program comes from the Japanese words; Seiri, Seiton, Seiso, Seiketsu and Shitsuke. In the figure below (figure 2.4), there follows a translation of each term and a short description (Liker, 2004).

Japanese	English	Shortly explained
Seiri	Sort	Review all tools, materials and equipment in the workplace, and keep only what is needed. Everything else is waste and are thrown away or stored somewhere else.
Seiton	Systematize	Focus on efficiency by organizing tools, materials and equipment in such a way that work flow becomes as efficient as possible. All equipment should be appropriately placed according to where it is needed, and the tiered place should be marked
Seiso	Shine	Systematic clearing, so that all equipment is restored to its original place after use. This should be part of the daily routines, ensuring that all equipment and tools are clean, tidy and ready to use at all times
Seiketsu	Standardize	Standardize work tasks and routines so that everyone knows what their own area of responsibility and how different work tasks should be carried out. Standard levels of order and orderliness are also introduced in various work areas
Shitsuke	Secure	Maintain and improve standards and routines that have been introduced. This should help to ensure that the level that has been worked up through the previous 4 S's is maintained. A clear division of responsibilities for further developing the 5S work is important

Figure 2.4 5´s program (Rolfsen, 2004)

Dennis states in his book "Lean Production Simplified" that workplaces easily can get packed with documents, tools, and other parts that effect and have an impact on the work flow (Dennis, 2007). This will result in longer lead-time and more hassle. As figure 2.4 says, it's important to go through the production and see what add value to the product and what's not. In an office environment sorting will include cleaning and organizing their databases.

After sorting the office environment, all has to be systematized and set in order. Every document and folder should have a permanent place so it can easily be found. It should be so obvious and clearly marked, that even out-of-standard situations should be easily found for everyone.

Japanese where before their time in the 70's and 80's, when it came to keep the workplace facilities clean - Seiton. The standards have been adopted in the military and national defends systems, but also civil organizations. The cleaning process include also some level of inspection, reveal abnormalities that can in worst case affect the quality and start machine failures. Clean working areas ensure efficiency in an office environment (Liker, 2004).

Standardization (Seiketsu) supports the three first steps. Is should be easy, clear and visual as possible to understand the different standards. Standards for sorting should tell what is of value and what is not in the disposal procedures. Sorting standardizations should tell what is of value or not in the disposal process. Same for cleaning, what should be clean at what time and who is responsible for keeping it tidy (Dennis, 2007).

Shitsuke, it's maybe the most important step, because it promotes a continuous improvement process and a balanced workplace. This step is all about getting the first S's rooted into the organizations culture (Liker, 2004).

Gemba

Locher describes the term Gemba as the center for value creating in an organization (Locher, 2017). The statement to Imai describes it well "The worst thing a leader can do is live in a world isolated from the Gemba, making all decisions from a comfortable office." (Imai, 2012). The reality of today's managers is that they spend most of their time in meetings or behind their desks instead of actually being in Gemba.

Gemba should be looked at the place for all improvement and information about the product/service, and its therefor crucial that the managers take part. Managers should be in good contact with Gemba, so they can make efficient decision when problems occur (Imai, 2012). With discussions, managers can take the team on a so called "Gemba-walk", that takes them through the production function in the organization. This will give the team an opportunity to observe the problem at the place it occurs, and in many cases, this type of "Gemba-walk" will also give them a solution to the problem. The priority of the walk can differ, from information flow and their challenges to look at NVA activities in the PLC (Locher, 2017).

Standard Work

Effectively processes or activity are often a result of standardized work – the best-known tool. Standardized work, or referred to as standard work, says something about how a process should be performed, how much time that is needed, and other factors that is needed in order to perform the activity in a right and consistent way. When a job is performed consistently, despite if it's in the office or in the production, the quality will rise and be consistent regardless of who performs it. Chart for standard work should be made, easy and visual for everyone, but also in a way it gets utilized by workers with the skills for the concrete task. The chart below (Figure 2.5) is taken from one of Locher's examples in customer service. It describes how the activity should be performed, how often and how long each step takes (Locher, 2017).

STANDARD WORK DAILY MANAGEMENT				
ROLE; CUSTOMER SERVICE				
			FREQUENCY	
TASK (WITH KEY POINTS)	TIME	DAILY	WEEKLY	MONTHLY
1 Enter orders within day of receipt to ensure that published lead times can be met	5-10 min per order	Throughout day		
2. Generate weekley order input reports to monitor current demand	5 mins		Fridays by 16:00 pm	
3. Generate monthly reports for management to monitor sales performances	10 mins			Last Friday of month

Figure 2.5 Standard Work Daily Management (Locher, 2017)

Standard work is a tool that provides a numerous of other Lean implementation and is the base line for continuous improvement. And in many professions, they are familiarized with this type of charts. Accountants have the same checklist for each month and chefs with kitchen staff are obliged to follow authority's checklist when it comes to keeping the kitchen clean.

A3-Reports

After Toyotas revolutionizing of the manufacturing process many have, including Dennis, said that A3-reporst where one of the most effective communication tools they used (Dennis, 2007). The reason for why it's called A3, comes from the paper size A3 that were used for the report. In the book "Understanding A3 Thinking" Sobek and Smalley state that the purpose behind A3-reports follows Edward Deming's process of continues improvement (Figure 2.6), the Plan-Do-Check-Act (PDCA) – Cycle (Sobek & Smalley, 2008). Usage of a A3-Report will help and

give the readers a deeper understanding of the opportunities or problems the organization's facing which result in better alignment and cohesion within the organization's four doors.
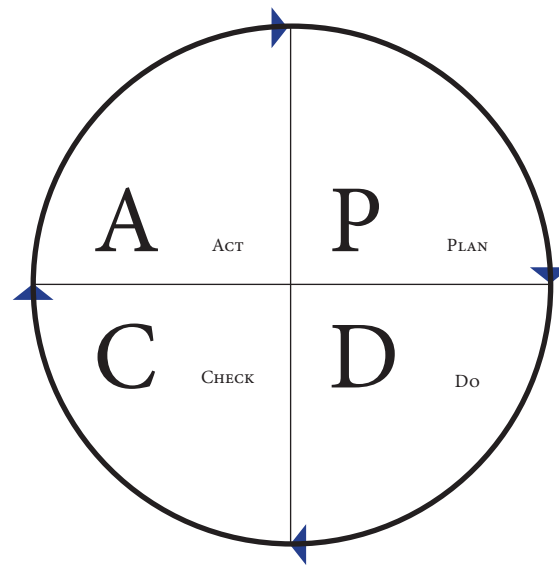
Figure 2.6 PDCA – Cycle

A3 reports exists in different types, and the most common ones are; proposal, current status, and problem-solving. A proposal A3 report is often used in cases where the financial investment is significant, implementation process, or when a proposal involves large parts across an organization. In an early phase of a product as proposal, it's important to have consensus, wise thinking and good planning on the recommendations from the organization. The purpose and aim are to structure a plan guide that ease the decision-making (Sobek & Smalley, 2008).

A report that includes problem-solving, is often made after an approved proposal or between the plan and do phase in PDCA-cycle. The function of a report like this is to find the cause of a problem, what kind of effort that is needed, and confirm when a problem has been solved. Any situation is different so the A3 report can't be fully relied on when it comes to problem-solving, but it should be used as often as it can, because it will lead to learning opportunities (Sobek & Smalley, 2008).

The current state A3 report has a main purpose to describe the current situation, improvements and what has still room for improvement and to point out key factors for why things turned out the way it did. A current state report can't therefor be made before an organization/team has gone through a problem-solving plan and have their proposal approved. Linked to the PDCA-cycle, the current status report focuses on the last two steps of the cycle, check and act. It sums

up all the changes and outcomes in the implementation phase, plan and do in the PDCA cycle (Sobek & Smalley, 2008).

Kanban

The term Kanban, in the perspective of lean production, is known as signal of refilling in the production control systems (Vatalaro & Taylor, 2005). The signal can be made through post-it stickers, and the most important thing is that the signal is generated by consumption. The main purpose of Kanban is to be the link between the value stream process and the supplying resources, by visualizing the pull of the customer (Vatalaro & Taylor, 2005).

Kanban was basically made as a tool for the production system, but in later times Kanban is utilized by other main managing processes within the organization. As a general Kanban is a great tool to visualize the workflow an eliminate waste factors on an individual, team and organization basis. How effective the outcome of the tool is relying on three factors; 1. Visualization, 2. Limitation and 3. Managing. When a particular task is visual, it's easier for every team member to follow what is happening along the process, who is responsible for the task and which employee who is the most suitable. Limiting the work process, will take of the multitasking pressure of the team members, and let them focus and be committed to one thing at the time. Limitation over multitasking will increase the productivity. If the whole workflow is managed correctly, issues and failure will be found and tracked at an early stage and they prevent that it escalates.

In the following example, we have a post-it board that goes through 8 different stages of a product function. It's a Kanban example for visualization for a potential team. If a product/function or other types of features pass the verification but not the manager review, it will get tossed back into the "bumped by manager" -column to go through the process ones more. There is also a limitation to 10 cases of how many cases a manager can have to review at the same time.
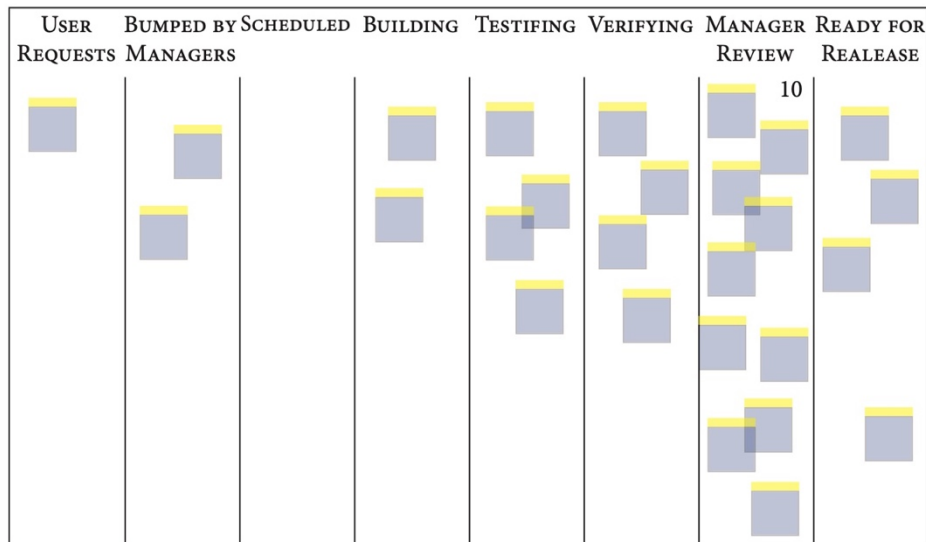
Figure 2.7 Kanban Board

It's three major differences between task board and Kanban board according to Stellman and Greene. Firstly, task board describes tasks and Kanban boards describes story. Secondly, the columns that are shown over are just an example and not fixed, so the columns can vary from teams and different tasks. The last different that Kanban and Stellman recall to is, limitation in each column (like the example). To keep the process fluent and in control, there should be regularly meetings for the Kanban teams to discuss the current state of each item on the board (Greene & Stellman, 2016).

Key Performance Indicator

Performances in an office environment are usually measured up against a budget. Administrative in an organization have usually their biggest cost in white-collar workers, and their budget are therefore controlled by how many employees they have. By implementing lean principals into the office environment, the focus will change from simple "head count" to focus on improve productivity through performance measures (Katko, 2014)

There are three purposes with Lean key performance indicator (KPI). Firstly, it exposes the problem with the value stream that lead to poor performance. It finds the root/main cause to the problem. Thirdly, it encourages the team to take action and solve the problem. Actions taken to solve a problem can be short-term through countermeasures, continuous improvement and long-term or large-scale changes. Lean Performance measures are reported frequently (every hour, day, week), and it's therefore important to have it as simple as possible in order to calculate it as fast as possible. It's also easier to motivate employees with simple performance measures and find the root cause to the problem (Katko, 2014).

Dudbridge looked into lean manufacturing in the food industry, and the amount of different KPIs in the organization is something he turned his attention to. A team can easily be overwhelmed in workloads if the organization imply to many KPIs, but at the same time to few will not be taken seriously. Is therefore an important job in finding the right KPIs. It's a job that needs to be taken seriously, if not improvements opportunities or issues may be overseen. Since metrics are often manually created, it should be presented at the performance board that strives towards continuous improvement. It's important that the is clear, frequently updated and readily available (Dudbridge, 2011).

To choose the right KPIs is therefore highly important. One of the most used performance measurement frameworks are the balanced scorecard (BSC) (Kaplan & Norton, 1992). It includes four different aspects with an organization, financial and non-financial. The different perspectives are; financial, internal processes, learning and growth and customer. It's a framework used to identify and improve internal business functions and are therefore highly related. BSC measure and provide information about the organization and its used to make better business decisions as which KPIs Puma should implement.

Heijunka

Heijunka is a Japanese word for signify load leveling and balancing (Luyster & Tapping, 2006). The main purpose of Heijunka is to set a flow in the production and product withdrawal in the factory shop-floor. Production systems base with pull should in fact always start and end with Heijunka. The first two steps of Lean thinking, Stability and Standardization, need to be implemented before an organization can start with Heijunka. Pereira states in his e-book that Heijunka boards (shown in the figure below) will utilize in the same way in an office environment as in manufacturing (Pereira, 2008). The items produced is the only difference, where in an office environment the product is referred to as invoices, quotes, mails, drawings etc. Anyhow we see that leveling of the workload is even more important in an office environment than in manufacturing.

TIME / PART	7:00	7:20	7:40	8:00	8:20	8:40	9:00	9:20	9:40	10:00	10:20	10:40	11:00
BLUE TOP 20 PCS	/	/		/		/	/		/		/	/	
GREEN TOP 20 PCS			/	/			/		/	/			/
BLUE BOTTOM 30 PCS	/	/		/			/	/		/			/
GREEN BOTTOM 30 PCS					/						/		

Figure 2.8 Heijunka board (Luyster & Tapping, 2006)

Heijunka's first step is to calculate task time (available daily work time/total daily volume require). Then every value stream needs to get a pitch each. A pitch can be calculated by multiplying the takt time by the number of work units that flows through the value stream. Second last step is to create a work sequence table that says when the value stream should be done and at what quantity. The last step is that an Heijunka board provides balance through work volumes and value stream (Tapping, 2005).

Lean visual management

Visualization in Lean thinking has an important role, and it's normally used to detecting problems. People are visual beings, means that they can absorb a large amount of data and information through what they see, example signs, logo, lights.

Visual management is all about telling how the process is running and how it's compared to its standards (Liker, 2004). It will increase the productivity, lower the cost, and improve the quality when it's implemented correctly. The employees will have better control over the situation than before, this will give them motivation and further improve the circle of productivity, lower the cost and productivity. When its visual, it makes it easier for the workers that knows little about a task or area of production to understand an amount just by walking through the production and observing (Shimbun, 1995). Visualization makes it also easier to identify problems and make decision and suggestions on the go.

Visual control, when it's implemented correctly, have no need of communication between the workers/employees to indicate what actions that should be taken into matter. All NVA-activities such as emails, phone calls or other information communication systems is not

needed. In today's world visual communication is getting popular in many corners of an organization. A good example of visual communication that most of us have seen is the safety cards and busy signal for the toilets onboard planes. It signals when the toilet is occupied and what to do if an emergency occurs.

Kaizen

Kaizen is a Japanese term derives from the two words: Kai (change) and Zen (good). It's a part of the fourth step of Lean, continues improvement, and its main goal is to encourage creativity and empower the people. The optimal situation is reached when employees starts to think Lean and implement Kaizen in every minute of their work (Martin & Osterling, 2007).

Kaizen projects is a short focused project, that usually takes three to five days to accomplish unless you have a mini project on just a day (Alukal & Manos, 2006). Referred to Martin and Osterling, Kaizen projects is structured activities and something organizations can utilize from with quick and dramatic enhancements (Martin & Osterling, 2007). An innovative team is the underline of kaizen and is necessary in order to identify waste, eliminate it and find new and better solutions. Kaizen helps team and individuals with communications and teaches theme how to find new solutions through PDCA-circle. Kaizen will better the organizations productivity, lower the cost and better the quality.

Its recommended that practicing kaizen is an 8 weeks cycles, in order to perform in the best way (Alukal & Manos, 2006). Three weeks before the first meeting, the organizing team should meet to prepare the project. During the event, they should conclude on the current state, know how to improve processes and in the end, implement. The upcoming three weeks should include follow-up activities to substantiate the best ending, and that its sustained and results are being public.

2.2   Product Management

2.2.1   Strategic role of product Management

Product management is something a number of companies in different industries have seen the utility in. They have also begun to implement it in the organization on the basis of their positive experiences. Product Management is something we can lead back to 1931, when Procter and Gamble assigned their two soap products with their own product manager. Since this management engagement, product management has become a well-known term all over the world (Kittlaus & Clough, 2009).

The role of a product manager will vary from industry to industry and within the different companies. Their everyday work routine will vary from different responsibilities, since they will work through different functions of the company's new and existing products. They have to supervise and coordinate all the activities for some product and do strategic planning and tactical execution to reach the company's goals and the value of the end consumer. For a product manager to able to this job, it's important that he/she has a good overview of the PLC within the company, but also the organization has a whole with its internal and external threats. A product manager need to have the knowledge to adapt and execute on the customers and other companies decision to generate a positive value stream for their own products (Geracie, 2010).

Zahid pictures a product manager as a CEO of a product (Zahid, 2013). It's his job to make the right decisions on a daily, weekly and monthly basis in order to work out the lifespan of a product in the best way. Whereas, the product manager has the responsibility for a specific product, a product-line manager has the responsibility for the whole product family. He is responsible to lead the portfolio of products in the right directions compared to their competitors. A strong and clear market positioning among the different products and a clear market strategy is crucial for a successful product-line manager (Zahid, 2013).

Since marketing and management of a product is closely connected, we see that PMs often get the responsibility for them both. In bigger companies these two activities will anyhow be separate, with a product manager and a product marketing manager. Zahid specify that the role to a product manager is to listen to the market and communicate the markets problems into product requirements (Zahid, 2013). In this way the product manager will communicate his vision, ideas and meanings through his promoting of his product or his product-line. A product marketing manager's job description is to managing product launches, building up, originating the product and managing the promotions around a product (The Pragmatic Marketer, 2009).

In a company we see that there are some crucial factors, both inbound and outbound (figure 2.9), that are important to work close to in order to promote a successful product to the market. Together with the customer's needs, the PM has to understand the link between the inbound and the outbound factors in order to convey the requirements for the product (Zahid, 2013).

On the inbound side, a product manager deals with almost every function in a company since he follows a company from a concept to the termination of a product. It involves planning, organizing and control of the product. These different inbound teams/activities include

services, marketing, manufacturing, finance etc. (Zahid, 2013). The different teams require the project manager to be subjective and a neutral expert, where he should be able to answer questions about clients, competitors, market and prospects. On the outbound side, the project manager interacts with the products and the company's customers, analysts and business partners.
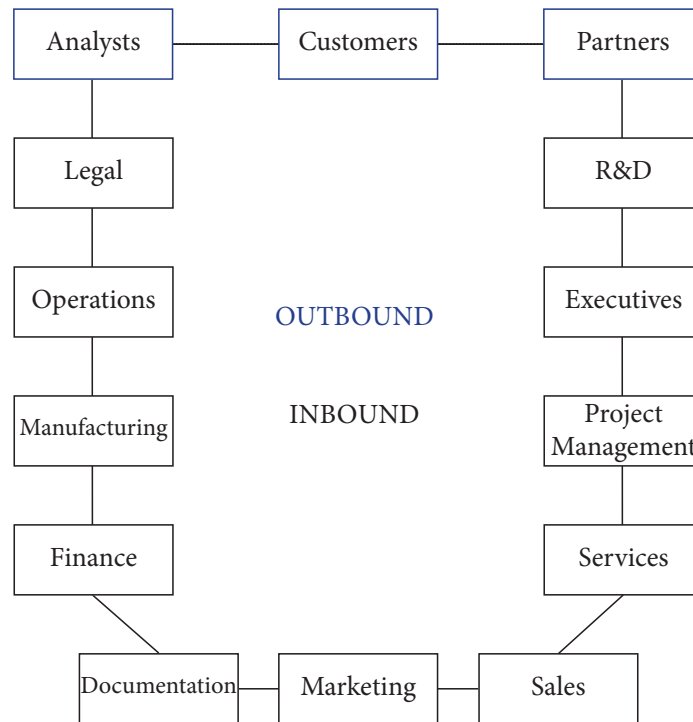
Figure 2.9 Inbound & Outbound sides of a company

Many reasons can be mentioned for why a product manager should be the middleman between the inbound teams and the customers. Every team can technically interact directly with the customers, but in most of the cases it's not advisable. To interact with the customers the teams has to follow very strict protocols for example handling what a team can expose and not to their customers. A good relationship with the customers is also something a company has to pay attention too, and in general teams are not trained or have the capacity to handle this task in a proper way (Zahid, 2013).

The inbound teams have an enormous responsibility and is important when it comes to the value chain, communications with customers can therefore be more of a setback then value added. Evaluating and turning the customers' needs into requirements for the product can also be a challenging task that not all of the teams are capable of doing. And how do they decide on which requirements that is important? This is why a product manager has to be subjective in terms of filtering, combining and prioritize the requirements from different sources to the

inbound teams. Besides controlling, a product manager has to perform a market analyzes, forecasting market positioning and prizing of the product. This is simply something functional teams cannot do (Zahid, 2013).

2.2.2 Product management tasks during the PLC

A product can either be tangible or intangible and the main objective for the product is to answer the needs to the customers. How well it answers those depends on how well the managers have been able to translate the needs into requirements and further into realization. A product has to create value for the customers, so it has to serve a specific purpose and need. That's why it's so important that the product and the idea has to be well thought through, and not being based on a random idea (Zahid, 2013).

The PLC (figure 2.10) is a basic but an important model in the world of economics, as well for the product manager. The model consists of five phases, that each dictate how a product manager execute his job. Planning, execution, launch, sustaining and termination is five phases that together should say how a product manager should be able to create and growing products that meats the customers' requirements. All this in order to generate revenue. In the figure below (figure 2.10) it's included the phases before a product goes to market, the planning and execution phases. Two phases that normally will show huge losses in terms of high costs without any revenue. The high costs are related to the concept of the product, development and testing, and they are all crucial to if the product's future success or failure (Zahid, 2013).
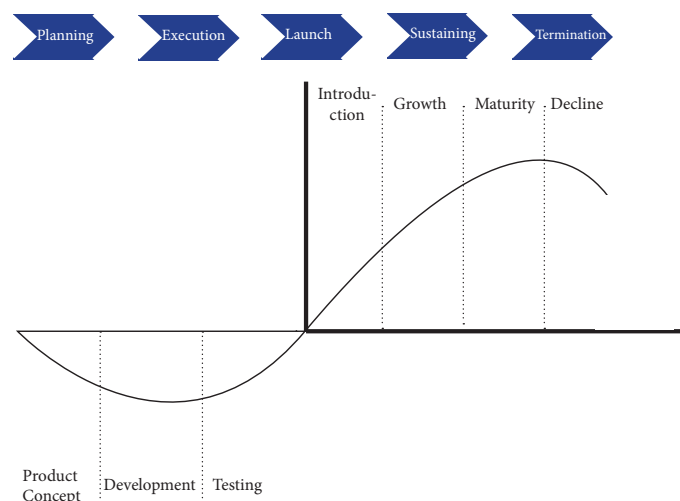

Figure 2.10 PLC model

Product management involves in the whole lifespan of a product. From an idea, it evolves to a concept, where the production is according to the customer's requirements and the launch of the product into the market is to generate revenue. But it doesn't end with a launch for a product

manager. The product often needs upgrades or improvements in order to obtain or take a new position in the market. When the product reaches its decline phase, the product is faced either to be renewed through innovation and new ideas or to get terminated. A more detailed description of the different phases follows below (Zahid, 2013).

1. **Product Planning** – Is the first phase of PLC and the foundation for the product's potential. The idea of a product often occurs from a deep understanding of the needs to the customers and the market as a whole, technologies and from problems other products are facing. The first step of a product manager is therefor to discuss and think through an idea with colleagues, business partners and even customers to see if it fits their needs. Taking to the customer can in many cases be of valuable information, since you can talk to the end buyer of the product and get a deeper understanding of what kind of needs that need to be covered to make the product more useful for them (Zahid, 2013).

   When a potential idea has been validated and approved by the management, customers and investors, the idea has to be translated into a concept. A concept proposal that expand the idea into a refined and a more detailed form. The problem that the customers are facing with existing products has to be described in the proposal with a suitable solution for it. When a proposal validates existing products and solutions it will also give an insight to potential market opportunities and product positioning. The positioned of the product needs to be referenced with competitors existing products, but as important is to reference the new product to their own product portfolio. It's a difficult task and it needs to be done as accurate as possible from the product manager (Zahid, 2013).

   The logic step after a product proposal have been excepted, is to start transforming the customers need into product requirements. The product manager has in this phase the voice of a customer with targets and requirements that needs to be fulfilled for the product to meet the needs when it comes to performance, functionality and features. Since the product manager is in the "center" when it comes to communication with the different teams and functionality, it's important that the requirements are as clear as possible (Zahid, 2013).

2. **Product Execution** – whether a product is delivered to the market on time or not, is depended on how well the execution phase is executed. If this phase fails in terms of

delays, it can cause negatively consequences to the products success. It's a busy phase for all the functions that take part in designing, building and testing the product. The product manager is the supervisor for all these activities (Zahid, 2013).

The core team is a set of specific functions that is there to deliver an end product that fits with the requirements the manager has set for them. The teams itself has the control over the product on a detailed level, and this isn't the job for a product manager. A product manager is more of a consultant for all the other teams and review all their suggestions up against the other functions in the core team and the products requirements. To lead this process as smooth as possible, a project manager (often referred to as program manager) is often appointed to follows the project on a daily and weekly basis, and to constantly update the product manager to status quo (Zahid, 2013).

In the development stage it can be useful to make a prototype to test the functionality and design of the product. A raw version of the product can give visual image of what they should improve and potentially discover opportunities that they didn't see in the first place. Potential improvements can be related to the hardware or the design itself. A beta version of the product is in many cases used to test and get feedback on a product when the design and functionality has been validated. Many companies use different kind of events to find potential buyers that are willing to test and give feedback on the upcoming product. It's a job for the sales team to find the potential customers. Events and beta trial helps in order to gather early information about the quality of the product in terms of feedback, let the customers get familiar with the products and potentially start a word-of-mouth marketing (Zahid, 2013).

3. **Launch** – is the phase where a finally shaped product is ready for the market. The main goal of a launch is to spread the word and awareness about the product through marketing. The quality of the product doesn't matter if no one knows it exist, therefor it's important to advertise the product so the potential buyer can find the information and potentially buy it (Zahid, 2013).

   The information that was gathered in the beta phase of the product is important to terminate and have report before a product moves into a launch. To price a product correctly compared to the competitors, diverse geographies, and buying behaviors is also an important task for the product manager. When the price that shouldn't be exceeded have been found, the product manager can give the sales team and partners

the permission for an open- quote announcement. This will allow the sales team to start building up sales pipeline that consist of potential sales, and while they are starting to build up it should turn into real orders. Since the product manager has the overview of the whole process, he/she should also look closely into the pipelines growth to see how well the market is taking the product (Zahid, 2013).

A launch is often started with a press release with a big industry event such as a public conference, in order to maximize the media and customers attention. A press release often ends, or being followed up, by media briefings which is a perfect opportunity for a product manager to sell their product story a argue for why their product have the advantages over their competitors. Opening the accounting books for revenue recognition, is the last step of a product manager in the launching phase. When they have come to this point it's important that they have set the final price and have it correctly in the ordering system for when the real orders are rolling in (Zahid, 2013).

4. **Product sustaining** – When a product has been launched, it's important that it keeps being sustained. A product that enters the market is often not perfect from at the time it's launched, and unpredicted events can occur when it's put into operation. As the product its often expected to live for several years, it's important that these problems are being fixed and that the customer can get the maximum performance out of the product when they purchase it (Zahid, 2013).

When a product enters the concept phase of the PLC, the product manager makes a long-time development strategy. A product roadmap is then formed based on the long-time strategy plan that explains how a product should evolve, and how it should and which futures that will be added with time. The teams that are in contact with the end consumer will soon after the launch begin to request different kinds of options and accessories that will increase the total utility of the product. In this phase request submissions can also be an advisable think for the product manager to apply. Which requests and requirements that will suite the product in the long run, it's up to the product manager to prioritize and choose. Over time, the product will sets its ground in a more specific market, and the product manager can then more clearly further strengthen the product that's in the markets customers best interests (Zahid, 2013).

In a sustaining phase, the product manager should also look closely to the sales pipeline in order to predict the future process. Trough theory the prediction of the future process should be expected to increase every year, if not quartile, in order to maintain a healthy

business. The predictions are in fixed time periods, on month or every quarter, presented to executives and other teams so everyone knows what they are working towards. It's important to keep in mind that when a product is launched and it's in a sustaining phase, competitors try to make similar product, if not better ones. It's therefore important to still promote the product, launch market campaigns and interact with the customers to see if the products fit their needs and what kind of potential that can be fined (Zahid, 2013).

5. **Termination** – With time, every product will face the end of the PLC and be terminated for new and better products. For company's this isn't an easy step, and more like a process then based on a single decision. A termination process often starts long before the termination date, weeks, month sometime years before the actual termination is taking place. When a product reach the maturity phase on PLC curve, the product manager should start to planning and visualizing the product(s) that will replace the existing product and how the new product should be better and increase the utility for the end consumer than the soon to be terminated product (Zahid, 2013).

The end-of-life process usually starts with the product manager presents the reason for that the product(s) should be terminated. Included in the proposal is a financial analysis of the impact of the termination and a proposal for new product(s) that will replace the terminated product, with a migration plane on how to do it. When the proposal to the product manager gets approved, he can make an end-to-life announcement to the customers and partners. It's important that they get the announcement in an early stage, so they can prepare themselves for the migration so that they will get affected as little as possible (Zahid, 2013).

When the announcement has been issued, the product manager can start on the end-of-life readiness. The pipeline will be orientated from the product that is being terminated to the new product in this phase. The sales team will start shifting their revenue source to the new product and start protecting their customer base from the previous product. At last, the product manager will close the accounting books for the product, take the product of their web shop and the price list and stop shipping the product to customers and retailers (Zahid, 2013).

2.2.3 Challenges

The product management is multidimensional and through the different stages of PLC it requires different inputs. That the PM also needs to have communication and control over the different functional teams makes the job even more complex. There hasn't been conducted much research about difficulties in the product management function, and it has therefor been hard to reflect and develop it further. In May 2015 a consultant group conducted a comprehensive survey to determine the biggest challenges that the companies are facing when it comes to product management. The results from the survey is referred to in this subchapter to deepen the knowledge about which issues that needs to be solved in order to get a more agile and Lean product management.

280 Group is according to themselves the world's leading product management training and consulting firm, and in 2015 they conducted a survey with over 900 respondents from all over the world and from a wide variety of industries and company sizes (280 GROUP, 2015). The survey gives important insight in the challenges a company meets with product management's ability to create value for the customer, internal and external.

1. 56,0 % - Rate PM's skills from avarage to no skills
2. 20,9 % - Fail to meet customers needs (avarage)
3. 41,2 % - Describes Product Management as neutral or ineffective
4. 31,4 % - PMs are neutral or ineffective at communication
5. 29,3 % - Executive team understands the PM's role
6. 56,0 % - PMs focus to much on single phases on not the whole PLS
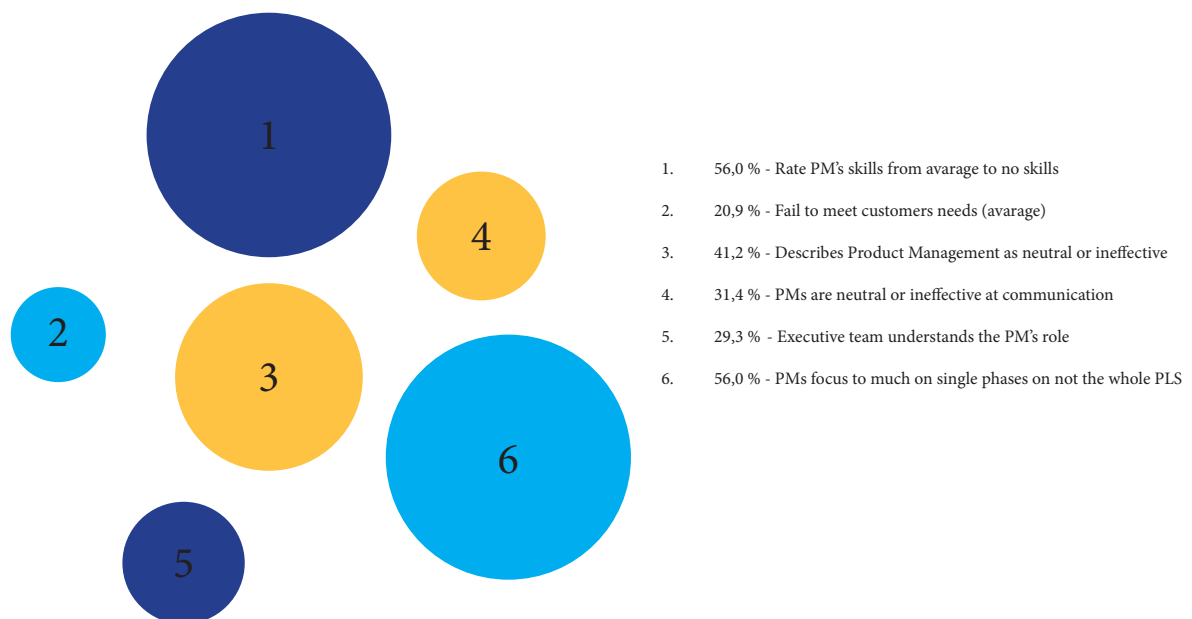
Figure 2.11 Challanges with PM in companies

The internal challenges can be quite divided in the company, and through different kind of surveys, we can see that the two main challenges are related to knowledge and role definition. The survey to 280 Group shows that 56 per cent of the respondents indicates that the PM's at their company had average or below PM skills, which implements that the PM didn't have enough tools, or definite methodologies and that they struggled to structure the process and

tasks. On average 20.9 per cent fails to meet customer needs, according to the respondents (280 GROUP, 2015). More defined methodologies is not a guarantee for any success, but it helps in order to reduce failures by repeating what has worked before through different checkpoints in PLC. Organizations should therefore strongly consider process maturity (Fradin & Kumar, 2015).

Altogether 41 per cent of the product management is described as neutral or ineffective. Overall 31 per cent responded that the internal interactions and communication between the PMs and the engineers are neutral to ineffective. The PMs are dependent on having valuable information in possession in order to make profound decisions. If the PM has to search for the information, the decision making will be more arduous. It's therefor highly important for the PMs to be as effective as possible in communication with engineers and other staff and team members (280 GROUP, 2015).

From the survey it also present that only "29 per cent feel that the executive team at their company has a complete understanding of what PM is and the value it brings" (280 GROUP, 2015). When roles and responsibility in a company is misunderstood or poorly defined, it's challenging to do the activities and tasks in an efficient way. The common problem, and that we see tendency towards in the survey, is that executive teams doesn't know how to structure their organization after PMs, because the role is so complex and cross-functional (280 GROUP, 2015).

At Lappeenranta University of Technology there was two professors and one doctoral student that followed 13 Finnish software organizations to understand challenges with product management (Maglyas, Nikula, & Smolander, 2012). The result of the study was to identify common problems a PM in software company is facing. The same problem can be related to other industries as well, because we look at the process of product management and not a specific product/service. Maglyas, Nikula, Smolanders findings give us another perspective on product management compared to the survey of 280 Group because it analyzes problems more precisely.

They identified five main problems that they addressed with Lean principles. The first challenge they refer to is that PMs have problem to describe the different phases and activities in a PLC until the delivery/launching phase. "In the described situation, every department was an isolated unit acting independently and focusing on its own work instead of thinking about the whole product." This is also they find tendency to in the survey report, where 56% of the

respondents say that the PMs focus to much on some phases of PLC, and not as a whole. The article pointed out R&D as the bottleneck and as a black box where the other teams didn't know what kind of product that would be the output. The market team for example, needs to know which features and requirements that are implemented on the final product in order to start their work (Maglyas, Nikula, & Smolander, 2012).

PMs are responsible for the whole PLC, but who is responsible for the PM? In general, there isn't any proper tools and metrics to analyze the job of a PM, even though there is many for the product itself. It's expected that the PM reach he/she's goal and that the product is released on time with requirements strained from the customer's needs. But if he/she fails, they see that no consequences follow (Maglyas, Nikula, & Smolander, 2012).

Both the survey and the article find that some of the PM organizations fail to meet customer's needs, on average 20% (280 GROUP, 2015). New products where development without having any collaboration with the customers. PM where guessing on needs to the customers in the market, and without testing the product or collecting surveys they can face delayed product release, and in worst case loose the opportunity to hit the market before their competitors (Maglyas, Nikula, & Smolander, 2012).

The two last problems that is raised in the Finnish article is that organizations have a short-term thinking and that they try to change their vision and strategy instantly to external conditions. If an organization try to implement every change that happens outside its four walls, it will never succeed in their own excellence in any area. The best reaction for an organization is to be clear and follows its vision and strategy in the long run. Several articles shows that a long-term strategy will deliver unique customer value, and make possibilities to reduce costs and increase efficiency and productivity (Maglyas, Nikula, & Smolander, 2012).

2.3   Market orientation

This subchapter explains what it means to be a market- and customer orientated company. These two concepts together with two previous subchapters will be the theory basis for market- and customer orientation an organization has.

Narver and Slater find that that market orientation consists of three elements, customer- and competitor orientation and inter-functional coordination (Narver & Slater, 1990). Customer- and competitor orientation acquire and convey information about the buyer and competitors in the market. Inter-functional coordination initiate action based on this information, with purpose of add value for the customer. This is equivalent with Kohli and Jaworski's definition (Kohli

& Jaworski, 1990). Market orientation is defined as the organization's ability to understand the current and future customer needs, the spread of this knowledge internally within the company and the organizational response to this information.

Market orientation has many similarities to customer orientation. Both has an external viewpoint with customers as its main focus. Slater and Narver distinguish these two concepts in the table below (Table 1). The table shows that a market orientated company is proactive and with its long-term focus it tries to the customers' needs in the future. If a company is market orientated, it means that it's continuously committed to find and create customer value. This mindset promotes generative learning, where employees can be creative and innovative (Slater & Narver, 1998).

Table 1 Market- vs. Customer orientation

	MARKET ORIENTATION	CUSTOMER ORIENTATION
Strategic orientation	Underlying needs	Expressed wishes
Customization	Proactive	Reactive
Time perspective	Long-term	Short-term
Goal	Customer value	Customer satisfaction
Learning	Generative	Adaptive

2.3.1 Customer orientation

As for market orientation, the customer is in the center for attention in customer orientation. Like table 1 gives an impression of, customer orientation is about being reactive and with a short-term approach it focusses on satisfying the customer's wishes. Organizations that are customer orientated measure often customer satisfaction of existing product and services. This will often lead to adaptive learning which can limit their ability to be innovative, because the focus is to satisfy their existing customers. This is in contrast to market orientated organizations which are also looking into new markets. Slater and Narver argues that customer orientated companies is preferred in markets with stabile customer base and a static market with few changes (Slater & Narver, 1998).

As said customer- and market orientation is an external viewpoint on an organization. Anyhow, I will not discuss an internal focus in this thesis, due to the limitation of this paper. Internal focus can be expressed through internal process improvements and cost leader strategies. Since Puma isn't an organization that base their corporate business on being a cost leader, this isn't relevant in this study (Puma SE, 2018).

2.4 Model for the study

The theory chapter give an introduction to Lean thinking (chapter 2.1), Product Management (chapter 2.2) and market orientation (chapter 2.3), and together it's det foundation for the model of the study (figure 2.12). The blue box represents out main RQ in this thesis, if lean implementation in product management can increase Puma's profitability. Figure 2.12 shows that I anticipate that both Product Management and Lean thinking have a positive connection with the organization's profitability. These assumptions are the foundation for the study, which will be discussed in following subchapter below. Market orientation is included in the study to ensure high degree of validity in implementation of Lean in Product Management.
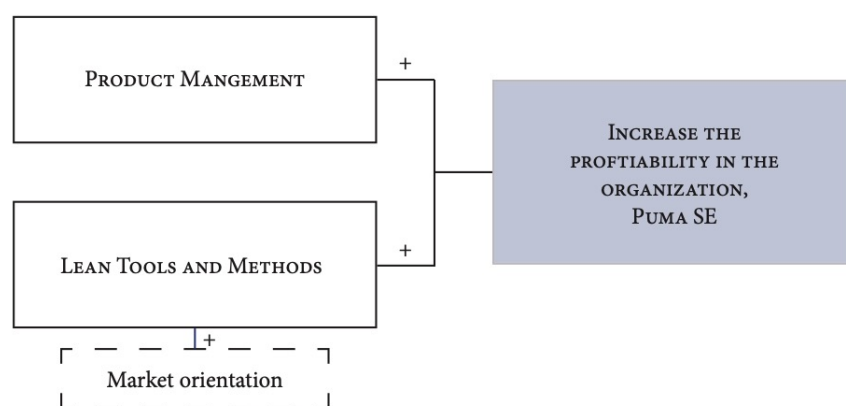

Figure 2.12 Model for study

2.4.1 Product Management and profitability

Zahid describes a product manager as a CEO of a product. He has the responsibility to make the right decisions on a daily, weekly and monthly basis. It's his job to make sure that the product is as profitable as possible through the whole PLC (Zahid, 2013).

In the model for the study (figure 2.12) I therefore assume positive connection between Product Management and the organization's profitability. This positive connection can justify with that Puma is an international manufacturing company that sells products and goods. If each product in the organization is carried out as profitable as possible, is nearby to think that the whole organization also will increase its profitability. If the profitability increases in Product Management, I therefore assume that Puma's profitability will increase.

2.4.2 Lean thinking and profitability

The foundation of Lean Thinking is to always meet customer requirements for perfect quality, exact quantities, at the exact time and place and at the lowest cost possible. TPS acquired the

knowledge to shorten their processes lead time by eliminating waste in the different phases of the production line which resulted in better quality and lower cost (Liker, 2004).

In this study I therefore assume positive connection between Lean Thinking and an organization's profitability. But as a Product Manager that strives to lower the cost in the product function and meet the customers' needs, I also assume positive connection between Lean thinking and Product Management. It can be justified in that lower cost, better quality, and delivery with its exact quantity and at time, will increase the profitability of the Product Management than again will increase the organization's profitability.

3 Method

By method we mean how we collect, organize and interpret information. Choice of method will be of great importance to the collection process, and to the results and conclusion we arrive at (Larsen, 2017). It's therefore important that the choices of method are made so that the questions can be addressed in the best possible way.

This chapter describes the method that underlies the study. The chapter consists of research design (chapter 3.1), object of study (chapter 3.2), data collection (chapter 3.3) and reliability and validity (Chapter 3.4).

3.1 Research design

Research design is all about choosing the design that enables us to answer the questions as best as possible. It provides a framework for collection and analyze data. One can mainly choose between three different types of designs: exploratory-, descriptive- and causal design (Saunders, Lewis, & Thornhill, 2015). The purpose of the analysis determines which of the designs that are relevant. The design is chosen on behalf of the RQs being raised in the thesis and their objectives.

RQ1 aims to find out if Lean tools can be implemented in order to increase the product management profitability. For this question it's appropriate for a descriptive design, since the purpose is to describe a situation that exists on a point in time (Jacobsen, 2015).

RQ2 aims to measure the results of Lean implementation in the product management function. This question lies close to exploratory design, since the research wants to clarify the exact nature of the problem to be solved.

Furthermore, it's natural to choose which methodical approach is appropriate. The choice stands between intensive (deep) or extensive (broad), as well as between quantitative or qualitative methods. The choice of design, layout and method is usually naturally related (Jacobsen, 2015). The intention is to get a representative overview of the Puma's use and utility of Lean thinking in product management which happens in an office environment. Then it is appropriate with an extensive study since I examine many managemental functions spread over the whole company. The study wants to chart the usage in Puma and the data will therefore be collected as qualitative as well as quantitative (Johannessen, Kristoffersen, & Tufte, 2011).

Finally, we will look at which approach should be used to get such an accurate picture of reality as possible. The choice is between using an inductive ("from empiricism to theory") or a

deductive approach ("from theory to empiricism"). There will be used a mix between the two. To answer RQ1 an inductive approach is used. An inductive approach is preferred since it's possible to develop hypotheses from existing theory. When a RQ has an inductive approach, there is specific expectations to the data and findings that will be collected. The downside with expectations is to overlook important information and have its main focus on information that supports our expectations. To answer RQ2 a deductive approach is used. This is because there is not sufficient existing theory on the subject to have expectations of findings in the specific organization. Therefore, all relevant information will be gathered when we look at how puma should measure its implementation of Lean in the product management function (Jacobsen, 2015).

3.2   Object of study

Several studies have mapped the opportunity to apply Lean practices in Norway. These studies have looked at usage and utility of Lean thinking and Lean production in manufacturing. Studies have looked at the prevalence of Lean in Norway (Berg, et al., 2019; Storsveen, 2015; Klethagen, Madsen, Stenheim, & Storsveen, 2016), while Haarr looked into Lean construction in a rehabilitation project at Statsbygg (Haarr, 2016). Since there is no equally sophisticated thesis about implementing Lean thinking in product management in Norway, it's appropriate to have a wider population than the mentioned studies (Johannesen, Schjølberg, & Vik, 2013). Inspired by Saavalainen, who look into implementation of Lean thinking in product management in a case company, I have chosen to look into Puma (Saavalainen, 2015). Unlike the first mentioned studies I will look into the office environment and not the production floor and unlike Saavalainen who base her empirical data from Product Managers, I will add with interviews of managers in different departments within Puma to get an in-dept understanding.

Puma is chosen with the anticipation of opportunity to learn. Secondly, I chose an organization, which is international and with multi product lines, spread over different division to compare their experiences with Lean and product management. Also, with the reflection of the mangers, the chosen organization had to be able to implement modern techniques as a part of their continues improvement process. Puma is also selected because its operating globally in a turbulent environment, with competitive competitors followed by frequently changes in the external factors, but also with business structure and ownership. Besides, Puma is running within an industry that can be threatened by technological changes, with security threats or opportunities for efficiency. Finally, the goal is to combine the learning possibility in product management and ease the interaction between theoretical and practical practice.

Profession titles examined in the thesis are mainly managers from different departments within Puma. Managers within Project, Business process and PMO are contacted because of their insight with the different management tools, as well with the impact of the tools being adopted and therefore are likely to have knowledge of Lean thinking that is being examines. Marketing and strategy managers are contacted because it's reasonable to believe that these are aware of and how customers are analyzed. And PLMs have an in-depth understanding of Product Management and its challenges, and how implementation of Lean Thinking would benefit or give the organization a disadvantage. The aforementioned titles in Puma are the theoretical selection for my interviews. The survey will go out to all Product Mangers or Product-line mangers in Puma - the actual population. It's not likely that everyone will get and have the opportunity to answer the survey. The actual number of respondents answering the survey is called "actual selection" and these are presented initially in the next sub-chapter (Jacobsen, 2015).

3.3   Data collection

This subchapter will provide information about the theoretical background for the data collection. It encompasses triangular sources which entails using more than one source of data in the study. To achieve an in-dept understanding that will make the findings more reliable and valid, it's chosen to collect data from multiple sources such as interviews, survey and document analysis.

It's common to distinguish between two different types of data, primary- and secondary. With primary data we mean data that is collected for specific case. Data that has been used for other purposes in the past, is called secondary data (Saunders, Lewis, & Thornhill, 2015). This thesis will only use primary data, but findings will be compared with other studies.

3.3.1   Collection of primary data

Survey

Quantitative methods have a demand for standardized information. This is its strength and weakness. This paper will gather quantitative data using survey with closed-answer options. The questions are therefore predetermined and fixed. This kind of survey is most common when it comes to analyze many different units in an efficient way (Jacobsen, 2015).

A benefit with surveys is to get an overview of complex and big data in a simple manner. Surveys has a low cost, and it takes up a short amount of time. This means that one can collect

data from many respondents, which gives opportunities for prevalence and to generalize findings (Jacobsen, 2015; Johannessen, Kristoffersen, & Tufte, 2011).

A disadvantage with survey is that it isn't any room for adaptations to different respondents. The respondents will have varied and different knowledge about the questions being asked. They can be affected by how the questions are formulated, the order of the survey, the different answer options. It's therefore important to design the survey according to recommended guidelines in the literature. The survey is therefore designed with easy questions at the beginning. In the middle is the more technical and important part of the survey, while the ending has some easy reflections questions about the respondent.

The survey is mainly designed to answer the thesis first RQ, with the desire to achieve high validity. This will be further discussed in next subchapter. Number of questions have been minimized to increase the probability of a higher response rate. This priority is done because of the virus (covid-19) the world is facing, where people have a busier working day than usual. The survey takes approximately 1-2 minutes.

Before the survey was sent out, it went through a pretest. The main reason was to see if some of the questions was perceived as unclear. Supervisor, colleagues and family participated in the pretest, which helped in improving the survey on some bulled points. The survey was made in Microsoft Forms. It was sent out one reminder, that increased the percentage of answers. The survey, e-mail invitations, and the reminder can be found in the appendices (Appendix 5-7).

The objective of the survey was to get inputs from different PLM's with different amount of experiences and based in different BU's and/or regions. The cap of years experiences ranged from 2-15 years. The diversity of the PLM is to ensure different opinions and to get a total picture on the challenges the PLMs are facing, no matter if they're based in Germany or America, or if they are a junior or senior PLM. Altogether 5 PLMs took part in the survey and one of them was also interviewed regard to the challenges he/she is facing.

Interview

There are three types of interviews; structured, semi-structured and unstructured. The interviews that this thesis is based on are semi-structured. This form of interviews has a list of themes/topics and questions that set the guide for the discussions. The response from the interviewee can vary due to the room he or she is getting, and it's not given to response in a particular way or form. The interviews can also vary in number of total questions and length

(Bryman & Bell, 2015). The interviews were held with following people from Puma. All interviews where recorded and transcribed.

Sl. No	Title	Date	Duration
01	Business Process Manager	14/04/2020	42 Minutes
02	Manager Global Retail	16/04/2020	39 Minutes
03	Senior Project Manager IT Business Solutions	20/04/2020	37 Minutes
04	Teamhead Easy Business Platform - PMO	21/04/2020	49 Minutes
05	Product line manager (PLM)	21/04/2020	61 Minutes
06	Senior Marketing Manager Retail Europe	24/04/2020	48 Minutes

The objective by using interviews was to get a deeper understanding of the current issue with product management in an office environment and look for improvements by implementing Lean thinking. The interviewees where selected by their professional and relative to their inbound team in Puma (Bryman & Bell, 2015).

Due to the long-distance between Puma's headquarter and author, the interviews where substituted with video interviews over Microsoft Teams. The major reason for video- over telephone interviews were to add a certain importance and professionalism to the interview due to the fact that you actually can see each other. Compared to travel to Germany, interviews over internet gives a much lower cost and is highly effective in terms of less time spent. It includes also less effort for the interviewee.

Video calls includes some disadvantages like; interruption, difficulties to read the candidates body language, scheduling outside working hours, bad signals and some interviewees feel that video calls are unpleasant. The interviewees have therefore had the chance to schedule the meeting when it suits them the best, and at the place they wanted to have the interview. They were asked to participate by a colleague in Puma, in case they wouldn't like to participate or if they had a problem with the design of the interview. Myself, had made sure to be at a place with good internet connection and at a place where I don't get disturbed throughout the interviews.

Before the interviews there was conducted a pretest with supervisor, colleagues and family. To see if some of the questions was perceived as unclear. An interview guide was sent out the day before the respective interview. Since deep understanding was the objective, interviewees reflection before the interview were prioritized.

As previous studies I intentionally left out questions about product delivery strategies, due to its dependencies to the different phases in the PLC. The idea of the interviews was to get a deep understanding on the different challenges and opportunities that Puma face as a whole organization, and that indirect affect the product management department from all the different inbound teams within Puma. A PM can have great communication with a Marketing manager, but if the information in the market department is misled or wrong information is given, the decision-making process in product management is indirect affected. Secondly, an outside opinion on the challenges in product management was wanted to compare it with the PLM's own opinion. The idea of the survey was to gain knowledge with the challenges in product management from a PM point-of-view and compare it to the findings conducted by 280 Group and Maglyas et al. The interview- and the survey form can be found in Appendix 2 and 3.

3.3.2 Operationalization

Before an analyzation of the empirical data can start, I have to pay attention to operationalization of concepts, in order to make them measurable. It's about categorize and concretize concepts (Jacobsen, 2015).

To concretize a theoretical concept, it will be divided into one or several subcomponents. These subcomponents can each be measured through one or several questions in the survey or/and in the interview. Market orientation is a complex concept, and a term that needs to be operationalized with subcomponents in order to be measurable. I do this by asking the interviewees; 1. In which degree would you say that the customers drive the organization's strategy? 2. How do Puma prioritize between short or long-term customer perspective? 3. How do Puma deals with market orientation?

Some terms like Lean thinking and its different methods are difficult to concretize, due to not all respondents had the same knowledge about the concept. I therefore sent out an interview guide in advance, so each respondent could ask questions about the study, the different questions and themes before the interview. In this way it will be reasonable to measure the concepts directly from the different questions asked in the interview.

Table 3 show all the questions used in the interview guide (appendix 2). The table explains how they are supposed to help in answering the RQs. I categorize the table into four categories; General, Product Management, Market orientation and Lean Thinking.

3.4 Reliability and validity

A good analysis has to meet some criteria's; 1. The analysis is reliable (reliability), 2. The study analysis what it says it will analyze (content validity), 3. The analysis probes that conditions that coexist also are causally related (internal validity) and 4. The results can be valid in other studies and areas of study (external validity) (Jacobsen, 2015). The qualitative analysis doesn't have their main focus on causal contexts, therefore internal validity isn't relevant (Johannessen, Kristoffersen, & Tufte, 2011). This subchapter includes; reliability, content validity and external validity.

3.4.1 Reliability

Reliability means that the study has to be trusted. With this means that the analysis is carried out in a credible way. The design and how the analysis are carried out can affect the result, this is sources of error in the study (Jacobsen, 2015). In this study there are a combination of interviews and a survey for collecting data, which can affect the result. In order to avoid possible misunderstandings, I avoided using leading questions in the survey. Questions that leads the interviewee to answer something specific. Example, there has been avoided using answer alternative that would be looked at either very positive or negative. All ambiguities like unclear questions, vague definitions or overlapping answers where highlighted and omitted through the pilot.

Other sources of error can be features with the interviewees. Jacobsen state that it can occur a difference between what the interviewee answer to a question, and what he or she actually thinks. Sometimes the reasons for this, can be that the interviewees have some to gain from the results. Another reason could be that people wants to justify their choices. Some would justify that Lean has given great results in their manufacturing due to reduced waste, but the situation in reality is different. A third reason could be that they don't take the survey or interview seriously and mark of and answer completely random.

There are different ways in testing the data's reliability. If the same result is achieved in a later examination, or the result is the same as an earlier examination, test-retest reliability is achieved. Another method to check the data's reliability is that several researchers studies the same phenomenon. If the same result is achieved, the data has high degree of inter reliability

(Johannessen, Kristoffersen, & Tufte, 2011). Because of limited time available it isn't possible to conduct the study ones more, referred to the sub-chapters "Limitations" and "Research implications" in chapter 6 and 7.

3.4.2 Validity

Content validity is about whether it's correlation between the theme/phenomenon in the study and the observations/measurements done in the study (Johannessen, Kristoffersen, & Tufte, 2011). It means if one measure the phenomenon one actually wants to measure. This is a logical method, not an empirical one, but neither less important in quantitative methods. To verify content validity, the survey went through a pilot with supervisor and fellow students that are known with the term Product Management, to check if the questions are reasonable and that it covers the theme. Some definitions and clarifications were done based on the feedbacks. Product management is complex, so in order to ensure high content validity, 12 questions were asked in survey to throw light on various sub elements of Product Management.

Internal validity says whether our data have coverage in our conclusion (Jacobsen, 2015). It's about whether our data is considered as correct. The studies internal validity can be tested in two ways; compare the result with previous studies or make a critical review on your one (Jacobsen, 2015). Some studies have been conducted and will be my comparison and with a critical review of my findings I will ensure internal validity for the survey.

External validity occurs when relationships are discovered and can be generalized to other contexts (Jacobsen, 2015). There are two types of generalization; theoretical and statistic. Theoretical generalization is about generalize data from a smaller sample from empiricism to theory, while statistical generalize from sample to a population. Statistical is more common in quantitative studies. In my analysis I got contact information to the interviewees from an internal contact in Puma. There is therefore uncertainty about the distribution and representation among the different managers and PLMs. It's both challenging and time-consuming to obtain contact information and collect data from absolute all managers and PLMs, therefore based on available time and resources available the thesis's sample can be regarded as representative.

4 Puma – Empirical Findings

This chapter consists of three sub-chapters. The first sub-chapter gives a quick insight in how Puma has structured their product management function (Chapter 4.1). The second sub-chapter goes through the result from the Lareau's 20 keys-assessment (Chapter 4.2). Lastly the product management's challenges get overviewed from the interviews (Chapter 4.3). Together, these three sub-chapters defines the thesis's empirical findings.

4.1 Case company introduction

Puma claim they are one of the world's leading sports brands specialized in footwear and clothing (Puma SE, 2020). The company's business functions are divided into five regions; Eastern Europe, Middle East and Africa (EEMEA), Europe, Latin America (LATAM), North America and Asia Pacific (APAC), which are further divided into Business Units (BU). These BUs focus on different product groups and markets within Puma.

Puma's product management function is organized in regional- and global teams. The different BUs are led by a Local General Manager (LGM), who has the responsibilities for the overall growth in Puma's different product group. Every BU has also their own (or several) Product Line Managers (PLM), with the responsibility for the different BU's service and products in a region. Puma's regional product management is not always congruent, as it's depended on the different markets within the different regions.
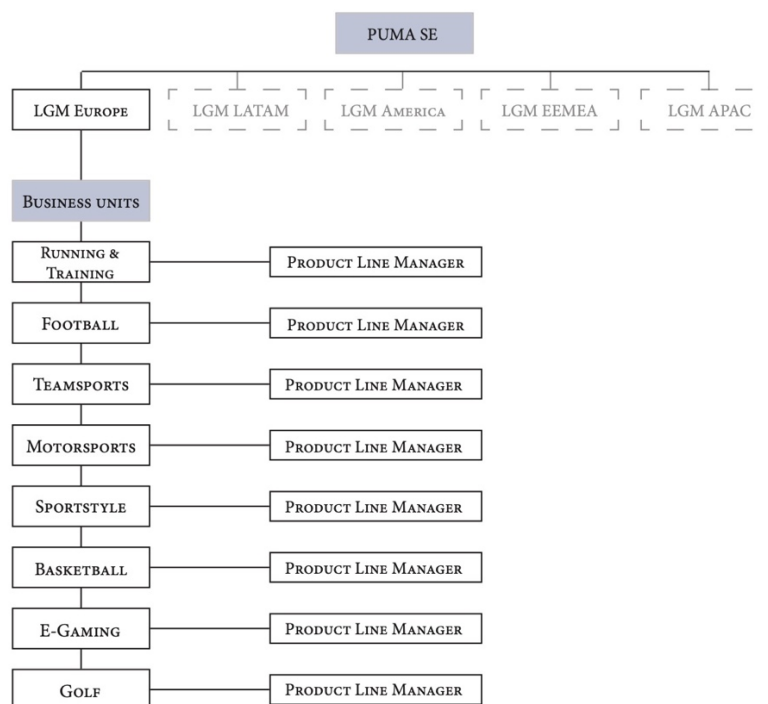

Figure 4.1 Product Management (regional)

Each product and the different BU's on a regional level are also led globally by the LGMs together with the board and the different inbound teams at Puma's headquarter. Together they have the responsibility and strive for continuous growth and optimization of the business on a global level. In this way a PLM in Running & Training at Puma's office in Boston, who is locally belonged to the America-region, interacts with a PLM in Japan since they are all under the same global business function. Puma doesn't separate between PLM and PM, but rather just have PLMs in their different BUs.
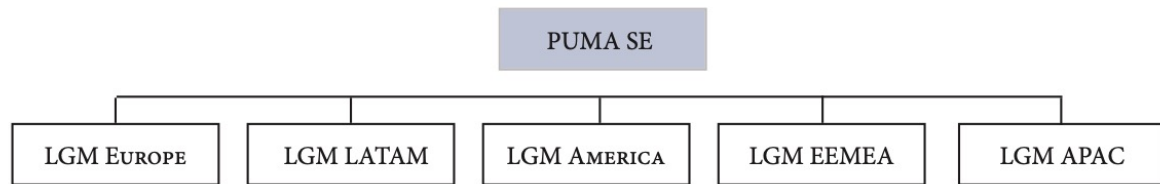
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Figure 4.2 Product Management (global)

4.2 Puma's Lean maturity

Puma has been practicing agile management with particular scrum for several years now. Kanban boards have been utilized in some departments where they lately have begun to make electronical Kanban board to utilize and make the tool more efficient. Kaizen thinking have been utilized by some managers, but without being a utilized process and working method for a whole team or department. Standardization together with visualization is used in some departments more than others. However, according to the managers there is a big variation in how the different tools are used and utilized in Puma's different BUs and regions.

Laureu's 20 keys-approach is a suitable tool that is made for office environment to assess Lean thinking in Product Management. Before going in depth of Puma's product management function it's important to know their current state and performances. A product line manager in the BU, running & training, conducted the 20 keys (Appendix 1) and the result is visualized in the radar chart below (Figure 4.3). It visualizes the product management's current state. The current state of the product management its rated in the chart from a scale from 1-5; the higher the maturity level, the longer away the point/line are towards the center. In a "perfect" organization, a circular line will shape a circle on the fifth level.
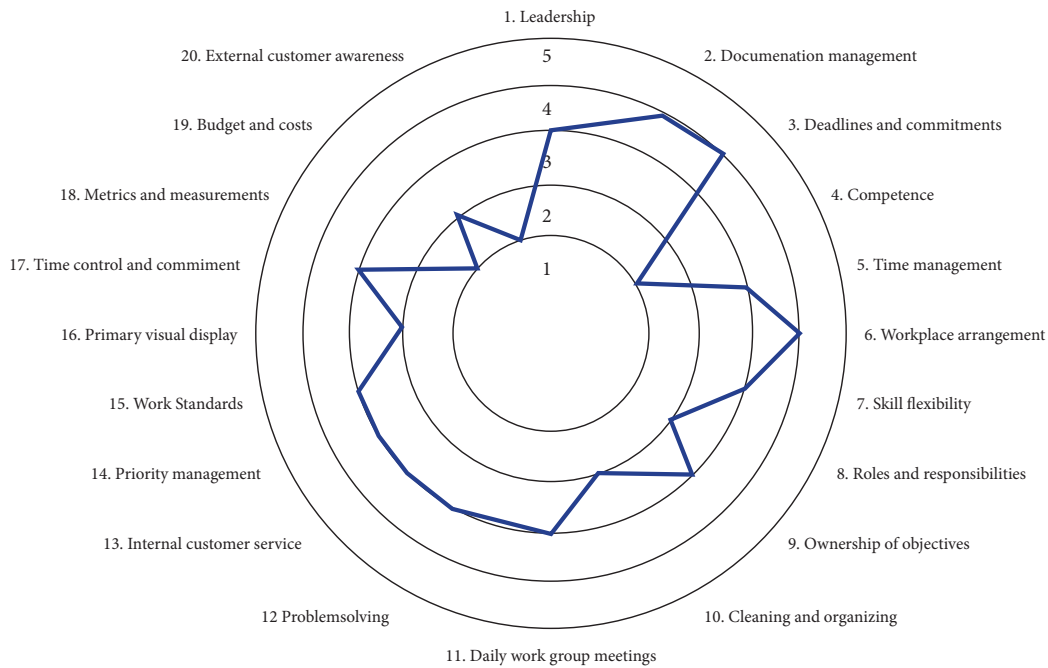
Figure 4.3 Lareau's 20-keys approach

Puma's product management score a total of 53 out of 100 points which according to Lareau's scale in the theory chapter means that they are doing an excellent job as a traditional organization. Three keys received the lowest score (grade 1) and four keys with the second lowest score (grade 2). The three keys that received the highest score were; Documentation management, Deadlines and commitments, and Workplace arrangement.

According to the assessment, all associates use the central area for work group documents and very seldom is a document misplaced, and/or found to be out-of-date, or in two places at once. The work group is skilled when it comes to manage deadlines. Managing commitments is defined as an internal/external customer satisfaction through consistent on-time delivery. Work group has equipment placed to support key processes and workflow. The workplace is flexible and highly mobile, and it can be reconfigured if the work group find it necessary. Despite the overall good result with their total score and the positive scores in the mentioned areas, the product management unit has still a long way to go in becoming a world-class organization with a perfect score of 100 points.

4.3   Product management challenges

A number of 6 managers were interviewed from 6 different inbound teams in Puma to unravel challenges within the product management department, but also in their specific department. The interviews, together with the survey questions, were formed based on challenges-chapter

(Chapter 2.2.3), and this sub-chapter will sum up the findings from the survey and the 6 interviews.

The PLMs were asked a total of twelve questions, excluding some introduction questions. The findings are depicted in the figure bellow (Figure 4.4), where the blue bars indicate degree of agreement as statement, and the orange bars degree of disagreement. The darker colors of blue and orange indicate strong agreement and strong disagreement. In some of the questions the PLMs were almost perfect to unanimous, but some tend to divide opinions. There was one respondent who answered all the questions in survey with *strongly disagree* including if he/she thinks that product management its related to the organization's profitability. He/she did it all in under 40 seconds, which was significantly lower than the others. According to Jacobsen it requires particularly good reasons to exclude a respondent from a survey. Since I didn't have the chance to have an interview with the mentioned respondent, I decided to show the result from the survey when every respondent is included (left chart below) and one where the one is excluded (right chart). The rest of this thesis will because of the circumstances base its analysis on the chart to the right.

Figure 4.4 Product Management challanges in Puma

All of the PLM's agrees that roles and responsibilities in Puma's product management department were clear and well defined. In regard to the Puma's market standing and vison, the PLM that were interviewed felt that the work instruction was clear, and the end goal for the products was clear.

They also disagree with poor tool for measurement to evaluate their work. The PLM would disagree with the statement due to their commitment and ability to keep up with timelines, due dates, schedules and task. The interviewed PLM often refer to what he calls a "showroom product/business", were the visual design of the product is the main focus, and often they don't take into consideration factors as; quality, market orientation, logistics, marketing, service, merchandising, development and other internal- and external factors. In order for Puma not becoming a "showroom business", customer satisfaction was therefore prioritized, were the best total experience of the product was the goal. The PLM also stated that feedback from the different functional groups in Puma is given during different phases of the PLC.

50% of the PLMs admitted that they don't collaborate with the end consumer in the extend to actually know their true needs of a product. Different types of managers that were interviewed could relate to this statement, and that they had opportunities to increase their knowledge about customers' needs, compared to competing brands. Puma is operating with product cycles on 9-12 months from a product idea to the launch of the product. Their ability to predict the customers' needs 12-18 months ahead is therefore crucial. They base much of their judgments on statistic from retail and their past products, rather than going through the local sales units in each country to conduct information about the customers true needs. However, 50% of the PLM state that they strongly disagree with the statement and mean that they collaborate with the customers in a way to know their true needs.

The PLMs were quite divided with their opinions regard to if processes and methods is clearly defined or not. 70% disagreed and 25% agreed to undefined processes and methods. A PLM stated that there is too much variety in induvial working methods, with almost non degree of standardization of excel, power point and other person-to-person sheets. Waste regards to double work on some projects and task could therefore occur. Some also felt that there were some positions that were well-defined, and some that they didn't have that they needed and vice versa.

As regards to process and methods the PLMs are quite divided when they acknowledge the situation around the information flow in their department and the company as a whole. In Puma different communication platform is being used to share information. In general; most of the managers use e-mail in formal settings, phone for ad-hock communication, share point for files that are too big for e-mail and Microsoft teams for communication within a "team/department". All the managers that were interviewed acknowledge that there has been a big improvement compared to the previous internal situation, where they had up to 20 different types of platforms

for communication. The remaining problem are regards to knowledge barriers between departments, knowhow of communicate important information and how-to storage information. A manager felt that there was a to big leap of communication of what the different departments are doing, there priorities and roles. It was therefore difficult to have a good knowhow of which information to communicate and how to communicate it. Another manager also stated that there can be difficult to keep track with the final version of a product, and to know which file that include the final version. Storage and where a file is stored was therefore a problem most of the managers felt could be improved in the future. As in the previous paragraph, there is room for individualization of work methods and how to share and save files. Some therefore had problem to know which platform a file has been shared, if the file was saved and if it had, where the file was saved. Some noted that poor communication could lead to duplication of work.

Surprisingly, all of the PLMs stated that they don't have a problem or difficulties to describe the PLC from a product concept till its launch, which differ a lot from previous studies. A PLM stated that experience through the years as a project manager and now as a product manager has helped him to see the bigger picture.

All of the PLM consider the interactions cross the different teams and departments to be rather good in Puma. Managers noted that how well the communication is are often depending on the chemistries between the people in the different departments. What is interesting is that some departments/managers felt that interactions between different departments is sometimes considered to be difficult due to mislead or misunderstood information. A manager stated that sometime there can be big difference with a digital illustration of the product and the physical prototype that is being presented to different stakeholders. 30% of the prototypes are therefore directly sent back to the respective departments in the development phase of PLC to renew the prototype. This is according to the manager a waste of time and resources for all involved parties. A manager also mentioned that cross-functional communication can also be challenge with the different time zones, especially around Puma's 360 meetings where they receive a lot of feedbacks on their products from different stakeholders. At the same time most of the managers felt that there has been a big improvement in holding information transparency and keep it available for all involved parties in a product/project, relative to previous product/projects. Anyway, they still see communication as one of Pumas biggest challenges.

With topic about managing tasks and processes in terms of time, the PLMs were quite divided in their answers from "strongly disagree" to "agree". The reason is due to an indirect effect of

information flow. Sometimes a PLM or another manager in a PLC has to wait until another team or person finishes their process/task in order to pursue their own. Managing tasks for a PLM is therefore complex, and he is depended on how other teams are organized in order to managing his/her tasks on time.

The PLMs were quite unanimous about having the tools they need to do their job. However, there is a need in some departments for tools/systems to structure their workflow. At the time the interviewed was held, April-May 2020, managers in different departments saw a potential to have a better visualization of status-co on different projects and products. They saw the opportunity for improvement even stronger due to Covid-19, that made them to do a lot of the day-to-day business at home and that they in a situation like this didn't have all the tools to make the best decision-making.

A red line through interviews regards to the information loop from customers to the PLM is more informal and its challenging to know their true needs, and to get information about how changes on a product affect the customer satisfaction. A number of managers mentioned that most of the data regards to customer satisfaction is based on statistic numbers from retail, and information from an outsourced company (OC) that conducts information regards to customer satisfaction. Some managers mentioned that the outsourced service sometimes get sprinkled away or that it hasn't had a central role in the decision making in the PLC. Most managers stated that the vision and strategy in Puma doesn't change to often and that they lay their focus on a long-term plan. Surprisingly the PLMs are quite divided in their opinion compared to the other managers and what's informed from Puma's financial statements. A PLM said that Puma in the long-term always follow their vision and strategy, but that they change in the short term to meet the trends in the market. He also stated that the problem with short term trends are that they need to predict it 18 months ahead due to the long product cycles. All of the managers including the PLMs also felt that they get enough support from the management and that product management, is highly related to the company's profitability.

5 Analysis

This section consists of 6 sub-chapters that looks into the product management's challenges up against Lean tools and methods. Furthermore, this chapter will highlight the findings which will be linked to the theory presented earlier.

5.1 Challenges vs. Lean methods and tools

In order to evaluate Lean methods and tools up against the challenges in product management, a framework (Table 3) was formed. The challenges that were asked in the survey are listed up in the left column of the table. It has also been added "poor documentation management" since it was a challenge that was mentioned in the interviews. Lareau's 20 keys-approach is also mentioned in the framework since some of the keys and question are highly related. The different Lean methods that were mentioned in the theory chapter (2.1.4 Lean Tools) are listed in the top row of the table. The circles in the table indicates that the specific Lean tool is applicable to better and overcome the specific product management challenge. For some challenges there are several tools that can be utilized in order to increase their profitability.

Table 3 Product management challanges vs- Lean tools & methods

PM Challanges	Keys	VSM	5S	Gemba	Standard Work	A3-reports	Kanban	KPIs	Heijunka	Visual Management	Kaizen
Poor role and responsibility definition	8, 9	●									
No methodology to evaluate work	16, 18							●		●	
Lack of collaboration with customers	20			●				●			
No definite methodology	15				●	●					
Problems in information flow	6	●				●	●				
Difficulties to see the "Big picture"		●					●				
Poor internal interactions	13			●				●			●
Problems in managing tasks and processes	3, 5, 14						●		●		
Lack of tools											●
Poor documentation management	2, 10		●		●						
Visions & strategies change to often											
Lack of support from the management	1, 11										

Value to the consumer is crucial in Lean thinking, and in order to defining the value it's important that the company has clarified the different roles and responsibilities of each member in a value stream (Keyte & Locher, 2004). VSM exposes any duplication of work and has it purpose to better the role definition by addressing tasks and responsibility correctly, so it supports the value creation process. When responsibility is correctly specified, everyone in product management knows the expectation from the management and what to do.

KPIs are utilized in some of Puma's departments, as in marketing were, they work closely with retail with different KPIs on their different brand stores. By defining suitable KPIs in their product management functions as well, they would have a bigger opportunity to learn and improve (Katko, 2014). Through KPIs, the PLMs could also keep track of his/her team performances and if there have been any major difficulties or change in their performance. Visual management is always considerable when making metrics in an organization. Visual KPIs will make it easier and quicker to interpret and provide the team with transparency within the different members (Shimbun, 1995).

Puma's lack of collaboration with its customers in the product management function can be solved by practicing Gemba. The more time the PLMs uses in the customers premises, the more they will learn and understand about the customers' needs and processes (Locher, 2017). KPIs can also be implemented as a motivating tool for the team to have higher activity in arranging visits or video calls with the company's customers. A regional team could have a goal for customer visits quarterly/yearly within the different BUs, and then monitor and check the actual activity with a KPI. The LGM and the PLMs in the different regions and BUs should pay attention to the KPIs and try to find the root cause if the results don't meet its expectations.

By having each product management method and process clearly defined and standardized, the PLMs could focus more on the task and responsibility itself rather than how to do the work (Locher, 2017). The difference in the managers opinions related to the survey could be explained by the variety in years as a PLM. A senior PLM have during his years learnt to handle tasks in their own individual way, and therefore don't see the need for precise process descriptions. The quality of the information will however increase and be more consistent if every PLM are more synchronized with the working methods and making less room for individual working methods, especially with cross-functional teams. If a new concept, a new or improved product feature wants to be proposed, a A3-report could be used as a template.

Information flow and its challenges can be solved by using different types of Lean methods. By VSM, the biggest challenges can be identified and eliminated. Eventually, usage of VSM will result in an enhanced information flow that's of major importance for the PLMs and their processes. It will also clarify the "Big picture" for the PLMs and the other managers in Puma, because when all roles and responsibilities are mapped it will be easier for the different teams to describe the value chain in the different PLC phases. Kanban board can make the managing of the information in a process more visual and a PLM can get better control of the workflow

in the different teams. A3-reports can provide a clear and brief way to share information and can therefore also be a tool to achieve more efficient information flow in product management.

Challenges towards communication and cooperate in cross functional teams can be decreased by implementing Gemba, KPIs and Kaizen events. PLMs should have an interest to gather information about where the customer value is created. Meetings with the functional teams to gather information and feedback should therefore be done frequently. Internal interactions can vary between the different teams, and its therefore important to have these meetings in person than over email or other communication platform. If there is communication or other interaction problems, the product managements KPIs should reflect those issues, so it can be identified and eliminated at an early stage. Some small kaizen events could be arranged in order to solve challenges between the different teams and implement better ways to work cross-functional. Working with some kaizen events would also better the relationship between the different PLMs and the individuals in the different functional teams (Martin & Osterling, 2007).

Tasks and processes can be handled smoothly by implementing Kanban and Heijunka boards. Kanban systems give an easy overview for the PLM to see the future tasks and make a plan on how to use their time and resources for each task in the most efficient way. Through a Kanban system the LGM could overview how well the different PLMs are doing in their BUs and give suggestions and guidelines if needed. Heijunka is designed to level the workload in an office, which can be a helping tool to reach upcoming deadlines and improve the time management.

Lack of specifications or functionalities in current tools used by PLMs to support the decision-making process in the different teams, could be reviewed and further developed or changed through Kaizen. Kaizen strongly encourage innovation in the cross-functional teams, and the kaizen events should therefore also include personnel from the other inbound teams as IT, retail and marketing (Martin & Osterling, 2007). Sorting and organizing the databases of documentation can be improved by implementing 5S technique. Following the 5S-procedure will give the PLMs the possibility to regularly get rid of information that doesn't add any value, and rather focusing on the information that is needed to pursue value to the consumer. Folders, inboxes and files would be reviewed, and information considered as waste would be eliminated (Dennis, 2007).

Most of the challenges with product management that the PLMs and mangers from the inbound teams pinpointed, could be overcome by implementing Lean. Issues were Lean is not the best

practice are potential lack of support from the management and if the company change visions and strategies to often. Usability of the different Lean practices can be reviewed by checking how useful it's up against the challenges. Table 3 show that VSM, Kanban and KPIs have the highest usability rate with three different challenges with product management.

5.2   Lean tools and methods selection

To choose which Lean tools to discuss further, the results in the survey were carefully reviewed in order to sort out the most critical challenges from the PLMs point of view. Together with the survey, Table 3 worked as a supplement in the selection process. Interviews with managers in other inbound teams were included in the selection process with an outside point of view of the biggest challenges the product management are facing and which one that is most urgent. They also contributed with knowledge about previous implementation of some Lean tools and which ones they are using in their day-to-day business. To clarify the possibility for Lean implementation in Puma, every tool was sufficiently reviewed. Due to the limitation of the thesis, every tool couldn't be discussed for implementation even though the tool could be appropriate to use. The figure below (Figure 4.5), show the selected tools that will be further discussed and looked into in the following chapters and subchapters. The rest of this thesis will go into a possible Lean adaption to the product management function in Puma.
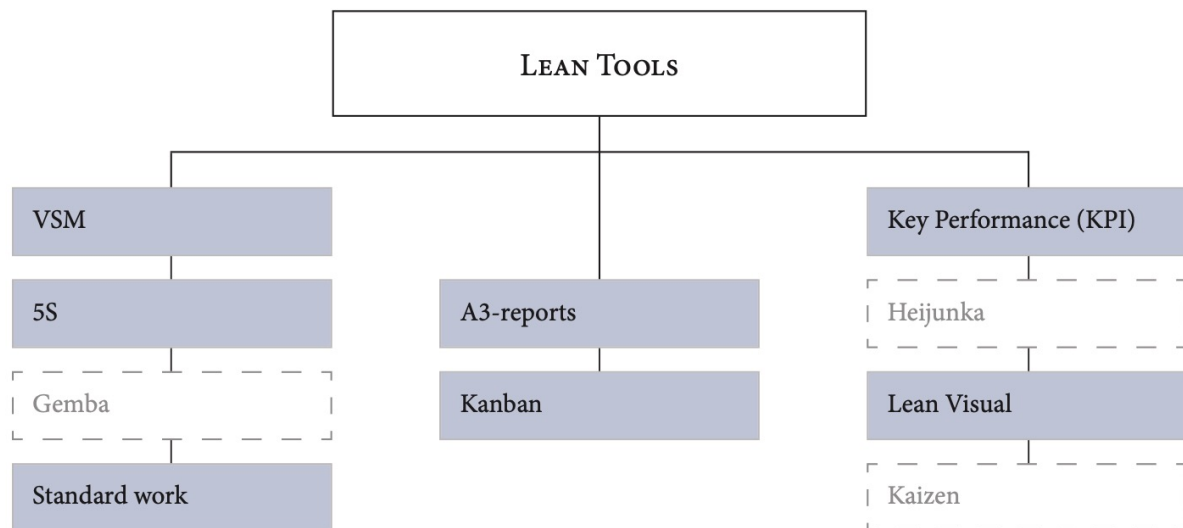

Figure 5.1 Selected Lean tools

As it's important and highly considered to continuously improve the information about the teams' performances, KPIs were chosen to track this trend. There were divided opinions about if there were lack of communication with the customers or not, however a dedicated indicator should be implemented to keep up with the status quo up against their goal for customer communication. KPIs should be used and have aim to encourage for an increase in customer

visits. Visual management should also be implemented to give a more transparent product management function and make the process visible to everyone.

Kanban board is something a few departments in Puma has implemented. They started with post-it stickers and are now in a current digitalization of the Kanban boards. Some managers have expressed their need for boards like Kanban, especially at the time when the interviewed were held with the Covid-19 virus which made most of the workers working from home. Kanban board would help the PLMs in task management and make their workflow more efficient. Since the PLMs have some individual work routines and were every process isn't standardized enough, the Heijunka method to level the workload shouldn't yet be implemented (Luyster & Tapping, 2006).

To visualize the information flow, VSM was chosen as Lean tool to track the information from the consumer to the PLMs. The customers' needs for a product is essential in Lean and for product management, is therefore by interest to find out if these needs and desires reaches the PLMs ears or if the information somewhere stops on its way (Poppendieck & Poppendieck, 2006). A3-reports should be looked into to facilitate better information flow in the department. Some respondents from the interviews pointed out the need for better documentation management, were they have duplicate of documents, struggling to find the right file and that they storage old documents that they don't need anymore. 5S-cycle will be introduced in this case to look further into Puma's databases.

The PLMs from the survey and interview were divided on if Puma had clearly defined product management methods and processes and if it was standardized enough. This thesis will therefore include a standardization method shown through certain tasks.

5.3 Measurement-driven product management

A PLM need a tool to measure their work, despite which organization or department he/she belongs to. KPIs are a tool that can reflect about the success of a PLM and motivate them to set and reach higher goals. In order to achieve this, it's important to have easy and understandable metrics that don't steel to much of the PLM's time. Choosing the right KPIs should therefore be done carefully, to not miss opportunities for developments or problems. To consider the all the aspects of the metrics and its success, it can roughly be divided into three categories (Figure 5.1).
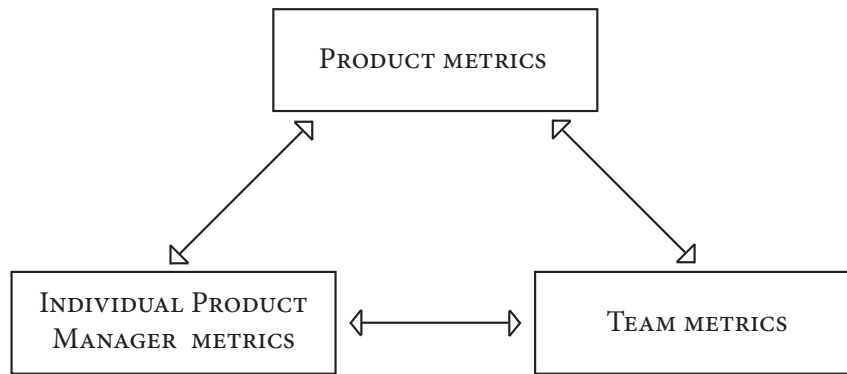
Figure 5.2 Product management metrics

Product metrics can give an insight in product revenue growth, gross margin, reduce in cost, customer satisfaction and average revenue for each sale. Since these kinds of metrics are based on numerous factors, we can't say that PLM can affect the metrics in a direct way. Taken into consideration that it takes time to see the output from a PLM's input, we can say that he/she affect the metrics indirectly. If a department hires a new PLM, this time is considered to be relatively long.

Since product metrics relies on different circumstances and factors, the PLMs should also be evaluated on an individual level or/and through team metrics. Team KPIs should measure factors that drives the product management department to be more efficient and market driven. The team metrics can either be the whole product management department or a set of PLMs within a BU or a region. There isn't any predefined metrics that should be used in product management from a literature point of view, so general performance frameworks are used as base for choosing of the right KPIs.

5.3.1 Choosing KPIs

BSCs framework and perspectives can be used as a baseline for picking the right KPIs in the product management function. During the interviews with different managers I got a scope for what kind of KPIs they used in their departments and why they use them. Based on that knowledge and the interview with the PLM, the figure below shows the chosen KPIs for implementation in product management (Figure 5.2).
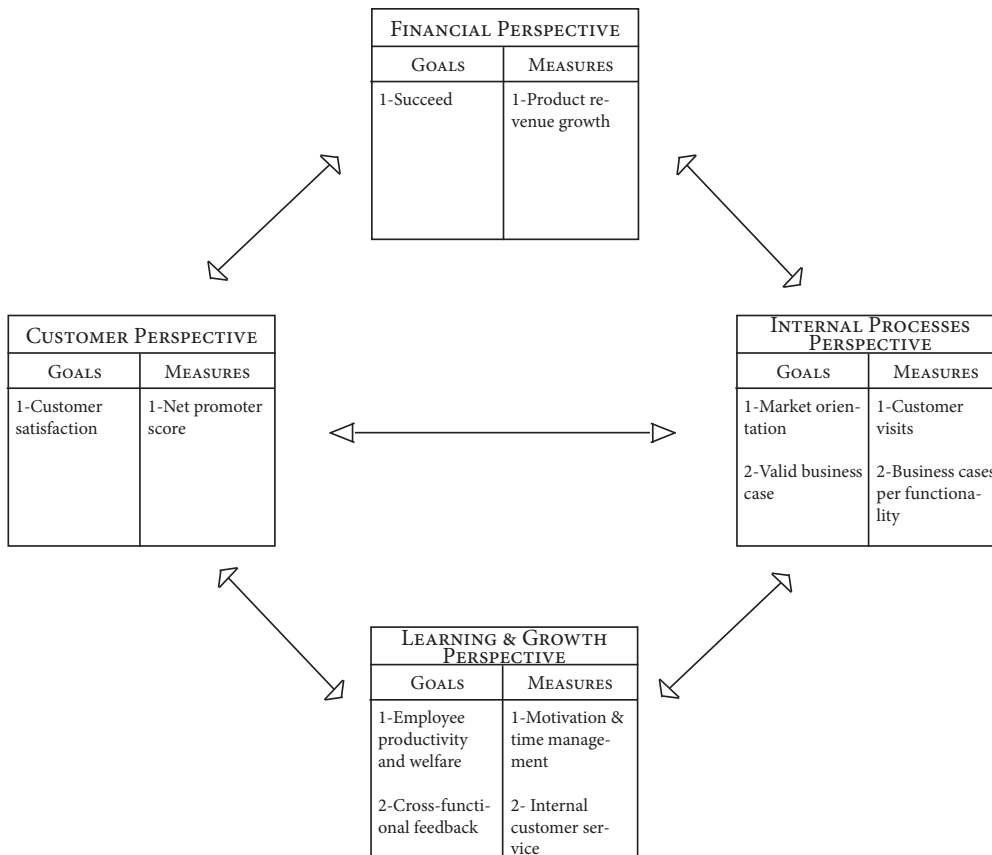
Figure 5.3 Product management's KPIs, grouped to BSC framework

Product revenue growth

For Puma it's important to either increase their revenue growth with constant cost or decrease their costs while at the same time have the same output in order to growth. Product revenue is chosen as a financial KPI in the product management department. As previously stated, the outcome is depended on numerous factors and not directly on the PLM alone. These types of factors can be the global economic situation and competition on the market. Despite the external factors, the KPI should pick up revenue growth based on improvements on the product. In that matter a PLM should also be held accountable for the result. The LGM have the responsibility for the profit and loss in the certain region, but the PLM should have the knowledge and responsibility for his product of product-line. The KPI should be updated monthly.

Customer visits

How well the PLMs know the market and how they are orientated can be indicated through customer visits. This type of KPI pushes the PLM to engage more with the customers than they have previously done. Since some PLMs and managers agreed to the lack of customer interactions, customer visits should be implemented in order to have a more actively look for

customers value. Puma is working with long processes and its therefore crucial to know the market orientation in order to predict the future products. During periods with a lot of potential features but limited amount of resources the PLMs should have the knowledge about the market in order to prioritize and make a decision that its market orientated. Customer visits or video calls should increase little by little and should be recorded once a month.

Business cases per functionality

One of the most important things when a new product is released is to justify its functionalities, why it has been implemented and why other didn't. A PLM needs to understand the cost-benefit ratio in order to do the right decisions to every new product enhancement. A potential overproduction or production with the wrong functionalities can occur when there isn't a real business demand. This will be categorized as waste and will affect other projects/products due to the tied resources in developing a solution with low business criticality. PLMs should therefore always be able to base product decisions on real facts and not on assumptions. The proposed KPI shows how many business cases per product functionality that has been constructed. The goal is that every product enhancement is based on a business case. This KPI is especially important during R&D (Katko, 2014).

Motivation & Time management

This KPI is supposed to catch up the employee's productivity and welfare in the organization. Every week should be summed up though a survey that indicates the PLMs energy, motivation and stress level. It's important to find the right tools to evaluate and measure the employee's motivation as it highly affects the daily operations. To heavy workloads and stress leads to burnouts and in worst case more severe consequences. The PLMs also needs to structure their time during the week and how they divide the time into the different tasks. This is also an important insight in the time management for a PLM, to see what they use their time on and if all activities consume more or less time that it's supposed to.

Internal customer service

In a global company like Puma its essential to have good cross-functional communication with other teams. Other inbound teams such as, marketing, development, merchandising and design should evaluate product management's performances and express openly their challenges and opportunities. The goal by this KPI is to monitor and display customer satisfaction between the teams. It will break down information barriers and give a transparent knowledge about the different functionalities and purpose of the product. The internal customer survey should be

conducted once every quarter, and it should be an easy and quick survey to conduct in order to keep the response rate high.

Net Promoter Score

This KPI represent the customer satisfaction. It's a tool that Puma has been using in several occasions and it's something that they should still pursue. The customers will rate Puma on a scale from 1-10 on how likely they will recommend the company to others. Determined by the answers from the customers, they will be given a specific category; promoters, passively satisfied and detractors. A customer can also give a pinpoint to what he/she thinks should be improved or what is performed well, by dragging a red or green card to a specific area. As mentioned, most of the areas are linked to product management, such as quality, industry, applications, knowledge and design (Geracie, 2010).

When a customer gives a comment or/and places a card in an area, the respective product management will be notified at once. The Idea is that the company through this KPI can follow the amount and trend in green and red cards. If a product management gets a red or green card, it will be sorted and stored in folders for "improvements" and "strength" to later be followed up.

5.3.2 Team dashboard

A layout below shows a possible team dashboard that visualize the product management's KPI on the left side of the table (Table 5.3). It should be visible for the operating product management unit, so everyone has access to the information in the office. Lareau's 20 keys is also included in the dashboard to visualize the current state and trend of the product management department. It's also included to motivate and engage the PLMs in the everyday work. The right-hand side of the dashboard includes a problem-solving and continuous improvement part with a A3- report and a task list. The A3-report is a tool used for problem-solving and the task list should visualize current challenges in the product management function and what to eliminate in order to better the teams KPIs (Appendix 8).
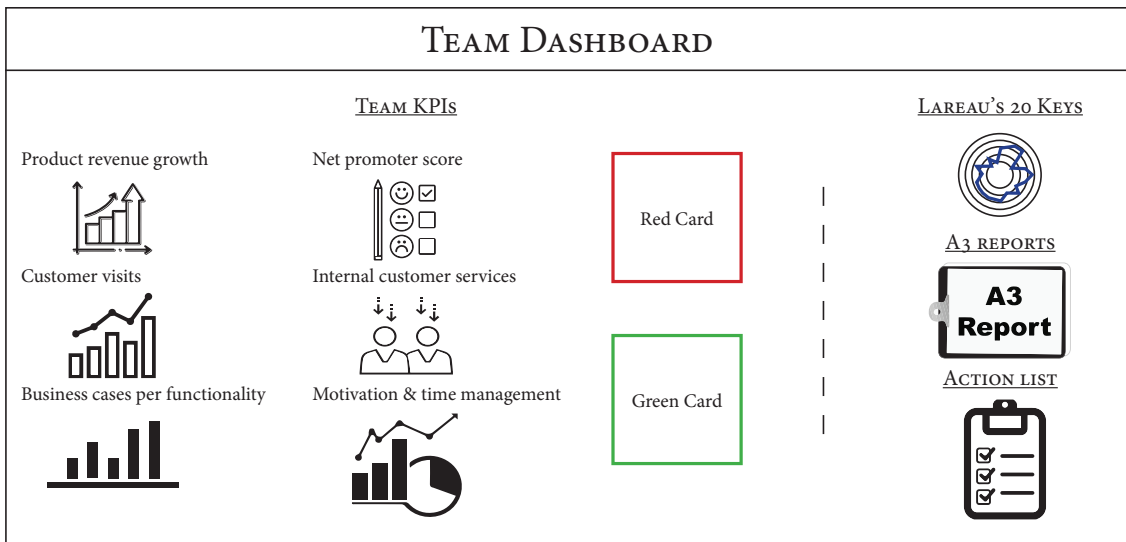
Figure 5.4 Team dashboard in product management

On regular basis the PLMs should gather to discuss performances in the last period and which main factors that have been decisive for the good/bad performances. By having a visualized dashboard in the office, the main goal is to get a measure culture in the office environment. To reach the potential of a team dashboard, it's important that the PLMs keep the dashboard up to date with other functions in the company such as strategy and IT developments. This should be checked and updated if needed, once a year.

5.4   Electronic Kanban board

Kanban board has been practiced for some years in Puma and are now found in an electronic version. It offers the same features as a physical Kanban board and it offers more flexibility and transparency for a global company as Puma. The Kanban board is therefore not tied to a specific location, but can be found and utilized by the ones that needs it. A physical board is limited, were a digital version can add more specific details, comments and details to specific teams. Since everything is digital, they also don't need to be considered to lose information that are written on physical post-it stickers.

Many online companies offer Kanban services, and other online programs have been utilized by companies all over the globe. There was done a review of the top three most used services, before picking "Monday" as an example for implementation in this thesis (Monday, 2020).

5.4.1   Main Table

The implementation of Kanban starts with making a main table with work items for the product management department. Monday starts with the two groups "Things to do" and "Done", in this example there has been changed to; PM Boston, Training & Running, Football and

Lifestyle (Figure 5.4). This example will be based on a potential overlook of the Product management department in the region of America that is based in Boston. It's worth mentioning that you can make many boards within the same organization, so this would be a good board for a total overview as well. A potential concretization would be making a separate board for each BU.
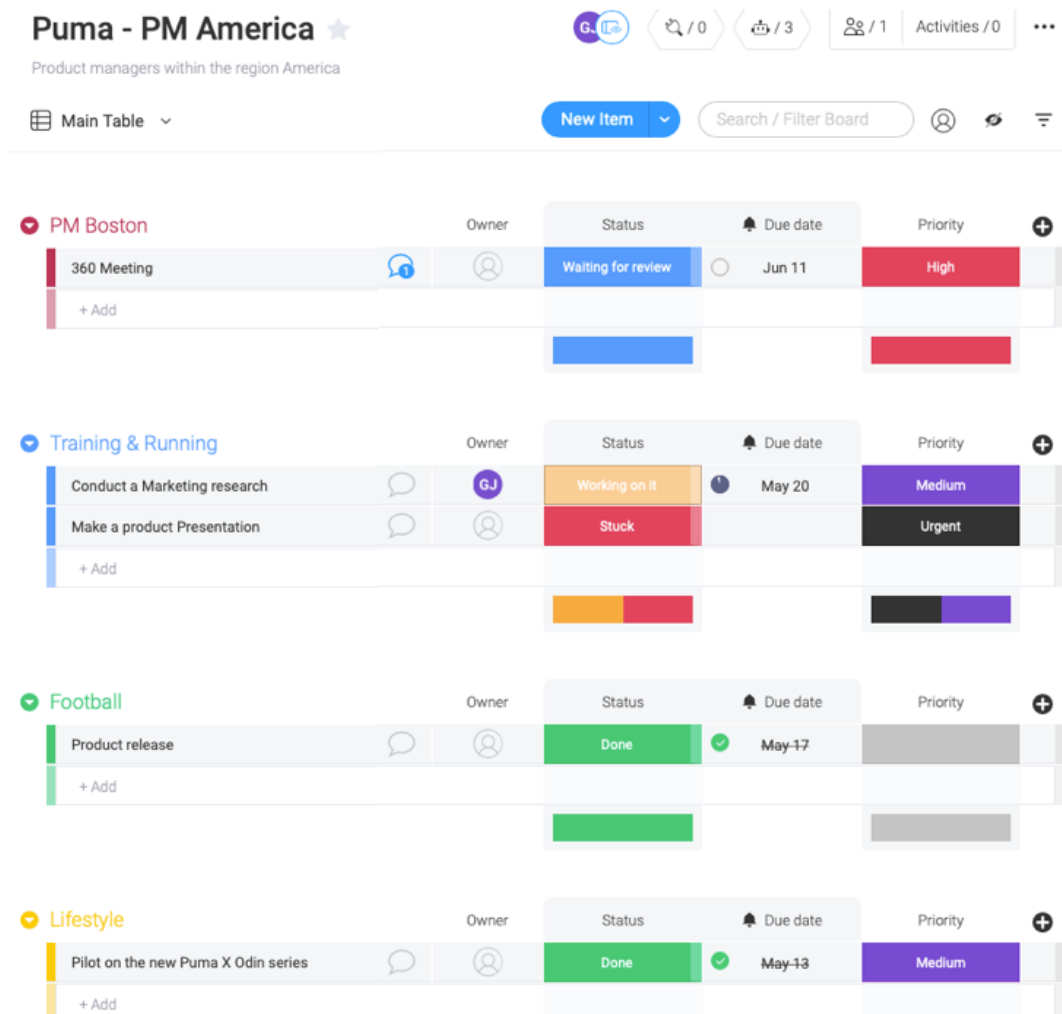

Figure 5.5 Main table "Monday"

Every task has to have one or several owners so it can be tracked and filtered to an individual or team – like marketing or design. Within the different groups you can also give the different work tasks a status like; To do, stuck, done, future or waiting for review. You can also make and manage your own status. Status together with due dates helps the owner of the task to prioritize and schedule their workday and week. By adding other types of column and using the status a team can also make a task cross-functional with others. So, if a task is to make a product presentation, it can be subdivided into the two tasks "graphic illustration" and

"features". By also give a note or key point on how big each task is, a team can better schedule ahead of time.

By defining dependencies with other tasks, a team can specify when a task has to be finished in order to finish another. This also helps the team and the department to pick up frequent failures that are holding up the production and management. After creating a main table for a board, it can be further sorted into different "views" such as Kanban board, timeline, calendar or other preferred visualizations.

5.4.2   Views

Monday's different "views" is designed to help the users to organize, plan and track their everyday activities. The different views can easily be customized to the needs of the user and their preferences. They also have a dashboard in their service that shows the most important information panels. In the dashboard you also have the opportunity to have a cross-functional view over all your different teams, to see the whole workload. The "main table" in the previous chapter can be chosen to show all the upcoming work items into the Kanban board. All of the items that have either been done or accepted can also be displayed in an information panel.

If a team is practicing Kanban, it would be recommended to have this as their main tracking view (Figure 5.5) of all of Monday's different views. The Kanban board displays all the work items for the team in Kanban columns. These columns follow the status from the main table in Monday but can also be customized to use priority or other preferred sorting. As for Kanban board you can also view your own personal Kanban board with your own personal task management or view other teams in other departments to keep up with other products and projects. The Kanban board enables each team member to get a quick and good overview of the product management function and to see and understand the bigger picture.
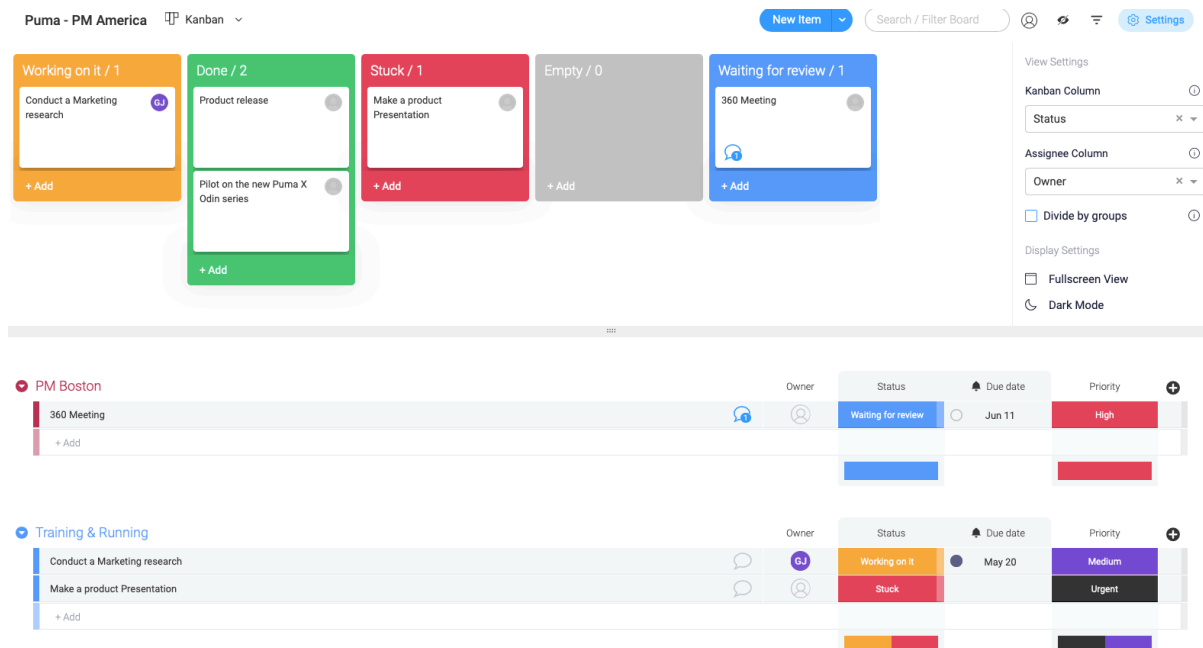
Figure 5.6 Kanban board (Monday)

Each team member can customize the display of Kanban boards with what's called, split view. The Kanban board will then be in the upper row of the screen with the main table in the lower row. The new window with the main table will give a more specific overview with details including due dates, priority, owners and recent updates on the work item. As with the physical Kanban boards, a team can set limitation to the quantity of work items in each column. A team member will get notified if the work in progress limit (WIP) have been reached. An old work item has to be removed or be done/approved in order to add a new work task. The limitation can be set of the team chief and is set to focus on the right tasks and to ensure continuous flow in the product management function.

In addition to the Kanban board every work item has a room for sharing files, asks questions, add a note and give updates on the item. These specifications make it easy for the whole team to keep up with the last version of a file, see answer and questions regards to the task and to follow updates from the other team members. Monday's services are also integrated into Microsoft teams and Outlook. These are two of the main communication platforms in Puma and to have it integrated with the Kanban board makes the whole communication more transparent and easier to keep up to date with.
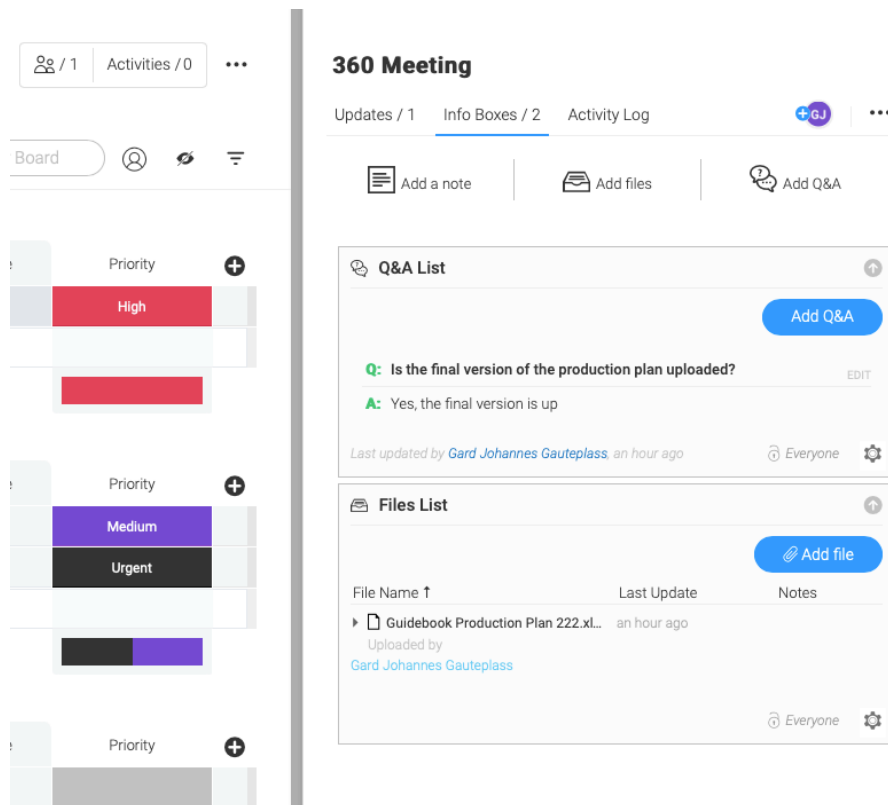
Figure 5.7 Task information panel

After implementing the electric Kanban board, PLMs should have a better understanding and be more capable of managing their day-to-day work life with tasks and processes better (Vatalaro & Taylor, 2005). But this will also help other teams in marketing and design to keep up with developments, discussions and in general to see the big picture with the product. They all will be able to see which tasks that are of importance and where in the development phases the tasks are in. Whit limitation set to WIP, the PLMs avoid an unproductive degree of multi-tasking. The Kanban board will also help the PLMs to see the whole PLC, and not from idea to launch – that some of the managers stated in the interview (Zahid, 2013). Lastly. the information- and communication flow over cross-functional work relations should be enhanced by implementing Kanban boards in Puma's functional teams.

5.5   Standard work

One of the first thing that the PLM mentioned should be more standardized were templates for certain product management tasks. To increase the information quality and the consistency, a long-term goal should be that every product manager uses the same templates, so they avoid duplication of work (Locher, 2017). Each template should provide information of what kind of information that is needed and where to put it. When templates have been used for a while in

the product management, they can also take into consideration the time perspective to handle certain templates.

When standardization of templates for different processes has been completed, a strongly advisements form the management to use them is important. All templates should be organized and stored in a shared database so it's easy for the PLMs to find them. The templates should be frequently reviewed and updated with changes in the business requirements, where the old version is deleted from the shared database. In the following subchapters, two standardized templates will be presented to implement in the product management function.

5.5.1   Lean canvas

Lean Canvas is something Ash Maurya adapted from Alex Osterwalder's canvas. Both business models give an easy and visualized overview of a business plan and how to write it. The Canvas is only a one-page summary, so it forces the PLM to be accurate and precise in their choice of words to describe and capture the essence of the product in an exact way. Since the business model can be summed up on a one-page, it makes it easier to communicate the information in a more efficient way.

Lean canvas model is based on nine boxes, were four of them have been changed compared to Maurya's original business model. Saavalainen changed the boxes to give the canvas a more problem-focused approach, and since it's used as a comparison the changes will also be applied in this thesis. The added boxes are; Problem, Solution, Key Metrics and Unfair Advantage. The four added boxes replaced; Customer Relationship, Key Activities, Key Resources and Key Partners.
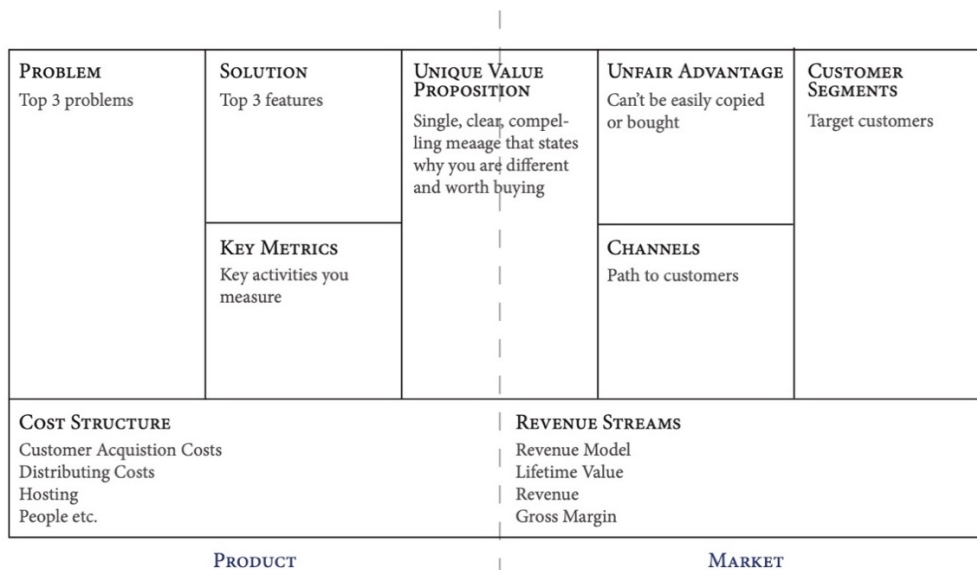

PROBLEM	SOLUTION	UNIQUE VALUE PROPOSITION	UNFAIR ADVANTAGE	CUSTOMER SEGMENTS
Top 3 problems	Top 3 features	Single, clear, compelling meaage that states why you are different and worth buying	Can't be easily copied or bought	Target customers
	KEY METRICS		CHANNELS	
	Key activities you measure		Path to customers	

COST STRUCTURE	REVENUE STREAMS
Customer Acquistion Costs	Revenue Model
Distributing Costs	Lifetime Value
Hosting	Revenue
People etc.	Gross Margin

PRODUCT   MARKET

Figure 5.8 Lean canvas (Maurya, 2012; Saavalainen, 2015)

The figure is divided into product and marketing, with a well-balanced layout with equal number of boxes in both segments.

The problem box wants to shortly describe the three main problems with existing products in the market that the new product wants to solve. Maurya mention that many companies fail with this purpose where they use a big amount of money, time and resources that aren't problem orientated.

To define top three features should be rather easy when a problem is defined and described. These features are the core of the solution and a must in order to meet the customers' needs. Key metrics will give the right tools to measure the success of the solution.

5.5.2 Competitor product comparison

In a competitive market with many competitors it's important that the PLMs know how to position themselves against their competitors with competitive products in order to succeed. When a PLM is compering their products against their competitors, he/she should have a better understanding of what specifications and features that is needed in order to supply the market with a competitive product. A comparison process can be highly detailed with technical data and therefore not so popular among all the users. However, an analysis of their products up against the competitors has to be detailed in order to give the PLMs, engineers, sales team and other functional teams the right information at the right time.

A comparison template should be online where the information can be organized consistently. The process should give a comprehensive insight in how the different products from the competitors differ from Puma's, where it starts with giving basic information about both products. It should be followed up by a thorough comparison and give an insight in Puma's biggest strengths over the competitor's product. The whole process ends with a summary of the products' top selling points and a frame size difference. The template is consistent and standardized and should therefore be utilized in all of Puma's different regions and BUs to have transparent communication between the different teams and departments.

5.6 Information flow

As a PLM they constantly collect, analyze and distribute information between each other and different operating functions. It's of importance that the information is up to date, has good quality, and are reliable in the product management function. The PLMs doesn't only create and use information, but they are also highly relied on when they distribute the information to the peoples and teams that needs it. For teams to operate as efficiently as they can and to make

smart business decisions, the PLMs needs to have a good understanding of what information to provide, at what time and in which form they need it (Vatalaro & Taylor, 2005; Liker, 2004).

Through the following two subchapters (5.4.1 and 5.4.2) the information flow in Puma through value stream mapping (VSM) and the 5S procedure will be further described. How efficient the information systems are at current state will be evaluated in order to get a better understanding of the improvements and changes that should be seen through in the future. The information flow and the advantages it gives when executed well is undoubtedly a competitive advantage and something that Puma should strive towards to gain maximum value.

5.6.1   Value stream mapping

To visualize the information from customer to PLMs in Puma, VSM was decided as a tool to look further into. A current situation of the value stream was sketched after the interview with the PLM in order to capture the information chain about customer information. Additional info about the chain was obtained by interviewing with the other managers.

The figure below states the current value stream (Figure 5.8) of information flow from the customer through an outsourced company (OC) towards the PLM. There is also supposed to be a backwards information flow from the PLM to the customer. The icons for value stream is according to the literature and the map has been made through Lucidchart (Keyte & Locher, 2004; Lucidchart, 2020). The explanation of the figures follows in Appendix 4.
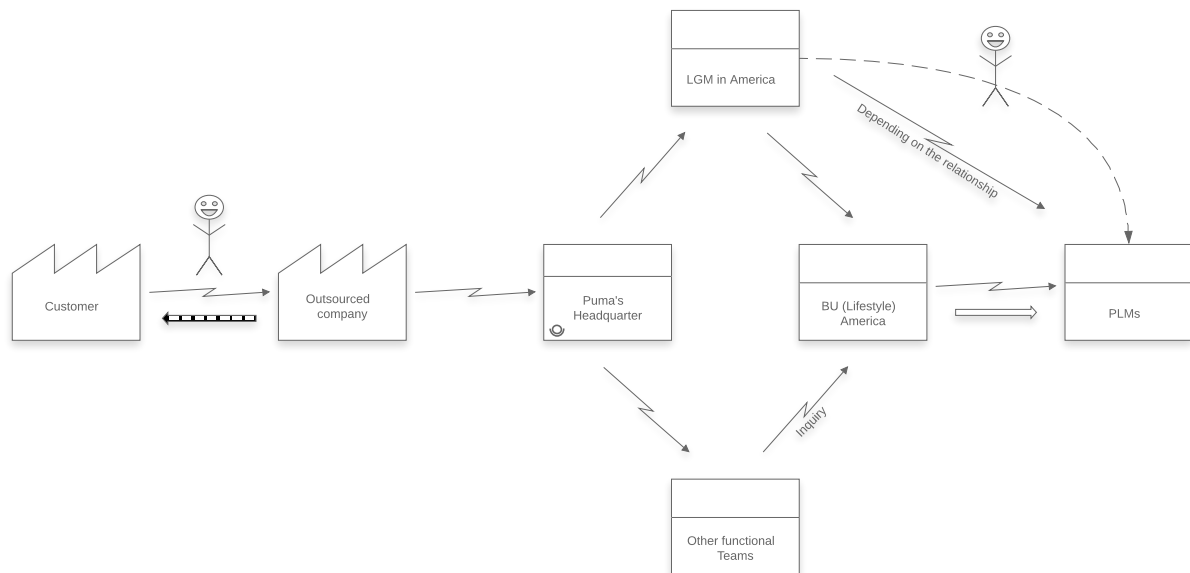

Figure 5.9 Current VSM

The OC contact the customer for information about demography, geography and their overall satisfaction and experience with Puma's products. These two parties often have a good

relationship were the consultant knows how to approach the customer in order to get their honest meaning and where he feels comfortable to give it. The received information will be handed over to Puma, where they at the Head Quarter (HQ) will organize and sort the information. Depending on the information, HQ will send the information further to the respective regions. The LGM has further knowledge to know which of the BU the information is important for and which it isn't. He/she is more familiar with the products and has a more particular knowledge than the guys at HQ. Customer information is also shared with the different functional teams at HQ, these teams also have communication with the regional teams, so if the information doesn't find its way through the LGM, it's a second way of communication. Some LGM have good relationship with the different PLMs in their region and depending on the information, they might contact the PLM for direct delivery of the information. Otherwise, it will go through as general information in the BU which in this example is Lifestyle.

By having an OC to gather customer information, Puma doesn't need full extend of customer knowledge in all of its value stream. The information received by the PLM can vary from all to a fraction of the gathered information, depending on how it's filtered and shared through the value stream. Since its limited how frequent the OC can conduct information, and when some of the information is lost on its way through the value stream, the PLMs can lose some good business opportunities. Let's imagine that there is as customer that wants to run a marathon in Sahara, and he will choose either Puma or a competitor for a supplier of shoes. The shoes need to meet a special requirement – tolerant high temperatures without effecting the other functionalities of the product. This kind of information would in most cases reach Puma in other ways, but for the cause of the example let's say it goes through the OC. This kind of information is so specific, that it can easily get lost in filtration of the data before reaching the PLM.

The PLM might haven't thought about this kind of specifications and features for a new shoe. In cases where the business opportunities are big, it can in some cases be profitable to add the required features to the existing products to satisfy the customer's needs. Long information chain filtered business opportunities and as a result potential cash flow loss. If the LGM has a sense for a business opportunity when he/she sees one, he/she can directly inform the respective PLM and suggest the potential opportunity. However, this is depended on good communication and relationship between the two.

Under is a red information flow that should be prioritized and strengthened in order to maximises as many business opportunities as possible. The future VSM emphasises the importance of communication between customer, OC, HQ, LGM and PLM. The goal is that the PLMs can gain maximum value of the provided customer information in their business decision making.
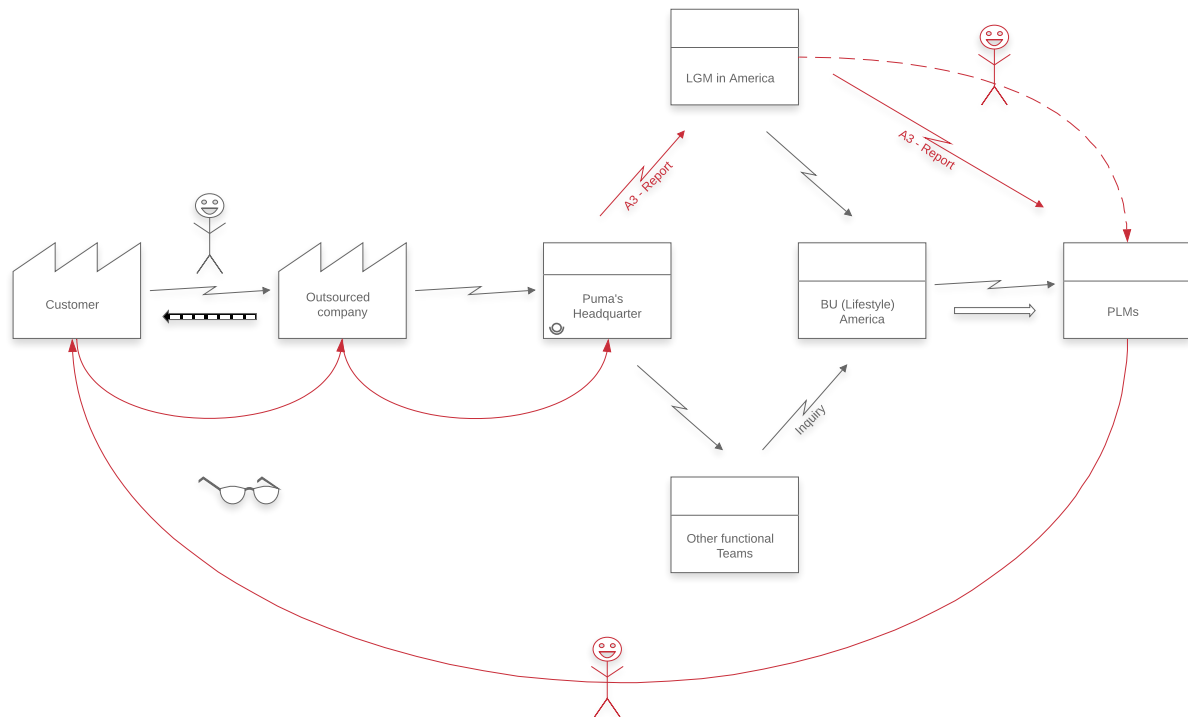

Figure 5.10 Potential future VSM

The HQ has an important role in communication with the OC since they are the one that communicate with the customers. They should give a brief of what kind of information that are of importance and to tell an easy but in-depth summary of the business current status quo. This can be of importance for the OC since it can affect what they are looking for in the customers, regarding the questions to be asked. A proposed A3-report would train and encourage the employees at HQ to look and seek for new business opportunities. An A3-report also compiles a lot of information into a small sheet, so you can filter information that is NVA and eases the flow of importance towards the PLM (Dennis, 2007).

After the ones at HQ has filled in the A3-report, the LGM would have a closer look at it. A LGM can work as a filter between the HQ and the PLM. It's an important filter to make sure that the PLM doesn't drown in too many business proposals, but only prioritize the most important ones. After reviewing the proposal, the PLM could have a video conference or even visit the customer to get a more first-hand information about the business case.

5.6.2 Lean document management and 5S

Mangers have mentioned there need for a better filing system to obtain and use information. Now days they contain files that are not up to date that they don't use in their processes, duplication and prototypes of the final file version. The managers specially mentioned this as a challenge together with standardization, where there are several files with the same information in another format.

The purpose of Lean document management is to provide the amount of information needed at the right time to the right people (Locher, 2017). This will free a lot of space in Puma's database, but it will also help and make it easier for the PLMs to find the requested and wanted file. For a manager's point of view there are many files that would need revising, and with their lack of purpose they aren't used any longer in Puma's processes. This type of files could be old meeting reports and shared files with no importance. A typical problem with saving files is also to have several folders that are empty or with only a couple of files stored. Moreover, some managers have seen personal files from previous PLMs or managers still being stored in their database after several years since their last appearance in Puma.

In a big company it's easy to end up with multiple folders and different databases to share files when they want to separate data end user access. However, with multiple databases and sharing platforms, companies need a lot of resources to handled them. In most cases companies seldom have this kind of resources and NVA documents will most likely be provided and stored. The same problem does some managers see in Puma, where they don't know where a filed is stored and shared. The 5S method will help to improve the document management by sorting and organizing their files and folders (Liker, 2004). For Puma to better their efficiency in information searching process, they should perform the following 5 steps;

1. **Seiri** – look through all the files and folders in company's database. The purpose is to only store files of importance and that the product management need in order to create value in their process – everything else is considered as waste and should be deleted. This process also includes the PLMs own desktop and libraries with files and folders. An essential part of this point is to critically evaluate if all of Puma's databases is necessary or if some of them could be removed and united.

2. **Seiton** – Organize all of PLMs files and folders. In the database there should be a specific location that all the PMS knows, for information. Names to files and folders should be descriptive enough, so that all of the users will be able to get a glance of what kind of content and information they can expect. "marketing" and "other documents"

are examples of general titles that should be avoided as a name to a folder. The number of subfolders should also be limited, to endure efficiency and easy access to information.

3. **Seiso** – In general, clean up all unnecessary data. The PLMs should twice a month go through their folders and subfolders and clean unnecessary data. Moreover, they should also keep their e-mail inboxes neat and tidy. There should be a culture for deleting e-mails that doesn't need any action or re-reading, so that the PLMs doesn't save up a workload to do in the future.

4. **Seiketsu** – find a standardization process for the first 3Ss. This should include a retention guide on how to name a file/folder and how to structure and organize it in Puma's database. The process should also include a cleaning plan for the databases and give examples and recommendations for which files, e-mails and folders to delete.

5. **Shitsuke** – That all the PLMs follow all of the different Ss isn't certain. The last S wants therefore to review and maintain the standards and to look after that everyone is following the procedure as they should. In every quarter the management should hold an audit to make sure that the information stays efficient in the searching process.

Puma use different databases and platforms to share files and information. The document management can therefore be rather challenging, where it takes up a lot of time resources to organize and sort all of their files and folders. However, this process can be seen as a one-time investment where the efficiency for information searching should have been drastically improved. After the databases have been organized and sorted, the document management only require maintenance. By implementing the 5S method in the product management, the end goal is that all of their files are up to date, accurate and where no duplications exist (Liker, 2004). It requires that every PLMs participate and that they start to implement Lean thinking in their everyday work life.

5.7 Summary of Lean implementation

The table below compromises all the Lean methods that have been covered in this chapter. The table includes different stages, description and goals so the management can systematically climb the stairs to reduce waste and increase their overall performance in product management. It takes time to transform the product management into a perfected Lean department, so it's ultimately up to Puma to adapt the methods into their management function.

Table 4 Summary Lean implementation

STAGE	STEP	DESCRIPTION	GOAL
1	KPIs	Set up a team dashboard. Implement and further develope the KPIs. Frequently meetings to discuss further improvement with the product management in front of the team board.	Key 13 level 3 Key 16 level 2 Key 18 level 1 Key 20 level 1
1	Kanban board	Pick a Kanban system for the product management department and collect feedback. Should have a mutual systems within all the functional parties in Puma	Find the long term seloution for Kanban systems in Puma
1	Lean Canvas	Introduce Lean Canvas to Product management	Key 15 level 3
1	Competitor template	Make or improve a template for the PLMs	Key 15 level 3
1	5S method	Implement 5S method into all the functional parties in product management, and have quartly audits to ensure efficent and fluent information search.	Key 2 level 4
1	Roles and responsibility	Define a PLMs roles and responsibilities through VSM and group brainstorming.	Key 8 level 2 Key 9 level 3
1	A3-Report	Encourage more efficient information flow, and focus on knowledge sharing through the value stream	Maximise potential business cases
2	Common KPIs	Make a team dashboard for all of the different regions and BUs. Evolve the current KPIs through kaizen events.	Key 13 level 3 Key 16 level 2 Key 18 level 1 Key 20 level 1
2	Kanban board	Implement Kanban thinking into all of Puma's departements and functions.	Key 3 level 4
2	VSM	Better the first value stream, and slowly start to look at other value stream within product management.	Clarify processes and enhance information flow

6 Results, limitations and research implications

This chapter aims to answer the RQs that were raised in the beginning of this thesis (Chapter 6.1), followed by limitations and research implications (Chapter 6.2).

6.1 Results of findings

Previous studies mapped the implementation of Lean practices in product management from a PM/PLM's perspective. By interviewing managers from other functional teams in the organization, this study gives a broader picture of how Lean practices will affect the organization's profitability.

The main RQ of this thesis was;

How do Puma apply Lean tools and methods for product management purposes to improve profitability?

To answer this question a deeper look into Puma's product management problematics was necessary to eventually address Lean methods. The purpose was to get an insight point of view on the challenges, but also from a more outside point of view with managers from other functional teams. Information about the challanges were gathered from a Finnish study, conducted in 2012, and an electronic article (280 GROUP, 2015; Maglyas, Nikula, & Smolander, 2012). Managers and PLMs in Puma were then interviewed to discover if the same challenges occurred in their product management function. The table below (Table 5) summarize the challenges in product management and that can be overcome by using Lean tools and methods.

Table 5 Challanges with product management Puma

Product Management challanges	Challanges in Puma according to PLM	Challanges in Puma according to managers
Poor role and responsibility definition		X
No methodology to eveluate work		
Lack of collaboration with customers	X	X
No definite methodology	X	
Problems in information flow	X	X
Difficulties to see the big picture		X
Poor internal interactions		X
Problems in managing tasks and processes	X	X
Lack of tools		
Visions and strategies change to often	X	
Lack of support from the management		
Poor documentation management	X	X

Through interviews and the survey's result, Puma can see tendency to battle with approximately half of the same challenges. As in the survey that was used for comparison, poor documentation was added to the listening over challenges, since it was pointed out in the interviews with the managers. Compared to the two previous studies the added interviews with other managers from other functional teams are important to acknowledge. The sample size of PM/PLM is smaller due to the limitations of this thesis which can to some extend distort the result.

Additionally, there was conducted a Lareau's 20 keys approach in Puma to seek the current Lean maturity in their product management function. The result was according to the assessment, excellent, when it's compared to other traditionally run organization. The result 53/100 tells them that they are over halfway to becoming a world-class organization, and that they still have a way to go. However, they are doing a good job when taking into consideration that over half of the keys were scored with grade 3 or higher.

When a deeper understanding of Puma's product management needs was gained, several Lean practices were looked into and evaluated. The chosen Lean tools were chosen with recognition to better the profitability in the organization, but also with the intuition to improve the office processes. The answer to the first RQ is presented in the table below (Table 6).

Table 6 Answer to RQ1; Can Lean tools and methods for product management purposes be applied for improving profitability?

LEAN TOOLS AND METHODS	USABILITY RATE	IMPLEMENTATION
Value stream mapping	3	X
Kanban	3	X
Key Performance Indicator (KPI)	3	X
Standard work	2	X
A3-Report	2	X
Gemba	2	
Kaizen events	2	
Heijunka	1	
Visual management	1	X
5S	1	X

The usability rate indicates how many product managements challenges Lean practise can address. Three Lean practises were the most suitable; VSM, Kanban and KPI – these were also implemented in this thesis. Research at the time indicates that all of the challenges in Puma can be overcome by using Lean, except that vision and strategies changes to often. Anyhow, this

is an important component in the business to consider achieving a motivated and innovative work environment.

Puma's information flow was further looked into through VSM and 5S procedure. VSM was used to visualize the information flow from the customer through an OC and finally to the PLM. This flow was chosen to investigate since Puma is operating with long product cycles and are depending on making the right customer predictions 18 months ahead. It's an important value stream in how profitable Puma are as a whole, and therefore something that should be prioritized. The proposed value stream emphasises the importance of sharing knowledge between the different parties in the value stream. A3-reports was suggested to facilitate the big amount of information in a structured way. They will make products according to the customer needs and increase the profitability by lowering the lead time and reducing the cost. Poor documentation management were suggested improved by a 5S-plan with their database.

6 KPIs were studied and further looked into to be implemented in Puma's product management function. Since the managers and PLMs acknowledge there could be a challenge to collaborate with the customer, some KPIs were addressed to better this situation by having a deeper understanding of the market needs so that the PM/PLM can address more profitable business decisions. A team dashboard is suggested to be implemented to better the visual management and reducing the lead time, which provide transparency and visibility within the department as well as Puma as a whole. Additional to the KPIs, there is suggested to implement A3-reports in the dashboard to identify and eliminate problems that affects the management negatively.

Kanban board is something Puma already has experience within some departments, it was therefore decided to further improve the electronic version. Standardization were a big wish for some of the interviewees. Standardization of templates that the PLM use for certain and important tasks were therefore looked into with a Lean canvas model and a competitor comparison. The end goal is that all of the PLMs use the same templates to avoid duplicated work and enhance a more productive and efficient office environment. Time perspective with standard work isn't looked further into in the templates but can be added later on to the templates.

How to measure the implementation of Lean in product management function were the second RQ (RQ2). The PDCA-cycle has an important role in implementation of Lean. It's therefore important that Puma pay attention to method when implementing each Lean tool. The step *check* should give the management a meaning of how efficient the implementation has been,

how to further develop the tools and methods and how it affects the organization's profitability. An evaluation can be made by conducting Laureus 20 keys-assessment, but the PLMs should also be interviewed in order to compare the results.
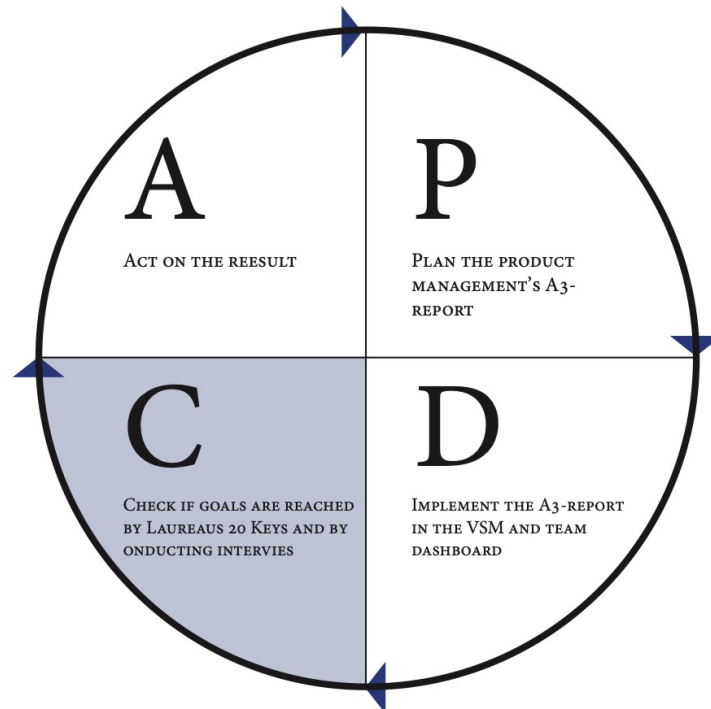

Figure 6.1 Measuring Lean implementation through PDCA-cycle

People tend to by default to be against or have problems with changes that affect their working routines. People tends to ask question about why changes are made and what's wrong with the way it is. To have an internal education about Lean thinking is therefore advisable and also asked for from the PLMs in Puma. If every PLM has knowledge about the tools and methods that's being implemented, it's also easier to be committed to the changes and understand the benefits of it. Culture changes can be the hardest and biggest challenge Puma will face, and it will take some time to change the course. PLMs should therefore try to implement Lean practice as a part of their department's everyday work routine, instead of some extra activity from the actual work.

Lean is a never-ending process were companies strives for continuous improvement. Puma has a great starting point from Laureus's 20 keys perspective, but also by reaching a world-class organization score, they should never stop moving forward. By frequently going "waste-hunting" and having short kaizen events, Puma should focus on building a work-culture within their organization of continuous improvement.

6.2   Limitations

During the time working with this thesis, some limitations has come to light that can be improved. The biggest limitation is that only one PLM was interviewed which reduce the reliability of the data. This reduction limits the possibility to generalize the result. The interviews were aimed to a wide range of managers and I got a high level of conducted interviews. Nonetheless, there was some managers that didn't get interviewed as planned and, in this regard, it could be interesting to perform a dropout analysis to find out if there was any systematicity in the waiver. According to Jacobsen is not a total apostasy that make the results uncertain, but a systematic waiver (Jacobsen, 2015). The main challenge with this kind of research is that researcher needs prior knowledge about the respondents, which I didn't have in this case.

This thesis stands above the usual drawbacks by collecting data through surveys. An example would be that respondents don't have the opportunity to resolve ambiguities, which may cause them to answer randomly. With a combination of qualitative and quantitative data one will however be able to increase the content validity. Interviews can include dialog with the different respondents about the different challenges they face, and in this way avoid misunderstanding that weakens the content validity. This improved content validity is being weakened by the fact that only 1 of the totals of 5 PLMs were interviewed.

By having a survey with fixed answer options, rating from strongly disagree to strongly agree, it will be a chance that the respondents will responds in a way that make Puma to be more knowledgeable. Furthermore, it's difficult to know how the product management challenges actually occur in reality. For example, when PLMs are quite divided in their opinions about customer communication, it's hard to know how this is in the reality. A better design can be achieved by having more questions in the survey.

The adaption to the Lean framework depends on the top management's direction, since they hold the authority to design the systems according to their strategic initiative. Nevertheless, a manger in a top-down organization has no control over the performance measurement systems. This thesis is thereby based on an organic culture as well as lateral coordination where the value is driven by customers perspectives where in mechanistic culture is useless. Moreover, if the implementation of Lean isn't followed through the whole product management function and later on the whole organization, the implementation will have less or in worst case, no relevance. It can rather cause goal incongruence and dysfunctional behavior in a cross-functional work environment.

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Some of the interviewees didn't have any knowledge about Lean thinking, but they had some knowledge about other processes as Scrum. There wasn't conducted any second time interview that would give possibilities to go more in-dept to the challenges Puma is facing. Due to the limitations of the thesis, there wasn't any room for a pilot in the company to implement some tools and methods and to see the effect it could have had. The thesis is therefore based on a fully theoretical perspective.

Another limitation is that the PLMs were the only one to conduct the survey about product management challenges, it would be interesting if the other managers also conducted this survey to see if some splits in the results would find place.

6.3   Research implications

The thesis is based on a given time in Puma's organization. It can therefore be interesting to do longitudinal research. By conducting time series in Puma's product management function, it will be possible to track and see the development over time. It will give basis to analysis if Lean have better the efficiency in the product management function and if it has increased their profitability. There would also be of interest to see if all of the tools were implemented, if any, and to find out what the cause of it.

The poor documentation management would be interesting to look further and deeper into their different databases, and to conduct a more thorough 5S analysis.

To review the differences between the PLMs and managers, a more comprehensive study could be conducted. There could also be applicable to do multiple case studies about Lean implementation in Puma's different departments and to see if there are any differences. This would give a more elaborate and explanatory answer from all involved parties in the organization

7 Conclusion

There hasn't been conducted a lot of research about implementation of Lean practices in product management function. The purpose of thesis was to explore how Puma could affect their profitability by implementing Lean tools and methods into their office environment, product management.

A broad understanding of challenges with product management were formed by reviewing an article and a previous study. Based on those findings, a PLM and managers in other functional teams were interviewed to get an in-dept as well as broad understanding on the challenges. The interviews combined with a short survey revealed that Puma's PLMs were struggling with over half of the challenges that were found in previous research. There was a divided opinion on what kind of challenge the product management are facing in the two groups, PLMs and managers. They mutually agreed on the challenges; Collaboration with the customers, problems in information flow and managing tasks and processes. Through the interviews there were also revealed the lack of documentation management.

Lean practice has in addition to the production floor been recognized to improve office processes. Ten tools and methods were studied and evaluated up against the challenges Puma is facing, and the result was that most of the challenges could be overcome by practicing Lean. Based on a thorough analysis and the usability rate, the most suitable Lean practices are; VSM, Kanban, KPIs, A3-report, 5S, Standard Work and Visual Lean.

Through Lean implementation it's recommended that Puma will follow the PDCA-cycle to measure the results from their implementation and to see possible improvements for further solutions. Evaluation can be done by interview the PLMs and to repeat Lareau's 20 keys-assessment in order to see if the desired goals have been reached and improved.

The challenges Puma is facing in product management combined with a more customer orientated business than market, makes it hard to be productive and to predict customers' needs in their long product cycle. It's a PM/PLM job to make the right business decisions on a daily, weekly and monthly basis in order to keep the product profitable throughout the whole PLC. Lean thinking will increase their profitability by lowering the lead time, shorten their processes, meet the customers- and co-workers needs with exact quality, quantity and at the right time.

The biggest challenge Puma and other companies could face in a potential transformation is to convince white-collar workers to utilize the new practices and processes. The management has

an important task to encourage and support in the transformation process, so that new terms and concepts will be adapted in the employees own daily work. Lean should be implemented in all of Puma's functional teams and departments to increase the overall efficiency, productivity and profitability in the company.

I hope this thesis will contribute to more research on lean thinking in an office environment, and that the contribution leads to greater knowledge and interest in the subject in Puma and other manufacturing companies. If companies would improve their profitability in product management, the internal knowledge about Lean thinking should be increased. In particular, working methods, documentation management, market orientation, standardization and visualization are some key findings in my thesis that should be improved to better the overall profitability. Manufacturing companies should have an indebt understanding of their product management, before they choose and implement Lean tools and methods. To this context, it would be naive to think that similar companies in the same market means equal practice. Generally, companies should focus more on their own customers and inbound teams as this brings out their differentiation to the market and their biggest operational opportunity to seek profitability.

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Appendices

Appendix 1:

Lareau's 20-Keys approach assessment

A key point for the organization before moving into Lean or further down the scale, is to know where their business is compared to the world-class standard. Lareau introduce through his book 20 key-approaches that is specifically designed for an office environment

Each of the twenty keys includes five performance levels, ranked from lowest (one) to highest (five).

* Obligatorisk

1. Key 1 - Leadership *

○ 1 - The work group has no defined leadership structure and there is no clear leader. No work area vision or goals exist.

○ 2 - The work group has recognizes the group leader, and a work group vision is defined. there is little worker participation making.

○ 3 - A plan to achieve objectives is developed. Associates have input to decisions, but the leader gives final approval.

○ 4 - Everyone in the work group understands the plan to achieve objectives. Decisions are made by group consensus facilitated by the leader whose main role is that of a coach.

○ 5 - Everyone understands the vision, the plan, and road map to get there. Associates are empowered to make decisions to achieve objectives. The leader/coach provides guidance when needed and his/her input is always appropriate and welcomed.

2. Key 2 - Documentation Management *

○ 1 - There is no central location for work group documentation. Documentation is missing, redundant, and/or out-of-date. Associates maintain personal storage areas. There is on consistent process for document handling.

○ 2 - Elimination of outdated, redundant, and unnecessary documentation has begun. A storage area for shared documents has been established but is not always used

○ 3 - No personal storage areas for work group documentation remain. Occasionally, documents are still misplaced, duplicated, and/or lost.

○ 4 - All associates in the work group use the central area for work group documents and very seldom is a document misplaced, and/or found to be out-of-date, or in two places at once.

○ 5 - Documents are always where they are supposed to be, and they are up-to-date and accurate. All documents are quickly available to any work group member on demand.

5. Key 5 - Time Management *

○ 1 - Time management is not viewed as an important tool in the work group. Overtime and/or long days are normal.

○ 2 - The work group realizes that time management is important. An efficient, consistent, and standard time management (ECSTM) system is beginning to be used in the work group.

○ 3 - All work group members use an ECSTM system with few problems. Work group members can access each other's schedules and plans. Overtime and long days occur no more than once a week.

○ 4 - All work group members use an ECSTM system expertly. Long days are rare and time is rarely wasted due to poor time management.

○ 5 - It is easy for all personell at the site to quickly access appropriate portions of the work group members' schedules and plans. All work group members feel as if their time is always effectively used.

6. Key 6 - Workplace Arrangement *

○ 1 - Workplace layout just "happens", with no planning or thought as to work flow, storage, traffic patterns, and person-to-person communication

○ 2 - The work group begins to explore possible areas of improvement in the physical layout og their area. Work group members construct a diagram of the current layout and begin to think about alternatives.

○ 3 - The work area arrangement has been modified to improve work flow and communications. There are still some issues that have not been resolved but they are being explored.

○ 4 - Work group equipment is placed to support key processes and work flow. Workspace is flexible and highly mobile. The work group can reconfigure their area when necessary.

○ 5 - All floor space is fully utilized to maximum effectiveness. The work group members belive that they have a near-perfect arrangement to be productive whiteout wasted space.

3. Key 3 - Deadlines and commitments *

○ 1 - Deadlines are not defined, documented, communicated, or measured. Commitments are regularly missed whiteout accountability.

○ 2 - The work group begins to document and measure deadlines and commitments. Awareness of the need to meet commitments is built. Commitments and deadlines are still regularly missed.

○ 3 - The work group implements a structured system to mange deadlines. Commitments and deadlines are usually met, but sometimes deadlines and commitments, some major, are still missed.

○ 4 - The work group is skilled in using a structured system to manage deadlines. Ownership of every aspect of managing commitments is defined and internal/external customer satisfaction is met through consistent on-time delivery.

○ 5 - Firm schedules are always set and are never missed. Internal and external customers have full confidence that delivery will be on time, every time.

4. Key 4 - Competence *

○ 1 - There may be general descriptions of functional and technical (F/T) competence requirements in the area, but they are not communicated. There is no process in place for competence improvement.

○ 2 - The work group defines F/T requirements for itself. Associates begin to improve current skill sets through training and education.

○ 3 - The work group begins measuring competence against best practices in their industry/field. All work group members attend at least three relevant inside/outside technical workshops each year.

○ 4 - Work group F/T competence is on par with the best in the industry/field. The area associates have the ability to teach F/T skills to other associates.

○ 5 - Some members of the work group conduct workshops in their industry/field and at least one is published as an F/T innovator in the industry/field.

7. Key 7 - Skill Flexibility *

○ 1 - Cross training is not tracked, and/or it is done informally, and/or it is done only when a problem arises.

○ 2 - The work group begins to define tasks and begins to display skill flexibility charts in the work area.

○ 3 - Skill flexibility for all appropriate tasks in the work group is tracked and displayed visually. Goals for work group flexibility are established. At least 50% of the work group members are skilled in three critical tasks.

○ 4 - The work group has training plans for each member's skill development. Every task can be done by at least two work group members. At least 75% of the work group members can do all tasks in the work group. The work group is beginning to learn tasks of up/downstream work groups.

○ 5 - Except for recent hires, all work group members can do 90% of the work group's tasks. Members visually track tasks of immediately adjacent up/downstream groups and can do 50% of the tasks.

8. Key 8 - Roles and Responsibilities *

○ 1 - Roles and responsibilities (R&R) are left to evolve on their own or are assumed on the basis of past work practices.

○ 2 - A member of management, whiteout any discussion, specifies R&R for each work group member.

○ 3 - The supervisor or leader of the work group meets individually with each group member to jointly develop the member's specific R&R.

○ 4 - Through group brainstorming and discussion by the entire group, each person's specific R&R are negotiated and defined in detail.

○ 5 - Level 4 above and all R&R are continually monitored and modified as required through discussion among the work group members.

9. Key 9 - Ownership and Objectives *

○ 1 - There is no clear ownership of objectives in the work group, and/or objectives continually change and evolve on their own.

○ 2 - The work group identifies and displays short-term (daily and weekly) goals with milestones, completion dates, and accountabilities (MCDA). Medium-term goals (monthly and quarterly) are being added to the visual display.

○ 3 - Short- and medium-term goals are displayed and tracked with MCDA. The group quickly deals with occasional missed goals. Plan changes create some problems.

○ 4 - Short-, medium-, and long-term (annual to several years) goals are tracked and displayed with MCDA. The work group is totally accountable for objective attainment and adjusting to changes. Almost no problem exist.

○ 5 - The work group has full ownership for all objectives, handles changes easily, and adjust proactively to potential problems. Objectives are always met.

10. Key 10 - Cleaning and Organizing *

○ 1 - Open space and storage is cluttered with excess and used equipment, supplies, and papers. There is visible grime, obvious trash (old newspapers, copy machine rejects, etc.), and dust in the work area.

○ 2 - A formalized plan to improve C&O is being developed. Obvious trash is removed by the and of each day by work group members. Unused equipment and out-of-date materials, supplies, and files (MSF) have been removed.

○ 3 - C&O performances is assessed at least twice per week with checklists and visually displayed and reviewed results. MSF are labeled in both the work area and storage areas

○ 4 - Work group members conduct C&O activities during the day. Audits show near-perfect C&O performance. Only rarely is an item out of place. Members begin to plan for optimum placement of MSF.

○ 5 - 99,99% C&O performances exists. Work area MSF are stored, labeled, and arranged for optimum ease of use.

13. Key 13 - Internal Customer Service *

○ 1. The quality of service to other areas is poor and there are no measurement system and improvement plans in place

○ 2. Work group asks other areas to measure their performance. Issues are identified and displayed for improvement planning. Many problems still exist.

○ 3. Metrics are in place and displayed to formally monitor customer satisfaction. Continuous improvement plans are defined to address root causes of the most serious problems. Small problems occur regularly but are dealt with quickly.

○ 4. All major and many minor root causes of customer dissatisfaction have been eliminated. Almost all potential problems have been proactively eliminated.

○ 5. Customers' satisfaction is near perfect. Satisfaction metrics are consistently at the very top.

14. Key 14 - Priority Management *

○ 1. The work group functions via crisis management. Environment is purely reactionary as members are only fighting fires

○ 2. Work group priorities are imposed on the group. There is some discussion within the group as to how they must meet the priorities, but most decisions are made by some level of management.

○ 3. There is a good level of work group discussion involved in deciding how to meet imposed priorities. The work group begins to set many of its own priorities and develops and displays plans to manage them.

○ 4. The work group begins to take ownership of all of its priorities and develops and displays plans for them. Management reviews and approves the work group's plans but seldom makes any changes.

○ 5. The work groups develops all of its own priorities after being given broader organization priorities. The work group priorities are 100% in line with organization priorities and need no management approval.

15. Key 15 - Work Standards *

○ 1 - There are few standardized work procedures (step-by-step instructions, flowcharts, lists og needed data/forms, approximate time required) that are known by and/or accepted by the work group.

○ 2 - All work group members are familiar with what a good work standard would look like. A few activities have work standards that all group members have reviewed.

○ 3 - 80% of the work group's primary tasks have work standards and they are used in cross-training activities.

○ 4 - All crtical activities and most minor activities (95% of the group's tasks) have standards that the entire work group helped develop, understand, and uses.

○ 5 - Standards for all work group activities have been established and the work group continually strives to improve them.

11. Key 11 - Daily Work Group Meetings *

○ 1 - No daily work group meetings (DWGM) are held or they are only held when there is special news (for example, merger, reorganization, and so on)

○ 2 - DWGM have begun but are not attended by all work group members. Some meetings are missed and some meetings seem pointless.

○ 3 - DWGM are held almost every day and are attended by most work group members. Efforts are underway to make the DWGM relevant to all group members.

○ 4 - DWGM are held every day, whiteout exception. Attendance is 100% and most work group members participate actively.

○ 5 - Every work group member views the DWGM as an essential and critical element of the job.

12. Key 12 - Problem Solving *

○ 1 - The work group has few or no "team tools" that everyone understands for manipulating data and/or identifying/solving problems.

○ 2 - A majority of the work group members understand a few tools but they are applied inconsistently. A plan is developed to identify necessary tools and teach them to the work group.

○ 3 - All work group members understand a small set of basic problem-solving tools. The proper tools are used for significant problems, but there is still much "subjective" analysis of minor problems.

○ 4 - All work group members understand and apply appropriate tools for all problem solving. Tool usage skills are tracked on cross-training displays.

○ 5 - The work group members (except new hires) are expert in all of the basic tools that might be used in the work group. Additional skill development plans are always in process.

16. Key 16 - Primary Visual Display *

○ 1 - There is no primary visual display (PVD), which is a large display in the work area showing the work group's status, metrics, tasks, priorities, and so on, and/or the PVD is not updated regularly.

○ 2 - The work group has a PVD and it displays information that is important to the group. the information that is displayed is kept up-to-date most (80&) of the time.

○ 3 - The work group PVD is comprehensive and has been extensively improved by work group members. The information is almost always up-to-date (95% of the time).

○ 4 - The PVD contains almost every critical element that the work group must track. Work group members have most of the responsibility for keeping the PVD up-to-date. It is current better than 99% of the time

○ 5 - The PVD display and the performances it tracks are viewed by the work group as the heart and soul of their pride and commitment.

17. Key 17 - Time Control & Commitment *

○ 1 - Work group members don't always arrive promptly and there is considerable (5% to 10%) absenteeism on occasion. Turnover in the work group is high.

○ 2 - Attendance is charted and displayed.

○ 3 - Work group members generally arrive on time. People will work late when it is required unless personal commitments are pressing. Absenteeism is less than 3%

○ 4 - Work group members always arrive on time. Absenteeism, is less than 2%. Annual turnover (not counting promotions) is less than 5%.

○ 5 - Workers are prompt, enthusiastic, and willing to work late on those rare occasions when it is required. Absenteeism is less than 1% and turnover less than 3%

18. Key 18 - Metrics & Measurement *

○ 1 - There is little or no measurement of critical processes whiten the work group

○ 2 - Initial efforts are underway to identify key performances indicators (KPI) for critical processes in the work group.

○ 3 - The work group tracks and splays KPI for all critical processes and has developed and displayed plans for improvements.

○ 4 - The work Group tracks and displays the KPI of all major and most minor processes as well as progress against plans for improvements.

○ 5 - The KPI of all appropriate processes are monitored on a continuous basis and corrective action is seamlessly integrated into the work group's daily activities.

Appendix 2:

Interview guide PUMA

Opening;

- Could you present yourself?
- What is your current job at Puma?

General;

- When did you get the job?
- What do you consider to be the most important roles and tasks in your current position?
- How do you look at your different roles that you possess?

Product Management;

- What where your thoughts about Product Management, the first time you heard about it?
- Do you mean that Product Management have been and still is profitable and utilized by the organization? Why/Why not?
- Do you think that Product Manager's focus to much on specific phases in the Product-life cycle (PLC), then the whole?
- Have you seen any negative effects with Product Management?
- What do you think is the biggest problem with product management?
- Have past experienced changed your meanings about Product Management?
- Do you think that Product Management is highly related to the organization's profitability?

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Lean Thinking;

- When did you hear about Lean Thinking the first time, and what are your thoughts about it?
- Which Lean methods do you use in Puma to reduce waste?
- Have you seen any improvement after implementing Lean?
- Have you met any challenges with lean?
- What are the main advantages by implementing Lean thinking in Product Management from your perspective?
- Which type of waste do you see in your department?
- Which Lean methods would you implement in Product Management?
- Do you see room for further improvement, and have your thoughts about Lean changed since your first notice?
- Do you think that Lean tools and methods in Product Management would increase the organization's profitability?

Closing;

- Something you think I should have asked that I didn't?

Appendix 3:

Challenges with Product Management

* Obligatorisk

1. I'm a *

    | Velg svaret ditt | ⌄ |

2. I have been a product manager/product-line manager for how many years: *

    | Velg svaret ditt | ⌄ |

3. Challenges with Product Management *

	Strongly Disagree	Disagree	Agree	Strongly Agree
Product manager's role and responsibilities are poorly defined	○	○	○	○
I can't evaluate/measure my work performance	○	○	○	○
I don't collaborate enough with the customers to really know their needs	○	○	○	○
Product management methods and processes are not clearly defined	○	○	○	○
Information flow is one of the problem areas in Product management	○	○	○	○

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I have difficulties to describe the product's PLC from the concept to the launching phase	○	○	○	○
I think that the product managers have poor internal interactions with the other functional teams	○	○	○	○
I have difficulties to manage the tasks and processes in terms of time	○	○	○	○
I don't have enough tools in order to do my job	○	○	○	○
I think that the Product management's visions and strategies change too often	○	○	○	○
I don't get enough support from the management	○	○	○	○
I think that Product Management is highly related to the organization's profitability	○	○	○	○

4. Do you have any comments to the survey or the study?
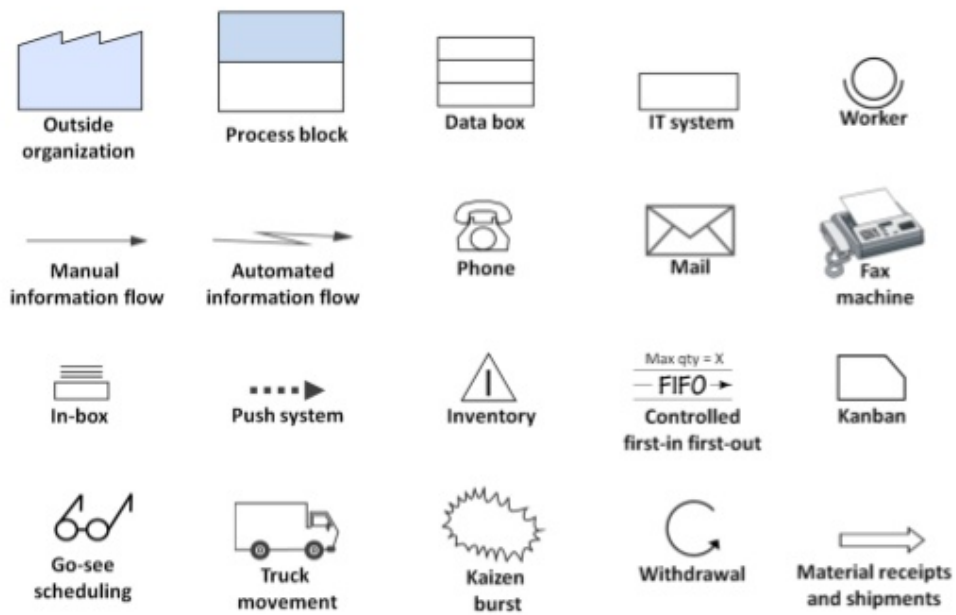
> Skriv inn svaret

5. If you would like a copy of the my master thesis, please leave your e-mail bellow:

> Skriv inn svaret

Send

Appendix 4:

Common value stream mapping icons

Outside organization	Process block	Data box	IT system	Worker
Manual information flow	Automated information flow	Phone	Mail	Fax machine
In-box	Push system	Inventory	Max qty = X FIFO → Controlled first-in first-out	Kanban
Go-see scheduling	Truck movement	Kaizen burst	Withdrawal	Material receipts and shipments

(The Karen Martin Group, Inc, 2013)

The "person" that is added in the VSM in this thesis represents "verbal communication".

Appendix 5:

Dear Product managers and Product-line Managers,

My name is Gard Johannes Gauteplass and I'm a master student at the Norwegian University of Science and Technology. This spring I'm writing my master thesis, and I have been so fortunate to get the possibility to write about Puma.

The purpose of this thesis is to study the opportunity to apply Lean practices to the product management function. Since management plays an important role in the company's success story, it's important to have it functioning as effectively as possible. The goal is to find those Lean tools and methods that fit the best into the needs for product management.

The empirical data will be collected by conducting interviews and through a short survey in order to gain an in-depth understanding of the research questions. The research questions are as following;

- *Which Lean tools and methods fit the best to the needs of product management? (RQ1.)*
- *How do Puma measure the results of Lean implementation in the product management function? (RQ2.)*

I anticipate that the survey will take approximately 1-2 minutes. Any information collected which is commercially sensitive will be treated in an appropriate manner and confidentiality will be respected at the utmost. So the different individual will in no way be identified in the report.

If you would like to receive an electronic version of the thesis – please let me know by e-mail or in the end of the survey.

Link; https://forms.office.com/Pages/ResponsePage.aspx?
id=DQSIkWdsW0yxEjajBLZtrQAAAAAAAAAAAAMAANPyxY9URjRVOUE0Q0hVUFczQ0c4NFY3NEJITlBPTS4u

Thanks in advance for your help, I appreciate your participation!

With best regards
Gard Johannes Gauteplass
Master student - NTNU
gardjo@online.no
Tel: +47 469 56 838
gardgauteplass.com

PS. If you have any questions related to the study, feel free to email or call me

Appendix 6:

Dear Teamhead & Managers,

My name is Gard Johannes Gauteplass and I'm a master student at the Norwegian University of Science and Technology. This spring I'm writing my master thesis, and I have been so fortunate to get the possibility to write about Puma.

The purpose of this thesis is to study the opportunity to apply Lean practices to the management function which happens in an office environment. Since management plays an important role in the company's success story, it's important to have it functioning as effectively as possible. The goal is to find those Lean tools and methods that fit the best into the needs in an office environment.

The empirical data will be collected by conducting interviews and through a survey in order to gain an in-depth understanding of the problematics/questions.

All analyzes will be carried out at the aggregate level, so that different individual in no way could be identified in the report.

30 minutes will be set for each interview, and I am announcing now that it will be recorded. It will be deleted when the study is complete, but let me know if this is not desirable.

I would prefer to have the interviews the following weeks after Easter (week 16 or 17), but let me know which date that suits you the best. I would also like to send out an interview guide in advance, so you have the chance to reflect before the interview.

If you would like to receive an electronic version of the thesis – please let me know.

Thanks in advance for your help, I appreciate your participation!

With best regards
Gard Johannes Gauteplass
Master student - NTNU
gardjo@online.no
Tel: +47 469 56 838
gardgauteplass.com

PS. If you have any questions related to the study, feel free to email or call me

Appendix 7:

Dear Managers,

Hope you all had a great Easter holiday!

A week ago, you received an invitation to an interview about Lean thinking.
I can't see that I have received a response from you, and hope this reminder finds you. The interview will take 30-40 minutes. Please let me know when it suits you the best. Preferred would be in the end of this week, or in next week.

If you would like an electronic version of the thesis you can let me know by email or in the interview.

All analyzes will be carried out at the aggregate level, so that different persons in no way could be identified in the report. Contact information will be deleted when the study is completed.

I really appreciate your help!

With best regards
Gard Johannes Gauteplass
gardjo@online.no
Tel: +47 469 56 838
Gauteplass Photography
gardgauteplass.com

PS. If you have any questions related to the study, feel free to email me or call

A3-Report

Owner:

Challenge

Why are this proposal written? What is the problem to be solved?

Current state

What is the current state?

Be specific: What is observed? What is the difference between current and target state?

Future state and hazards

What ideas have you come up with? Which challenges can or will occur?

Which alternatives do you have?

Action Plan

How will you reach the future state? How will you adapt and choose between alternative solutions?

What is the final recommendation?

This section should evolve over time as you get deeper understanding for the problem.

Measure - KPI

How will you measure the results? What will you do and why?

Gard Johannes Gauteplass

LEAN PRODUCT MANAGEMENT

NTNU

Norwegian University of
Science and Technology