# EMPLOYEE PERSPECTIVES ON LEAN IMPLEMENTATION IN THE FINNISH MANUFACTURING SECTOR

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ABSTRACT

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Lean has become a widely adopted management strategy in today's ever-increasingly competitive industrial landscape which helps organizations to improve operational efficiency, eliminate waste, and enhance value creation for the customer. While different organizations across different industries have adopted Lean practice, limited attention has been given to the human aspect involved in Lean, especially, employee perception and engagement towards Lean initiatives which plays a critical role in determining whether Lean implementation will be a success or failure. In addition, academic research on this phenomenon is also limited, particularly in the Finnish context. This study bridges that gap by investigating Lean implementation from the employees' point of view within the Finnish manufacturing sector.

Drawing on a qualitative research approach using semi-structured interviews, this thesis addresses the primary driving forces behind the development of positive employee perception and barriers hindering positive employee perception of Lean implementation in the Finnish manufacturing sector. Therefore, this research seeks to better understand how employees in the Finnish manufacturing sector actually experience and perceive the application of Lean methodology.

The findings reveal that factors such as awareness of Lean methodology, support from the management, transparent communication, employee empowerment, and training drive positive employee perception, while poor communication, inadequate follow-through, limited involvement, lack of support, and resistance to change play as obstacles to generate positive employee perception towards the Lean implementation. The study contributes valuable insights to both academia and industry by reinforcing the significance of employee perception in sustaining Lean initiatives.

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ABBREVIATIONS

| | |
|---|---|
| 3D | 3-Dimentional |
| AI | Artificial Intelligence |
| CEO | Chief Executive Officer |
| HFD | Henry Ford model |
| JIT | Just-in-Time |
| LIPS | Lean in Public Sector |
| LMI | Lean Management Institute |
| MIT | Massachusetts Institute of Technology |
| QFT | Quality Function Deployment |
| TPM | Total Productive Maintenance |
| TPS | Toyota Production System |
| TWI | Training within Industry |
| VM | Visual Management |
| VSM | Value Stream Mapping |

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# 1 Introduction

The concept of Lean management has rapidly spread in the business world, due to the capitative idea behind the word Lean which is “achieving more with less”. Many industries and companies were mesmerized by this idea since everybody wants to achieve more revenue with the least amount of resources they can use. The book, The Machine that Changed the World published by James Womack and Daniel Jones have done a great job bringing this idea and the term Lean to a wider public where they explained Lean as a means of achieving more with less (James Womack et al., 1990). Lean has evolved over time, from a cost-reduction and productivity-enhancing tool to a philosophy, which transforms a whole organization across its cross functions.

The concept of Lean came to life back in the late 1940s when Toyota put the foundations of Lean manufacturing having the aim of reducing processes that do not bring value to the end product. Then it has been used in various companies with the idea of creating more value with fewer resources. Effective implementation of Lean management tools helps organizations to increase overall productivity by minimizing waste, streamlining workflows and highlighting important factors that create more value to the customer. This whole approach results in strengthening the organization’s competitive advantage. Lean itself is an evolving methodology in a continuous manner as continuous improvement is a major pillar of Lean Management. The principles of Lean management have significantly changed since the 1950s to adapt to diverse organizational cultures and changing demands. Improving efficiency, customer value and employees' skills have become the main goals while eliminating all types of waste during this transformation (Staats & Upton, 2011).

Employee involvement plays a vital role when implementing Lean practices in any organization. Essentially, it can be introduced as a must for receiving expected outcomes and to execute as a successful initiative. According to (Hobbs, 2011), Organizational management needs to recognize which employees will most likely be optimistic about the change, which employees will be doubtful about it, and which employees will resist it, before Lean implementation. (John Drew et al., 2004) state that the employees and their mindsets highly influence the success of Lean implementation. In that case, carrying out studies and building up satisfactory literature around employee participation in Lean implementation is

vital. A positive organizational culture is essential for successful Lean implementation that values employee engagement, open communication and continuous improvement. This has been realized by organizations ever since the Lean concept was initially developed in the automobile industry. Toyota who is the owner of TPS which later evolved to today's Lean philosophy recognized the importance of understanding their employees and that is the main reason behind the success they gained through Lean implementation. What they have learned through that understanding motivated them to continuously improve and reach perfection, which is one of the major elements and the final goal of Lean implementation. As organizations started initiating Lean principles, they recognized that employee is not just an extension of the production line but an important contributor to company management. This highlights the importance of having a clear focus on employee learning and inserting motivating elements into the production environment which can shape employee mindsets towards the desired direction. This explains the need for a deeper understanding and exploration of employees' genuine perspectives on Lean implementation.

## 1.1 Purpose of the research

According to (Hobbs, 2011), before the implementation of Lean practices, organizational management needs to recognize which employees will respond positively and which employees will respond negatively towards change. Employees and their mindsets highly influence the success of Lean implementation (John Drew et al., 2004). In that case, carrying out studies and building up satisfactory literature around employee participation in Lean implementation is really important. (P. Hines et al., 2011; Losonci et al., 2011) state that there is a lack of empirical data related to the importance of employees' behavioural attitudes in Lean implementation. Most studies have been carried out focusing the operational and financial performance measurements instead of employees' behavioural impact. When it comes to the Finnish context it is far worse. Anyhow, further research is still necessary to explore the employee perspectives on Lean implementation while focusing on the required factors for creating employee motivation. It is important to understand the sources of employee motivation and how they perceive Lean implementation in order to effectively motivate employees through changes that are associated with Lean execution. Furthermore, it is essential to adopt an efficient and effective learning culture aligned with employees' preferences in order to foster continuous employee upskilling and adaptability. This is a

crucial element in Lean implementation that helps change management in the process. Finland has a clear gap in understanding how employees perceive the implementation of Lean practices while identifying associated challenges, risks, benefits, and opportunities. Advancing knowledge in this context enable Finnish scholars and professionals to add value specially to the manufacturing industry. This new knowledge can improve operations excellence, human resource management, and social aspects.

In the process of transformation under the Lean philosophy, the manufacturing industry faces challenges and finds opportunities, especially related to employee perspectives. Organizations in the Finnish manufacturing sector aim to increase efficiency, eliminate waste, and improve overall productivity by implementing Lean practices. But their successful implementation depends on active employee engagement, adaptability upon changes, and a positive organizational culture. However, many Finnish manufacturing firms face difficulties in executing Lean methodologies and receive expected outcomes due to various reasons such as existing conventional workflows, employee resistance to change, skill gaps, and concerns about job security. This opens a need to investigate the elements around this matter since ineffective implementation may result in reduced workforce morale and operational inefficiencies instead of all positive outcomes which are expected to achieve through Lean initiatives. This research aims to identify the driving forces behind active employee engagement in adopting Lean practices and explore the key barriers that hinder the positive employee perception towards the Lean implementation within the Finnish manufacturing sector.

This research is based on qualitative data that was primarily collected from employees in the Finish manufacturing sector and this research aims to understand how employees feel about Lean and how they perceive practices in Lean management. Implementing Lean in Finnish Manufacturing companies has become vastly popular in recent years. Even though, Lean management has been extensively studied in an industrial setting for various years, still there are only few studies carried out exploring Lean implementation in the Finnish manufacturing sector, specifically focusing the viewpoint of employees. This study will provide new insight into a territory which is not fairly explored in the world of Lean.

## 1.2 Research question & objectives

This study on "Employee perspectives on Lean implementation in the Finnish manufacturing sector" will address the following key research question:

**How do employees in the Finnish manufacturing sector perceive the implementation of Lean practices?**

When taking a wholistic view, considering the enabling factors (strengths and opportunities) and challenges (weaknesses and threats) is a commonly used management framework (Hill et al., 2016) applied in various settings. Based on this approach, this study established two research objectives in line with the research question.

***Objective 1:*** *Finding the driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector.*

***Objective 2:*** *Finding the barriers to generate positive employee perception towards Lean implementation in the Finnish manufacturing sector.*

## 1.3 Scope of the research

Defining the research scope is really important when designing research. Several factors have been considered for defining the domain or boundaries of this research during the research design. Geographically this study is limited to Finland, ensuring that all primary data collection is carried out within the Finnish manufacturing sector. Hence the study is focused on the Finnish manufacturing sector which is a key contributor to the national economy and employment in Finland. Hence sectors outside of manufacturing, such as services and retail, are excluded from the research. The reason for focusing on this specific context is because the research aims to generate insights relevant to Finland's industrial landscape.

Furthermore, this study specifically looks into the Lean implementation from an employee's viewpoint. Hence this study does not carry any insights into the other organizational functions such as finance, sales, marketing, and human resources directly and they remain outside of the research scope unless they directly impact Lean practices.

## 1.4 Structure of the research

The thesis is organized into six main chapters as follows.

Chapter 1, the Introduction, outlines the background, purpose, research questions and objectives, as well as the scope and structure of the research. It sets the context by elaborating the significance of Lean implementation from an employee's viewpoint in the Finnish manufacturing sector.

Chapter 2, the literature review, provides a comprehensive understanding of areas such as the concept of Lean, Lean principles and tools, and its evolution in manufacturing. It also discusses employee roles, motivational drivers, and challenges in Lean implementation, with references to empirical studies and theoretical frameworks.

Chapter 3, the methodology, offers an overview of the research methodology and a brief introduction to the study area and the data used. Saunder's Research Onion is referenced to develop the overall research methodology. Additionally, this chapter provides an understanding of the ethical considerations, reliability, and validity of the research.

Chapter 4, the analysis and results, presents a thematic analysis of interview data aligned with the research objectives. It begins with the initial data processing activities and explains insights derived from the interviews. This chapter delves into both driving forces and barriers associated with the positive employee perceptions towards Lean implementation in the Finnish manufacturing sector. The analysis is conducted using NVivo, a qualitative data analysis software.

Chapter 5, the discussion, provides an overview of findings while comparing with existing literatures wherever necessary. Additionally theoretical and managerial implications are discussed in this section by exploring the practicality of findings.

Chapter 6, the Conclusions, summarizes the key outcomes of the research and offers concluding remarks. It outlines the study's limitations and provides recommendations for future research on Lean implementation in manufacturing from an employee-centric perspective.

# 2 Literature review

This research aims to understand how employees feel about Lean and how they perceive Lean management practices aimed at improving efficiency and reducing waste. In order to do this, it is required to understand what Lean actually is, explore its origins, key principles, and how it's typically put into practice. Also, it is necessary to examine the different roles employees play in Lean and how crucial it is to train and develop them.

This chapter will delve into empirical data exploring the factors that force employees to involve and perceive Lean practices positively making the Lean implementation successful and the obstacles to make a substantial acceptance and involvement form the employees for implementing Lean practices. Also, this chapter will uncover how Lean concepts have been applied in manufacturing sector in general, and how those practices have evolved over the time from the primitive age of the lean concept.

## 2.1 The idea of Lean

The idea behind the Lean methodology is very simple. The word Lean means creating more value using least resources. The philosophy behind Lean management is eliminating waste and increase customer value. Lean can be also explained by these three simple components. Number one, deliver value from your customer's perspective. Number two, eliminate ways or things that don't bring value to the end product and number three, continuous improvement. In addition, Lean management is a combination of tools and techniques which are used by companies and business entities to enhance production efficiency while eliminating waste (John Drew et al., 2004). Understanding the non-value-added activities in a business process is a crucial part of the Lean management. Lean techniques are all about streamlining work processes and practices to eliminate any unnecessary steps or delays such as getting rid of things like waiting time, queue time, administrative time and other activities that slow things down and waste valuable time which can be used to create more value to the customer (Hobbs, 2011).

The Lean concept was rapidly spread among the business world since the capitative idea behind the word Lean was achieving more with less. Many industries and companies were

fascinated by this idea since everybody wants to achieve more revenue or profit with least amount of resources they can use. The book, “The Machine that Changed the World” published by James Womack and Daniel Jones have done a great job bringing this idea and the term Lean to a wider public. In their book, Lean was explained as a mean of achieving more with less (James Womack et al., 1990).

Understanding the core idea of Lean is important before digging deeper into the different dimensions of Lean Methodology. It is also important to get to know the basic principles of lean management and where it comes from, what is Lean management and how did it start. But it is necessary to understand that the Lean methodology is about continuously improving work processes, practices and people. Lean itself is an evolving methodology in a continuous manner while the continuous improvement is a major pillar of Lean Management. Lean management highly thrives shared responsibility and shared leadership. This is why the Lean methodology emphasize the importance of the respect for people and continuous improvements. A good idea or initiative can be born at any level of the hierarchy, hence Lean trusts the people who are really working on the process to say how it should be done. Hence, the multiskilled employees are a significant part of Lean management. Being multiskilled, employees become able to achieve high flexibility. As explained earlier, the main factor of Lean is using least of everything that includes workers. When employees are multiskilled, it eliminates the need for further recruitment (James Womack et al., 1990).

It's true that Lean management is a concept that embraced by various industries in the current context. However, it has originated from the Toyota production system established more than 75 years ago. It came to life back in the late 1940s when Toyota put the foundations of Lean manufacturing with the expectation of reducing processes that do not bring value to the end product. The Toyota production system is greatly based on the Henry Ford model which was created in the beginning of the 20th century (Hobbs, 2003). The Toyota production system is one of the groundbreaking inventions that completely changed the world of operations systems and production line activities. As a result of this new initiation, they were able to achieve significant improvement in production efficiency, cost efficiency and cycle time. This notable impact has given the birth to the Lean thinking which has later spread across many industries and evolved to the five basic principles of lean management which has defined by the Lean Management Institute (LMI) which will be discussed later in this chapter. Even though the TPS and the HFM were created in order to enhance production

and manufacturing in assembly lines, their core ideas and techniques enable these principles to be added and used in an organizational work environment in which the main goals remain the same which are enhance efficiency, customer value, eliminate waste and improve employees competences (Staats & Upton, 2011).

The term Lean was introduced by John Krafcik who is the former CEO of Google self-driving car project, Waymo in his article "Triumph of the Lean Production System" in 1988. Originally Lean is an American term, which derives from research project conducted by MIT. But then, the term Lean was only used in the car manufacturing industry, since the whole philosophy was formed to enhance manufacturing productivity in car factories (Krafcik, 1988). Later, the term Lean was further put in place to a wider public along with the book "The Machine that Changed the World" by James Womack and Daniel Jones.

In 2003, Mary and Tom Poppendieck took Lean industrial practices to a new level by their book "Lean software development: an Agile Toolkit". The book revealed a new knowledge about how the initial principles of Lean can be used for software development. It is one thing to read about value stream mapping in a manufacturing plant but quite another to see this idea applies to software development process (Mary Poppendieck & Tom Poppendieck, 2003). Later, this Lean software development concept defined with 7 principles. In the beginning, it was not able to gain popularity, but quite few years later it became one of the most popular software development methods.

Later, the idea of Lean further evolved into the world of startups. In 2011, Eric Ries, an engineer, and serial entrepreneur came up with a methodology to help startups succeed based on the Lean principles. He published his ideas in his book "The Lean Startup" which consists of 5 basic principles that aim to transform startups to become more flexible and responsive to changes. The ultimate goal of the Lean startup is to shorten the product development cycles and find out if a given business concept is viable in a shorter period of time as described from a business point of view. In Eric's words, the Lean Startup is a new way of looking at the development of innovative new products that emphasizes fast iteration and customer insight, a huge vision, and great ambition, all at the same time (Ries, 2011). Nowadays this methodology is widely used in government structures, marketing professionals, and many other entities.

When a process itself starts to require least of everything, least human effort, least space, least capital and of course least time, all the while improving the efficiency and customer perceived value, it can be considered as a successfully Lean implemented environment. This analysis of the empirical data indicates that Lean management was not created in a moment. Instead, it has evolved over the time gradually and it is still evolving, thanks to many observations of countless individuals and the inherent human drive for continuous improvement.

## 2.2 Lean as a management tool

The growing popularity of the lean management concept in the business world is a known fact. There is no surprise that Lean management is now widely spread across industries thanks to its core values and positive impact on companies' overall performance. The Lean concept appears to be a universal management tool. This study aims to examine the employee perspective on Lean implementation, have an understanding how they perceive the idea of Lean. Hence it is vital to understand Lean as a management tool to explore the essence of Lean philosophy. Lean management is based on the principles of Lean and the tools associated with these principles. Lean principles contain various guidelines and steps which help organizations to achieve a Lean culture. This chapter will introduce the main principles and tools associated with Lean management.

### 2.2.1 The five principles of Lean management

Principles of Lean provides a wonderful foundation that really highlights, which helps to ensure that organizational processes are effective and efficient. According to (Bicheno, 2004), there are 5 basic Lean principles which are necessary to create a Lean system in any organization which focuses on achieving continuous improvement. These five principles of Lean originated from the Toyota production system. Namely, these five principles are creating value, identify value stream, creating the correct flow, forming a pull system, and the pursuit or perfection.

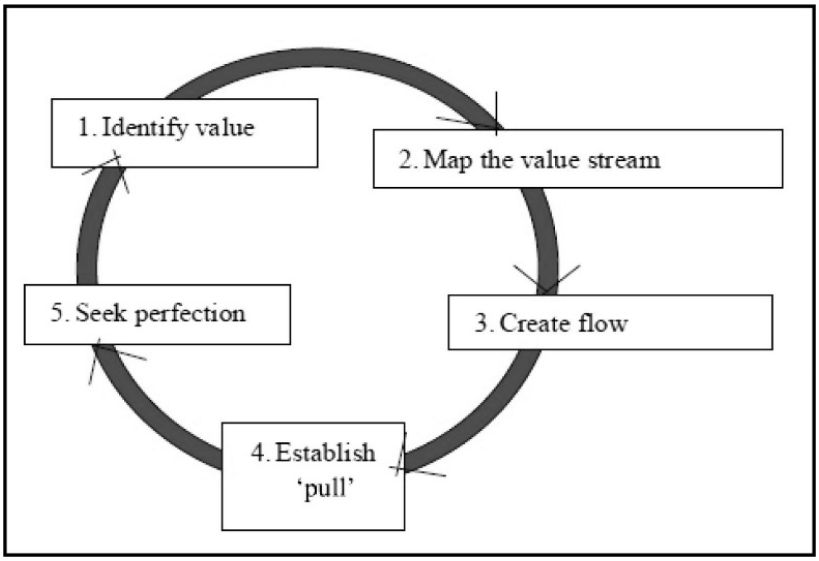


Figure 1: 5 Principles of Lean

The first principle of Lean is creating value, as it perceived by the customer's eye. In this competitive business world, every company's goal is to create a product or service that a customer is willing to pay for. In order to do that any company need to offer a product or service with the value defined by its customer's demand or the value lies in the problem they are trying to solve for the customer. In other terms, in a part of the offer or solution that the customer is actively ready to pay, if there are any other activities or processes exist that do not bring value to the finished product are considered as waste. According to (Bicheno, 2004), the end product must always be based on the viewpoint of the customer. Any organization must first need to identify the value that they want to deliver. This principle sets an organization on the right path, so they can make sure that they are looking at specifically what they want to deliver to their customer. An organization should ask themselves, who are our customers, are they internal or are they external and what is their want or need that our product or service fills. These are essential questions which helps to identify the value straight away. So that a company can make sure that they are giving their customers the real value that they demand for. This can be simply explained in a small example. Let's say if someone wants a hot fast lunch and he goes to a restaurant. This is a sit-down restaurant that took hours and maybe they specialized in salad. Doesn't matter the food is prepared with top quality and served beautifully, this customer would be very disappointed. If all the customers are like the same who come in, the restaurant management may think about changing their restaurant. However, assume if that person is going to a fast-food restaurant and getting a hot lunch within three minutes. In that case they are able to

understand that their customer doesn't care about the quality or ambiance much. Hence, that restaurant is going to fulfil their customer's need or the value that he sees in his lunch. Therefore, it is crucial that the Lean thinking starts with the effort to define value by defining the specific product, the specific price and the specific customer (Womack et al., 1997).

Second principle of Lean is creating value stream. This is the point where an organization literally need to map their workflow considering all those actions and steps that they take to deliver the defined value. By doing so, they will be able to recognize what parts of the process bring no value which is considered as waste. In this process of value stream mapping, it will reveal where the value is being generated and in what proportion different parts of the process do or do not produce value. When an organization has their value stream mapped it will be much easier for them to see which processes are owned by what teams and who are responsible for measuring, evaluating and improving that process. The output of this process will enable organizations to detect the steps that don't bring value and eliminate them. According to (Womack & Jones, 1997), transparency is an essential part of this step for the value stream mapping to be successful, and for a product or an offer to get fully mapped by the organisation. This principle also can be simply explained by the previous example. Here the value for the customers is that hot quick lunch. Then what are all the steps that are required to prepare that lunch from the time the person orders and all the way up to that order coming back out to the customer quickly. So, what are all those action steps and decisions involved is the question which will be answered.

The third principle of Lean is creating a continuous workflow which comes after mastering the value stream creation. It defines how does a product or service flow through all those previously defined different steps. It is necessary to make sure that the workflow of each team remains smooth. Usually, this process takes a while. Developing a product or service often includes a cross functional teamwork. It is certain that bottlenecks and interruptions may appear at any time during the process. However, by breaking up work into smaller batches and visualising the workflow, organizations can easily detect and remove the process roadblocks. The primary task of the third principle is to reduce the delays on the value-added activities in the workflow. Flow creates value that revolves around people, culture and processes (Bicheno, 2004). This step can be also explained by bringing up the same previous example. The process of proceeding with an order of a hamburger contains several actions which have to be proceeded in an orderly manner where each action in this process might be

associated with some potential bottlenecks. It often involves actions from the order receiving at the front line and the completed item is wrapped and sent back to the front line for delivery to the customer. First the order must be communicated back into the kitchen and there need to be some specific actions that need to be performed such as preparing a bun, cooking a patty, adding cheese, and assembling the hamburger with lettuce, tomato, and onion. Delays might occur in the workflow in places such as cooking the patty since it takes additional time to get prepared where every other step together takes a couple of seconds. Only due to the reason that the patty takes few minutes to get ready, the overall efficiency of the process is affected and thereby highlights a need for improvement. Importance of this Lean principle is highlighting this kind of bottlenecks comes along the workflow and eliminate or improve for the optimum efficiency.

The fourth principle of Lean management is creating a pull system. Having a stable workflow is a guarantee that the teams of an organization can deliver work tasks much faster with less effort. However, in order to secure a stable workflow without interruptions it’s necessary to make sure a pull system is established. When it comes to the Lean methodology, in such a system the work is pulled only if there is a demand for it which means that the productions only triggers and bringing out product or service when a customer demands it. This lets organizations optimise resources, capacity and deliver products and services only if there is an actual need. This step can be also explained by bringing up the same previous hamburger example. When a customer goes to that restaurant and order a hamburger, then the restaurant worker pulls his order and starts making the hamburgers according to the order. They do not prepare anything in advance because if there isn't actual demand where for some reason the customers that usually come in don't come in, then that excess inventory sitting around or those tons of hamburgers can turn into a waste of resources. So that working at pull system means working at the demand of the customer, to give them what they want and when they want it. The principal point is to minimize or completely remove the excess production.

The fifth and last Lean principle is pursuit of perfection through continuous improvement After going through all previous steps an organization can already built its Lean management system. However, no one can forget to pay attention to this last step probably the most important one to remember. Nothing is ever going to be perfect, and nobody is ever perfect. The principle might be tough and seems to be impractical, but it is important to strive with

relentless or continuous improvement mindset. A product offeror should revisit and reassess the value in the eyes of their customer. This might reveal that if their perception of value has evolved or shifted. This might also involve engaging with a new set of customers which may lead to developing a new product or service. No system is isolated, and static problems may arise at any of the previous steps which have been discussed. This is why an organization need to make sure that employees on every level are involved and took part in continuously improving the processes. Transparency is one of the most significant parts and factors of the last Lean principle, the pursuit of perfection. Everyone should be able to see and contribute on the value creation process and the employee satisfaction, ensuring the organization is motivated to continue to improve (Womack & Jones, 1997). Of course, there are different techniques and methods to encourage continuous improvement such as having a daily stand-up meeting among every team to discuss what has been done, what needs to be done and possible barriers, which is an easy way to process improvements on a daily basis.

### 2.2.2 Lean implementation tools

This research aims to explore the employee perspective on Lean implementation with regard to the Finnish manufacturing sector. Hence Lean implementation is an important part of this research. Because of that, it is important to explore the philosophies and tools of Lean implementation. Therefore, the connection between Lean principles and their implementation on the production floor will be discussed in this section. This chapter will further explain how Lean is implemented along with the right Lean tools associated with each Lean principle.

Lean methodology became popular among organizations soon after TPS has gained a notable success along with its Lean initiatives and this has especially triggered the companies that do not operate in the manufacturing field, trialling out how these principles can be employed for those non-manufacturing-oriented entities. It is naturel that companies are always looking to enhance their overall performance in all aspects of production excellence, employee satisfaction, and profitability to create ways to keep their company competitive and successful. In that case companies invest their time and effort to implement Lean management and Lean tools in their organizations in order to discover the factors that need to be eliminated which do not create value, the factors that should be improved which create

value and the factors that should be added to create more value. When it comes to the non-manufacturing-oriented entities, there was high demand for Lean implementation, especially within the service sector. The service sector is a comparatively highly competitive entity since their main goal is customer satisfaction, creating and enhancing customer value (Petersson, 2010). Due to Lean methodology being modified throughout the years, these other sectors along with service sector also were able implement Lean tools in their organizations.

Transparency and openness are essential features when implementing Lean. It doesn't harm much that the Lean thinking and Lean implementation process start with the company's management, but the whole organization should be notified of the objectives, execution plan and should take part in the implementation process. Many companies fail to understand that the results of Lean implementation always take time to expose within the process or within the service. As per (Petersson, 2010) Lean implementation should be a part of the organization's processes and objectives, and it should be maintained and continued for them to receive results and to maintain the outcomes. The employees need to be informed the "why" and the "how" of Lean implementation for making it successful, and the new knowledge should be successfully transferred from management to employees across the organization (Swank, 2003). Understanding the reasons behind the Lean implementation is really important in order to ensure employee engagement and motivation. Furthermore, it is also important to ensure that these processes need to be continuously improved and adjusted to sustain the results. Success of Lean implementation is highly relied both on the employees and the management (John Drew et al., 2004). Sustaining changes often depends on employees, hence, the employee mindset towards changes is an utmost importance. Hence, it is highly recommended for the organizations to try and instigate positive attitudes towards the changes from top to bottom before the actual implementation.

It can be seen that Lean tools and techniques have evolved over time into a powerful approach that companies can use to improve the overall performance of their organisations. They have first built based on the manufacturing sector and later transformed into a universal set of tools where all types of companies and industries have been followed. When an organization starts to transform their processes under the Lean methodology these tools provide a guideline on how to do that transformation step by step. In the present day there are plenty of Lean tools available to use which have been developed by many prestigious

schoolers and practitioners, but it's really important that an organization wisely choose the most compatible tools since the nature and capabilities of an organization is vary from one to another. The Lean tools are the backbone of Lean implementation, and without them Lean implementation is impossible. There are various Lean implementation tools.

When it comes to using Lean tools, what specially need to be cared of is, going through each Lean principle in order and choosing the right Lean tool or tools at each of the 5 stages of the Lean methodology. The first Lean principle is value creation, defining what has value for the customer. The voice of the customer and the QFT (Quality Function Deployment) are recognized as two important Lean tools that organizations can use to discover the real value they are expected to deliver to the customer which they are willing to pay for. In the book "Lean Thinking", (Womack & Jones, 1997) strongly recommend spending time and resources on this phase. Furthermore, in their next publication, "Learning to See" states that after the publication of their first book many companies had rushed to do VSM without connecting this exercise with value for the customer and the company which should be the case (Rother & John Shook, 2003).

After this exercise an organization must ask themselves how, where and in what time frame they start to translate the value that they defined. In that case another Lean tool comes to play, which is called Hoshin Kanri. Hoshin Kanri comes from Japanese origins which means strategy deployment. More elaborately the word Hoshin means direction and the word Kanri means administration in Japanese language (Kesterson, 2014). This tool guides an organization to communicate its strategic goals throughout the company and then put into action with the help of middle management. The top-down approach is used to maintain steady communication from top to bottom explaining visions, making and implementing strategies, and on the other hand receiving feedback from bottom to top management. Hoshin Kanri enables organizations to develop an effective and efficient communication system through the organization eliminating the waste that comes from poor communication and unorganized administration (Witcher & and Butterworth, 1997). It also helps organizations to make all employees within the organization understand its vision and to drive all employees toward a common goal which they are intended to reach.

Figure 2: 7 Processes of Hoshin Kanri (SSDSI Blog, n.d.)

After creating the value then an organization can move on to the second step, creating the value stream. Here it is really important to use the right process map depending on the process to be mapped. Ther are different tools available to undertake this stage, but it's the organizations' choice to pick the right tool or tools depending on the capabilities and nature of the business they are involved in. While "Swimlane" is a famous Lean tool used for transaction processes, Value Stream Mapping is used in most of the manufacturing related organizations.

The purpose of using VSM is analysing the flow of the processes in an organization and identifying and removing non-value-added activities to enhance efficiency. Value stream mapping also assists in controlling and supervising the process flow of an organization. Identifying the waste that exists within the organizational processes is really important when creating a Lean culture which can be aided by VSM. Since people involvement is a vital part of the Lean implementation, it is important that the value stream mapping should be taken part by the people who are directly involved with the process and the activities. This ensures that the best results will be achieved from the mapping (Bicheno & Holweg, 2008). As the empirical data shows, VSM associates the concepts of waste and value stream (Sugimori et al., 1997). Value stream mapping visually shows the current state, future state, ideal state and an action plan of an organization. In the Map, the value adding and non-value adding activities along with the linkage between those activities show in the current state. Then it is easier to escalate them and separate them as in the next step, the value adding activities are

brought to the future state map while the non-value adding activities are removed from the map (Hobbs, 2011). In value stream mapping the visualization of the entire action and the process is important where the mapping begins with writing and adding the activities to the map by using post-it notes. This is how all the processes and activities are identified and added to the map. value stream mapping identifies as a great tool among organizations for observation as the process progresses where changes and other progression details are added on the map as process progresses. Additionally, it is essential for an organization to have a clear idea on the direction of the process, what is their expectation and what would they like to achieve at the end of the process for the VSM to be successful (Hobbs, 2011).

After mapping the process, the next step is creating flow. The primary task here is to reduce the delays on the value-added activities in the workflow and making sure that the workflow of each team remains smooth. The most famous 5 S method comes to aid this process which is one of the most well-known Lean tools companies often use to create safe and efficient workstations. In this concept it describes about three main types of wastes which are called 'Muda', waste that directly comes from production which are created in the shop floor, 'Mura', waste that comes from unevenness or inconsistency, and 'Muri', waste that generates through overworked and overburdened employees or infrastructure.

The famous 5 S method, which originated in Japan in connection to the Toyota Production System holds a huge popularity among worldwide organizations as a simple but an effective tool for eliminating waste from the manufacturing process. While the 5 S technique was first used in the Japanese manufacturing industries in the 1950's, Takashi Osada who is a prominent author in Japan developed the framework for 5 S in a more structured way, where anyone can easily apply into their organizations. The 5 S stands for Sort, Set in order, Shine, Standardize and Sustain, which originally comes from the Japanese terms, Seiri, Seiton, Seiso, Seiketsu, and Shitsuke. When compared to other Lean tools, 5 S is seen as a more convenient tool to implement, and it is considered to be a significant tool when creating a Lean culture within an organization (Bicheno & Holweg, 2008). Even though it has been a long time since the 5 S methodology was introduced, this framework is still being actively used in many organizations worldwide (Gapp, Fisher & Kobayashi, 2008). 5 S was even referred as the DNA of the TPS (Pil & Fujimoto, 2007). In order to explore the greatest way to integrate the 5 S model into an organization, they should understand the ways how 5 S can create productivity and eliminate waste (Osada, 1991). 5 S system requires a top-down

approach when it comes to the implementation where it needs more support and involvement of the senior management to get higher results. As mentioned in the book “Lean manufacturing that works: powerful tools for dramatically reducing waste and maximizing profits”, (Carreira, 2005) says commitment of the senior management of an organization has a significant importance to Lean implementation. But also, it is vital to take a holistic approach to the implementation of the 5 S along with a proper communication of its vision and work progress throughout the company incorporating it into the process or services or everyday activities without considering it as just another tool (Gapp et al., 2008).

The next step is designing the new workstation or cell through standard work and work instructions. TWI, Training within Industry is a commonly used tool for work instruction within most of the organizations. Training within industry is a methodology that comes to aid quick and consistent training for newcomers withing an organization. This tool originated in United States during the second world war which played a major role in boosting industrial production to cater the required supply levels for the war (A. G. Robinson & Dean M. Schroeder, 1993). Implementing TWI helps organizations to provide instructions in effective manner in order to develop new or existing employees into productive workers along with immediate reduction in scrap and rework. To sustain a continuous flow, an organization needs to make sure that the materials must never run out. In this phase, the figure of the “Water Spider” comes to play. It is one of the Lean tools used withing organizations where it describes a role who is thoroughly familiar with the materials, tools and methods of the process he is supporting. The WS is a critical role in making continuous flow and a smoothly functioning Lean system a reality. As describes in (Fabrizio, 2017), a spider works within the process, a spider keeps the workplace clean, a spider facilitates flow, a spider is always moving, and a spider’s job should be systematic. Finally, if the process involves machinery, then another Lean tool comes to play which is called Total Productive Maintenance. The main focus of TPM is to maintain the “ready to work” condition of all the machineries involved in the process to avoid breakdowns and delays in manufacturing process. TPM is a systematic approach of maintaining and improving the performance of the processes, people, product quality, safety and employee satisfaction. But as (Wireman, 2004) states in his book, many companies fail to achieve fullest benefits from this methodology because of the paradigm around the word “maintenance” where they often describe the word “maintenance” with words such as overhead, expense, fire fighters, necessary evil and prima donnas which provides a negative attitude around it.

After completing the task of creating the flow then an organization can move on to the next step, implementing pull strategy. The pull strategy in Lean emphasizes the importance of actual customer demand and aligning production and supply processes accordingly. It aids organizations in minimizing waste and enhancing efficiency. Traditional push system, which produces goods based on forecasts comes with a risk of wasting resources around the production. But in contrast to push system, pull system ensures that the production is initiated only after there is a specific demand for it from the customer. There is a series of interconnected tools and techniques when it comes to the implementation of the pull strategy, which help organizations to streamline workflows and maintain just-in-time production. Some of the tools used to implement pull strategy are Visual Management and Kanban. Visual management is a tool that is used to communicate within an organization using visual aids to pass messages more effectively, more efficiently and at a high speed. It provides the ability to manage the communication system of a company visually. Like most of the other Lean tools, VM has also come to life through TPS. Then it has been developed through practitioner efforts together with being propelled by theoretical insights as most of other parts of the TPS (Koskela et al., 2018). Generally, VM is a powerful tool which provides a more rapid and reliable mode of communication in contrast to traditional communication systems. Kanban is a tool which is used by organizations to control the movements of materials within an operation. Through kanban, materials and resources which are purchased from suppliers are controlled and maintained. The basic principle behind Kanban is the just-in-time technique, which assists organizations to eliminate waste by only purchasing products in demand that actually required (Bicheno, 2004). According to (Melton, 2005), kanban helps organizations to handle customer demands more efficiently by catering to customer requests in a fast and accurate manner. Kanban also helps companies with efficient product deliveries and to observe customer services closely and improve if needed. With kanban products are easily reachable, easily traceable and after services are far more efficient (Bicheno & Holweg, 2008).

At last, an organization reaches the most important step of Lean implementation which is the pursuit of perfection. This phase is also called continuous improvement. To successfully navigate this last stage of Lean implementation, an organization should possess several tools such as developing a standard work leader, a daily morning meeting and a problem-solving culture. Standard work leaders come along with great leadership skills to ensure the consistency of standardized work practices and adherence to best practices across the

organization. Furthermore, daily morning meetings provide a crucial platform for open communication and problem-solving making sure all important messages flow through top to bottom and bottom to top which is one of the success factors of lean implementation. These meetings build a collaborative environment empowering employee to identify and address challenges proactively, preventing chaos from escalating.

The best way to implement Lean is to focus on one particular process or service and implement the tools (Carreira, 2005). This highlights the importance of implementing Lean on a smaller scale, one process at a time which ensures more effective and long-term results. On the other hand, if Lean is implemented on a larger scale, the success of the implementation is not promised as best as possible, due to the possibilities of different deficiencies. Finally, fostering a culture of continuous improvement is vital. An organization must encourage its employees to actively seek out and address inefficiencies because it enables an organization to build a dynamic and adaptable workforce that continually work towards the operational excellence.

## 2.3 Lean in manufacturing sector

The manufacturing sector plays a vital role in the global economy, which contributes to economic growth, employment, and technological advancement in a significant manner. Manufacturing sector includes a wide range of industries whose primary act is transforming raw materials into finished goods in the physical form. However, in the current context, manufacturing is considered an integrated concept at all levels, from machines to production systems to an entire business level operation (Esmaeilian et al., 2016). Today manufacturing sector varies among different players and organizations who run manufacturing processes, ranging from simple assembly lines to more complex, technologically advanced production systems.

The manufacturing sector has dramatically evolved over centuries where it has transformed from manual labour-intensive processes to highly automated and technologically advanced systems. In ancient days, manufacturing was a localized sector with craftsmen producing goods in small workshops where it was dependant on handmade skills. The latter day, industrial revolution gave a different face to the manufacturing sector, giving birth to mass production techniques driven by steam power and crude oil together with the development

of machine tools. This was the turning point where factories and large-scale industrial operations begun. This evolution kept being happening and in the 20th century further advancements have risen in the manufacturing sector including the development of assembly lines, the increasing use of electricity, and the rise of automation. Today, the manufacturing sector is experiencing a dramatic transformative which has never been dreamed of with the rise of advanced manufacturing technologies such as robotics, artificial intelligence (AI), 3D printing, and the integration of cyber-physical systems. This transformation collectively known as Industry 4.0. This evolution has made a remarkable improvement in terms of efficiency and productivity but also comes with challenges such as the need for continuous adaptation of workforces to the changes and providing training to update workers' skills to remain competitive in this rapidly changing landscape.

### 2.3.1 Introduction of Lean concepts into the manufacturing sector

The introduction of Lean concepts into the manufacturing sector has marked a significant milestone, aided the development of revolutionary production processes and enhanced competitiveness. However, since the day this idea of Lean initiated from the Toyota production system and later evolved in post-war Japan, Lean principles fundamentally challenged the traditional mass production model, which is called the economy of scale, into a customer centric production model emphasizing the elimination of waste and the maximization of customer value. When exploring the differences between Lean manufacturing and mass production, mass production aims to minimize the unit cost of whatever it is producing by trying to get economies of scale, and it typically aims to do that by producing in large batch sizes. The problem with large batch sizes is that they tend to reduce flexibility within the company, and they have to handle enormous inventories in big volumes. Inventories, besides being very costly, actually hide many other production problems in a company. All of this has a cost, and the cost is typically absorbed by the end consumer. Lean manufacturing on the other hand aims to produce only what the customer wants just-in-time and eliminating any other source of waste.

When exploring the origins of Lean seeds in the manufacturing industry it goes decades back where (James Womack et al., 1990) introduced the Lean production concept, based on a comparative study in the automobile industry in Japan and other parts of the world but mostly

influenced by TPS. This study provided a significant eye opening to the earlier day just-in-time (JIT) manufacturing practices (Monden, 2011; Schonberger, 1982; Shingo, 1985). (James Womack et al., 1990) described the supply coordination system from the Japanese point of view while in 1993 (Lamming, 1993) introduced the "Lean Supply Model" which describes the supply chain management practices within Lean production. The origin of Lean thinking even goes back in time where Japanese manufacturers were practicing shop-floor, specifically in the early work of Toyota. As stated in the beginning, the concept of Lean production was first defined by (James Womack et al., 1990) as a system that generates more output using the least of everything. Here they state it is just like the traditional mass production system, but the difference is, it offers an increased choice for the end customer. This definition of Lean production has been brought out from TPS based on their definition of waste (Shingo, 1981). All non-value adding activities that do not create value in the final product as seen in the eyes of final customer account as waste (P. Hines & Taylor, 2000). TPS system recognizes that in order to achieve efficiency and the productivity of the service or the product, eliminating waste is a must do activity. In the Toyota house, waste reduction is an important part of the structural component. As defined by the TPS there are three types of waste which are namely, Muda, Mura and Muri. These are called 3M's of waste. Muda refers to the waste that comes from production which does not create value for the customer and usually comes out on the shop floor level. Mura refers to the waste that comes from unevenness, non-uniformity, and irregularity which is not caused by end customer. Muri refers to the waste that comes out from overburden on resources including equipment, facilities, and people (Bicheno & Holweg, 2008). Management of processes and supply chains, management of relationships with employees and all stakeholders and management of the change from traditional production practices are the main pillars of Lean production (P. Hines, 1994).

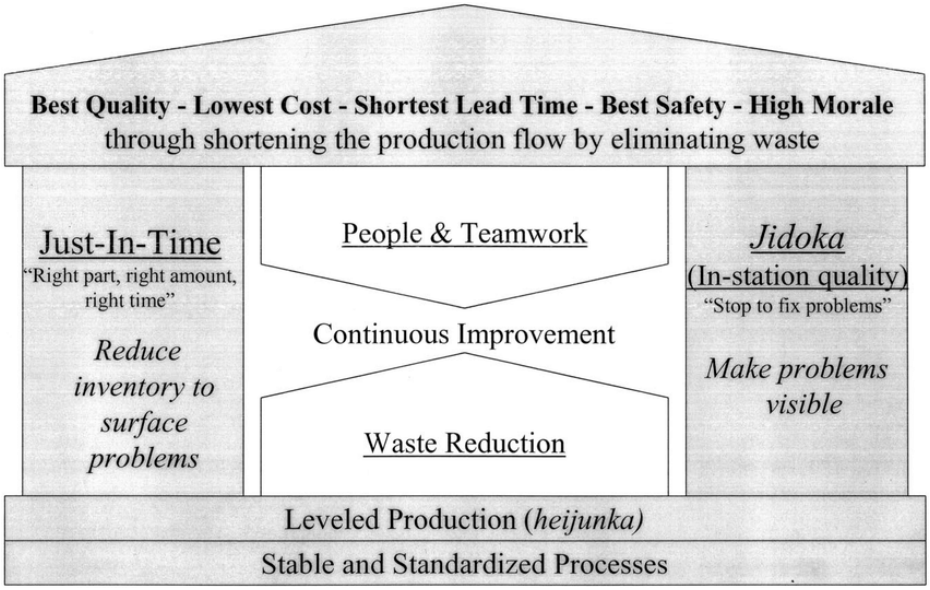


Figure 3: Toyota production system house (Liker & Morgan, 2006)

After 1990, lean production focused away from the shop floor. Along with the evolution of the value-stream concept it was able to go beyond manufacturing, enabling a single company to cater to customer demands, starting right back from the raw-material sources. (Womack & Jones, 1997) emphasize the "Value" as the first principle of Lean thinking and the notion of value stream defines the Lean enterprise. Thereby, Lean concept transformed manufacturing sector from the "shop-floor-focus" to waste reduction focus emphasizing the value (or perceived value) to the customer by adjusting product or service features while removing waste on production process (P. A. Hines et al., 2004).

Initially, in the implantation of Lean methodology in the manufacturing sector companies primarily focused on adopting specific tools and techniques. Techniques such as JIT production which served to minimize inventory and reduce lead times has gained significant attraction. These tools were immensely beneficial for organizations, but there was a lack of a holistic understanding of the underlying principles of continuous improvement, effective communication, employee empowerment and customer centricity. However, over time along with the evolution of the theories of Lean and the best practices around Lean, the manufacturing sector was able to get a deeper understanding of Lean principles. Companies in the manufacturing sector began to realize the importance of a holistic approach, integrating Lean concepts across the entire value stream. They just realized the importance of the involvement of the whole workforce from the management to machine operator, from

design and planning to production, delivery, and customer service in order to achieve success in Lean implementation.

### 2.3.2 Lean in Finnish manufacturing sector

Today's manufacturing companies operate in a rapidly changing environment where customer requirements are vivid, and global competition is at its highest phase. In order to survive in this ever-increasing competition, companies have an urge to offer high-quality products, a large product mix, a competitive price tag and a fast and reliable delivery. Therefore, manufacturing enterprises put rapid responsiveness and agility as new strategic goals alongside high quality and cost reduction. Lean manufacturing plays a major role in catering to that need.

In Finland, the manufacturing sector plays a major role in the economy accounting for 87 percent of the total production. Chemical is the biggest segment of the Finnish manufacturing sector which bears 16 percent while electrical and electronics account for 13 percent, machinery and equipment account for 11 percent, paper and paper products account for 9 percent, fabricated metal products account for 8 percent and food products account for 7 percent (Trading Enonomics, n.d.). The latest statistics shows that manufacturing in Finland increased 3.90 percent in November of 2024 over November of 2023 which shows a significant improvement. Manufacturing in Finland averaged 2.27 percent from 1991 until 2024, reaching an all-time high of 22.20 percent in February of 1995 and a record low of -26.40 percent in January of 2009 (Statistics Finland, n.d.).

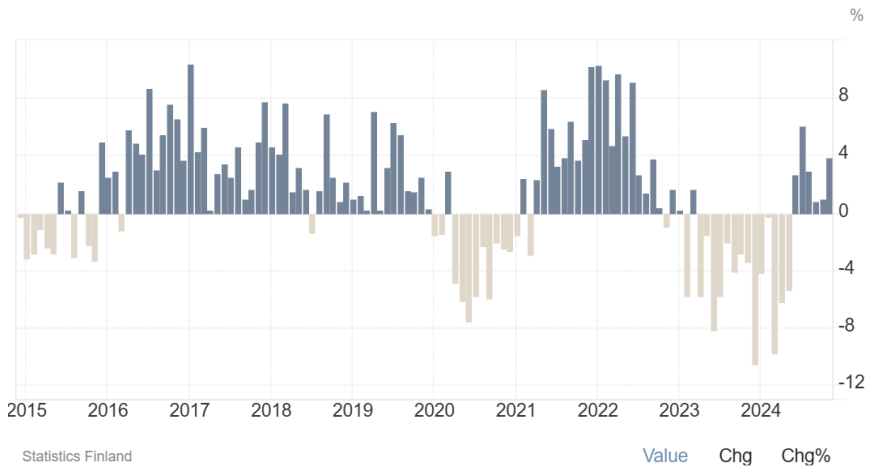


Figure 4: Finnish manufacturing production (Statistics Finland, n.d.)

The world has experienced “New Globalization” since 1990 and the Finnish manufacturing industry also witnessed the new trends of manufacturing (Ali-Yrkkö et al., 2017). Lean concepts were also introduced to Finland with its fascinating idea where Lean was explained as a means of achieving more with less (James Womack et al., 1990). Manufacturing practices also saw a development with the introduction of new business innovation models, key technologies, organizational concepts, and relocation-focused performance excellence. The new globalization caused firms worldwide to look for ways to optimize efficiency by reconfiguring their value chains and working on relocating their value-added activities and tasks to the most appropriate locations based on the geographical advantage. Along with that, Finnish companies also started moving their manufacturing work abroad (Slepniov et al., 2013).

But later, “Bringing manufacturing back home” has became a popular slogan in Finland along with the concepts of backshoring and nearshoring, receiving much attention in recent years while globalization and outsourcing become less popular. Finland seems to be an attractive target for nearshoring backed by many positive stories from the Finnish manufacturing industry in the recent past. Yet, there is a lack of research or discussion regarding this matter. There has been a remarkable development in Southwest Finland over the past few years even though there is a drop during the covid pandemic period. The rice of major manufacturing sites and the creation of more than 30,000 new jobs in the region claims that massive development (Paavola, 2022). This development is notable since it has happened against a backdrop, “The Great Recession” where Finland was hit hard by a financial crisis (Suni & Vihriälä, 2016). Only in 2009, Finland lost 8.5% of GDP where the manufacturing sector also went through a hard time. During the period from 2007 to 2016, the manufacturing workforce in Finland was reduced by about 90,000 and it affected 307,000 employees losing their jobs (Heikkilä et al., 2018). Somehow after 2016, this trend started to turn back.

The research done by (Heilala, 2024) reveals that competitive standards such as automation, additive manufacturing, robotics and access-based business models have profound influence for enabling the transition of manufacturing sector in Finland. Finnish representatives have been active in the “Lean in Public Sector” network, which is a network of researchers and practitioners who contribute to build the knowledge on applying Lean principles and methods especially in public sector organizations and in general. LIPS congresses are

concentrated on the key segments of Lean such as Lean leadership, collaboration, project delivery, procurement, and sustainability (Petäjäniemi, 2023). (Hallavo et al., 2018) have conducted a longitudinal study on Evolution and effect of Lean bundles with the involvement of 23 Finnish manufacturing firms. They found that the holistic and adaptive use of Lean bundles is effective. They suggest that the ownership structure of the firms significantly impacts the successful implantation of Lean concepts while the stage of the business cycle (e.g., startup, growth, maturity, decline) also plays an important role. The findings also reveal that the maturity effect is also taken place during the Lean adoption where in the beginning Lean implementation is just a bunch of tools and techniques, and later companies tend to embrace Lean as a cultural mechanism and a complete management philosophy (Hallavo et al., 2018).

Although Lean philosophy was founded decades ago and it has been studied for a long time by many researchers in universities, its practical application to manufacturing in Finland started quite late despite its benefits being indisputable. It took a long time for Finland to build a proper network of researchers and practitioners who can share their knowledge and experience on Lean philosophy. That kind of network can support the manufacturing sector to develop and configure Lean Manufacturing methods and tools in Finland (Petäjäniemi, 2023). Also, it seems that Lean philosophy is not highly adopted across the manufacturing sector, especially in smaller scale manufacturing firms in Finland. Even within the organizations that are using Lean tools, there is a gap between the perceived quality of the Lean implementation and the perceived impacts. The majority of the Lean users in the Finnish manufacturing sector do not embrace the Lean implementation in a collective approach, where they do not measure the progression of the desired impacts against the actual results. It also seems that when the size of the organization or the number of employees is the decision factor for companies to decide the number of Lean tools they would implement, which is not the case. But on the other hand, these large organizations pay much less attention to measuring and tracking the impact of these tools on their performance(Kiiskinen, 2022). Overall, it seems that there is a considerable room for improvement in Lean implementation in the Finnish manufacturing sector which may involve addressing areas such as employee training, leadership support, and continuous improvement initiatives.

### 2.3.3 Future trends in Lean manufacturing

Today enterprises are left with no choice but to constantly look for continuous improvement in productivity, quality, and level of services in this ever-increasingly competitive business world. The manufacturing sector is also going through a rapid development with the rise of industry 4.0 concept and the new advantages of automation and systems integration alongside. Approaching the future with the emerging digital platforms of serving customers, accommodating customer experience with a greater speed is a must and continuous effort is the road towards it. In order to leverage the fullest of customer revolution, organizations need to adopt innovative and agile thinking. Greater service and superior quality should come together and that's where the future of Lean lies in the decade of robotics and automation (Henry Harvin Education, 2024). Lean is a typical process-oriented technique which originated through TPS. Adapting to the changing environment is a one big challenge in front of Lean. Hence, bringing out modification in the system while focusing customer needs is not an easy task. In that case, future of Lean requires narrowing down into few approaches such as process and product quality, process and product lifecycle, high return on investment and change management with best utilization of available resources.

The future of Lean lies in the ability to analyse the complexities and performance improvement scope of projects or processes while beating up the time constrain relies on this mechanism. Lean is the best responsive system to embrace the oncoming challenges and new opportunities. The world is already stepped in to the era of digitalization where the power lies on automation and robotics. With the rise of automation and robotics, data analytics and AI, Lean production tools and techniques demand for digitization and interconnectivity. As it seems "Lean Robotics" is going to be the new revolution of the business world. Machines replacing humans at work brings a new type of waste, machine error. Hence, now there is a requirement for a pre-programmed error management system to eliminate all possible bottlenecks in a process (iCert Global, 2024). The rise of smart working associated with smart technologies demands startups and entrepreneurs to compete with dynamic and innovative business transformations. In order to navigate through this challenge, Lean practices play a major role. The future of Lean expects organizational leadership to play a new role in different segments such as reengineering, downsizing, transformational technologies and minimal manning. Following the transformation of

implementation, the leaders need to engage and monitor the overall impact of the process and the progress until the desired outcomes are achieved. Organizations effectively implement Lean tools alongside the transformation goals gains a competitive edge in the global market.

Today the Finnish manufacturing system contributes to building sustainable industries, smarter cities, and eco-friendly innovations that are essential for addressing climate change, resource scarcity, and the need for resilience in a rapidly changing world. The Finnish manufacturing sector aims to create intelligent systems to cater dynamic and advanced demands of the new world by integrating smart technologies such as IoT, automation and AI (Superstory Oy, 2024). The result is a globally recognized manufacturing philosophy, that delivers reliable, high-performance products and infrastructure. In order to achieve all of these, Lean plays a vital role along with its technological transformation shaping a smarter tomorrow.

## 2.4 Employees' role in Lean implementation

The employees' perspective is the main focus of this study. This research explores the perception and perspective of employees toward Lean implementation. It is a proven fact that employees play a vital role in the successful implementation of Lean practices. Their active involvement is not just a requirement but a crucial element for achieving sustainable improvements. Organizational management needs to recognize which employees will most likely be optimistic about the change, which employees will be doubtful about it, and which employees will resist it before Lean implementation (Hobbs, 2011). In that case there should be an understanding about the employee psychology in an organization. According to Hobbs, there are three types of employees based on their mindset and attitude towards change. The employee types he introduced are good soldiers, skeptics and resisters (Hobbs, 2011). Categorizing employees into specific types makes things easier for managers, since it helps to work on different strategies for different employee types during execution ensuring the success of a Lean implementation.

### 2.4.1 Driving forces behind employee involvement in Lean implementation

Active employee involvement is a sign of successful Lean implementation. Employees' positive perception towards Lean implementation is the key to active involvement. Transparency and effective communication can lead the way to generate positive attitudes around Lean execution. There are several key factors drive employee acceptance of Lean implementation within organizations. Strong leadership commitment and visible support from management serve as the foundation for gaining employee attention towards the Lean implementation. When employees see that management teams genuinely support and actively involve in the implementation process, they are more likely to come forwards and support the change. Leadership should effectively communicate across the organization making sure that the goals, benefits, and expected outcomes of Lean initiatives are well understood by the employees. Organizations can develop a transparent atmosphere which can build trust and a sense of ownership among the workforce by keeping employees informed and involved throughout the process.

Furthermore, employee empowerment is a critical driver of creating trust and increase engagement. Employee empowerment can be certified by letting them participate in improvement teams, decision-making processes and problem-solving activities. These make them feel they are valued and involved in the success of the initiative. The organizations who use *andon* system in the production line provide worker the right to stop the line when a defect is detected. This is an example where the delegation of responsibility for quality control in a Lean system (Berggren, 1993). According to the few studies on the subject, perceived level of responsibility is positively correlated with job satisfaction (Bennett et al., 2005). Training and development opportunities related to Lean principles, tools, and techniques are also accounts for the success of the sustainable improvement along the process. Organizations can enhance employees' understanding of Lean concepts by providing necessary knowledge and skills and that will also build their confidence to effectively involve in the Lean execution. Careful Lean employee selection and proper rewards also increase employees' involvement and engagement in Lean implementation (Hu et al., 2015).

A positive organizational culture is essential for successful Lean implementation that values employee engagement, open communication and continuous improvement. Trust, respect,

and collaboration are the essence of a positive organizational culture where employees feel comfortable speaking out, sharing ideas, making constructive criticism and actively participating in the pursuit of perfection. By creating a supportive and empowering work culture, organizations can lead a journey of continuous learning and improvement, fostering employee involvement and driving sustainable Lean transformations.

### 2.4.2 Challenges to employee engagement in Lean implementation

A key objective of Lean manufacturing is to push responsibility far down the organizational hierarchy. Responsibility gives a sense of freedom to control one's work which is a positive sign, but it also comes with anxiety about making costly mistakes (James Womack et al., 1990). Lean implementations consist of delegating tasks, such as quality control and maintenance. This makes the employees involved in the Lean execution more accountable (De Treville & and Antonakis, 2006; Jackson & Mullarkey, 2000; James Womack et al., 1990). As (Edwards & Burnard, 2003) and (Jackson & Mullarkey, 2000) have suggested, there is a positive correlation between the perceived level of responsibility and the stress level. This has been studied by several authors, and their idea is that the inherent characteristics of Lean could bring down employee productivity rather than facilitating it (Scherrer-Rathje et al., 2009). Increased responsibility and accountability, work intensification, higher peer pressure and continuous involvement in the production process can build up adverse working conditions (Delbridge et al., 1992). This circumstance can hinder the decision-making involvement, job autonomy, upskilling and active participation in problem-solving activities (Parker, 2003). (Conti & Gill, 1998) also suggest that these potential adverse effects of Lean on employees are contingent upon the design and operation of Lean production systems. This is a potential challenge if management doesn't pay enough attention to navigate the work of delegation gradually and carefully. Responsible delegation can lead successful execution where employees are actively engaged providing valuable insights into daily operations and identifying areas for improvement.

Furthermore, lack of empowerment and benefits hinder engagement and participation, leading to Lean implementation failure (Antomarioni et al., 2020). Surprisingly, there is a lack of empirical data related to the importance of employees' behavioural attitudes in Lean implementation (P. Hines et al., 2011; Losonci et al., 2011). Most studies have been carried

out focusing the operational and financial performance measurement instead of employees' behavioural impact. Resistance to change is one of the biggest challenges where employees may be reluctant to change the working culture making adjustments to their established ways of working which they are comfortable with. Bringing them out of their comfort zones to work in new ways, share information and collaborate across silos is a must to do in order to successfully implement Lean practices in an organization. Lack of proper training is another challenge in successful Lean implantation which may result in lack of understanding, commitment, and skills among employees and managers (Maware & Parsley, 2022)

### 2.4.3 Communication and training in Lean implementation

Scholars introduce communication as the foundation for successful Lean implementation where nobody can even talk about Lean in the absence of effective communication. Transparency and effective communication can lead the way to generate positive attitudes around the Lean execution. There are several key factors that drive employee involvement in Lean implementation within organizations. Trust, respect, and collaboration are the essence of a positive organizational culture where communication is the key to generating all of that. Successful Lean adoption requires careful planning for the pre-implementation, implementation, and post-implementation phases. Lean awareness programs should be created during the pre-implementation phase to overcome initial resistance. That will develop trust across the organization in Lean benefits and create a long-term commitment to a positive organizational culture (Bhamu & Singh Sangwan, 2014).

External training and education programs around Lean practices and techniques create the required knowledge to forge employee readiness and empowerment for the implementation phase (Gunasekaran & Lyu, 1997). Organizational training in a group setting has been proven as an effective and efficient way. Employees need colleagues for mutual motivation during the learning and training process (Helfrich, 1994). (Wildermann, 1993) argues in contrast claiming that training should always take place outside the company. But it has a point that learning and training should be a never-ending journey hence it is important that the training and learning take place close to where the actual work is conducted as a continuous process.

# 3 Methodology

The methodology section provides an understanding of how this research was conducted with a scientific approach while providing details of the methods used to extract and analyse data gathered from the Finnish manufacturing sector. This chapter consists of three main sections, each focusing on a specific aspect of the methodological approach. This structure also provides a clear and concise understanding of the concepts and tools used to identify the employees' viewpoint on Lean practices in the Finnish manufacturing sector.

## 3.1 Research approach and research strategy

Saunders has developed a fine concept or theory which is called Saunders research onion. This prompts researchers to plan their research carefully rather than make superficial choices enabling them to undertake their research better in terms of getting the methods to be appropriate to answer the research questions. According to (Saunders et al., 2009), the research methodology should be developed following a systematic and step-by-step approach with logical reasoning, while ultimately approaching inner layer of the research onion starting from the outer layer making sure the methodological fit is formed.

The most outer layer of the research onion is research philosophy. Even though there are few research philosophies exist in literature, Saunders primarily explain two main principles, ontology, which reflects the researchers' beliefs about the nature of reality and epistemology, which reflects the researchers' beliefs about the nature of knowledge. From an ontological perspective, the research follows a "positivism" philosophy, as the researcher's observation shapes reality. In general, a research carry out with positivism aims objectivity, generalizability and replicability of findings. The epistemological perspective of research philosophy is "interpretivism," as it takes the stance that reality is socially constructed where this type of research focuses on observing subjective meanings and interpretations of individuals. Research processes are frequently observed as a series of stages or interconnected elements, but more importantly, they are shaped by the researcher’s beliefs, which significantly impact the actions and decisions throughout the research journey

(Saunders et al., 2009). Given the research question and objectives, an interpretivist research philosophy can be seen as the most appropriate research philosophy for this study.

The next layer of Saunders research onion is research approach. As per Saunders, there are two widely used approaches which are the deductive approach and the inductive approach. The deductive approach starts with a particular theory then makes predictions by studying that theory and finally goes to the experiments in which a theory is tested. In contrast, the inductive approach basically starts with observations and later makes generalizations finally forming a bigger theory in which a theory is built. Given the nature of this study the research objectives were inductively approached for this study. The next layer of Saunders research onion is research strategy. This research involves interacting with employees in the Finnish manufacturing sector exploring their perceptions related to Lean implementation. Since this specific study area is not fairly explored in previous studies there was a large set of data gathered during the interviews. Interactions with informants through semi-structured interviews enable the revelation of new knowledge and rarely heard contexts. Accordingly, the qualitative approach aligns perfectly with the aims of this research, and it helps to generate more confident results (Vivek et al., 2023).

The next layer of Saunders research onion is methodological choices. Mono-method qualitative approach was selected as the methodological choice for this study. This method fosters a deep understanding of the participants and their perceptions, simplifies the study's complexity, and enhances its overall practicality (Creswell, 2014). Qualitative research is helpful in investigating new topics or understanding complex issues, for understanding and explaining people's beliefs and behaviours and for exploring social and cultural norms of a group or society (Hennink et al., 2020). Hence qualitative research is most suitable for addressing 'why' questions to understand and explain cases and 'how' questions that describe processes or behaviours. Given the research question and the objectives, this proves the compatibility of followed research method with this research. However, researchers must reduce bias, minimize errors, and seek evidence that disconfirms hypotheses to get the best results from qualitative research. The next layer of Saunders research onion is the time horizon which explains in which type of time frame the project executes. There are two types of time horizons have been described, the "cross-sectional study" in which a sample or samples set is going to be used over a fixed point of time and the "longitudinal study" in which the same sample or samples set is going to be used over the number of the years. This

study executed as a cross-sectional study with an intended completion date. The final layer or most inner layer of the Saunders research onion is data collection and analysis. Data collection was carried out through semi-structured interviews in which primary data was gathered for analysis. In order to ensure diversity in roles and experience with Lean, participants were selected using purposive sampling. Data was analysed by thematic analysis and more information will be discussed in the next section.

## 3.2 Research method

The following sections explain how the interviews were planned, how participants were selected, and how their responses were analysed to come across final results and conclusion.

### 3.2.1 Interview protocol & sampling

This research has been conducted using primary data, which was collected through a series of one-on-one (in-person) interviews using a semi-structured questionnaire. Semi-structured interviews provide more freedom to informants, allowing them to respond naturally. Additionally, this method allows more flexibility and increases the interactive nature of the interviews. Interviews can be conducted in different forms, such as face-to-face or online. Anyhow, face-to-face format is more effective in terms of identifying non-verbal communication elements like facial expressions, gestures, and body language which is quite difficult to manage in online format (Balushi, 2018) except video interview tools which have been introduced lately. In this research, Microsoft Teams communication platform was used to record meetings for later use of analysis.

There were two interview questionnaires used for this research, which are called “pre-interviews questionnaire” (Appendix 1) and “interviews questionnaire” (Appendix 2). The pre-interview questionnaire was designed to gain an understanding of the company and its Lean culture before conducting employee interviews, which was used during the interviews conducted with management teams of the respective companies. The insights gained from the pre-interviews helped to improve the “interview questionnaire”, which is used to conduct interviews with operational level employees, in which data was used for the analysis and results. Both questionnaires were developed based on the researcher’s previous experience

and empirical data and later modified with the assistance of AI tools. Before commencing the interviews, they were further modified with expert opinions for validation and practicality.

Sampling is a crucial element in research, yet it has received limited attention in research discussions. The four-point approach, which includes defining a sample universe, deciding on sample size, selecting a sample strategy, and sample sourcing (O. C. Robinson, 2014) helps to develop the sampling process logically and meaningfully. The sample universe for this study consists of operational level employees (non-management) in the Finnish manufacturing sector. Sample size was determined based on the availability of informants and time constraint. In order to ensure diversity in roles and experience with Lean, participants were selected using purposive sampling. The analysis was conducted using qualitative thematic analysis with the help of the NVivo software tool. The themes identified during the analysis are mapped to the research objectives and the main research question.

### 3.2.2 Respondent selection

Since the study focuses on the Finnish manufacturing sector, all respondents were included in the domain of Finnish manufacturing companies. At the first stage, targeted companies operate in the Finnish manufacturing sector were contacted through official emails along with the thesis proposal and asked to collaborate with the data collection process. Once the companies were finalized, informants were selected and contacted along with the ideas and involvement of the management of the respective companies based on the purposive sampling technique. All respondents who participated in the interviews were operational level employees (blue colour workers) representing line operators, supervisors, and coordinators. Additionally, all respondents were from medium or large-scale companies conducting business in Finnish and international markets.

### 3.2.3 Data analysis strategy

The first step of the analysis process was preparation and refinement of the transcript data. Although the support was taken from AI tools for refining transcripts and generating initial draft, a manual review was conducted, and corrections were done as a necessary step to

ensure accuracy and authenticity of the data. Clean, error-free transcripts facilitate easier data handling once imported into NVivo software. As outlined in the methodology section, the interview protocol was designed with open-ended questions linked to the research objectives, particularly examining the driving forces and barriers associated with the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

Once the refined and processed data was imported into NVivo, each respondent's answers were carefully reviewed, allowing the identification of keywords, critical phrases, and notable information. These key pieces of information, called "codes," were recorded in NVivo, which allows for linkage with individual respondents. Careful attention was given to code identification to ensure alignment with the research question and objectives, particularly around driving forces and barriers. Once coding was complete, the codes were sorted based on similarities and then exported. Using this exported file, codes with similar or related attributes were grouped into categories. Each group of related codes was assigned a common theme. The researcher established a guideline, defining themes with a code count of more than five (5) as key themes, while themes can be formed with fewer than five codes were considered negligible for this research. Defining the themes was critical, as each theme must accurately represent the codes within its cluster.

## 3.3 Reliability, validity and ethical considerations

The pre-interview questionnaire was designed to gain an understanding of the company and its Lean culture before conducting employee interviews. The insights gained from the pre-interviews helped to provide context on how Lean practices are implemented and how they shape daily operations in the organizations in which the employee interviews were conducted. The sole purpose of the interview questionnaire was to examine the thoughts of respondents on Lean implementation in their companies. The interviews were conducted in a neutral manner; hence the possibility of red herrings was eliminated. Also, during the interviews no optional or additional questions were provided, therefore the answers were solely based on the thoughts and perceptions of the respondents. However, based on the insights and knowledge gathered during the pre-interviews a little introduction was provided prior to the interview, which helped the respondents to articulate their feedback easily and

more effectively because some employees were not familiar enough with the term "Lean" but recognized specific projects or processes they were involved in. The questionnaires did not derive from one another. However, they had a slight consistency providing an opportunity to side by side compare what discrepancies exist between actual employee perceptions and management expectations during the Lean implementation.

The respondents' identities were kept anonymous, and that was informed to the respondents prior to the interview process. Anonymity is an important element when it comes to the reliability of the interview responses. Since this questionnaire was developed to collect individual ideas or self-perspectives, most of the respondents being co-workers, and knowing the management can have access to the feedback, there was a high possibility of getting manipulated responses during the interviews if the respondents were not well aware of the anonymity of the responses of the interviews. Also, it was an ethical consideration to protect the respondents' identity while encouraging more open responses. Even no personal information was asked on the questionnaire or during the interviews. The sole purpose of the research was to reveal the employees' perspective regardless of the personal background of the employees. There was no need to specify age, gender, or other personal data to explore the research question. The respondents were also informed about the purpose of the research and asked to notify the author if they needed to get a copy of the final report once the research is concluded.

# 4 Analysis and results

This chapter presents the study's analysis and results, detailing the process of coding and organizing information gathered from informants into themes. The section also explains how these identified areas or themes align with the research objectives, which are 1-finding the driving forces behind positive employee perception towards lean implementation and 2-finding the barriers to generate positive employee perception towards Lean implementation in the Finnish manufacturing sector. Further, it synthesizes the collected data into results addressing the research question, which is “How do employees in the Finnish manufacturing sector perceive the implementation of Lean practices?”.

NVivo was employed for this research, which is a qualitative data analysis software designed to help researchers organize, analyse, and visualize unstructured data like interviews, surveys, articles, and various contents. Once the refined and processed data was imported into NVivo, each respondent's answers were carefully reviewed, allowing the identification of keywords, critical phrases, and notable information. These key pieces of information, called "codes," were recorded in NVivo, which allows for linkage with individual respondents. Careful attention was given to code identification to ensure alignment with the research objectives, particularly around driving forces and barriers associated with positive employee perception towards lean implementation. Accordingly, codes were initially clustered into two groups depending on which objective each code was connected to, either objective one or objective two. Once coding was completed, the codes were sorted based on similarities. Here, codes with similar or related attributes were grouped into categories. This categorization process was backed by literature review, identifying if there are connections to already derived driving forces or barriers. Finally, each group of related codes was assigned a common theme, which is a border construct. The researcher established a guideline, defining themes with a code count of more than five (5) as key themes, while themes can be formed with fewer than five codes were considered negligible for this research. Defining these themes was critical, as each theme must accurately represent the codes within its cluster. Five key driving forces and five key barriers associated with positive employee perception towards Lean implementation are explained in detail. Table 1 and table 2 below illustrate the connections between codes, themes, and objectives.

Table 1: Objective 1 _ Codes

Objective 1: Finding the driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector

| Cluster 1<br><br>(Awareness of Lean methodology and it's benefits) | Cluster 2<br><br>(Management commitment and leadership) | Cluster 3<br><br>(Employee empowerment and involvement) | Cluster 4<br><br>(Effective communication) | Cluster 5<br><br>(Training and continuous learning) |
|---|---|---|---|---|
| Believe in Lean's potential<br><br>Efficient work<br><br>Time saving<br><br>Positive attitude toward change<br><br>Visible improvements | Continuous follow-up<br><br>Proper guidance<br>Lead by example | Sence of ownership<br><br>Valued contribution<br><br>Involvement in planning | Follow-up and monitoring<br><br>Data driven and visual information | Desire for learning<br><br>Value of workshops |

Table 2: Objective 2 _ Codes

Objective 2: Finding the barriers to generate positive employee perception towards Lean implementation in the Finnish manufacturing sector

| Cluster 1<br><br>(Poor communication and lack of transparency) | Cluster 2<br><br>(Lack of support and resources) | Cluster 3<br><br>(Absence of follow-through) | Cluster 5<br><br>(Lack of engagement and involvement) | Cluster 5<br><br>(Resistance to change) |
|---|---|---|---|---|
| Unclear expectations and outcomes<br><br>No idea of the big picture<br><br>Lack of feedback<br><br>Lack of explanations and instructions<br><br>Unshared results | Limited Lean knowledge and training<br><br>Lack of tools and outdated technology<br><br>Lack of manpower (experts or specified) | Abandoned projects and processes<br><br>Absence of monitoring system | Changes without employee input<br><br>Feeling excluded from decision making<br><br>Lack of shared goals and cooperation | Unwillingness to leave comfort zone<br><br>Fear of failure |

## 4.1 Analysis of objective 01: Finding the driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector

This section analyses the driving forces behind positive employee perceptions towards Lean implementation, focusing on major themes that emerged from the interviews. In this study, themes are lined up based on the frequency of codes (code count) to enhance readability and

clarity, identifying their importance and relevance. During the analysis process there have been a few more other codes which are not considered withing these finalized themes. The researcher established a guideline, defining themes with a code count of more than five (5) as key themes, while themes can be formed with fewer than five codes are considered negligible for this research. According to the arrangement above, five major themes are finalised under objective one, as shown in table 3.

In this section, the themes are organized in alignment with the first research objective and the code count

Table 3: Driving Forces _ Code & Case count

| Driving Forces | | File (Case count) | References (Code count) |
|---|---|---|---|
| DF 1 | Awareness of Lean methodology and it's benefits | 6 | 33 |
| DF 2 | Management commitment and leadership | 5 | 12 |
| DF 3 | Employee empowerment and involvement | 5 | 9 |
| DF 4 | Effective communication | 5 | 7 |
| DF 5 | Training and continuous learning | 4 | 6 |

### 4.1.1 Driving force 1: Awareness of Lean methodology and its benefits

Awareness of Lean methodology and its benefits was identified as the first major driving force that contributes to positive employee perception towards Lean implementation in the Finnish manufacturing industry. Across the interviews, employee awareness of Lean methodology varied. Only a few respondents were aware of Lean as a management technology who has learned Lean from institutional level or on the job training. A couple of them even had not heard the word Lean and one said, *"I've only heard the term "Lean", that's all".* Hence, interviewer had to give a brief explanation and education around Lean,

providing examples at the 3rd interview question, “Have you heard about Lean methodology? If yes, what has been your experience with Lean practices?” before proceeding with the rest of the questionnaire. But after having an idea about Lean, respondents’ feedback on Lean methodology was surprisingly positive. They started to explain their own similar practices and how those have added value to their lives. Even they became enthusiastic about getting more knowledge and education about Lean.

*“As you explain, now I know what Lean is. I think it's a cool thing. Like I said, when implemented correctly, it works well. It's a good system. Those practices make our work efficient and save time. I like them. Lean makes things clearer and helps improve work efficiency”.*

Anyhow most participants had at least a basic understanding of the Lean applications at their work and the benefits of Lean, at least after briefing the idea of Lean. In the first question of Section 3 (Experience based perception on Lean implementation) in the questionnaire, the respondents were asked how they feel about Lean practices in general. All respondents viewed Lean as necessary for renewing inefficient practices, improving efficiency and saving time. According to (Murthy, 2007), the attitudes and mindsets of the employees involved in the changing process are immensely important.

When employees are well aware of the benefits of Lean practices, such as better organization, time savings, and reduced stress helps to generate positive perception towards Lean implementation. Success stories and visible improvements also build up confidence in employees’ mindset. Moreover, when employees understand the core principles of Lean methodology, they are more likely to view its implementation positively. Interview results indicate that employees who see its benefits and believe in Lean’s potential are more likely to embrace it. As a matter of fact, there was a distinct difference between the feedback of respondents who had prior awareness of Lean methodology and the feedback of respondents who hadn’t. It was observed that awareness of Lean methodology and its benefits has a positive correlation with positive employee perceptions toward Lean implementation. Therefore, awareness of Lean methodology and its benefits become the most important driving force which generates positive employee perceptions toward Lean implementation.

### 4.1.2 Driving force 2: Management commitment and leadership

Management commitment and leadership was the second important driving force found in the analysis which generates positive employee perception towards Lean implementation. Several respondents highlighted the importance of visible, ongoing support from leadership showing that the perception of management's role in Lean was a major factor influencing positivity. As highlighted by (Abdullah et al., 2008), management commitment, employee involvement and training and education are the most important factors that contribute to the success of Lean implementation. These own research findings also agree with that statement showing management commitment and leadership as the second most import driving force as per the data.

It has been seen that employees are more willing to support and engage with Lean initiatives when they perceive that management is genuinely involved and follow-through in the process.

*"We had weekly 5S-type meetings where managers walked around checking cleanliness and organization, which motivated us to maintain order."*

Respondents highlighted the importance of active listening from management and improved communication between employees and management. Initiating Lean practices is not enough for effective leadership. It also requires management to actively participate in the implementation process and continuously follow through by providing necessary support.

*"Managers should lead by example and motivate through trust and shared purpose."*

The response above highlights the urge of employees for active involvement and leadership of the management, which helps to create a sense of shared purpose and encourages employees to take ownership of Lean initiatives. When managers lead by example, employees are more likely to embrace Lean principles and integrate them into their daily work routines. Therefore, management commitment and leadership become the second important driving force which generates positive employee perception towards Lean implementation.

### 4.1.3 Driving force 3: Employee empowerment and involvement

Employee empowerment and involvement was the third important driving force found in the analysis which generates positive employee perception towards Lean implementation. According to (Abdullah et al., 2008), one of the important factors that contribute to the success of Lean implementation is employee involvement. These own research findings also agree with that statement, showing when employees are involved in planning and implementing Lean changes, they are most likely to understand the reasons for those changes and less likely to resist them.

Many participants appreciated the instances in which they were asked for input, involved in decision making, or invited to improve their own workspace. They highlighted that they feel motivated and more responsible towards Lean implementation when they are given an opportunity to get involved in the planning stage before all changes coming into the execution stage. One of the respondents spoke positively about how they are involved in the planning discussions, especially when some new machine is going to be installed or anything new to be introduced.

*"Training and responsibility can help, when people are empowered and informed, they feel ownership."*

The findings highlight the importance of the prior involvement of the employees well in advance in the planning and execution process of Lean practices. As employees have firsthand knowledge of process inefficiencies by living through them, their direct input in Lean initiatives is invaluable for successful Lean implementation.

*"Ideas should come from employees; they know the processes best."*

It is evident that when employees are given opportunities to contribute to Lean initiatives, they develop a sense of ownership. This leads employees to feel good about themselves and about the organization, since it gives them the idea that their opinions and contributions are valued by the organization. Along with all these facts, employee empowerment and involvement has become the third important driving force behind positive employee perception toward Lean implementation.

### 4.1.4 Driving force 4: Effective communication

The importance of effective communication emerged strongly from the interviews, making it the fourth major driving force which generates positive employee perception towards Lean implementation. Across the interviews respondents emphasized the importance of transparency and clear communication regarding the changes, their influence at work, and post-feedback after execution. This understanding helps to build trust and motivation around Lean initiatives.

*"If workers could see the whole picture, it would help motivate them. People are happier when they understand why they're doing something."*

Transparency and effective communication can lead the way to generating positive attitudes around the Lean execution. While organizations have much larger and broader communication channels, the importance of having smaller, targeted, or focused communication channels emerged during the analysis process. Even though all these positive improvements of effective communication are disregarded, its value of minimizing confusions and misunderstandings is indispensable which leads to a smoother implementation process. When correct information is shared at right time, with right people, clearly and openly, it helps to avoid inefficiencies. Open communication is crucial for cooperation and teamwork, which are two most essential parts of successful Lean implementation. When employees can openly discuss and share their perspectives, it promotes a collaborative environment and facilitates the standardization of practices.

Trust, respect, and collaboration are the essence of a positive organizational culture. Only a positive organizational culture can foster a positive employee perception towards Lean implementation. Effective communication is the key to generating trust, respect, and collaboration. Hence it has become the fourth major driving force which generates positive employee perception towards Lean implementation.

### 4.1.5 Driving force 5: Training and continuous learning

The importance of training and continuous learning opportunities was repeatedly heard during the interviews, making it the fifth important driving force behind positive employee perception towards Lean implementation. It is clearly seen that respondents who possessed education and training experience had a strong belief and confidence in Lean practices and genuinely supported the implementation of Lean initiatives within the organization. Participants appreciated the workshops, practical activities and even basic 5S training.

*“Workshops on Lean concepts enhanced understanding.”*

*“Training in problem-solving tools empowers employees.”*

Some of the respondents’ feedback showed employees are motivated to continually learn by themselves and share the knowledge across their teams.

*“One idea I’ve wanted to implement is observing and learning from high-performing workers to share best practices across the team. However, due to limited staff and time, this hasn't been possible yet.”*

On the other hand, this kind of mentality promotes teamwork and collaboration. When employees receive adequate training, they feel more confident in their work and feel valued by the organization. This can result in increased engagement and motivation getting more support for Lean initiatives. However, many respondents emphasized that more regular, focused, and deeper training is needed instead of general, or just informative training to effectively integrate Lean thinking into daily work.

*“When we're told to think about how to improve our workplace, it’s sometimes hard if we feel everything is already optimal. More knowledge or training can help us see new ways of improving.”*

*"Training is useful, but only if everyone understands the purpose of Lean first."*

In essence, training and continuous learning is crucial for creating knowledge, uplifting skills, and improving engagement of the employees that generates positive perception toward Lean implementation and actively contributes to its success.

The figure 5 below summarizes the major driving forces identified during the analysis process under objective one which generate positive employee perception towards Lean implementation in the Finnish manufacturing sector.

Figure 5: Summery of driving forces

## 4.2 Analysis of objective 02: Finding the barriers to generate positive employee perception towards Lean implementation in the Finnish manufacturing sector

This section analyses the barriers that hinder generating positive employee perception towards Lean implementation, focusing on major themes that emerged from the interviews. In this study, themes are lined up based on the frequency of codes (code count) to enhance readability and clarity, identifying their importance and relevance. During the analysis process there have been a few more other codes which are not considered withing these finalized themes. The researcher established a guideline, defining themes with a code count of more than five (5) as key themes, while themes can be formed with fewer than five codes are considered negligible for this research. According to the arrangement above, five major themes are finalised under objective two, as shown in table 4.

In this section, the themes are organized in alignment with the second research objective and the code count.

| Barriers | | File (Case count) | References (Code count) |
|---|---|---|---|
| B 1 | Poor communication and lack of transparency | 7 | 38 |
| B 2 | Lack of support and resources | 6 | 17 |
| B 3 | Absence of follow-through | 5 | 13 |
| B 4 | Lack of engagement and involvement | 5 | 12 |
| B 5 | Resistance to change | 3 | 6 |

### 4.2.1 Barrier 1: Poor communication and lack of transparency

Poor communication and lack of transparency was identified as the biggest barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector. Across the interviews, many respondents highlighted that being unaware of the purpose, goals, or expected outcomes of Lean projects lead them confused and reduced their motivation to actively engage. Absence of the big picture in employees' minds has hindered their understanding of changes and their roles in the transition. It was noted that lack of clear explanation regarding the rationale behind Lean processes has reduced employee's positive perception towards Lean implementation. Instead, this lack of context has resulted in reduced trust, resistance and negative perception.

*"We're told to do something for productivity or Lean reasons, but without enough explanation."*

*"There should be better information flow from management to employees. Often new practices are introduced without clear communication or follow-up."*

As per general psychology, lack of clarity generates resistance in the human mind. Poor communication and lack of transparency generate a sense of uncertainty and fear, usually making employees more resistant to adopting Lean practices. During the interviews, it was identified that the resistance and reduced positive perception towards Lean practices have

acted as a defensive measure against the sense of uncertainty and fear of failure due to Poor communication and lack of transparency.

One of the other aspects of poor communication was undelivered post-project results or feedback upon ongoing or completed Lean initiatives. Many respondents reported their experience of unshared results and lack of feedback, which has demotivated them from being actively engaged with Lean implementation. Another aspect of the poor communication highlighted during the interviews was disconnected information flows. Respondents have provided examples where some critical information did not continue flowing after certain levels, creating inefficiencies and misunderstandings since not everyone knew what's happening or why. They emphasized the importance of more visibility of changes and updates across all employees, not just management. Thus, poor communication and lack of transparency has been highlighted as the biggest barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

### 4.2.2 Barrier 2: Lack of support and resources

Lack of support and resources was identified as the second major barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector. Several responses were received mentioning the need for more training and resources to effectively implement Lean. Majority of the respondents had barely received Lean training or learning opportunities, with some only having a surface-level introduction which has identified as a significant barrier for generating positive employee perception towards Lean implementation.

*"We haven't had much training beyond 5S. More knowledge on Lean would help."*

Knowledge and training promote Lean thinking and motivate employees to find improvements. Outdated, inefficient and conventional practices exist in the operation do not support Lean. Employees need to be supported with new technology and sufficient training for their upskills. Sometimes employees come out of new ideas, become blind to needed improvements, when they do the same tasks or work at the same place for years. Many

respondents have identified this nature and saw new knowledge and training as a must for successful Lean implementation.

*"When we're told to think about how to improve our workplace, it's sometimes hard if we feel everything is already optimal. More knowledge or examples can help us see new ways of improving."*

Lack of managerial support and leadership in Lean initiatives were also highlighted during the interviews. From a psychological perspective, perceived organizational support plays a crucial role in shaping employee perception. When employees feel the organization is not adequately investing in the necessary tools, training, or time to support Lean, they don't see a value in Lean initiative and resist engaging actively in the execution.

*"We lack the manpower to properly implement or maintain Lean initiatives."*

Lack of manpower was another concern that was brough into light during the interviews. The respondents' idea was that due to lack of specific individuals or teams dedicated to Lean initiatives limits the long-term improvement. Thus, lack of support and resources has been highlighted as the second largest barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

### 4.2.3 Barrier 3: Absence of follow-through

Absence of follow-through was identified as the third major barrier that hinders the generation of positive employee perception towards Lean implementation. Many respondents expressed their frustration over the lack of follow-through in Lean projects which often failed to sustain the changes which are implemented. It was noted that Lean projects often started with enthusiasm but failed to maintain momentum which resulted in failing to maintain positive employee perception towards Lean initiatives.

*"There needs to be more follow-through from management too. We start strong but then forget it. If something is implemented and then forgotten, people lose motivation."*

When employees see that the management truly drives change with adequate support and follow-through, they maintain momentum in the new initiatives. But when follow-up stopped, people go back to their old habits. It is the natural way of human. People do things

the comfortable, familiar way. During the interviews many respondents highlighted the importance of sharing results and providing feedback to keep employees motivated.

*"Follow-up on projects is missing; results are rarely shared, so people feel disconnected."*

Respondents across various roles at different levels expressed that they often contribute to Lean-related activities without ever receiving updates on the outcomes or impact of their efforts. Only when results are shared do employees get to know how their efforts have made any difference. Otherwise, they are left wondering whether their effort added any value. This lack of closure creates demotivation and a sense of ignorance and devalued. Since employees cannot see a tangible outcome, it creates a disengagement with Lean implementation. Over time this ill practice builds distrust and reduces willingness to participate in future initiatives, diminishing positive employee perception towards Lean practices.

The lack of follow-through also hinders the opportunity for learning and improvement. If employees don't get an opportunity to review their work and align the malpractices through continual learning, that misses the presence of continuous improvement cycle which is centre pillar of Lean methodology. Without consistent follow-up or visible commitment from leadership, employees perceived Lean as a temporary management fad rather than a sustained cultural shift. Thus, absence of follow-through has been highlighted as the third largest barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

### 4.2.4 Barrier 4: Lack of engagement and involvement

Lack of engagement and involvement was identified as another major barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector. Many respondents stated that they feel excluded from the planning, decision making and discussions related to improvements. They highlighted the importance of being involved earlier in the planning process where they can flag issues before they become problems. They expressed how much pressure sometimes they feel due to deviations between planning and execution, which could have been avoided if they had been involved during the planning stage.

*"Yes, being involved earlier in the planning process would help. Currently, meetings about new products or changes happen without our involvement, and we only hear about them later."*

Most of the respondents expressed the desire for greater involvement in the planning and decision-making process. Especially, respondents who were at the supervisor level emphasized that if they could sit in on meetings with planners and designers, they could better prepare for what's coming and avoid misunderstandings.

*"It would help us align as a team and avoid the pressure and inefficiency that come from last-minute surprises."*

In the context of Lean implementation, it is crucial to understand the difference between the terms *engagement* and *involvement*. It has been seen that organizations rarely distinguish these terms. Involvement is about employees being physically included in actions or decisions such as attending meetings, being part of process improvement discussions, planning discussions or problem-solving related to their work. Engagement on the other hand is about employees being psychologically and emotionally connected to what they are doing, motivated, committed, and genuinely involved in reaching the goals and achieving the outcomes. Hence organizations need to carefully think about getting employees genuinely involved, making sure they are genuinely engaged. Involvement is about having an outer voice while engagement is about having an inner voice. As an example, some of the respondents mentioned that they have been involved in projected and given their ideas, but they have never heard back about the results. This disconnection fosters involvement with absence of engagement hindering the generation of positive employee perception towards Lean implementation. Organizations must ensure that their employees understand the purpose of the tasks they are involved in, feel that their ideas are valued, and receive timely feedback on results for making sure employees are both involved and engaged.

Thus, lack of engagement and involvement has been highlighted as the fourth largest barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

### 4.2.5 Barrier 5: Resistance to change

Resistance to change was another major barrier identified during the interviews that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector. This is a common challenge in any organizational change or in human nature in general. The human mind often perceives change as a challenge to existing ways and promotes resistance as a shield or a protective mechanism. Surprisingly, most of the respondents were aware of this nature and frankly accepted it as a barrier for successful Lean implementation.

*"The biggest challenge is change. People here have worked the same way for years."*

It was identified that the most common causes behind resistance for change are unclear instructions, lack of understanding of the benefits, and sense of extra effort. When employees are not provided with adequate instructions, the purpose of the tasks they are assigned and not being followed-through, resistance grows stronger, and they tend to go back to the old practices. Moreover, Lean requires cross-functional collaboration, standardization, and shared accountability. But often all of these foster a threat to individual autonomy or existing hierarchies.

*"But it should come from management. If we try to take initiatives without their support, it's seen as overstepping."*

*"Lean tasks like cleaning can feel like chores, and if everyone doesn't participate, it creates frustration."*

When a new Lean initiative is implemented without proper change management initiatives, open communication, and trust-building, successful execution and receiving expected outcomes might become harder or even impossible. Due to the fear of losing control, making mistakes in a new system, or being judged against new performance indicators, employees could disengage and resist new Lean initiatives.

Thus, resistance to change has been highlighted as the fifth major barrier that hinders the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector.

The below figure 5 summarizes the major barriers identified during the analysis process under objective two which hinder positive employee perception towards Lean implementation in the Finnish manufacturing sector.

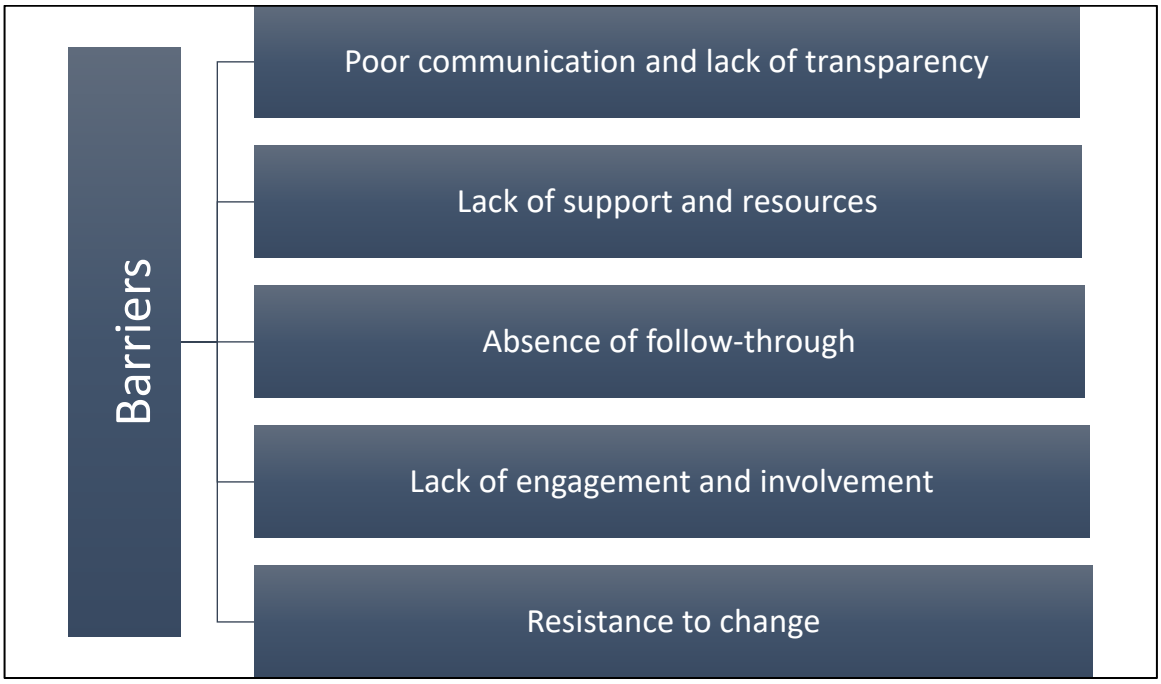


Figure 6: Summery of barriers

# 5 Discussion

This chapter explores the findings of the analysis in the context of the research aim: to understand how employees in the Finnish manufacturing sector perceive the implementation of Lean practices particularly around factors involved in shaping employee perceptions. The discussion draws from the coded themes, explaining their significance, interdependency and binding factors while connecting insights from prior literature, followed by theoretical and managerial implications.

## 5.1 Discussion: Driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector

The study revealed five major driving forces contributing to positive employee perception towards Lean implementation in the Finnish manufacturing sector. Notably, awareness of Lean methodology and its benefits, management commitment and leadership, employee empowerment and involvement, effective communication and training and continuous learning were those key driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector. Previous literature shows that management commitment, employee involvement and training and education are the most important factors that contribute to the success of Lean implementation (Abdullah et al., 2008). While agreeing with existing empirical data, this analysis expands and specifically elaborate the key driving forces behind positive employee perception towards Lean implementation in the Finnish manufacturing sector.

Awareness of Lean methodology and its benefits emerged as a cornerstone in generating positive employee perception towards Lean initiatives in the Finnish manufacturing sector. This goes with the powerful and timeless statement, “Education is power” where awareness of Lean empowers employees reducing fear and resistance towards change come across Lean implementation. Importance of awareness of Lean as a concept and as tools or practices was recurrently seen during the interview process. When employees understand the core principles of Lean methodology, they are more likely to view its implementation positively. The study shows that employees who believe in Lean’s potential seeing its benefits are more

likely to embrace it. It has found that there was a distinct difference between the feedback of respondents who had prior awareness of Lean methodology and the feedback of respondents who hadn't. As a matter of fact, this study constructs a theory that awareness of Lean methodology and its benefits has a positive correlation with positive employee perceptions toward Lean implementation.

Management commitment and leadership was another crucial driving force in generating positive employee perception towards Lean initiatives in the Finnish manufacturing sector which has been highlighted in this study. There was greater trust among employees towards Lean initiatives, when they encountered active involvement and consistent follow-through from management, not just during the initial rollout but throughout the execution process. This follows (Cotte et al., 2015), where they have also highlighted the importance of management support on the success of Lean implementation. Employees valued leadership when they were listened to, asked for ideas, provided answers and continuously guided, fostering trust in the process. When there is strong leadership and sound involvement from the management, not just a symbolic presence, employees perceive Lean as a shared responsibility, not a top-down directive, making them motivated to genuinely engage in Lean implementation. This explains why TPS specifically underscores the management's substantial involvement in the daily operations and process actions (Liker & Morgan, 2006).

Employee empowerment and involvement was another important driving force found in the study which helps to generate positive employee perception towards Lean initiatives in the Finnish manufacturing sector. This again supports findings from previous scholars such as (Abdullah et al., 2008), who have emphasized the importance of employee involvement and motivation in Lean implementation processes. Employees highlighted that they feel motivated and more responsible towards Lean implementation when they are given an opportunity to get involved in the planning and decision-making process. This pre-execution stage involvement had made employees feel that they have more control over their work, which led to increased motivation and ownership. Moreover, genuinely involved employees are less likely to resist change due to improved morale, constructed by the feeling that their knowledge and experience is valued.

Effective communication emerged as another important driving force in the study which helps to generate positive employee perception towards Lean initiatives in the Finnish manufacturing sector. It was highlighted that frequent, structured communication about the

goals, benefits, and progress of Lean helped employees understand its relevance to their daily work. The study also shows that effective, consistent, and transparent communication is the key to generate positive attitudes around Lean execution, building trust while reducing uncertainty and anxiety about the changes. It is important to have a culture with open communication throughout the organization during the Lean implementation, giving information on the implementation every step of the way, which does not have gaps in between. According to (Cotte et al., 2015), effective communication serves as a success factor in Lean implementation, creating an open atmosphere where employees can give feedback. Several other previous studies have also shown effective communication as a foundational element in sustaining Lean culture.

Additionally, the role of training and continuous learning was unfolded in this study as a key driving force which helps to generate positive employee perception towards Lean initiatives in the Finnish manufacturing sector. According to (Arnheiter & Maleyeff, 2005), employee training is an important factor in maintaining the employee's effectiveness and problem-solving skills. Employees who received prior education, training or hands-on coaching showed greater confidence and trust in Lean initiatives and they had a sense of understanding in their roles during the Lean implementation. Knowledge, in this regard, was closely tied to psychological safety. Sense of safety generates positive feelings, which also supports the findings of the study. Continuous learning and improvement anyway become one of the center pillars of Lean methodology, where there is always room for improvement since nothing truly "finishes".

## 5.2 Discussion: Barriers to generate positive employee perception towards Lean implementation in the Finnish manufacturing sector

The study revealed five major barriers that hinders positive employee perception towards Lean implementation in the Finnish manufacturing sector. Notably, poor communication and lack of transparency, lack of support and resources, absence of follow-through, lack of engagement and involvement and resistance to change were those barriers that hinders positive employee perception towards Lean implementation in the Finnish manufacturing sector.

Poor communication and lack of transparency emerged as the top significant barrier to generate positive employee perception towards Lean initiatives in the Finnish manufacturing sector. Difficulties faced by employees due to poor communication and lack of transparency were heard across the interviews, resulting in reduced trust, resistance and negative employee perception. The study shows that lack of clear explanation regarding the rationale behind Lean processes has reduced employees' positive perception towards Lean implementation. Absence of the big picture in employees' minds due to being unaware of the purpose, goals, or expected outcomes has hindered their understanding of changes and their roles in the transition. (John Drew et al., 2004) suggests that communication must be a two-way dialogue, not a one-way broadcast. Poor communication and lack of transparency generate a sense of uncertainty and fear, usually making employees more resistant and reducing positive perceptions towards Lean implementation.

Lack of support and resources was found as another major barrier in this study which hinders the generation of positive employee perception towards Lean initiatives in the Finnish manufacturing sector. It was highlighted that majority of the respondents had barely received Lean training or learning opportunities, with some only having a surface-level introduction which has identified as a significant barrier for generating positive employee perception towards Lean implementation. This has restricted employees' potential to come up with new ideas, seeing things differently and most essential timely improvement. (Mohamed, 2016) also argue that lack of knowledge or training directly affect employees being against something new and different, out of fear. Lack of managerial support and leadership in Lean initiatives were also highlighted during the interviews. When employees feel the organization is not adequately investing in the necessary tools, training, or time to support Lean, they don't see a value in Lean initiative and resist engaging actively in the execution. In addition, the lack of new systems and technological adoptions, which could make work more efficient, and shortage of human resources to handle special projects were also highlighted.

Absence of follow-through emerged as one of the most compelling contexts, which this study shows as a barrier to generate positive employee perception towards Lean initiatives in the Finnish manufacturing sector. The importance of having follow-up measures after the changes have been introduced was highlighted by (Mohamed, 2016). This study promotes those findings showing that absence of continuous follow through affects negatively on

employee perception towards Lean implementation. It was highlighted that most Lean initiatives start with enthusiasm, but over time fades into thin air due to lack of follow-through. This generates a mental dilemma in employees, building distrust and reducing willingness to participate in future initiatives, diminishing positive perception towards Lean practices. Failure to share timely results and feedback emerged as a recurring concern resulted in unseen outcomes or impact of employees' efforts. This builds up a lack of closure, forming demotivation and a sense of ignorance and devaluation. Without consistent follow-up or visible commitment from leadership, employees perceived Lean as a temporary management fad rather than a sustained cultural shift.

Lack of engagement and involvement was found as another major barrier in this study which hinders the generation of positive employee perception towards Lean initiatives in the Finnish manufacturing sector. According to (Crute et al., 2003), employees should take part in the whole Lean implementation process, from beginning till end. The sense of exclusion from the planning, decision making and discussions related to improvements has made employees demotivated to actively engage with Lean implementation. Employees often felt that the pressure built up due to deviations between planning and execution could have been avoided if they had been involved during the planning stage. Organizations rarely distinguish the terms, involvement, which is just being part of something and engagement, which is being actively and enthusiastically contributes. Employees could be found involved but not genuinely engaged, which can only be fixed by making them understand the purpose of the tasks they are involved in, feel that their ideas are valued, and providing timely feedback on results, making sure employees are both involved and engaged.

Resistance to change emerged not only as a natural psychological response but also as a consequence of the previously discussed barriers, which hinders the generation of positive employee perception towards Lean initiatives in the Finnish manufacturing sector. According to (Hobbs, 2011), management needs to recognize which employees will most likely be optimistic about the change, which employees will be doubtful about it, and which employees will resist it before Lean implementation. When communication was poor, support was lacking, and follow-up was inconsistent, resistance and disagreement became rational reactions. When a new Lean initiative is implemented without proper change management initiatives, open communication, and trust-building, successful execution and receiving expected outcomes might become harder or even impossible.

## 5.3 Implications

This section presents the theoretical and managerial implications of the study, offering valuable insights for academia and professionals regarding how employees in the Finnish manufacturing sector perceive the implementation of Lean practices particularly around factors involved in shaping employee perceptions.

### 5.3.1 Theoretical implications

This research contributes to the existing literature on Lean implementation by providing empirical evidence on the specific factors that shape employee perception specifically in the Finnish Manufacturing sector, an area which has not much studied. (P. Hines et al., 2011; Losonci et al., 2011) state that there is a lack of empirical data related to the importance of employees' behavioural attitudes in lean implementation. While much of the existing literature delves with how operational and financial performance measurement in Lean, this research adds knowledge into the human dimension of Lean, specifically employees' psychological and behavioural impact of Lean where limited knowledge exists. Moreover, certain findings re-confirm existing literature and validate previous research findings while suggesting new directions for future research.

The study identifies key driving forces and key barriers associated with generation of positive employee perception towards Lean initiatives in the Finnish manufacturing sector, providing a structured framework for understanding how employee perceptions shape Lean success. This aligns with and extends existing theories on Lean implementation and employee engagement. It expands on frameworks such as Liker's (Liker & Morgan, 2006) by providing empirical evidence on how awareness of Lean methodology and its benefits, management commitment and leadership, employee empowerment and involvement, effective communication and training and continuous learning drive positive employee perception towards Lean initiatives.

Furthermore, the study expands on key barriers such as poor communication and lack of transparency, lack of support and resources, absence of follow-through, lack of engagement and involvement, resistance to change which hinder positive employee perception towards Lean initiatives, which have been also studied in previous studies. These findings contribute

to the development of a more comprehensive understanding of the challenges associated with Lean implementation and highlight the need for organizations to address these issues proactively.

### 5.3.2 Managerial implications

The findings of this study provide several important implications for managers in the Finnish manufacturing sector. Even though Lean is designed to increase efficiency, reduce waste, and improve operational and financial performances, managers cannot assume that Lean tools alone will produce results. Instead, they must invest in creating a supportive organizational environment where employees feel heard, involved, respected, and integral to the change.

Awareness of Lean and its benefits was highlighted as the most important context in the study which can support successful Lean implementation through improved clarity, trust and positivity around Lean initiatives. This connects through effective communication, transparency, training and continual learning. Management should ensure that there is clear, consistent, and transparent communication throughout the organization, which aids in reducing uncertainty and anxiety about the changes. Frequent and structured communication about the goals, benefits, and progress of Lean initiatives help employees understand its relevance and their role in their daily work. Use of visual management tools such as dashboards or feedback boards or advanced tools can be recommended to ensure clarity and inclusivity. Organizations should also provide employees with adequate training and learning opportunities to help them understand Lean principles and practices.

Furthermore, the study identifies the importance of management commitment and leadership in driving successful Lean implementation. Managers need to actively involve, not just fostering a symbolic presence, guiding, providing necessary resources, and ensuring consistent follow-through. If employees do not notice consistent follow-up or visible commitment from management, they perceive Lean as a temporary management fad rather than a sustained cultural shift. Moreover, the study highlights the need for organizations to promote employee involvement and empowerment. Management needs to recognize the resourcefulness of employees and make them involved specially in the early planning stages, where they can flag issues before they become problems. Employees should be actively

engaged in the Lean implementation process, their ideas should be valued, and they should be provided with opportunities to contribute to decision-making. Trust, respect, and collaboration are the essence of a positive organizational culture, which can promote Lean philosophy, where combination of all these findings and implications can drive the organizations towards excellence.

# 6 Conclusions

The purpose of this research was to investigate how employees in the Finnish manufacturing sector perceive the implementation of Lean practices. Even though previous research has emphasized the importance of studying employees' behavioural impact on Lean initiatives, existing literature in this context is limited. This research was carried out specifically to find out the driving forces and barriers associated with the generation of positive employee perception towards Lean implementation in the Finnish manufacturing sector. Particularly, this study identified 5 key driving forces that contribute to positive employee perception, namely, awareness of Lean methodology and its benefits, management commitment and leadership, employee empowerment and involvement, effective communication, and training and continuous learning. This study also identified key barriers that hinder positive employee perception, namely, poor communication and lack of transparency, lack of support and resources, absence of follow-through, lack of engagement and involvement, and resistance to change.

The findings of this study have important implications for both academia and industry. In terms of academic aspect, this research contributes to the existing literature on Lean implementation by providing empirical evidence on how employees in the Finnish Manufacturing sector perceive Lean implementation, an area which has not much studied. It expands on frameworks exist in the existing literature by providing empirical evidence on what key drivers and barriers shape employee perception towards Lean implantation. In terms of industry aspect, this research provides valuable and actionable insights for Finnish manufacturing firms which can guide them to effectively implement Lean practices in their organizations by addressing employee concerns and fostering a positive work environment.

This research shows many Finnish workers value organization, clarity, and efficiency in their work which are essentially inherited in Lean principles. Hence carefully designed, planned, and executed, Lean can be a powerful tool which can drive organizations towards excellence. Trust, respect, and collaboration are the essence of a positive organizational culture where employees feel comfortable speaking out, sharing ideas, making constructive criticism and actively participating in the pursuit of perfection. By creating a supportive and empowering

work culture, organizations can lead a journey of continuous learning and improvement, fostering employee involvement and driving sustainable Lean transformations.

**Limitations and further research**

However, this study has some limitations even though researchers tried their best to mitigate potential biases. First, the sample size of the study was relatively small. Since the interviews were conducted in English, finding informants with English proficiency, especially among non-managerial work force was a challenge. Even though purposive sampling was intentionally used in this study to mitigate certain biases by choosing informants covering a wide range of employee groups, it could have created other forms of biases. These limits the generalizability of the findings. Future research could be conducted on this topic with a larger sample size to explore more generalizable findings.

Also, the study focused specifically on the Finnish manufacturing sector due to time constrains and accessibility issues. Even though the findings may be relevant to other contexts, further research is needed to examine and validate how employee perceptions shape the successful Lean implementation across different industries and geographical locations to promote generalizability of the findings. Another potential limitation of this research is using a qualitative mono-method research strategy where future research could be conducted with quantitative methods or mixed-method approaches to complement these findings and provide a more comprehensive understanding of the context. Self-reporting bias could be another limitation of this research, as all these findings were based on employee perceptions gathered through interviews. If respondents had given “expected" answers rather than their honest opinions due to social desirability bias, or false or inaccurate responses due to inadequate knowledge or experience on the contexts, the validity of these findings could be compromised.

Furthermore, the data gathered from managerial personnel through pre-interviews was not efficiently used for the analysis purpose, as it deviated from the current research focus. However, this data can be utilized in future research from different perspectives, such as cross-checking how management expectations and perceptions align or contrast with employees’ experiences and perceptions related to Lean implementations. Also, the research scope was broader and included the entire manufacturing sector. However, this also opens

opportunities for future research to delve deeper into specific scales of companies (small, medium, and large) and obtain more targeted and detailed results.

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Appendix 1. Pre-interview questionnaire

LUT University

**PRE-INTERVIEW QUESTIONNAIRE**

This questionnaire is part of a master's thesis aiming to understand employee perspectives on Lean practices in the Finnish manufacturing industry.

This questionnaire is designed to gain an understanding of the company and its Lean culture before conducting employee interviews for my master's thesis. Your insights will help to provide context on how Lean practices are implemented and how they shape daily operations in your organization.

**Section 1: General information**

1. Can you provide an overview of your company's manufacturing operations in Finland?
   (key products, main production processes, facilities own, supply chain, markets, competitors)

**Section 2: Lean implementation related information**

2. Does your company use Lean practices in manufacturing process? If so, when did the implementation start?
3. What specific Lean methodologies or tools (e.g., Kaizen, 5S, Value Stream Mapping) are currently used in the production process or in the planning stage?
4. How has Lean implementation impacted efficiency, waste reduction, and overall productivity?
5. What role do employees play in Lean adoption, and how is their feedback incorporated into process improvements?
6. What challenges did you face when implementing Lean from an employee's perspective? (e.g., resistance to change, training needs, workload concerns, job insecurity concerns)
7. How does the company support employees in adapting to Lean practices (e.g., training programs, incentives, leadership involvement)?

**Section 3: Additional information**

8. Are there any internal reports, case studies, or documentation on Lean implementation that could support this research?
9. Is there anything else you think would be relevant for this research?

Thank you for taking the time to share your thoughts and experiences. Your input is highly valued and will contribute to a better understanding of Lean implementation in the Finnish manufacturing industry.

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Appendix 2. Interview questionnaire

LUT University

**QUESTIONNAIRE**

This questionnaire is part of a master's thesis aiming to understand employee perspectives on Lean practices in the Finnish manufacturing industry.

Your responses are valuable and will help uncover insights into the experiences, challenges, and opportunities associated with Lean implementation. Please be assured that your responses will remain anonymous and will only be used for research purposes.

I am sharing this document with you beforehand to give you an idea of the interview content and I look forward to meeting with you soon once we have finalized a time.

**Section 1: General information**

1. How long have you been working at this company and in the manufacturing industry overall?
2. What is your current role or department?

**Section 2: Awareness and understanding of Lean practices**

3. Have you heard about Lean methodology? If yes, what has been your experience with Lean practices?
4. Are you aware of the specific Lean practices currently implemented in your company?

**Section 3: Experience based perception on Lean implementation**

5. How do you feel about lean practices in general?
6. What factors motivated you to participate in the Lean execution process?
7. What challenges have you encountered during the execution of Lean projects?
8. How would you compare your work experience before and after the implementation of Lean practices?

**Section 4: Ideas for perfection**

9. What suggestions do you have for improving the implementation of Lean practices in your organization?
10. Is there anything you feel would enhance your experience or satisfaction with the Lean practices you currently follow?

Thank you for taking the time to share your thoughts and experiences. Your input is highly valued and will contribute to a better understanding of Lean implementation in the Finnish manufacturing industry. If you are interested in receiving a summary of the research findings, please let me know.

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Appendix 3. Codes and themes identification

| Objective | Code Name | Theme | Files (Case Count) | References (Code Count) |
|---|---|---|---|---|
| OB1_ Driving Forces | Believe in Lean's potential | TH1_Awareness of Lean methodology and it's benefits | 6 | 10 |
| OB1_ Driving Forces | Efficient work | TH1_Awareness of Lean methodology and it's benefits | 6 | 8 |
| OB1_ Driving Forces | Time saving | TH1_Awareness of Lean methodology and it's benefits | 6 | 8 |
| OB1_ Driving Forces | Continuous follow-up | TH2_Management commitment and leadership | 5 | 7 |
| OB1_ Driving Forces | Positive attitude toward change | TH1_Awareness of Lean methodology and it's benefits | 4 | 7 |
| OB1_ Driving Forces | Sence of ownership | TH3_Employee empowerment and involvement | 4 | 6 |
| OB1_ Driving Forces | Follow-up and monitoring | TH4_Effective communication | 4 | 5 |
| OB1_ Driving Forces | Desire for learning | TH5_Training and continuous learning | 4 | 4 |
| OB1_ Driving Forces | Value of workshops | TH5_Training and continuous learning | 3 | 3 |
| OB1_ Driving Forces | Visible improvements | TH1_Awareness of Lean methodology and it's benefits | 2 | 3 |
| OB1_ Driving Forces | Proper guidance | TH2_Management commitment and leadership | 2 | 3 |
| OB1_ Driving Forces | Lead by example | TH2_Management commitment and leadership | 2 | 2 |
| OB1_ Driving Forces | Valued contribution | TH3_Employee empowerment and involvement | 2 | 2 |
| OB1_ Driving Forces | Involvement in planning | TH3_Employee empowerment and involvement | 1 | 1 |
| OB1_ Driving Forces | Data driven and visual information | TH4_Effective communication | 1 | 1 |
| OB2_Barriers | Limited Lean knowledge and training | TH5: Lack of support and resources | 6 | 16 |
| OB2_Barriers | Unclear expectations and outcomes | TH1_Poor communication and lack of transparency | 6 | 12 |
| OB2_Barriers | No idea of big picture | TH1_Poor communication and lack of transparency | 6 | 10 |
| OB2_Barriers | Abandoned projects and processes | TH2_ Absence of follow-through | 4 | 10 |
| OB2_Barriers | Lack of feedback | TH1_Poor communication and lack of transparency | 5 | 8 |
| OB2_Barriers | Changes without employee input | TH3_Lack of engagement and involvement | 4 | 7 |
| OB2_Barriers | Lack of explanations and instructions | TH1_Poor communication and lack of transparency | 4 | 6 |
| OB2_Barriers | Unwillingness to leave comfort zone | TH4_Resistance to change | 3 | 3 |
| OB2_Barriers | Lack of tools and outdated technology | TH5: Lack of support and resources | 3 | 3 |
| OB2_Barriers | Unshared results | TH1_Poor communication and lack of transparency | 3 | 3 |
| OB2_Barriers | Feeling excluded from decision making | TH3_Lack of engagement and involvement | 2 | 3 |
| OB2_Barriers | Lack of shared goals and cooperation | TH3_Lack of engagement and involvement | 2 | 2 |
| OB2_Barriers | Fear of failure | TH4_Resistance to change | 2 | 2 |
| OB2_Barriers | Absence of monitoring system | TH2_ Absence of follow-through | 1 | 1 |
| OB2_Barriers | Rigid mentalities | TH4_Resistance to change | 1 | 1 |
| OB2_Barriers | Lack of manpower (experts or specified) | TH5: Lack of support and resources | 1 | 1 |