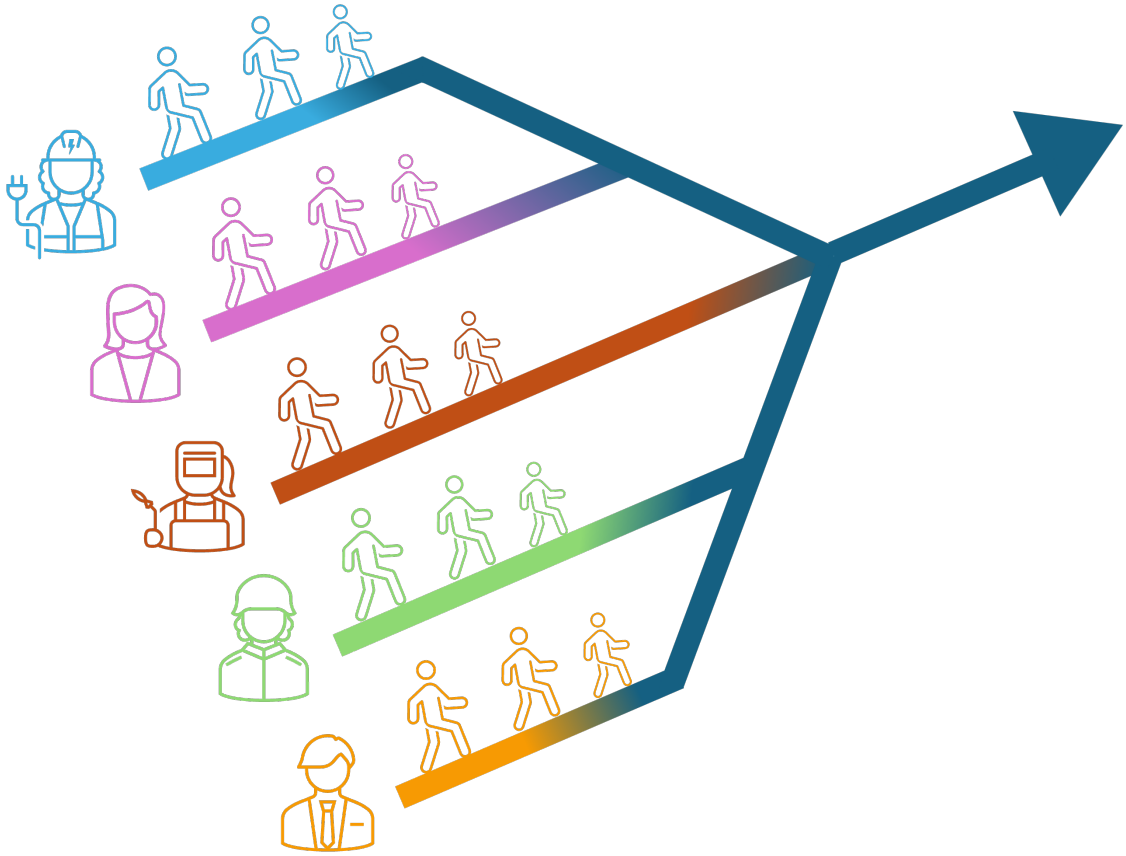
CHALMERS
UNIVERSITY OF TECHNOLOGY



Attaining Organizational Alignment Between Top-Down Directives and Shop Floor Initiatives

A Case Study at a Manufacturing Plant

Master's thesis in Production Engineering

NORA ARHALL & ANNA GÖTBERG

DEPARTMENT OF INDUSTRIAL AND MATERIALS SCIENCE

CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2025
www.chalmers.se

Master's thesis 2025

Attaining Organizational Alignment Between Top-Down Directives and Shop Floor Initiatives

A Case Study at a Manufacturing Plant

NORA ARHALL
ANNA GÖTBERG

CHALMERS
UNIVERSITY OF TECHNOLOGY

Department of Industrial and Materials Science
Division of Production Systems
Chalmers University of Technology
Gothenburg, Sweden 2025

Attaining Organizational Alignment Between
Top-Down Directives and Shop Floor Initiatives
A Case Study at a Manufacturing Plant
NORA ARHALL
ANNA GÖTBERG

Company Supervisor: Jens Johansson
Academic Supervisor: Mélanie Despeisse, Department of Industrial and Materials Science
Examiner: Mélenie Despeisse, Department of Industrial and Materials Science

Master's Thesis 2025
Department of Industrial and Materials Science
Division of Production Systems
Chalmers University of Technology
SE-412 96 Gothenburg
Telephone +46 31 772 1000

Cover: Visualization of all organizational levels aligned in a common direction.

Typeset in LaTeX
Printed by Chalmers Reproservice
Gothenburg, Sweden 2025

Attaining Organizational Alignment Between
Top-Down Directives and Shop Floor Initiatives
NORA ARHALL
ANNA GÖTBERG
Department of Industrial and Materials Science
Chalmers University of Technology

Abstract

To achieve company goals, the top strategies should align with shop floor activities. In a large global organization, it is hard to align thousands of people to get them to act in accordance with the same values and goals. This study investigated the main hinders and enablers by conducting a case study at a manufacturing plant of a global company. The methods included analyzing key performance indicators, behaviors, and point of view of employees at all levels of the plant organization. This study unveiled cultural clashes in an ongoing leadership shift that has led to a misalignment of expectations and inconsistencies of the way of working. There exist several best practices in the plant that are in accordance with existing research within cultural change and innovation, but to spread them and get the changes to stick, the organization must be aligned.

Keywords: Continuous improvement, Lean manufacturing, Best practice sharing, Organizational culture, Alignment, Case study, PDCA, Learning organization.

Acknowledgments

After 20 weeks at the case plant this work is finally completed. It has been a valuable journey with a lot of professional as well as personal growth. Many thanks to the case plant's employees who wanted to help us throughout this period. Without your kindness we would not have been able to gather this amount of data, and come to the conclusions that we did. Thank you for welcoming us and treating us like one of your own. We hope that this report can provide some insight and spark new ideas.

Thank you to our academic supervisor and examiner Mélanie Despeisse for invaluable support and guidance. Lastly, we would like to thank our industrial supervisor Jens Johansson for this opportunity and help throughout this journey.

Nora Arhall and Anna Götberg
Gothenburg, May 2025

List of Acronyms

BNI	Bottleneck Index
E	Engineer
FM	Factory Manager
FLM	First-Line Manager
ISO	the International Organization for Standardization
KPI	Key Performance Indicator
LM	Lean Manufacturing
MM	Middle Manager
MT	Management team
Op	Operations
PDCA	Plan-Do-Check-Act
PM	Plant Manager
RQ	Research Question
SDT	Self-Determination Theory
SIS	Swedish Institute for Standards
STS	Socio-Technical System
TC	Technician
TL	Team Leader
TM	Team Member

Contents

List of Figures

List of Tables

1
Introduction

The introduction chapter presents the topic of this thesis with a short background. Following this, the aim and research questions of the project are stated. Subsequently, the delimitations and scope are presented to define the project boundaries. Lastly, the outline of the report is presented.

1.1 Background

Today, manufacturing organizations face challenges with alignment of organizational culture and operational activities with strategic goals and visions to allow for continuous improvement and performance. The principles of Lean manufacturing, originating from the 20th century Toyota Production System, revolutionized manufacturing by emphasizing waste reduction, standardized work, and respect for people to achieve continuous improvement (Liker, 2004; Liker & Hoseus, 2008). Over time, these concepts have been adapted and evolved into frameworks such as Kaizen and Yokoten philosophies and structured problem-solving tools such as Plan-Do-Check-Act-cycles. All aiming to reach continuous improvement within manufacturing organizations (Imai, 1986; Emiliani, 2008). Strategic deployment tools such as Hoshin Kanri further advanced the ability of management to spread goals throughout the organization and foster alignment between top management directives and daily activities (Liker & Franz, 2011).

These top-down directives, which include global strategies, key performance indicators (KPIs), and standardized policies, are designed to ensure consistency, efficiency, sustainability, and competitiveness across global operations (Trevor & Varcoe, 2017). Social sustainability in particular is critical to maintain employee well-being and manage employee turnover, which if not, can lead to organizational knowledge loss (Kuhlman & Farrington, 2010; Karunanayake et al., 2022). Societal aspects such as inclusivity, open dialogue, and employee involvement are also essential to create collaborative work environments that foster better alignment and performance (Katzenbach et al., 2012). However, global strategies may not always align with the specific conditions and cultural dynamics of local production systems, and achieving consistent alignment between strategic goals and daily operations remains a persistent challenge (Birkinshaw et al., 2016; Kristensen et al., 2022). Misalignment between strategic goals and daily operations can result in inefficiencies, reduced workforce engagement, and missed opportunities for value creation (Kristensen et al., 2022; Trevor & Varcoe, 2017). To ensure efficiency, productivity, and long-

term competitiveness, in other words, environmental and economical sustainability, strategic alignment between top-down directives and daily operations is a crucial factor (Kristensen et al., 2022; Kuhlman & Farrington, 2010; Trevor & Varcoe, 2017).

This thesis explores these challenges in a manufacturing plant, with the current main goal of producing more products for less cost. The case company plant consists of three factories, two of which will be included in this case study, case factory A and B. Although best practices, improvement initiatives, and ideas are shared between factories at the case company plant, variations in levels of automation present challenges in adopting those practices. Case factory A has 1.2 robots per operator, while case factory B has 0.01 robots per operator. Other key issues include communication barriers, differences in employee training and education, and a disconnect between hierarchical expectations and operational ability. Although frameworks such as performance measurements, improvement tools, and standardization initiatives support goal fulfillment, their impact is often limited by organizational barriers, cultural misalignment, and inconsistent application (Liker, 2004; Emiliani, 2008). For best practices to spread and for problems to be solved, initiatives must have a stated meaning, and culture and values must be aligned in the organization (Greenhalgh et al., 2004). This further highlights the need to understand how leadership, culture, and organized improvement actions can work together for problem-solving and to align top-down directives with daily operations.

1.2 Aim and Research Questions

The thesis aims to achieve better alignment of daily operations and top-down directives at all organizational levels in the case plant. The main focus will be to find best practice for goal fulfillment and develop recommendations on how to align daily operations with top-down directives. The findings will form recommendations for the case company to continuously foster ideas to achieve top-down goals.

Today, manufacturing organizations apply continuous improvement and Lean manufacturing frameworks to support goal fulfillment and strategic alignment, but consistently achieving top-down goals remains a challenge (Emiliani, 2008; Liker & Hoseus, 2008). With standardization, processes can stabilize and performance measurement enables tracking progress toward organizational goals (Liker, 2004; Emiliani, 2008; Imai, 1986; Almström et al., 2017), but their practical implementation can be inconsistent. Improvement tools, such as Kaizen and PDCA, provide structured approaches, but their success is heavily dependent on effective leadership and a supportive culture among blue- and white-collar employees (Liker & Franz, 2011; Liker & Hoseus, 2008; Liker & Convis, 2012). Furthermore, leadership practices such as Hoshin Kanri and Nemawashi can help leaders align daily operations and top-down directives, but integrating these elements into daily work remains complex (Liker & Franz, 2011; Liker, 2004). These challenges show the need to identify best practices for goal fulfillment and how leaders can work to align top-down directives with daily operations in a manufacturing organization. Hence, the research questions for this thesis correlate with the aim of investigating how theory and practice

intersect to achieve effective alignment and goal fulfillment. The research questions are formulated as follows.

- RQ1: What is best practice for goal fulfillment in the case plant?
- RQ2: How can managers throughout a manufacturing organization align daily operations with top-down directives?

1.3 Scope and Delimitations

This case study spans 21 weeks, which has set some limitations for the project. To fulfill the aim of the thesis, the plant organization and two of the factories at the case plant will be investigated in the study. In the data collection phase, only meetings and roles during day and evening shifts will be included. With the dependence on the participation of employees in the case study, the availability of data will vary and presents a limitation of the study. Furthermore, since only employees of the case company are targets for the case study, their background limits the width of the findings. Following the nature of the case study and the subject, some sensitive data are to be obtained. Therefore, everything will be anonymized to avoid infringement on confidential and sensitive material from the participants and the company. To incorporate sustainable development into the thesis, the scope is limited to societal aspects. With the aim of the thesis of improving strategic alignment with daily operations in the case company, the focus is on social sustainability with organizational culture, knowledge sharing and employee collaboration. The economical or environmental strategies at the case company are not included, therefore ecological aspects are not considered in this thesis.

1.4 Outline of Report

The report is organized in 6 chapters. The first chapter, *Introduction* presents the introduction and background to the thesis topic and the aim of the project with scope and delimitations. Chapter 2, *Theory*, provides a theoretical background of the subject by describing the theory from which the thesis is established from. Chapter 3, *Methodology*, presents the methodology with subsections that describe the processes, methods, and frameworks used to reach the aim of the thesis. The findings are presented in Chapter 4, *Results*, divided into five sections to distinguish the pilot study and the main study with the corresponding analysis of both. To conclude Chapter 4, the recommendations to the case company are presented as a summary of the findings. In Chapter 5, the *Discussion* is divided into three parts with a discussion of results and methodology with a concluding section for future research recommendations. Finally, the sixth chapter presents the *Conclusion* of the thesis project.

2
Theoretical Background

This chapter presents the theoretical framework of the study. This is divided into the following six parts, Change Management, Organizational Culture, Continuous Improvement, Lean Manufacturing, Performance Measurement, and Knowledge Management.

2.1 Change Management

Organizational change is a complex process and to ensure long-term success, the process of implementing changes requires structured and flexible approaches (Kotter, 2007). According to Katzenbach et al. (2012), successful change initiatives include five principles that can help sustaining change and achieve higher performance, better customer focus and a more coherent stance. These principles are described below based on the theory by Katzenbach et al. (2012). The first principle is to match strategy and culture, as culture trumps strategy every time. Secondly, organizations must focus on a few critical shifts in behavior and try and understand them to enable reinforcement and sharing of beneficial changes. The third principle is to honor the strengths of the existing culture, as a mechanism to make major changes feel like a shared evolution within the organization, to minimize risk of resistance. As a fourth principle, it is crucial to integrate formal and informal interventions in promoting the new changes and behaviors. This should make people aware of their contributions to the company performance and reach people at an emotional level. Finally, the fifth principle is to measure and monitor the cultural evolution. This includes paying attention to four areas, business performance, critical behaviors, milestones and underlying beliefs and mind-sets. With measuring this, companies can track efforts, reinforce them and remind people of commitment and goals. In all, a fundamental aspect of effective change management is that culture often outweighs strategy, therefore transformation efforts should align with existing cultural strengths rather than imposing new values while focusing on people (Katzenbach et al., 2012).

A key reason why change efforts fail is the lack of a sense of urgency as employees tend to remain in their comfort zones unless they perceive an immediate need for transformation (Kotter, 2007) A powerful guidance and leadership commitment in a cross-functional collaboration environment is necessary to drive transformation (Kotter, 2007). However, even with urgency and aligned leadership, an unclear or poorly communicated vision can hinder change implementations as employees re-

quire a clear direction to align their efforts with organizational goals and objectives (Kotter, 2007). Leaders must embed the vision into daily decisions and organizational discourse to prevent confusion and disengagement (Kotter, 2007). Moreover, deeply rooted organizational structures and resistant middle managers can be seen as obstacles to transformations and must be identified and addressed early to enable smoother implementations of changes (Kotter, 2007). In parallel, functional diversity in the workforce can enhance innovation due to the range of perspectives, knowledge, and expertise (van Knippenberg & Schippers, 2007). While research shows that functional diversity can introduce task conflict, but evidence on if it directly improves performance is unambiguous (van Knippenberg & Schippers, 2007). However, diverse groups tends to possess a broader range of task-relevant knowledge, skills, and abilities, along with members who have different opinions and perspectives, which can be advantageous in solving complex, non-routine problems (van Knippenberg et al., 2004).

Studies have linked diversity to higher innovation and performance outcomes, suggesting that organizations operating in dynamic and competitive environments stand to benefit significantly from leveraging functional diversity (Bantel & Jackson, 1989; Hong & Page, 2004). Successful innovation and change also depend on individual adoption, which generally includes five stages: awareness, persuasion, decision, implementation, and confirmation. When individual adopters understanding of innovation matches that of top management, service users, and other stakeholders, innovation is more likely to be successfully integrated (Greenhalgh et al., 2004). Moreover, an adopter who is motivated and well prepared, in terms of values, goals, and specific skills, is more likely to embrace the innovation (Greenhalgh et al., 2004). Figure 2.1 illustrates how managerial efforts evolve with organizational culture to support innovation and adoption of new practices.

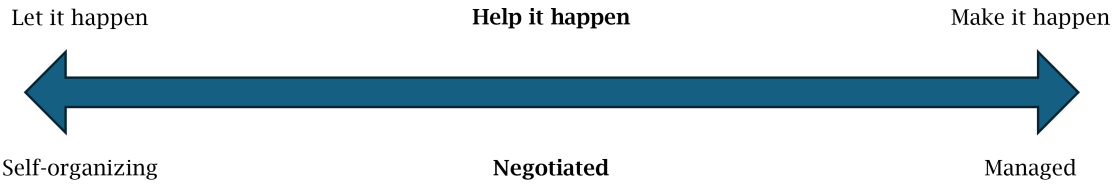


Figure 2.1: Adoption of innovation in different cultures, inspired by Greenhalgh et al. (2004)

A key reason why change efforts fail, is the lack of a sense of urgency (Kotter, 2007). Employees often remain in their comfort zones unless they perceive an immediate need for transformation (Kotter, 2007). A powerful guidance and leadership commitment in a cross-functional collaboration environment is powerful tools and necessary to drive transformation (Kotter, 2007). However, even though urgency and leadership alignment exist, an unclear or poorly communicated vision can hinder change implementations as employees require a clear direction to align their efforts with organizational goals and objectives (Kotter, 2007). Leaders must also integrate the vision and goals with the transformations into daily decision-making and organizational discourse to avoid confusion and disengagement (Kotter, 2007). Furthermore,

deeply rooted organizational structures and resistant middle managers can be seen as obstacles to transformations, therefore, these must be identified and addressed early to enable smoother implementations of changes (Kotter, 2007).

To manage change and new innovations effectively, Seijts & Latham (2012) argues that setting goals play a crucial role, as clear and specific objectives enhance motivation and performance. With challenging yet attainable goals, organizations can break them down into smaller, tangible tasks to facilitate engagement and monitor progress (Deci et al., 2017; Seijts & Latham, 2012). In this process, feedback is essential for regular updates to reinforce commitment and allow for necessary adjustments with the correct coaching (Seijts & Latham, 2012). This can also help employees understand how their individual efforts contribute to broader organizational goals and strengthen their sense of purpose and motivation (Deci et al., 2017; Seijts & Latham, 2012). Another approach is setting learning goals, which in a dynamic environment can be beneficial to emphasize skill acquisition and adaptability over immediate results (Seijts & Latham, 2012). Learning goals can also encourage employees to focus on development of new competences and refining processes that is valuable in unpredictable or evolving business conditions (Seijts & Latham, 2012).

Resistance to change is often viewed as a barrier to success, but research suggests it can be a valuable resource if approached constructively (Ford & Ford, 2010; Thomas & Hardy, 2011). Rather than signaling opposition, resistance often indicates that employees are engaged and concerned about the transformation's outcome (Ford & Ford, 2010). Leaders should instead view resistance with curiosity rather than defensiveness, using it to gather feedback, address concerns, and refine strategies (Ford & Ford, 2010). A common bias in change processes is blaming resistance for failures while crediting leadership for successes, overlooking how managerial decisions shape employee reactions (Ford & Ford, 2010). Instead of dismissing critical voices, fostering open dialogue and employee participation strengthens commitment and reduces perceptions of required transformations and changes (Thomas & Hardy, 2011). When acknowledged and harnessed, resistance transforms from a barrier into a driver of engagement and continuous improvement, making change efforts more sustainable and effective (Thomas & Hardy, 2011; Kotter, 2007; Katzenbach et al., 2012).

2.1.1 Motivational Theory

Leadership and management play a critical role in guiding organizations forward, however the understanding from leaders what motivates individuals is equally important to ensure engagement and sustained commitment throughout the process (Deci et al., 2017; Fowler, 2014). To enable effective change processes, understanding quality of motivation, what drives employees to act, adapt, and stay engaged over time is fundamental (Deci et al., 2017). Deci et al. (2017) presents motivational theory as Self-Determination Theory (SDT) where they provide insights into how organizations can sustain commitment and psychological well-being among employees. This theory distinguishes intrinsic and extrinsic motivation, where intrinsic motiva-

tion arise from genuine interest and enjoyment and extrinsic motivation is driven by external outcomes such as rewards or other recognitions (Deci et al., 2017). Extrinsic motivation can be effective, however Fowler (2014) argues that rewards such as higher salary or bonuses can fail in sustaining results and new behaviors. Fowler (2014) further describes how drivers are dangerous as it promotes external motivators while they undermine the basic psychological needs, which diminish the quality and sustainability of motivation. One of these needs are autonomy, which is lost with external motivators as they control employee performance (Fowler, 2014). The long-term value of extrinsic motivation depends on the extent to which it is integrated into employees own values and actions, in other words how it is internalized (Deci et al., 2017). The internalization process is shaped by the social context and is most likely to occur when employees' three basic psychological needs—autonomy, relatedness, and competence—are supported in the workplace (Deci et al., 2017; Fowler, 2014).

Deci et al. (2017) refers to autonomy as the experience of acting with a sense of purpose and ownership where one's actions are self-chosen and aligned with personal values. This is also emphasized by Fowler (2014) and they all further argue that organizations should support autonomy by offering choices, acknowledge employees' perspectives and avoid controlling language, to further enhance internalized goals and meaningful engagement. Relatedness is the second psychological need and involves feeling connected to others, valued, and respected in social contexts (Deci et al., 2017). Deci et al. (2017) describe that when managers demonstrate genuine empathy and interest, they are more likely to internalize external values and gain a sense of belonging. Supporting this, Fowler (2014) argues that people are more motivated when they experience belonging and positive relationships within a workplace, which makes social connections a powerful factor in motivation and commitment.

The third need, competence, relates to the feeling of being effective and capable of achieving the intended results (Deci et al., 2017). For managers, to support competence, it involves providing optimal challenges, constructive feedback, and opportunities to experience growth and mastery (Deci et al., 2017). When employees perceive that their efforts lead to meaningful progress and they can develop useful skills, motivation becomes more autonomous and resilient (Fowler, 2014). In all, these three needs form what Fowler (2014) calls the ARC-model, autonomy, relatedness and competence. The model serves as a practical framework for high-quality motivation in workplaces and other organizational contexts (Fowler, 2014). Fowler (2014) further emphasize that motivation is not about leaders doing something to people, but rather that leaders support people from within by nurturing these basic needs in daily tasks and interactions.

In all, both Deci et al. (2017) and Fowler (2014) underscore that motivation is dynamic and responsive to individuals experience of their environment. Change efforts are more likely to succeed when leaders intentionally support autonomy by involving employees in decision-making, foster relatedness through transparent communica-

tion and trust, and build competence by enabling success and recognizing progress (Deci et al., 2017; Fowler, 2014). Fowler's ARC-model enhance individual engagement and contributes to broader organizational adaptability and resilience to enable people to own change and daily tasks (Fowler, 2014).

2.2 Organizational Culture

Organizational culture is a complex and multifaceted concept that is universally present in all organizations, but difficult to define in a common frame of reference (Bortolotti et al., 2015). It influences all aspects in an organization such as strategy, goals, future visions and technological choices (Bortolotti et al., 2015; de Camargo et al., 2023). Schein (1984, p. 3) define the concept as, "organizational culture is the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.".

To analyze the concept of culture, Schein (2016) describes the analysis in three major levels: artifacts, espoused beliefs and values, and basic underlying assumptions. In the theory by Schein (2016), artifacts are the visible processes and observed behaviors, the espoused beliefs and values are sets of ideals, goals, and aspirations which may or may not be congruent with the artifacts, and the basic underlying assumptions are unconscious beliefs and values that determine behavior, perception, thoughts and feelings. The analysis of the cultural concept is also described by Cameron & Quinn (2006) as they state that an organizational culture is reflected by values, leadership styles, language and symbols, as well as procedures and routines. The authors also describe that the organization's definition of success is an essential part of the culture and shows the uniqueness of the organization.

Schein (2016) argues that the earliest shared learnings in a group sets the cultural DNA with beliefs, values, and desired behaviors. These learnings are in essence non-negotiable for the group as they with time become stable and serve as the structural stability of the group culture, therefore these initial beliefs and values cannot be changed without changing the entire group structure (Schein, 2016). As the group or organization develops their culture, it will be passed on to new members and the basic assumptions of a group culture can guide behaviors and simplify communication and decision making (Schein, 2016). Continuing, the culture is also reflected in the leadership styles of the organization (Cameron & Quinn, 2006). There are various leadership styles, and they influence organizational dynamics and cultural values by providing directing and maintaining values (Silvian et al., 2014). One leadership style the traditional leadership, which according to Liker & Convis (2012), is the way western companies view and apply leadership. This type of management involves top-down strategic planning with specific systems to dictate and control the actions of middle and front-line managers (Anand et al., 2009). Liker & Convis (2012) further describes western leadership as a top-down push system, where peo-

ple are expected to follow orders from senior managers. In the traditional approach, proven senior leaders are hired based on results and ability to make the right decisions (Liker & Convis, 2012). Further, leaders often adopt a proven leadership style from their predecessor, and they are expected to deliver or else they are replaced (Liker & Convis, 2012). Traditional leadership is also characterized by individual recognition and rewards for achievements in terms of performance and disciplinary actions in case of under performance (Liker & Convis, 2012; Liker & Hoseus, 2008).

Another leadership style is transactional leadership, which was initially introduced by Burns (1978) (as cited by Silvian et al. (2014)) and later modified by Bass (1985) (as cited by Silvian et al. (2014)) to an organizational psychology point of view. There are three dimensions of transactional leadership, contingent reward, management by exception-active, and management by exception-passive (Judge & Piccolo, 2004). In all, the dimensions of transactional leadership reflect the process of motivating subordinates with rewards and exchange of benefits (Judge & Piccolo, 2004; Silvian et al., 2014). Contingent reward involves leaders defining expectations and the associated rewards, in other words the degree of constructive transactions or exchanges from the leaders towards the employees (Judge & Piccolo, 2004). Management by exception reflects how leaders respond and take corrective action on the outcome of leader-employee interactions and transactions (Judge & Piccolo, 2004). The difference between active and passive is the timing of the intervention, where active leaders are more proactive with monitoring of behavior, anticipation of problems, and they act in a corrective manner before any serious difficulties may occur (Judge & Piccolo, 2004). In comparison, passive leaders apply a more passive approach and wait with corrective actions until the behavior has created problems (Judge & Piccolo, 2004). In all, the transactional leader negotiates with their subordinate to exchange valuable benefits (Eaton et al., 2024; Silvian et al., 2014).

Moreover, transformational leadership is a style defined by four key factors, charisma, inspirational motivation, intellectual motivation, and individual consideration (Eaton et al., 2024; Judge & Piccolo, 2004). This leadership style stresses the importance of collective purpose and a common vision and goal, and a transformational leader motivate their employees by inspiration, and encouraging a challenging environment for individual development (Silvian et al., 2014). The first key factor, charisma, outlines the way a leader behaves and inspire others to identify with them (Eaton et al., 2024). The charismatic approach of a leader fosters a deep connection with employees, on an emotional level, to encourage them to align with values (Judge & Piccolo, 2004). Inspirational motivation is how the leader articulates the vision in an appealing and inspiring way, for employees and organization (Eaton et al., 2024; Judge & Piccolo, 2004). This aspect of the leaders' approach should include setting ambitious goals and standards to stimulate motivation among employees as well as provide meaning for allocated tasks (Judge & Piccolo, 2004). Intellectual motivation is defined by the degree to which leader challenge ideas and take risks with employee's ideas, which should encourage creativity among the employees (Judge & Piccolo, 2004). Finally, individual consideration is characterized by the leader's coaching and skill in dealing with each employee's unique needs to foster

a sense of personal significance and value (Eaton et al., 2024; Judge & Piccolo, 2004).

Finally, another form of leadership is laissez-faire leadership, also known as non-leadership or avoidant leadership (Barber & Warn, 2005; Judge & Piccolo, 2004). This style is characterized by an overextended firefighter style where leaders ignore problems and avoid decision-making (Barber & Warn, 2005). This leadership style shares some similarities with passive leadership, but Judge & Piccolo (2004) argue that it should be treated separately from other styles, as it devoid of any leadership. In conclusion, there are several leadership styles, and they affect organizational culture in separate ways in terms of values, behaviors, and decision-making processes (Barber & Warn, 2005; Cameron & Quinn, 2006). For organizations to develop and cultivate an effective leadership approach, it is essential to understand the different styles and find the approach that aligns with culture, objectives, and values in the organization (Cameron & Quinn, 2006).

2.3 Continuous Improvement

To define continuous improvement, the Japanese term Kaizen is widely used among many organizations (Zandin, 2001). The definition of Kaizen has been influenced by several publications, Imai (1986) and Liker (2004), among others. Imai (1986) defines the word, in a workplace context, as an ongoing improvement that involves everyone, including top management, managers, and workers. Liker (2004) describes Kaizen as a direction to constantly improve the performance of an organization. In other words, continuous improvement in an organization aims to raise the level of organization-wide performance and eliminate waste, with help from different initiatives and tools (Anand et al., 2009). These tools, such as PDCA, Gemba, 5S, and Root Cause Analysis, help organizations to continuously evaluate their processes and thereby continuously improve (Liker & Franz, 2011). The improvements made with Kaizen efforts are thereby results of the organization's continuous effort (Wittenberg, 1994). One way to visualize continuous improvement and efforts is through the analogy of lowering the water level, presented by Liker & Hoseus (2008). The idea is to lower the water level to expose hidden rocks, which represents problems, and as they are exposed the underlying issues are revealed (Liker & Hoseus, 2008). One system that further exposes problems is the Toyota Andon system, where a worker can pull a cord, which sends an Andon signal, to stop the line to fix quality problems (Liker & Hoseus, 2008). This forces teams to solve problems and work on the daily improvement of processes while not risking safety and quality (Liker & Hoseus, 2008). Systems like Kaizen and Andon can allow team leaders to support the workers and ensure that problems are addressed without compromising standards (Liker & Hoseus, 2008).

However, Kaizen is not solely a set of tools and initiatives for problem-solving, but also a philosophy to move towards an ideal production system (Liker & Hoseus, 2008). Liker & Franz (2011) also emphasize the idea that Kaizen is a philosophy and the implementation requires a lot of work. As an organization, it is unsuitable to copy tools and ideas for Kaizen implementation from others as it would make it diffi-

cult to find successful practices (Liker & Franz, 2011). This could also lead to loss of traction and ineffectiveness, and lack of sufficient coordination and planning can hinder the possibility of sustaining organizational learnings (Anand et al., 2009). With the philosophy mindset, the culture of continuous improvement is strong throughout manufacturing organizations, and with the right leaders, an organization can aim for excellence (Liker & Hoseus, 2008) and systematically improve processes (Anand et al., 2009). Liker & Hoseus (2008) further enhance the importance of engaging competent and willing people and has identified three important aspects for leaders in an organization to engage the right people in the Kaizen and PDCA process. With guidance, trust and discipline, the authors highlight that Kaizen initiatives is done "with" your members and not to them, all to create a team and not an "us versus them" culture within a problem-solving initiative.

One important tool in Kaizen is PDCA (Plan-Do-Check-Act) cycles, which is considered the basis for problem-solving (Liker & Franz, 2011) and the heart of continuous improvement activities to ensure that benefits of new initiatives last (Imai, 1986). With the process, new standards are set, revised, and replaced (Imai, 1986). PDCA cycles has the intention to help people develop a method of identifying, defining, and solving problems as they arise (Liker & Franz, 2011). However, to succeed with the application of PDCA it is important to have the current standards and conditions stabilized (Imai, 1986). The PDCA cycle is a continuation of the Deming wheel and consists of four activities, plan, do, check and act (Imai, 1986). In the plan phase, you identify the gap between the current state and the target and gather data to formulate a plan for improvement (Imai, 1986). The do phase is the implementation of the plan (Imai, 1986). Following this, the check includes an evaluation if the action has brought the planned improvement (Imai, 1986). Finally, the act phase is conducted if the goal is fulfilled, to implement the new standard and ensure that the new initiative is followed and sustained continuously (Imai, 1986). If the check phase fails, and the results are not satisfactory according to the plan, a new plan is formulated, and the process is reiterated (Imai, 1986). In the PDCA process, Liker & Franz (2011) further mention that you must first identify the problem, then try and evaluate different countermeasures, and finally these learnings can help to implement new adjustments. In all, PDCA is an iterative process that can be reapplied until the desired results are obtained (Imai, 1986) and the key concept is to learn deliberately (Liker & Franz, 2011). The iterative PDCA cycle is presented in Figure 2.2 below.

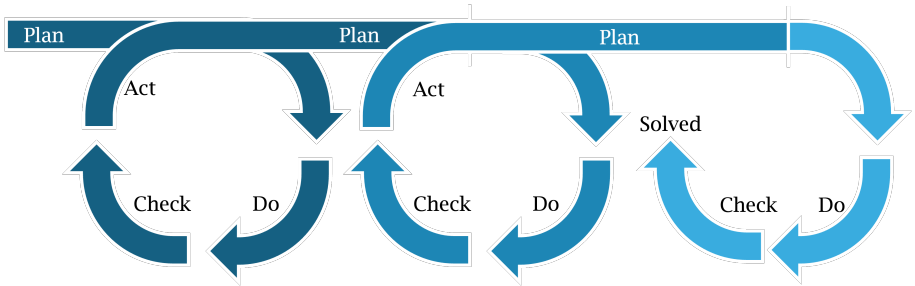


Figure 2.2: Plan-Do-Check-Act Cycle

Furthermore, an important aspect of using PDCA is Yokoten (Liker & Franz, 2011). Yokoten means "across everywhere" and is the name given by Toyota for spreading best practices (Liker & Convis, 2012). However, as mentioned earlier it is important that the adopter of a practice or initiative does not simply copy. Therefore, within Yokoten, the recipient of information has the responsibility to adjust to their own situation to implement a practice where it may be useful (Liker & Convis, 2012). In other words, the environment where the new idea, practice, or process is to be implemented, must be understood for the initiative to succeed (Liker & Franz, 2011). In the act-phase of PDCA it is crucial to apply Yokoten to share new learnings from a cycle and to spread new standards, and for the organization to learn (Liker & Convis, 2012; Liker & Franz, 2011).

2.4 Lean Manufacturing

The Lean manufacturing concept was introduced by Toyota and has been implemented in many production plants across the world (Pawlak, 2024), and many argue that a strong organizational culture is based in Lean principles (Kristensen et al., 2022). Pawlak (2024) describes that the Lean manufacturing (LM) concept allows for quality improvement, cost reduction and increased reaction speed to numerous changes as the various processes of LM are dynamic as well as reduction or elimination of waste. In LM, waste is defined as any activity that does not add value to a product or subject of any process (Pawlak, 2024). Dombrowski & Mielke (2013) further emphasize that in the Lean philosophy, there is no separation between white and blue-collar workers to benefit from employees' tacit knowledge about operative issues. The employees are key factor for sustainable success, and they must understand the tools and methods (Dombrowski & Mielke, 2013).

Liker (2004) and Liker & Hoseus (2008) state that the Toyota Way of Lean manufacturing includes fourteen management principles that can be summarized in a 4P model: Philosophy, Process, People and Problem-Solving, shown below in in Figure 2.3. The 4P model is often displayed as a pyramid, where the foundation of Lean is a long-term philosophy that focuses on adding value to customers and society (Dombrowski & Mielke, 2013; Liker & Hoseus, 2008). Building on this is the waste elimination process, which is done using problem-solving methods that form the top two layers of the pyramid, People and Partners, and Problem-Solving (Liker & Hoseus, 2008).

Figure 2.3: Toyota Pyramid, inspired by Liker & Hoseus (2008)

Apart from the management principles, Toyota has developed a model for presenting the values and principles of Lean as the Toyota Way from 2001 (Liker & Hoseus, 2008). This is often visualized as a temple, see Figure 2.4, where the bottom consists of the five core values that define the Toyota Way: spirit of challenge, Kaizen, Genchi Genbutsu, teamwork, and respect (Liker & Hoseus, 2008). The two pillars are continuous improvement and respect for people, and this forms the temple of the Toyota Way (Liker & Hoseus, 2008). In an organization that has implemented Lean manufacturing and Lean culture, all employees at every level are expected to use the two pillar values continuous improvement and respect for people, in their daily work and interactions (Liker & Hoseus, 2008).

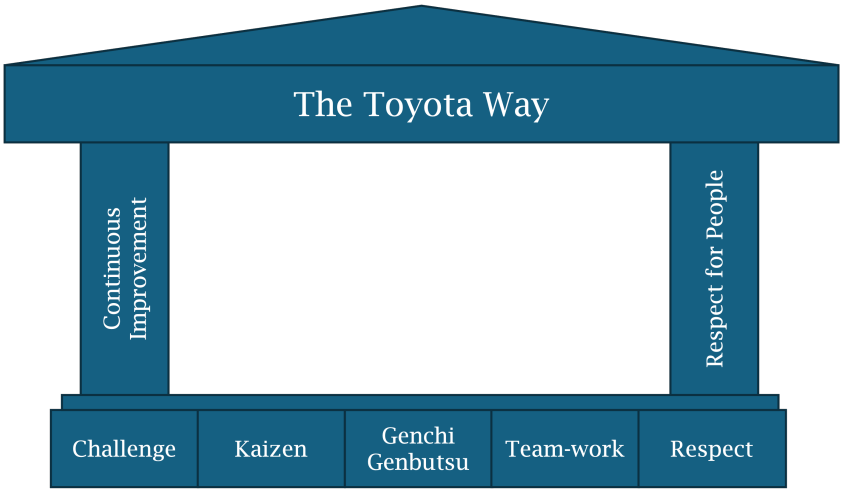


Figure 2.4: Toyota Way Temple, inspired by Liker & Hoseus (2008)

Liker & Hoseus (2008) have described all parts of the temple based on the theories of Toyota and Fuijo Cho. The authors present the values with *Respect for people* as the first pillar, including both respect and teamwork, and covers all people involved in the organization including employees, customers, investors, suppliers, and dealers. Continuous improvement is the second pillar and comes from the belief that people who continuously improve allow constant development and success Liker & Hoseus (2008). The three subcategories for continuous improvement are challenge, Kaizen, and Genchi Genbutsu Liker & Hoseus (2008). Challenge is all about meeting challenges with courage and creativity, Kaizen includes improving operations with a drive for innovation, and Genchi Genbutsu is a practice where you go to the source to find facts and achieve goals Liker & Hoseus (2008).

2.4.1 Lean Leadership

In the Lean philosophy, Toyota's approach to leadership is all about commitment to the core values of an organization (Liker & Convis, 2012). So, leadership within a Lean organization starts with understanding and living out these core values (Liker & Convis, 2012) and to succeed with Lean implementation, leaders must commit in the long-term (Liker, 2004). The idea of leadership from Toyota is to create a challenging, yet nurturing environment where leaders can grow and follow the core values to drive continuous improvement at all levels (Liker & Convis, 2012). Liker (2004) defines the five values of the Toyota Way leadership as the spirit of challenge, Kaizen, Genchi Genbutsu (go and see), teamwork and respect. These are the base for the Toyota Way temple (Liker & Hoseus, 2008) and are also called the True North values that is the core of the Leadership Development Model developed by Liker & Convis (2012). In this model, there are four stages stated, commit to self-development, coach and develop others, support daily Kaizen, and create vision and align goals (Liker & Convis, 2012). This model is a vision based on the values of the Toyota way, that provides a common ground and guide for a company to what they should aim towards (Liker & Convis, 2012; Nesensohn et al., 2012). With a common goal, the true north, the assumption is that every step and progress on the path towards the true north will benefit the organization (Nesensohn et al., 2012).

The model is viewed as cyclical, encouraging leaders to repeat it throughout their careers, integrating self-development with organizational goals to achieve alignment (Liker & Convis, 2012). It applies to both individuals and whole organizations where each leader will go through the stages several times, at different roles and levels (Liker & Convis, 2012). While practicing this model, Dombrowski & Mielke (2013) argues for the importance of understanding what is value adding or not, which is decided by the customer. Therefore, it is important to see that leadership is not value-adding, the shop floor worker adds value to the product (Dombrowski & Mielke, 2013). The leaders should coach their workers and create a strategy for ideal value creation, build the team and develop their skills (Dombrowski & Mielke, 2013), with help and guidance from the Leadership Development Model (Liker & Convis, 2012). In all, the goal of Lean leadership is to have a methodical system that enable a sustainable implementation and continuous improvement of a Lean

production system (Dombrowski & Mielke, 2013). Below follows a short description of each of the steps in the Leadership Development Model based on the theory from Liker & Convis (2012).

The first step is self-development where the idea is to actively seek to improve yourself and your skills, to fill the gaps in individual capabilities. This requires opportunities and support to find the right challenges to allow for coaching at the right time and space in the process. In the process, learning by doing is a central part of the development and this should be under the guidance of a leader or coach. This person should provide challenges, opportunities and coaching to enable learning and development. However, the authors point out that leadership cannot be taught, it can only be learned from willing students who demonstrate devotion to self-development.

The model continues with the second step of coaching and developing others. To enable development for others, the leaders are responsible for maintaining an environment that encourages development, embracement of challenges and learning. Leaders should be actively involved in coaching and developing everyone on their staff, which is also emphasized by the authors as the best way to learn. This part of developing leaders is to help potential leaders to correctly approach and think about problems, and the teacher must allow the student to generate ideas for improvement. In other words, students should be guided to generate material for Kaizen improvements, and with hard work in developing leaders, Lean improvements are more likely to sustain.

In the third stage, the focus is more on institutional leadership and maintaining focus towards the True North. As mentioned above, the authors describe True North as the values of the Toyota Way which provides a non-negotiable, stable vision for where the company should aim towards. Focus on this step for the leaders is to enable, encourage and coach both maintenance and improvement Kaizen from the bottom up. With the support and coaching from the leaders, the goal is that the ownership and understanding of the processes and improvements reside in the work group, which then can lead to improved processes and development of the people.

Lastly, the fourth step is “Create Vision and Align Goals”, which in other words has the goal to align Kaizen to ensure goals are accomplished. In this step, the purpose is to align bottom-up with top-down, a process that Toyota call Hoshin Kanri. Hoshin kanri is a process where the leader and the organization set consensus goals for long-term improvement and how to allocate resources to reach the goals. This step also includes testing and developing ideas through Nemawashi. This is an informal process in the background to lay the foundation for new changes and projects. With a Nemawashi process, a leader can test, modify and improve a proposal at all levels of the organization before it is presented to the top management for final approval. In all, this last step should enable leaders to break down the organization goals to align the team’s daily effort, so each group understands and owns a part of the goals and has a plan for how to reach them.

In all, the role of a Lean leader is, with a framework, to engage team members in value-adding activities and enable efficient ways of working (Liker & Hoseus, 2008). A mindset of that there is always room for improvement is crucial for a Lean leader, and with humility, patience and respect, leaders can foster a culture of innovation and high performance throughout the organization (Liker & Convis, 2012; Liker & Hoseus, 2008). This mindset encourages team members to come up with new ideas and improvements while learning from mistakes, while empowering team members and in the end reach better performance and outputs (Liker & Convis, 2012; Liker & Hoseus, 2008). This is further emphasized by Deci et al. (2017), that Lean leaders must motivate team members and enable a culture of learning-by-doing, sense of belonging and a challenging environment where they can feel confident and use their skills to develop.

According to Liker & Meier (2007), it is often said that the best measure of a leader's success is what is accomplished by their workers in the team. With Lean leadership, the goal is long-term and sustainable development of both workers and leaders, while working with continuous improvement (Dombrowski & Mielke, 2013). This requires a deep commitment to the core organizational values and leaders must understand and embody the values over the long term (Liker & Convis, 2012). Liker & Convis (2012) leadership model promotes a challenging environment where continuous improvement is promoted in all levels, with a four-step approach and core in the True north values. Furthermore, ownership should reside in the work groups to enhance understanding and idea generating while fostering self-development and development of others while continuously improving all processes (Liker & Convis, 2012; Nesensohn et al., 2012).

2.4.2 Standardization

Standardized, reliable processes are one of the main pillars of a Lean production system (Langstrand & Drotz, 2016), and one of the fourteen principles of Lean as principle six: "Standardized Tasks Are the Foundation for Continuous Improvement and Employee Empowerment" (Liker, 2004, Ch. 12). Many find standardization as intriguing and coercive, but that is not the intention of the process (Emiliani, 2008). A standard can be defined as a common solution to a problem to reduce uncertainty and create transparent routines (Larsson, 2021). Standardized work should create conditions that ensure that different employees can carry out production tasks in the same way (Pawlak, 2024). Standardization is in many ways about finding the one best way to do a task, but also about stabilizing a process to enable continuous improvement initiatives (Liker, 2004).

The standardized work is based on three aspects in manufacturing: Tact time, precise work sequence performed by worker within tact time, and the standard inventory required to keep the process operating efficiently (Imai, 1986). Imai (1986) further explains that it is impossible to improve a process before it is standardized, so to enable continuous improvement, one must standardize. Standardized work processes are continuously improving with people presenting new ideas of how to work, and

with that, the process can change (Emiliani, 2008). Working with standardized processes is also a key aspect for improving quality and productivity, as well as minimizing waste (Liker, 2004; Liker & Convis, 2012). Emiliani (2008) present other benefits with standardization include process control, reduction in variability, more predictable outcomes, enabling creation of reference points to improve from, visibility into abnormalities, clear expectations, and a platform for learning.

According to Liker & Meier (2006, p. 74), "the establishment of standardized processes and procedures is the greatest key to creating consistent performance". The author further explains that the work of developing standards should begin early in a Lean implementation, and that it is constant throughout the process of Lean operations. Moreover, one crucial aspect of working with standardized tasks is the ownership (Liker & Hoseus, 2008). In a manufacturing setting, there is a team to perform a set of tasks, and that team has a leader (Liker & Hoseus, 2008). The idea for standardization is that the team owns the tasks and are responsible for defining and improving the tasks and updating when an idea for improvement is presented (Liker & Hoseus, 2008). Further, the idea is that when a team owns the standardized work, it can be a tool to record and teach new ideas (Liker & Hoseus, 2008). Emiliani (2008) also mentions that in a standardized work environment, creative ideas are encouraged, and they can be implemented in a controlled manner, to reach better improvements. In all, the team shares the responsibility for the standardized work and for following the routines (Liker & Convis, 2012; Liker & Hoseus, 2008).

2.4.3 International Standards

Standards are, according to the Swedish Institute for Standards (SIS), jointly agreed solutions to recurrent problems with a purpose to create uniform and transparent routines for different industries and business sectors (Swedish Institute for Standards, 2025). SIS is part of a network that develop Swedish, European (CEN) and Global (ISO) standards (Swedish Institute for Standards, 2025). These standards have a broad spectrum of aims, for instance to facilitate trade and communication, increase safety and accessibility, improve processes and to reduce environmental impact (Swedish Institute for Standards, 2025). The ISO standards are internationally agreed upon by experts in different fields, and the ISO organization describes their standards as "a formula that the best way of doing something." (International Organization for Standardization, 2025c). The two ISO standards in focus for this thesis are ISO 9001 about quality management and ISO 14001 for environmental management systems (International Organization for Standardization, 2025b,a).

2.5 Performance Measurement

To measure performance in practice, most industries use performance indicators and key performance indicators (KPIs) for decision making and reporting (Almström et al., 2017). KPIs are mainly associated with goals, benchmarking and driving of improvement work and have three major purposes, report, control, and improve (Almström et al., 2017). In all, KPIs are important for providing information and

explanations of the company's progress towards stated goals (Almström et al., 2017). When defining KPIs, there are five objectives to have in mind that suggests that KPIs should be Specific, Measurable, Assignable, Realistic and Time-related (Almström et al., 2017). Meekings et al. (2011) further emphasize the importance of setting realistic goals and KPIs, highlighting the issues that can arise from not presenting realistic goals and stressing the need to base goals on both current and future process capabilities. The authors also point at issues with setting targets and there is a possibility that if set too high, targets create stress and de-motivation and if set too low, targets can encourage arrogance. Additionally, if targets are imposed, employees are more unlikely to take ownership and if they are negotiated, there is an incentive to suggest lower targets that are easier to reach (Meekings et al., 2011).

To fully benefit from KPIs, it is essential to understand how, why and when to use them (Almström et al., 2017). First, the KPIs must be aligned with organizational strategies to ensure relevance and understanding at all levels (Almström et al., 2017; Bellgran & Säfsten, 2010). This includes ensuring that the information is spread and continuously evaluated through all levels of the organization to keep goals visible and actionable throughout the organization (Almström et al., 2017; Bellgran & Säfsten, 2010). Standard procedures and clear and concise instructions also ensure support for employees to help understand how and what to measure in each KPI (Almström et al., 2017). Elvnäs (2017) emphasize the importance of clear goals as they help employees understand what is expected and how their individual efforts contribute the organization. To further enhance the understanding, each KPI should have a dedicated owner responsible for monitoring performance and spreading knowledge (Camp, 2015). This understanding of KPIs fosters ownership and engagement, which are essential for sustained improvement (Elvnäs, 2017).

Furthermore, for KPIs to effectively motivate performance, the goals they represent should be perceived as challenging yet attainable, with a clear link between individual behaviors and outcomes while being supported by high outcome expectancy and self-efficacy to encourage engagement and confidence in achieving the targets (Seijts & Latham, 2012). While Elvnäs (2017) emphasizes the importance of clear goals, Seijts & Latham (2012) further stress the need to differentiate between learning goals and performance goals. Learning goals aim to enhance employees' knowledge and skills, whereas performance goals focus on motivating individuals to apply those capabilities in achieving specific results (Seijts & Latham, 2012). Additionally, Sull et al. (2018) highlight the critical role of top management in communicating strategy, objectives and KPI expectations clearly from senior leaders to frontline supervisors. This aligns with the principles of Hoshin Kanri and Kaizen, which emphasize the alignment of strategic goals with KPI targets to foster continuous improvement across the organization (Liker & Convis, 2012). KPIs can also be used to assess performance across different factories in a plant, to enable knowledge and best practice sharing and measurable improvements over time (Liker & Convis, 2012). Common KPIs used in manufacturing organizations and relevant for this thesis include throughput rate, cycle time and takt time (Almström et al., 2017). The explanation for each KPI is presented below in Table 2.1.

Table 2.1: Key Performance Indicators (KPIs) and their explanations

KPI	Explanation
Throughput rate	The time it takes for one quantity to pass through the entire production system (Almström et al., 2017)
Cycle time	The time required to complete a specific task in a sub-process (Bellgran & Säfsten, 2010)
Takt time	The time needed to complete a product to meet the customer demand (Bellgran & Säfsten, 2010)

When designing and using the KPIs, it is crucial to consider if they are leading or lagging (Almström et al., 2017). Lagging indicators, such as throughput rate, are output oriented and show results after a process has been completed, they're valuable for assessing efficiency and output but harder to influence immediately (Almström et al., 2017; Bellgran & Säfsten, 2010). In contrast, leading indicators such as takt time can serve as warning signs that may affect future performance (Bellgran & Säfsten, 2010). However, they are harder to measure but easier to influence which makes them useful for preventing issues before they occur (Almström et al., 2017). Bellgran & Säfsten (2010) link these concepts to strategic capacity planning where a lead strategy can anticipate future needs, while a lag strategy responds after an increase in demand. In safety aspects, leading performance indicators can highlight early warning signs and lagging indicators reflect actual incidents (Lingard et al., 2017; Yorio et al., 2020). To benefit from both, a balanced use can help organizations monitor current conditions while proactively steering improvement efforts (Almström et al., 2017; Yorio et al., 2020).

KPIs are critical tools for identifying bottlenecks in manufacturing processes (Liker & Meier, 2006; Roser et al., 2002), and in Lean manufacturing, eliminating waste and leveling workload requires the identification and elimination of bottlenecks (Liker, 2004). However, finding the true, secondary, or bottleneck over time with utilization indicators is a complex process (Roser et al., 2002). Roser et al. (2002) highlight challenges in using utilization-based indicators, due to machines can appear as highly utilized without disturbing the overall flow. Similarly, buffer indicators face issues such as varying buffer sizes, lack of buffers for certain machines, and the risk of system choking due to full or empty buffers increase (Roser et al., 2002).

Machines are considered active when they limit flow, either when operating, being in setup or under repair, and conversely, they are passive when they are blocked (full output buffer) or starved (empty input buffer) (Roser et al., 2002). The length of a machine's active period determines if it is a bottleneck: a long active period means it limits other machines, while a short one means it is limited by others (Liker & Meier, 2006; Roser et al., 2002). The machine with the longest uninterrupted active period at any given moment is the current bottleneck, and analysis of the overlapping active periods indicate shifting bottlenecks (Roser et al., 2002). This method

charts momentary bottlenecks and calculates the long-term bottleneck probability for each machine (Roser et al., 2002).

In practice, cycle time, takt time and throughput are useful KPIs for bottleneck identification in manufacturing settings (Bellgran & Säfsten, 2010; Liker & Meier, 2006). As Liker & Meier (2006) describes, if a process has a cycle time greater than its takt time it becomes a bottleneck that disrupts schedule attainment. In contrast, if the cycle time is significantly less than the takt time, it can result in overproduction or idle resources (Liker & Meier, 2006). Thus, a process that persistently has a longer cycle time than takt time can be considered a bottleneck operation that requires targeted improvement (Liker & Meier, 2006). Liker (2004) further emphasize the importance of bottleneck identification in Lean manufacturing, to eliminate waste and enhance productivity. The author further describes that productivity improvements in Lean manufacturing rely heavily on continuously analyzing and optimizing bottleneck areas to ensure a smooth value stream. By constantly tracking machine state with KPIs, manufacturers can detect both momentary and long-term bottlenecks (Roser et al., 2002). To effectively manage performance and drive continuous improvement, organizations must not only track the right KPIs but also interpret them within the broader context of organizational strategy, employee motivation, and Lean principles (Almström et al., 2017; Liker, 2004; Roser et al., 2002).

2.6 Knowledge Management

One primary function for an organization is to generate knowledge (Baumard, 1999), and to succeed in organizational performance, the competence and knowledge of the employees is crucial (Osvalder, 2015). Many companies aspire to be learning organizations to maintain an environment for their employees to improve and sustain long term performance (Kristensen et al., 2022). Additionally, in the competitiveness between organizations, knowledge, both explicit and implicit, is an important asset for many (Osvalder, 2015). Explicit knowledge is articulated and theoretically constructed knowledge that is easier to pass on and verbalize (Gagnon et al., 2008; Osvalder, 2015). Often, the explicit knowledge is based on objectivity and possible to understand, collect, systemize, document, and pass on (Osvalder, 2015). Explicit knowledge is most often obtained through studies and education, or while actively seeking for information and knowledge (Osvalder, 2015). It can be difficult to differentialize explicit and implicit knowledge, as knowledge is most often a mix between the two (Osvalder, 2015).

Implicit knowledge is, especially in industrial manufacturing plants, one of the most valuable assets (Pantförder et al., 2017). Implicit knowledge is information that is not directly expressed or documented, based on experienced and often hard to verbalize (Osvalder, 2015; Pantförder et al., 2017). Implicit knowledge is gathered through practice, experience and praxis and can be hard to identify and express in words to pass on and teach (Osvalder, 2015). While it is valuable, using it correctly, investigating, preserving, and processing it to ensure long-term value is challenging (Pantförder et al., 2017). As employees relocate or leave organizations, the risk of

important knowledge disappearing is huge when the most experienced employees leave as they have the most implicit knowledge (Osvalder, 2015).

Additionally, implicit knowledge is present in two forms, tacit and hidden (Baumard, 1999). Hidden knowledge is the type of knowledge that an individual does not want to express, possibly due to having some personal gain in keeping the knowledge personal (Baumard, 1999; Osvalder, 2015). Hiding knowledge can also be to not expose possible shortcuts that break the rules or agreements, as it can lead to negative consequences for the individual (Osvalder, 2015). On the other hand, tacit knowledge is seen as something known that cannot be expressed or explained in depth (Baumard, 1999) and is often grounded in personal experience and opinions, actions and values (Gagnon et al., 2008; Osvalder, 2015). Osvalder (2015) describes the term as it being everything someone knows, except from the things that cannot be expressed verbally or written. This is further emphasized by Baumard (1999, p. 23) and he also describes it as a ”reservoir of wisdom” that an organization maintains to avoid imitation.

Tacit knowledge is acquired through actions, implementations and reflection, and it can take several years to gain enough knowledge to understand complex tasks and behaviors (Osvalder, 2015). However, the tacit knowledge is fundamental to solve problems with intuition and experience (Baumard, 1999; Osvalder, 2015). Tacit knowledge is also crucial in maintaining organizational flexibility where employees have knowledge about each other, everyone's intentions, goals, and fields of interest, as these aspects are not universal knowledge (Baumard, 1999). Furthermore, tacit knowledge has two dimensions, cognitive and technical (Osvalder, 2015). The cognitive dimension encompasses mental models with paradigms, beliefs, visions and personal perspectives while the technical is about knowing how, in practice (Osvalder, 2015).

In the perspective of tacit knowledge, it is also important to understand why knowledge remains implicit (Osvalder, 2015). It is difficult to express knowledge from events where one has been present or from one's muscle memory (Gagnon et al., 2008; Osvalder, 2015). Another aspect is the gathering of knowledge, which is realized through mental models and memory systems that can be visual, auditive, or abstract and this can be hard to convert to speech or words (Pantförder et al., 2017; Osvalder, 2015). In comparison to explicit knowledge that can be documented, implicit knowledge is stored in mental models (Pantförder et al., 2017). The mental models help to facilitate cognition, problem-solving and decision-making by simplifying the real issue (Pantförder et al., 2017). To find and understand implicit knowledge from experienced employees in an organization, it is mainly about trying to understand these mental models, intuitions and rules which are used to solve complex situations (Osvalder, 2015). Furthermore, the acquisition of mental models is crucial to detect errors and optimize efficiency in different processes (Pantförder et al., 2017). It is also important to use them to externalize the implicit knowledge and thus support less experienced employees in decision-making and new processes (Pantförder et al., 2017).

2.6.1 Organizational Knowledge

As mentioned earlier, obtaining implicit knowledge through mental models is crucial for externalizing knowledge, which supports new employees and contributes to organizational development. To make sense of their environment and help employees understand it, organizations must foster the interaction between explicit and implicit knowledge (Baumard, 1999). This interaction allows organizations to rely on models, memory, and experience to better understand and improve their processes (Baumard, 1999). In this context, organizational knowledge is often defined as the individual employee's comprehensive understanding of the organization's strategies (Gagnon et al., 2008). Such knowledge plays a key role in ensuring strategic alignment, where both explicit and implicit knowledge contribute to a shared strategic direction and commitment to goals (Gagnon et al., 2008).

The duality of knowledge aligns with the two ways of thinking, "System 1" and "System 2", a theory presented by Hess (2014). System 1 is quick and automatic, and System 2 is slow and effortful, and the systems could also be described as single-loop and double-loop thinking or intuitive and reflective thinking (Hess, 2014). The System 1 is an autopilot-like thinking system that relies on our existing mental models which are based on experience, assumptions and inferences (Hess, 2014). System 2 is when one is taking their cognitive and emotional processing to a higher level (Hess, 2014). System 2 is used when weighing alternatives or doing a root cause analysis to evaluate different strategic scenarios (Hess, 2014). To understand and make meaning from anomalies, contradictions and failures, System 2 thinking is required to make new knowledge meaningful and make good decisions (Hess, 2014).

According to Hess (2014), organizations rely on operational excellence and innovation to grow, improve performance, and deliver to customers, and the foundation for all is learning and individual knowledge (Hess, 2014). As Gagnon et al. (2008) emphasize, strategic knowledge is built on individual understanding, which enables alignment with strategic goals. This is also emphasized by Hess (2014), for organizations to learn the individuals within them must learn continuously, in other words they must learn to learn. This concept is central to become a learning organization, which facilitates adaptability to market changes and ensures long-term success and competitive advantage (Kristensen et al., 2022). Combining organizational excellence and working towards being a learning organization, is key to maximize long-term winnings, according to Saabye et al. (2022). The authors further emphasize that learning to learn is a core enabler for continuous improvement and sustainable improvements.

Furthermore, one essential aspect in organizational knowledge is the coaching and development of both new and current employees (Liker & Convis, 2012; Ferenhof et al., 2018). To maintain a good learning environment, the passing of knowledge must work for the organization to continuously improve (Ferenhof et al., 2018; Kristensen et al., 2022). Furthermore, to enable knowledge sharing it is crucial to hire the right people to make it sustainable and successful (Kristensen et al., 2022). Rother (2009) describes the importance of systematic procedures and routines to utilize capabilities

and achieve the potential of each employee. This requires the right leaders who can facilitate psychologically safe learning environments and structural team learning, in other words you must hire the right people from the beginning to reach operational excellence (Kristensen et al., 2022). With systematic procedures, knowledge sharing, and the right people in the right places, an organization can continuously improve (Ferenhof et al., 2018; Kristensen et al., 2022; Rother, 2009).

In all, the previously mentioned important aspects of organizational success have one thing in common that must work, which is communication (Ferenhof et al., 2018). Communication is important in all organizations, but especially in manufacturing environments where multiple shifts with different personnel are employed (Worley & Doolen, 2006). When the communication fails, production and quality can suffer and resistance and issues between employees may occur (Worley & Doolen, 2006). Communication skills are not just the ability to speak in a two-way communication, it is also about body language and gestures (Liker & Meier, 2007; Simoes & Esposito, 2014). Good communication is a key component for successful training and handing down knowledge and integrate across specialties and shifts (Liker & Meier, 2007). However, the lack of communication can lead to resistance (Simoes & Esposito, 2014) and an increase in misunderstanding and errors among employees (Liker & Meier, 2007).

While communication plays a key role in organizational learning and success, errors can still occur due to the complexity of human cognition and decision-making processes (Döös et al., 2004). Learning work tasks involves the development of mental frameworks that over time requires lower cognitive efforts but may still lead to errors and mistakes (Döös et al., 2004; Liker & Meier, 2007). What is important to consider in the matter is that trial and error is one way to learn, so to some extent errors are acceptable (Liker & Hoseus, 2008). However, to minimize errors and improve overall performance, it is crucial to understand how employees learn, process information, and act in the work environment to ensure that learning involves the development of mental frameworks that are stable and adaptable (Döös et al., 2004; Liker & Meier, 2007). Over time, the mental frameworks and structures develops to become more complex and with practice performing these actions becomes more automatic and requires lower cognitive level (Döös et al., 2004). With good communication and leaders who facilitate safe learning environments, employees can easier facilitate and share knowledge and skills to further enhance organizational performance and efficiency (Kristensen et al., 2022; Liker & Hoseus, 2008; Worley & Doolen, 2006).

3
Methodology

This chapter presents the case study methodology used for the research. It included three phases with an initial pilot study, then a main study, and finally a concluding analysis. This method with the stages for all phases is presented in Figure 3.1 below.

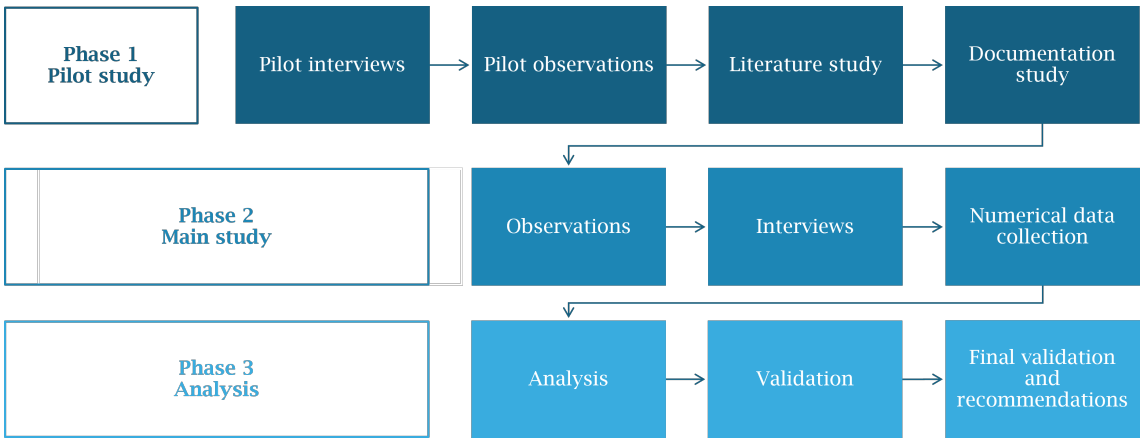


Figure 3.1: Research methodology

A case study approach is the preferred method of research when "(a) 'how' or 'why' questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context" (Yin, 2009, p. 2). It was a form of ethnography that generally focuses on cultural norms, organizational values, and workplace behavior (Bell et al., 2019) and includes a high level of researcher involvement in the organization. In this case study, the researchers acted as a part of the organization and worked the same hours as the employees. This approach has led researchers to be less obtrusive in case studies (Bell et al., 2019). Using multiple sources of data is essential (Yin, 2009). This thesis is based on a case plant, reviewing two of the internal factories, case factory A and case factory B, and the core organization of the plant. The case study evidence was collected by observations, interviews, document studies, and numerical data analysis. A data collection method should always be tested prior to conducting the case study in order to be well prepared (Descombe, 2017), which is why a pilot study was conducted. If the pilot study goes well, the researchers can feel confident, and if it does not go as intended, the methodology and contents could be adjusted before carrying out the main study (Descombe, 2017; Yin, 2009). The focus of the pilot study therefore was on getting to know the organization and its processes and testing possible ways of collecting data in regard to people and organizational

structure of the case subject. After the data collection, the results were analyzed using Davis et al. (2014) socio-technical systems (STS) framework and compared to existing research. Lastly, best practices were listed from the case study and the literature study, and final recommendations could be formulated. While conducting the case study and writing the report, AI tools were used to get suggestions on how to improve the overall structure and language of the text, focusing on clarification without affecting the content or analysis.

3.1 Field Notes

Throughout all stages of the case study, field notes were documented in a notebook. Field notes can include accounts of behavior, summaries of meetings, and the researcher's immediate reflections (Bell et al., 2019). It should also include dates, people involved, location, and occasion. In this case, it also included quotes, observations of actions, and potential follow up questions and their answers. This data was documented in the report as informal observations and informal interviews.

3.2 Pilot Study Interviews

During the first phase of the case study, unstructured interviews were conducted in case factory A. In an unstructured interview, the interviewer asks open-ended questions, allowing the interviewee to freely express their opinions (Osvalder et al., 2008). This format gives the interviewee the opportunity to guide the conversation towards topics they find important. It is also known as an open interview and this method is ideal when the interviewer has only a general idea of the relevant areas to explore and lacks extensive knowledge about the subject. Unstructured interviews produce qualitative data and are excellent for exploratory studies (Osvalder et al., 2008). Since there are no predetermined answers, all responses are open-ended. The main advantage of unstructured interviews is the ability to follow up on intriguing questions or deepen the investigation into specific topics to understand the interviewee's perspective. Therefore, the findings were collected and guided the formal interviews in the main study. The interview targets were chosen through snowball sampling, which means that one person, in this case the industrial supervisor of the researchers, suggested candidates based on relevant knowledge or experience related to the subject of the thesis (Bell et al., 2019). The intention was to interview employees who were present during daily meetings in production. This included different functions connected to different organizations and shifts, where shift X is the day shift and shift Y is the evening shift. The final interviewees for the unstructured interviews during the pilot study are presented in Table 3.1.

Table 3.1: Interview targets pilot study

Interviewee Target	Organization	Shift
Factory Manager	Case Factory A	-
Middle Manager Operations 1	Production	-
Middle Manager Operations 2	Production	-
First Line Manager 1	Production	Y
First Line Manager 2	Production	Y
First Line Manager 3	Production	X
Team Leader 1	Production	X
Team Leader 2	Production	Y
Middle Manager Maintenance	Maintenance	-
Technician 1	Engineering	-
Technician 2	Engineering	-
Technician 3	Engineering	-
Factory Engineer	Engineering	-
Plant Engineer	Engineering	-

3.3 Pilot Study Observations

To further understand behaviors of people and investigate the alignment between words and actions, interviews should be supplemented with observations to get a picture of how people actually behave in different situations (Osvalder et al., 2008). Observations are valuable for understanding the actual use and problems of current standards and ways of working (Yin, 2009). It gives a true picture of what people do, not of what they say, think, or intend to do (Descombe, 2017; Osvalder et al., 2008). The pilot observations were conducted in the natural setting of the target as unsystematic observations, and covered different organizations to get a broad perspective of the case company. The unsystematic observations allows the researchers to gather information about a situation at the early stage of the study and everything of interest was noted to get a broader understanding (Osvalder et al., 2008). The observations were done directly where the researchers as observers were present and observed with their own eyes and ears. According to Osvalder et al. (2008) and Yin (2009), recording direct observations can be done with written protocols, checklists, loose notes or photographs, and all were used in the pilot observations except from a checklist. The observation targets are presented below in Table 3.2. Due to lack of availability of the observation targets, only shift X was covered in this part of the pilot study.

Table 3.2: Pilot Observation targets

Observation target	Organization	Shift
Plant Manager	Plant	-
Factory Manager	Case Factory A	-
Middle Manager Operations 1	Production	-
Middle Manager Operations 2	Production	-
First Line Manager 3	Production	X
First Line Manager 5	Production	X

3.4 Literature Study

The literature review was conducted to gather relevant information and further enhance the understanding of the topic. This part of the project was crucial to determine what is already known about the topic, main concepts, known research methods, and possible controversies or clashes of evidence (Bell et al., 2019). Initially, the literature search began by screening articles and literature from courses that the authors have taken previously in the Master program Production Engineering at Chalmers University of Technology. These courses include Lean Management, Manufacturing Strategy, Production Management, and Change Management. The screening of this course material was based on the background and pilot study findings to find relevant sources. Based on the initial literature review, in combination with the background, objectives, and aim of the thesis, the more precise literature review was conducted with the database Scopus. From the stated aim, research questions and objectives of the thesis, the searches were performed with a set of keywords and combinations, presented in Appendix A.

In the search, some filtering was added to ensure accurate results for this project. Only articles, reviews, book chapters, and conference papers in English were retained in the search. From these results, the screening was done by the authors by reading abstracts to find relevant articles that matched the aim and topic of the thesis. To deepen the literature review, the snowball technique was used to find relevant articles in the reference lists. The snowball technique implies a backward search technique where you search the references and citations of the articles from the initial keyword search, to find additional relevant material (Bell et al., 2019). An important aspect to consider while using this strategy is to make sure the new articles are evaluated in the same screening methodology as the articles in the initial search (Bell et al., 2019). The establishment of the literature framework was a continuing process during the project. Initially, the literature study enabled a framework for conducting the qualitative and quantitative study, and ultimately it was used to link the findings with the research questions and discussion to the existing literature. This is an important part of the study to enable a demonstration of the credibility

of the research (Bell et al., 2019), which also aligns with a case study approach (Eisenhardt, 1989).

3.5 Documentation Study

Documentation includes documents such as calendars, notes, agendas, announcements, minutes of meetings, and administrative documents to name a few (Yin, 2009). The internal documentation site for instructions and standards at the case company was searched for meeting agendas to map the standards for daily, weekly, monthly, and quarterly meetings and for protocols to serve as a ground for observation forms. The department calendar was also used to schedule and plan data collection to match the availability of employees.

3.6 Pilot Study Analysis

In the start of an analysis, it can be helpful to ”play” with the data to get a sense of how it could be sorted (Yin, 2009). Yin (2009) further mentions that the findings of a case study can be sorted in a matrix of categories. In this case, the findings of the pilot study were sorted according to Davis et al. (2014) socio-technical system (STS) framework. In Figure 3.2, the six elements; people, technology, culture, goals, processes, and infrastructure are shown with lines showing that they are interlinked.

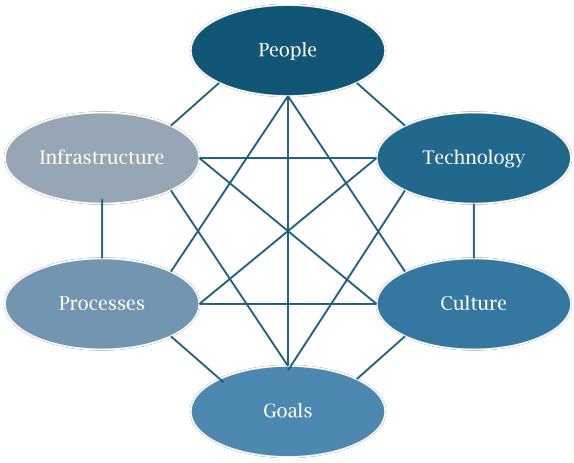


Figure 3.2: Davis et al. (2014) STS framework

This framework provides a picture of how systems work together and provides the foundation for a systematic analysis of a complex system (Davis et al., 2014). The framework could be used to identify the causes of error and map improvement efforts (Davis et al., 2014). To know what findings could be significant, theoretical propositions were used. Theoretical proposals are good to use in the early stages of the analysis to reconnect the findings with the theory that laid the ground for the research questions, ensuring that the findings answer the research purpose (Yin, 2009). From the findings of the pilot study, investigation areas could be formed. In this case, the validity of the findings from observations and interviews was checked

using existing research to verify its importance. The data sources used in this analysis are included in Figure 3.3 to demonstrate the convergence of the evidence from the pilot study.

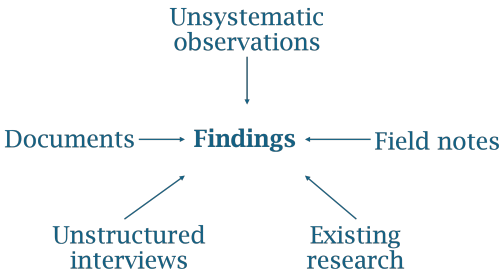


Figure 3.3: Convergence of evidence for pilot study analysis

After the pilot study was completed, research protocols for the main study could be designed based on the areas of investigation. This included the creation of observation protocols, interview guides, and goals for data collection. The method was also reviewed based on identified opportunities and time requirements.

3.7 Observations

For all observations in case factory A, two protocols were used that are presented in Appendix B, Table B.1, and B.2. Using a protocol increases the reliability of a case study and acts as a guide for the investigator when collecting data for research (Yin, 2009). To increase reliability, there should be more than one single observer (Yin, 2009) therefore, both researchers participated in this part of the study. This enabled systematic observations that were carried out according to a predetermined schedule (Osvalder et al., 2008). Observations were made in all production areas in case factory A, and in six different meeting forums at all levels of the hierarchy. The observation targets are presented in Table 3.3 with their corresponding manager and shift. To

Table 3.3: Observation targets

Observation Target	Manager	Shift
Plant Manager	-	-
Factory Manager	Plant Manager	-
Middle Manager Operations 1	Factory Manager	-
Middle Manager Operations 2	Factory Manager	-
First Line Manager 1	Middle Manager Operations 1	Y
First Line Manager 2	Middle Manager Operations 2	Y
First Line Manager 3	Middle Manager Operations 1	X
First Line Manager 4	Middle Manager Operations 1	X
First Line Manager 5	Middle Manager Operations 2	X
First Line Manager 6	Middle Manager Operations 2	Y
First Line Manager 7	Middle Manager Operations 1	Y
Team Leader 1	First Line Manager 5	X
Team Leader 2	First Line Manager 6	Y
Team Leader 3	First Line Manager 4	X

3.8 Interviews

Interviews are a useful method to collect case study information (Yin, 2009). They should have a fluid structure and be like guided conversations rather than following a fixed structure. The interviewer's task is therefore to balance receiving the required information while keeping the conversation 'friendly' (Yin, 2009). This also includes not guiding the answers, which could lead to bias, and instead sticking to open questions. For the main study, semi-structured interviews were conducted. A semi-structured interview is a middle ground between a structured and an unstructured interview (Osvalder et al., 2008). A framework was established in advance regarding the areas to be covered, with room for interviewers to freely choose the order of topics and ask follow-up questions. The investigation areas of the pilot study constructed the template for the interviews. This allowed a more systematic analysis of the results to be conducted in the later stages.

The interview questions, see Appendix C, were conducted after combining insights from the pilot study, theoretical framework, documentation, and observations. For the sake of impact and purpose of the project, managers were consulted about who were suitable interview targets during the pilot study. Additionally, the scope of the project was considered before designing the interviews and deciding the targets. The

interviews were conducted over a two-week period. All interviews were between 30-60 minutes long and were conducted in Swedish. As seen in Table 3.4, six different roles were interviewed and for each role the interview questions were matched to a template. The templates are presented in Appendix C. The areas of investigation were the basis for the interview templates. However, some areas were excluded from certain templates due to a lack of direct responsibility or ownership. So, all first-line managers had the same template, and the middle managers responsible for operations (abbreviated as MM Op) had the same, the middle managers for strategy had the same, the plant manager had one, and the factory manager had another template as well as the human relations employee, see column 4 in Table 3.4. 14 semi-structured interviews were conducted, all presented in Table 3.4 with the corresponding manager, as well as their shifts and what template was used for the specific interview target. In parallel, additional informal interviews were conducted to broaden the scope and expand the coverage of the investigation areas.

Table 3.4: Interview targets

Interviewee	Manager	Shift	Template
Plant Manager	-	-	A
Factory Manager	Plant Manager	-	B
Middle Manager Operations 1	Factory Manager	-	C
Middle Manager Operations 2	Factory Manager	-	C
Middle Manager Strategy 1	Factory Manager	-	D
Middle Manager Strategy 2	Factory Manager	-	D
First Line Manager 1	MM Op 1	Y	E
First Line Manager 2	MM Op 2	Y	E
First Line Manager 3	MM Op 1	X	E
First Line Manager 4	MM Op 1	X	E
First Line Manager 5	MM Op 2	X	E
First Line Manager 6	MM Op 2	Y	E
First Line Manager 7	MM Op 1	Y	E
Human Relations	Factory Manager	-	F

The interview targets were contacted in advance to book an appointment and with the invitation they received a brief background and purpose of the thesis project. Furthermore, at the beginning of each interview, a brief background of the project was presented to give the interviewee a sense of understanding of the purpose of the interview. All interviews were conducted individually and recorded after an agreement that only the researchers accessed the recordings and that they were

deleted after the project was finished. The recordings were used for transcription to later be used for interview analysis. Notes were taken during each interview, in addition to recording and transcription, to obtain a detailed description of the interview.

3.9 Numerical Data Collection

Numerical data could be collected through observations and interviews, and the rest of the collection came from using existing numerical data at the case plant. After discussions with case company collaborators on what type of data would be most suitable for this project, as well as the findings of the literature study, key performance indicators were identified and used for further analysis. Collaborators were also consulted on how to get access to the data. There was sufficient data already provided to make a comparison of before and after, so there was no need to construct new equations or make additional measurements. The existing data was historical results of the KPIs and KPI scorecards, as well as live throughput and bottleneck index numbers. However, new categorizations were made to anonymize the data and clarify for external readers.

3.10 Analysis

To strengthen the findings and make them more accurate and convincing (Yin, 2009) triangulation was used to find converging evidence (Yin, 2009). In this case, the findings of the pilot study and the main study were combined to show convergence, as seen in Figure 3.4. When searching for themes in the data, researchers should look for key elements (Bell et al., 2019). Repetitions, which are topics that recur frequently, and local terminology or categories are also important as they include local expressions that are either unfamiliar or used in an unfamiliar way. Metaphors and analogies are another crucial aspect, as they reveal how participants represent their thoughts through figurative language (Bell et al., 2019). In addition, missing data were considered by reflecting on what is not present in the data and asking questions about what the interviewees might omit in their answers. Using these elements, findings could be effectively identified and analyzed (Bell et al., 2019).

Figure 3.4: Convergence of evidence from main study analysis

The findings of the study from case factory A were analyzed and summarized by the elements of Davis et al. (2014) STS framework. In the analysis, the convergence of evidence and a theoretical synthesis were presented. In the search for best practices, a visit to case factory B was made, where four unsystematic observations and field notes were taken. Because case factory A is the main factory for the study, only strengths in case factory B were searched, and not weaknesses as during the case study in factory A. After the analysis of the present state and case study B, the best practices could be summarized. The best practice findings were prioritized based on possible impact if implemented. This, along with the findings of the literature study, provided final recommendations for case factory A on how to align daily operations with top-down directives. The STS framework by Davis et al. (2014) was again used, but to summarize the best practices found in case factory A, case factory B, and existing research.

3.11 Validation

The case study was validated throughout the project. Multiple sources of evidence were used as seen in Figures 3.3 and 3.4, the links between them were presented, and company collaborators in the case plant reviewed both methods and findings, all of which contributed in ensuring construct validity (Yin, 2009). Therefore, in each phase of the research process seen in Figure 3.1, the findings were validated by the case plant employees to make sure that both the extent and details of the findings were plausible. This also included assuring that the methods were suitable for collecting the data aimed at. Internal validation testing was performed by finding converging themes from different data sources, building investigation areas, and addressing rival explanations as Yin (2009) recommends. This was done using Davis et al. (2014) STS framework in the analysis. The external validity was tested to some extent by reviewing case factory B, however, it was mainly strengthened by existing research, which is what should be done if there is no other case to compare to (Yin, 2009). Lastly, reliability was confirmed by using study protocols when collecting data and summarizing the findings in a data sheet, which aligned with the last recommendation for validity in case studies (Yin, 2009).

3.12 Ethical Considerations

Throughout the case study, ethical aspects were considered during the execution of the qualitative study to ensure anonymity and transparency in the presentation of personal opinions (Yin, 2009). Making a statement about workplace culture could be harmful if the statements contained personal information and could be traced to the individual (Runa Patel, 2019). Therefore, it was necessary to obtain informed consent from all participants and ensure their anonymity by not using their real names. Information was handled with care, and interview transcriptions, observation protocols, field notes, and documentation were only shared between the researchers. Furthermore, the categories and information of the available data were renamed and clarified, not only for anonymity, but also to make it easier for the reader to understand the data.

4

Results

The results of this case study are presented in five sections; pilot study, analysis of the pilot study, main study for case factory A, main study for case factory B, and a concluding analysis. To further illustrate the result chapter, Figure 4.1 shows the sections and how they relate to each other and the research questions. In the figure, case study A and case study B correspond to the main studies of case factory A and case factory B.

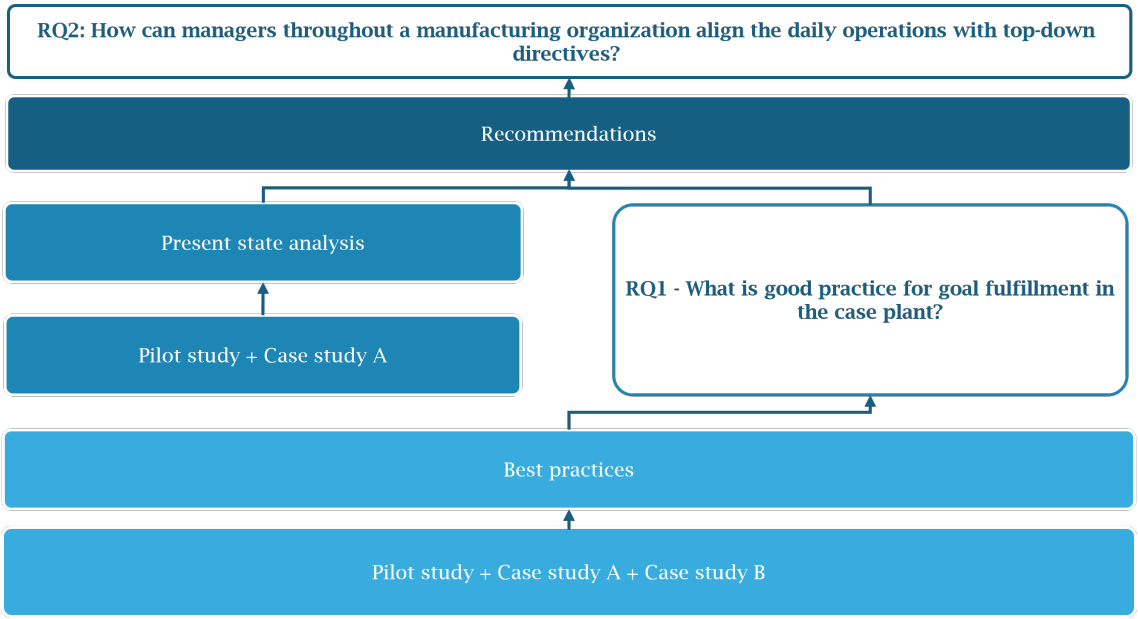


Figure 4.1: Linking Results to Research Questions

4.1 Pilot study

Based on the research questions, the pilot study tested the data collection methods and found six areas for further investigation. These main areas guided the protocol for observation, interviews, and data collection of the main study, as well as shed light on literature topics to investigate further.

4.1.1 Mapping Case Factory A

The manufacturing plant is made up of three self-governed factories with varying levels of automation. The case subject is a metal joining factory with a high level of automation, about 85%. The automation could be divided into three levels, the first being manual work with cognitive support and automatic tools. The second level are the lines where operators load material onto the line and robots join it together. Lastly, there are completely automated lines. There are two main flows, consisting of many independent production lines. Between the lines there are buffers that act as a safety measure for when a line breaks down so that the following lines can continue working. The roles in production that were within the scope of the project are presented in Figure 4.2.

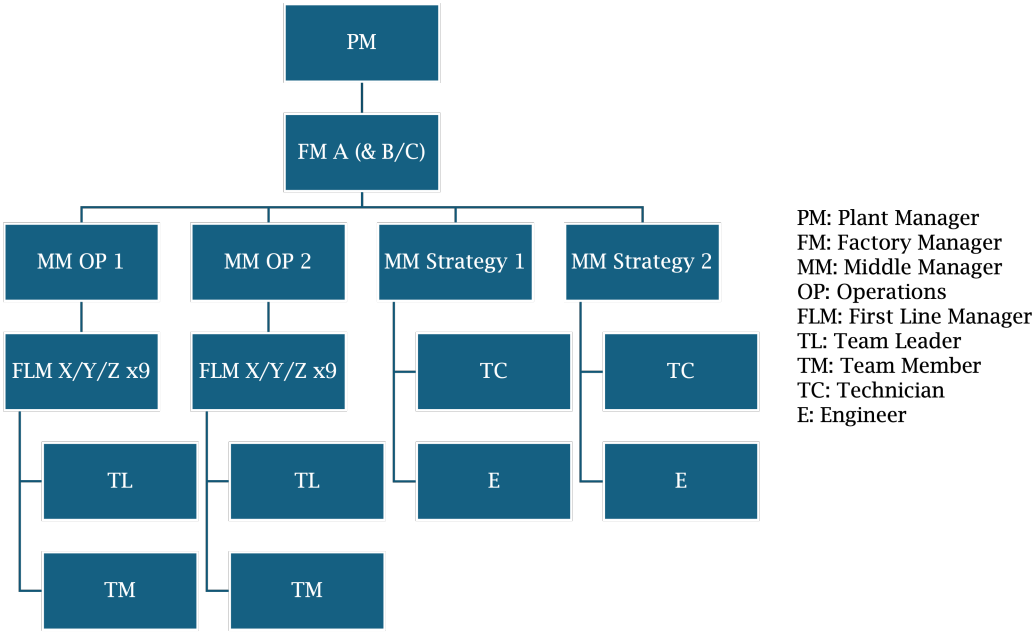


Figure 4.2: Organization chart for case plant

The first-line managers, team leaders, and team members work in shifts, while the other roles work only during the day. For the teams X, and Y, the workers schedule rotates weekly between the day and afternoon shift. Then there is a fixed schedule for the night and weekend shift workers. This means that middle managers do not naturally meet their employees who work night or weekends and that those employees have less organizational support. Each first-line manager has about 30 employees, and the middle manager has nine or ten first-line managers and an operational support employee. In addition, there are support functions such as process technicians, maintenance technicians, and geometrical assurance.

One finding from the mapping of the organization was that there was an alarming managerial employee turnover rate, with one quote that stuck out ”He has been a first-line manager for a long time, it has been 2 years since he started”. There were also a low number of meetings in which everyone who had been invited could actually attend. In some cases, the absent sent a replacement from their subordinates,

but on other occasions either no one showed up in their place, or two people showed up. In almost all of the cases the replacement did not know what was expected of them and could not contribute to the meeting as supposed. When discussing this issue with the factory manager and the middle managers, they mentioned that if someone could not attend their meeting, they were instructed to choose a replacement. The replacement should be sufficiently instructed on what will be expected from them so that the meeting can be held as normal without any deviations from the normal circumstances. The issue of turnover of employees in managerial roles will be investigated in detail during the main study. What happens in the event of absence so that the daily operations can go on undisturbed will also be further investigated.

4.1.2 Finding Interview Targets

Due to the turnover of employees in managerial roles, middle managers recommended first-line managers and team leaders that were the most experienced as targets for both pilot observations and interviews. As for the rest of the interview targets, observations and getting to know the organization served as a guide for deciding on what other areas would be included.

4.1.3 Finding Possible Observation Points

When searching for suitable observation observation targets, the different types of meetings identified were sorted into two categories, daily and weekly.

Daily Management Meeting
At the beginning of each shift, the team leaders for each line in the first-line manager area attend and report their safety, delivery, and quality issues for the past 24 hours, and planned actions. The meeting also includes roles such as process technicians, service technicians, and geometry assurance. Afterwards, the first-line managers meet up with their middle manager to report the information they recieved. At the beginning of X-shift, after the middle manager start up meetings the middle managers for production, maintenance, logistics, launch, quality, and production engineering are attending and reporting their issues on safety, delivery, and quality reported during the past 24 hours, and planned actions. Finally, factory managers met with the plant management team to report the information from the morning meetings.

Weekly start up meeting in the production teams
At the beginning of the shift each Monday or Sunday for the night shift, the team leader gathers the group for a 12-minute meeting. There is no set agenda, and participants can vary. This is usually where the team leaders inform the team members about decisions that have been made or what the focus is for this week.

Weekly Strategy Alignment Meeting
Each week, middle managers gather their subordinates for a two-hour meeting. The

purpose is to discuss current projects and the staffing of their areas. This is also a chance for first-line managers of the same area to meet since all first-line managers are attending regardless of what shift they work, and for other functions to share information to them. This could be on process development or human relations projects, for example. Every Monday, the factory management team meets for four hours to discuss current projects and make decisions about problems that might have occurred during the previous week. The same meeting is held in the plant management team each week.

Weekly Bottleneck Analysis Meeting
To improve throughput in the factory, each week, the lines in each flow that have the highest bottleneck index have a problem-solving meeting for process technicians and middle managers. The line team leader presents what has happened and what they are doing to figure it out. Then the attending support functions have the opportunity to help either directly or book a time to consult later. There is no standard for this meeting, and the employees who have transferred from case factory B were easy to spot, since they had a superior structure of their analysis.

4.1.4 Investigate Numerical Data

The case plant has two different types of KPIs. The first is the result KPIs defined by global managers and applied to all factories in the world. Then there are process KPIs, defined and measured by the local factory. They are intended to support the result KPIs and guide the process toward achieving the globally defined KPIs.

In the pilot study, the KPIs were investigated to find the ones related to the products produced at shop floor level. This resulted in that the data collection should cover bottleneck index (BNI), which is losses compared to allowed losses. It should also cover throughput rate, i.e. number of units produced per hour. Lastly, over-cyclings were included, which counts the time and occurrence of an operation that exceed the takt time. After that, it would be possible to compare the shifts and the teams and see how the performance varies. For example, only the day shift has organizational support in the form of process technicians and engineers, middle managers, and the factory manager. There is also a measurement of the number of unique participants in the improvement work and the number of closed improvement projects. This could possibly show what level of knowledge is attained in the team. For the analysis of competency retention, it was decided that the employee turnover rate for managerial roles within production operations would be further analyzed.

4.1.5 Field Notes

After having tried some possible observation points and conducting interviews during the pilot study to discuss operations with some of the employees, a few things stood out. When touring the areas, all team leaders presented their lines and work with great pride, however, one negative thing was reoccurring. Many of the team leaders failed to follow the link between their set goals and their actions. One team

leader said ”this one (pointing at a KPI) is always red (not okay), and we do not know what to do to change it, nothing we do makes it green (okay)”. At meetings, it was also observed that the employees had calculated their KPIs differently and errors were reoccurring. When visiting another part of the factory, a quote stood out that said ”... ask him, he has been here a long time, since 2023!”. When looking at company data, it was confirmed that the average amount of new first-line managers during 2024 and February 2025 was 0.4 new per week.

Notes from observing events in the factory include that there is frustration among employees due to the attendance level at meetings. Not everyone invited attends their daily and weekly meetings. Another thing that was noted during the meetings was the middle managers' frustration about that the first-line managers did not ask for the help that they clearly needed. However, neither attendance levels, KPI understanding, or standard fulfillment seemed to be followed up and reacted on.

4.2 Pilot Study Analysis

The findings from the pilot study were categorized by element from Davis et al. (2014) STS framework. The pilot study findings are presented with the STS framework below in Table 4.1.

Table 4.1: STS framework presentation of pilot study findings

Element	**Finding**
People	Varying competence and experience of leaders and attendants
People	No shows
People	Lack of understanding of purpose of goals and activities
People	High turnover in managerial roles
People	Decentralized operations/development
People	Managers/support only present during one of 3 shifts
Technology	Lack of knowledge/familiarity of data analysis tools
Culture	Not asking for help when uncertainties
Culture	Tolerance of low attendance
Culture	Tolerance of low goal attainment
Culture	Tolerance of not following/having a standard
Goals	Failure to communicate the purpose of goals

To support or deny the findings, they were compared with existing research to form the areas of investigation. All of which are explained and further described below.

When touring the production areas, many of the team leaders did not understand the link between their set goals and their actions. One team leader said, ”this one (pointing at a KPI) is always red (not okay), and we do not know what to do to change it, nothing we do makes it green (okay)”. In order to fulfill top level goals and align the entire organization, all employees must understand their KPIs (Almström et al., 2017) and have a clear direction to align their improvement efforts with organizational goals (Kotter, 2007). The factory should establish ambitious, yet realistic goals and break them down into smaller, actionable tasks to enhance engagement and monitor progress (Deci et al., 2017; Seijts & Latham, 2012). Additionally, regular feedback plays an important role in this process, offering updates that reinforce commitment and enable necessary adjustments with effective coaching (Seijts & Latham, 2012). This strategy will help employees recognize how their individual contributions align with the organization's larger objectives, boosting their sense of purpose and motivation (Deci et al., 2017; Seijts & Latham, 2012). As a result, it becomes crucial to investigate methods for breaking down top-down KPIs, ensuring employees understand how to achieve them and strive for continuous improvement. This finding led to the area of investigation *Investigate how to break down top-down KPIs, and especially ensure that employees understand how to achieve them.*

When taking a tour of another part of the factory, one quote stood out and it said ”... ask him, he has been here a long time, since 2023!”. That quote together with observed insecurity and lack of understanding of one's own role in different settings. When employees relocate or leave an organization, there is a significant risk of losing valuable knowledge, especially when the most experienced employees leave, as they possess the most implicit knowledge (Osvalder, 2015). Implicit knowledge is gathered through practice, experience, and praxis and can be hard to identify and express in words to pass on and teach (Osvalder, 2015). Although it is valuable, proper use, investigation, preservation, and processing to ensure long-term value is challenging (Pantförder et al., 2017). Tacit knowledge is acquired through actions, implementations, and reflection, and it can take several years to gain enough knowledge to understand complex tasks and behaviors (Osvalder, 2015). However, tacit knowledge is fundamental to solving problems with intuition and experience (Baumard, 1999; Osvalder, 2015). Tacit knowledge is also crucial to maintaining organizational flexibility in which employees have knowledge about each other, the intentions, goals, and fields of interest of everyone, as these aspects are not universal knowledge (Baumard, 1999). It is also important to use them to externalize implicit knowledge and thus support less experienced employees in decision-making and new processes (Pantförder et al., 2017). In a manufacturing context, organizational knowledge is often defined as the individual employee's comprehensive understanding of organizational strategies (Gagnon et al., 2008). This knowledge plays a key role in ensuring strategic alignment, where explicit and implicit knowledge contribute to a shared strategic direction and commitment to goals (Gagnon et al., 2008). This finding formed the investigation areas *Investigate the turnover rate in leadership roles within the production organization* and *Investigate how to succession plan and how to provide sufficient conditions for temporary and potential*

successors to take over when needed.

The difficulties in providing sufficient conditions led to the questioning if there could be other circumstances where employees are not equipped to perform the tasks they are exposed to. However, with for example standardized work, leaders could create conditions for ensuring that different employees can carry out tasks in the same way (Pawlak, 2024). These conditions can also ensure a more stabilized process to enable continuous improvement initiatives (Liker, 2004). As organizations rely on operational excellence to grow and improve, leaders must enable learning and emphasize individual knowledge (Hess, 2014). Individual understanding enables better alignment with strategic goals (Gagnon et al., 2008) and this includes that expectations must be clear and the passing of knowledge must work for continuous improvement (Ferenhof et al., 2018). Rother (2009) and Kristensen et al. (2022) further explains that to reach the full potential of all employees, an organization must provide safe learning environments and systematic procedures and routines to utilize capabilities and reach operational excellence. Hence followed the areas *Investigate how to state clear expectations on employees*, *Investigate how to be clear about where to find useful information,* and *Investigate how to provide the right support, and how to give employees the correct tools to ask for the right help.*

To summarize, the areas of investigation are listed below.

Areas of investigation

- Meaningful KPIs: Investigate how to break down top-down KPIs, and especially making sure that employees understand how to achieve them and work towards improvement
- Turnover: Investigate the turnover rate in leadership roles within the production organization
- Succession planning: Investigate how to succession plan and how to provide sufficient conditions for temporary and potential successors to take over when needed
- Managing expectations: Investigate how to state clear expectations on employees
- Finding information: Investigate how to be clear about where to find useful information
- Providing support: Investigate how to provide the right support, and how to give employees the correct tools to ask for the right help

4.3 Main Study (Case Factory A)

The main study resulted in different types of data. From the observations, quantitative and qualitative data were collected. The interviews provided qualitative data collected from a diverse set of participants. Lastly, the archives were searched for numerical data from the production lines and the need for information was further investigated.

4.3.1 Observations

In the search for best practices, 28 meeting occasions, 25 different constellations, and six types of meetings were observed throughout the production organization. When scheduling the observations, the intention was to get an even mix of shifts, middle manager areas, levels in hierarchy, and gender of chair. The results ended up being a distribution of observed meetings at 14 X-shifts and 14 Y-shifts, the factory area distribution was eleven in Middle Manager Operations (MM Op) area 1, and seven in MM Op area 2. The reason for this availability deviation was that MM area 2 had some educational leave and other absences. Throughout the hierarchy, two meetings were observed at the plant level, seven at factory level, six at middle manager level, eight at first line manager level, and four at team leader level. The observation protocol is presented in Appendix B. The observation findings are presented below according to the areas of investigation. Furthermore, a comparison between the production areas and additional findings are presented.

Turnover
On eight of the 28 occasions, one or more people had been replaced due to sick leave, educational leave, or prioritizing other meetings. At an additional seven meetings, one or more people were missing without a replacement. This makes the occasions of all invited people being present twelve out of 28, or 43%. When asking managers about the rotation in managerial roles, it was explained that no one is new at the company, but they recently underwent an organizational restructuring that led to the majority of managers switching production areas with each other. This explained why everyone said that they were new, and why the routines did not feel stable yet. In other words, the initial perception of turnover could be explained by a low presence and variation of attendants, as well as the recent rotation of production areas.

When discussing the recruitment of new managers, it became clear that the recruitment happens internally. This could also explain why they put effort into planning for succession prior to changing roles. Potential candidates are tested in the role before a role is available, which later laid ground for knowing whether or not they are suitable for being a manager. It also serves as training, so they require less time before they can manage their work as a manager when being promoted. This finding turned the investigation the other way around. Questions were raised like what consequences do internal recruiting of managers result in, especially with tasks that require debate and innovation.

Succession planning
They did not have sufficient resources. An average of 46% of active participants when successors were present compared to 70% when all participants were ordinary employees. Replacements also had a smaller inclination to talk at all they were not spoken to directly. At the management team level there was no observed difference between meetings with replacements or ordinary staff.

Managing expectations

Several weeks after introducing the meeting, a first-line manager expressed ”I am always so nervous when I stand here (in front of you and presenting)”. During the bottleneck analysis meetings, the management team was not satisfied with the reports of the person responsible. It did not include everything expected, and they did not see the progress they had hoped for. However, when asked what they do to ensure that the reports were better the next time, they mentioned that the person responsible should make sure to find the information and ask for extra clarification if needed. During the other meetings, at first-line level, none of the cases observed with replacements managed to fulfill the expectations of the chair. The same comment was made when asking the chair about how they looked at the level of readiness, ”they should had made sure to be prepared, either by looking up the information themselves or asking for help”.

Finding information
Not investigated in this part of the study.

Meaningful KPIs
On several occasions, employees had trouble filling in on the management board in the way the meeting chair wanted. When asking the chair about this after the meeting, they stated that their employees should ask for help to understand and that they would not provide any help otherwise. On some occasions, they corrected the errors, but did not seem to provide an explanation extensive enough for the error to not occur the next day or at other steps in the meeting chain.

Providing support
Not investigated in this part of the study.

Comparison between areas
To find out how the information is spread, the response to attendance and activity level was observed. In Figure 4.3, the average attendance compared to the number of people invited and the average number of active participants was compared between areas. On the x-axis the results are summarized by hierarchical levels and area. ”Plant” and ”Factory” represents the meetings where the plant manager and factory manager were chairs. ”Area 1 MM Op” and ”Area 2 MM Op” represents the meetings that the operational middle managers held. The first-line managers under their respective middle manager were summarized in bar clusters ”Area 1 FLM” and ”Area 2 FLM”. Lastly, the meetings where team leaders were chair were also summarized by operational middle manager as ”Area 1 TL” and ”Area 2 TL”.

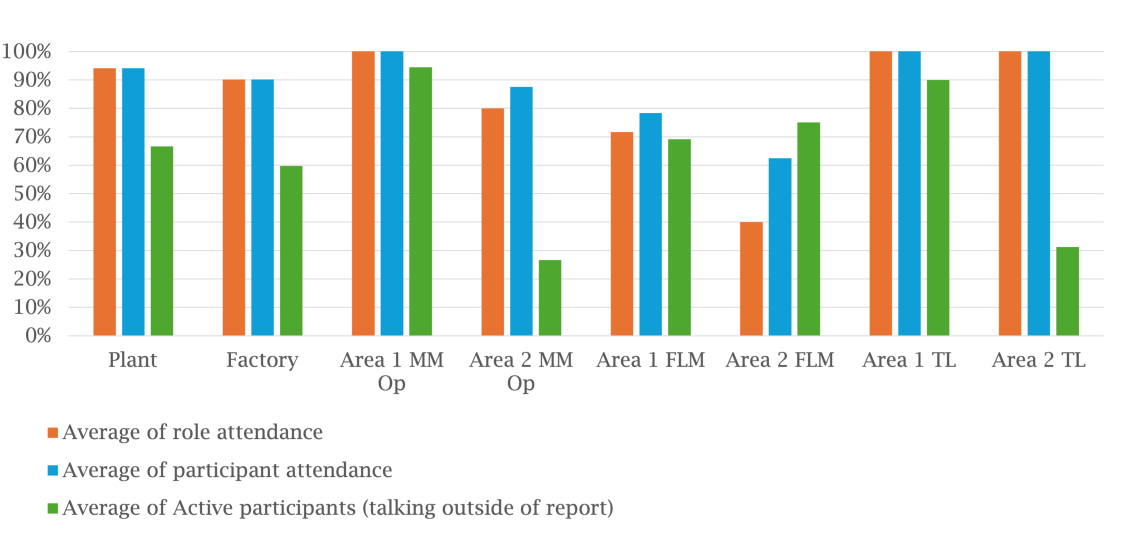


Figure 4.3: Chart for Average Participants per Area

As seen in Figure 4.3, the highest average of participant attendance is at Area 1 MM Op, Area 1 TL and Area 2 TL with 100%. These areas also have 100% role attendance. Since every role in the management teams is unique, the average role attendance is identical to the average participant attendance, but in the other areas there are several attendants with the same role, which made the distinction between number of attendants and attending roles necessary. Lastly, the average number of active participants, which is the number of people who participated in discussions and made comments on other reports and contributions in the meeting, was analyzed as the green bar in the diagram.

Additional findings

Not every aspect of the meetings could be summarized in quantitative data. Some findings were qualitative and intangible, such as differences in personality and attitude toward tasks. To capture that, an additional space for ”additional notes” was included in the observation protocol, to encourage researchers to write every observation down, even if it could not fit into any of the questions on the sheet. One thing that was noted was if the environment was out of the ordinary, both in a good and bad way. Based on these findings, five observation targets, on four different levels of the hierarchy, presented the best feeling of inclusion and openness that led to discussions that engaged participants.

Two first-line managers, as well as one middle manager stood out in another way. Their meetings were solution-oriented and had real investigative discussions. One first-line manager made sure to adapt the meetings to what the current needs were. If one of the lines had a breakdown, all attendants met there instead of the assigned first-line manager area. This made it possible for the participants responsible for fixing the issue to attend the meeting and report on their progress and support needs, instead of not being able to show up. The other first line manager had an environment where the team leaders expressed their needs clearly, which in turn made it easier to divide the resources between them or plan for how to solve the issues right

then and there. The middle manager had curious participants who were eager to help each other. The first-line managers could coach each other and, although not observed in this study, this conveyed the impression that the meeting might have been just as productive without the middle manager present. This middle manager also had the only meetings where more people and roles were attending than invited. On one occasion a first line manager brought one of their team leaders to explain an issue at a more detailed level. Two times a maintenance operations manager showed up to discuss equipment problems that affected attendees and their work.

During first-line manager meetings, it was observed that it was hard to discuss the issues without supporting roles attending, and the discussions became speculative instead of problem-solving. However, when all roles were present, the attendants were more active in the meetings and problem-solving discussions increased. In addition to that, comments during the meetings proved this observation. In several instances, team leaders mentioned that it was difficult or even useless to discuss the issues without the support team present.

4.3.2 Interviews

As part of the qualitative study, 14 interviews were conducted; see the interview targets in Table 3.4. In the following section, the results of the interviews are presented according areas of investigation presented in the pilot study analysis 4.2. In total, there are six areas that were the focus of interviews, turnover, succession planning, managing expectations, finding information, meaningful KPIs, and providing support. Below, each area is presented with the main findings from the interviews. Later on, the additional informal interviews are presented.

Turnover
The level of employee turnover has been discussed in the group and management teams according to ten of the interview targets. In the question of why there is high turnover, they argue that it is due to issues with working in rotating shifts and that many want personal development. Also, there was a big reorganization in the factory a few years ago, with this there were many first-line managers that only changed production area and not role. In other words, the turnover has been there but only internally in switch of production area and not in any role turnover. Furthermore, two interviewees argue that the turnover is too low and that the organization could benefit from a higher level of rotation in the roles at the factory. Four interviewees discussed internal recruitment and how that is a big part of the organizational culture, to develop employees. One of these interviewees mentions that the main area of internal recruitment is production roles such as first-line managers and middle managers. However, in the management teams there is a higher degree of external recruitment to have more diverse teams in several background dimensions, and a healthy rotation of leaders.

Succession planning
In the production environment, there are many situations where one must use subor-

dinates to fill for you and appoint someone to act for your role. This was addressed during the interviews and that showed that four out of seven first-line managers have one team leader always appointed for these situations, and the other have two or three chosen team leaders. All mentioned that these are chosen based on interest in the role and competence. Compared to this, the middle managers and the factory manager rotate the role as acting and base this on the development plans of the subordinates and competence. Another recurring theme of these questions was the importance of learning by doing and giving people opportunities to try, make mistakes, and learn. What many have mentioned as possible areas of improvement is better planning and reflecting afterwards.

Managing expectations
In general, the expectations are clear for all interview targets in their roles, and feedback systems are working in the organization of first-line managers and middle managers. One interviewee further mentions that with operations, tactics, and strategy matrices, the organization can illustrate who does what and each responsibility. Regarding having expectations of others, one interviewee mentions the importance of sometimes presenting unclear expectations consciously to let people try out ideas and learn the process. Eight interview targets mention recurring face-to-face meetings as a tool to give feedback and maintain a continuous improvement dialogue with their subordinates. Other forums for feedback mentioned by the interviewees were daily management meetings and weekly strategy alignment meetings. Continuing, six interviewees mentioned that expectations do not align with reality and tolerance is high with low attendance.

Finding information
With the vast amount of information constantly flowing in a production environment, all interviewees mention the importance of communication. Seven of them mention strategy alignment meetings as a source of information. Eight use Microsoft Teams as a tool to spread and find information for daily operations. All agree that their subordinates know who to ask for help with issues, and seven mention the internal documentation site as a source for information. Furthermore, the importance of being responsible for finding information was mentioned by seven interviewees. In connection to this, the question of ownership was brought up and it was mentioned eight times that one must own the processes you are working with. Finally, four interviewees mentioned that they use generic agendas for scheduling and planning.

Meaningful KPIs
Throughout the production roles, the nine interviewees all distribute the responsibility for the KPIs down to their subordinates. However, three of them sense that the understanding is not clear enough for goal fulfillment. Another set of three mentioned that to enhance understanding, the process requires more follow-up. In another part of the organization, one interviewee mentions that you should develop the goals lower in the organization to further enhance the understanding of why and how KPIs are used. To support shop floor in implementing and improving KPIs, one interviewee emphasizes the importance of a ”Gemba-culture” and visualizing

the real problems. This could help cross-functional teams to see the problems in person.

Providing support
Eleven interviewees are satisfied with the feedback and support from their colleagues. Nine of them mention that the factory has an open environment where everyone helps each other and everyone is just ”one call away”. However, all first-line managers mention that the support differs between the day and evening and night shifts. An interviewee in another managerial role mentions that, when providing support outside of the standard occasions, it is important to focus on the areas where the support gives the biggest effect in the bigger picture. Also, this interviewee mentions that you are never better than your weakest and therefore you must provide support. Furthermore, the feeling of being able to contribute to the organization is agreed upon by eight of the interviewees. Three of the interviewees are relatively new in their roles compared to the others, and they all agree on the well-functioning support and help from their colleagues in their new roles. However, one felt that the on-boarding could be clearer to be more prepared. Finally, the problem-solving method used in the daily operations is, according to four out of nine targets for this subject, not working. It requires more follow-up and better involvement from the employees taking part in the process, as well as the direct responsible employees owning the process.

Additional informal interviews
In parallel with the main study interviews, additional informal interviews were conducted. These are presented according to the main findings on diversity, change in organizational culture, accountability, and KPI awareness.

Background diversity
Three interviewees expressed that there is a lack of diversity in the backgrounds of white collar workers and what they call ”light-blue”-collar workers. Many have a similar background and education, which could make collaborations one-dimensional, with everyone attaining a similar skill set. Two interviewees also mentioned that the level of education is low and it can be difficult to help and collaborate when the level of knowledge differs. In addition, there is a perception that time management, independence, focus, and the ability to take initiative are lacking. This issue has been further discussed with the managers in the organization. In recruitment, they currently have no control of who gets matched with their vacancy, and only white-collar roles are assigned by the managers themselves. This gives less control of the diversity of the groups, especially since the assignee usually is someone from their current blue-collar group.

Change in organizational culture
Previously, leadership was more traditional with clear directives from top executives and middle managers. Even ”smaller” and seemingly unimportant decisions were made by them, and this leadership style was encouraged. However, in the past year, management has shifted to a more Lean leadership approach. This shift has created

a gap in the decision-making process, as top and middle managers now set the goals and the activities needed to achieve them but no longer dictate how, when, or by whom these tasks should be done. First-line managers and their subordinates, who are not accustomed to this level of freedom and decision-making, become confused as they do not immediately understand what is expected of them. Consequently, there is a gap where higher-level managers are giving more responsibility to their subordinates than they are used to and equipped to handle. It is assumed that the lack of follow through and hesitance in activities could be because they do not want to make mistakes and do wrong. This also results in a misalignment between the management's expectations and the subordinates' understanding of it.

Accountability and KPI Awareness
They hold each other accountable. Although it is not followed up at a higher level, they need to ensure it is done properly to perform their jobs effectively. They cannot motivate their subordinates if they do not believe in it themselves. Therefore, it is crucial to keep track of KPIs to know what needs to be done and to convincingly explain to subordinates why it should be done and what the goal is. Without this understanding, it is difficult for subordinates to perform and challenging for them to hold them accountable if there is no clear purpose. They have an internal culture where they help each other do the right thing and everyone assists each other. According to the interviewees, the night shift has more responsibility for documenting their KPIs, but the others ensure that tasks are completed if they are not done during the night. They point out that they are a team and believe that what it is important for them they need make sure to get done. It takes a maximum of 30 minutes if one sits down to document their KPIs, but if one does not know how to navigate the program, then it becomes impossible. One theory is the increased fear of being a controlling and confrontational leader, and the response is that activities are not followed-up.

4.3.3 Numerical Data and KPIs

To obtain quantitative data, numerical data and KPI results were analyzed to further research the areas of investigation. The investigation of archival data, bottleneck index, KPI scorecards and diversity numbers is presented below.

Archival data
At plant level all data from individual factories are summarized and compared with each other. However, there is no company standard to calculate the collected numbers, and it is up to each factory's industrial engineering department to decide on a standard. An engineer mentions that the competence to compute the numbers for a fair comparison does not exist at the plant, maybe not at all. Conflicting KPIs were identified during the interview phase. There is a strict manning goal for each production area, which first-line managers felt decreased the possibility of conducting problem-solving activities because each team member was needed at the production line at all times during the shift. Other conflicting KPIs include over-cycling and number of Andon alarms. According to the standard, the operator is supported to

pull the Andon chord if there is less than 30% left of the cycle time and they are not finished with their operation. This calls the team leader for help, which and they can together finish the operation within the cycle time. However, there is also a goal for the number of Andon calls that should fall below a certain number. This makes the operator less likely to follow standard and pull the chord, and in turn increases the cycle time and number of over-cyclings.

The available data on throughput is presented per hour and shift for each day. However, it is unfit to draw any conclusions from that data alone, since it is dependent on external factors. What deviations are due to subsequent errors at other lines or transports is hard to track because of buffers and other disturbances. This therefore makes a fair analysis based solely on throughput impossible at this time. The available data on manual over-cycling is presented for long cycle times in connection to breaks or shift changes. This is due to the fact that there have been the most important deviations according to the factory. Then there is also a file with all the data available. It fits within the scope of the project, however it was deemed at a too detailed level for this project. The third method to monitor the performance of the production lines is the bottleneck index. It gives an overview of combined own losses per line, where own losses include causes for a line to exceed set target cycle time. Such losses are over-cycling, time to attend and time to repair during breakdown, material shortage, preventive maintenance, and team meetings. The bottleneck index is preferred by the factory engineering department and is according to them the most accurate way of telling how a single line performs. Therefore, there is a meeting each week in the factory to support the lowest performing line in each flow based on the bottleneck index.

One drawback is that it can be misjudged for starved areas. If, for instance, the line gets one job every ten minutes and the buffer in front of it is full, it could be more valuable to let the jobs stack up and instead focus on something else such as problem-solving. Walking back and forth to the stations with ten minute intervals and disrupting the alternative activity instead of waiting for the jobs to stack up and do several at the same time is not prioritized. This results in manual over-cyclings and added losses that will lower the bottleneck index score, even though the alternative activity might gain the throughput in the entire flow instead of just this line. Instead, a suggestion is to use the shifting bottleneck method to highlight the lines that are the restricting ones in the flows when all the others are running to eliminate the risk of adding consequential errors to the equation.

Bottleneck index
A Bottleneck Index (BNI) of 1 is the maximum value, which means that the area does not constrict the flow, and 0 is the lowest, which would mean that it always constricts the flow. The bottleneck index calculation is under development at the case factory and the presented numbers are based on the present state. To validate BNI as a way to focus improvement efforts toward increased throughput, the daily minimum bottleneck index in the factory was plotted against the daily delivery for the last line in the factory. Figure 4.4 shows the relationship.

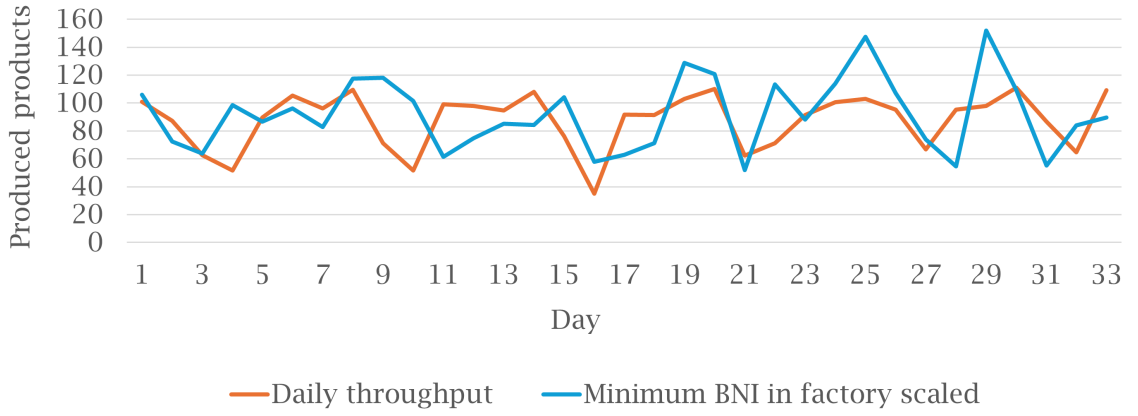


Figure 4.4: Bottleneck Index compared to number of produced products at case factory A

Each day and week are reviewed on a daily basis, but no analysis of variation over shifts or over time was evaluated. When asked about it, the managers implied that it was the responsibility of first-line managers, but first line-managers neither felt like they had the correct tools and support nor the time to do that. When asking about the data and its implications on their lines, they also wanted an explanation. The data available and analyzed are for five weeks, see Figure 4.5.

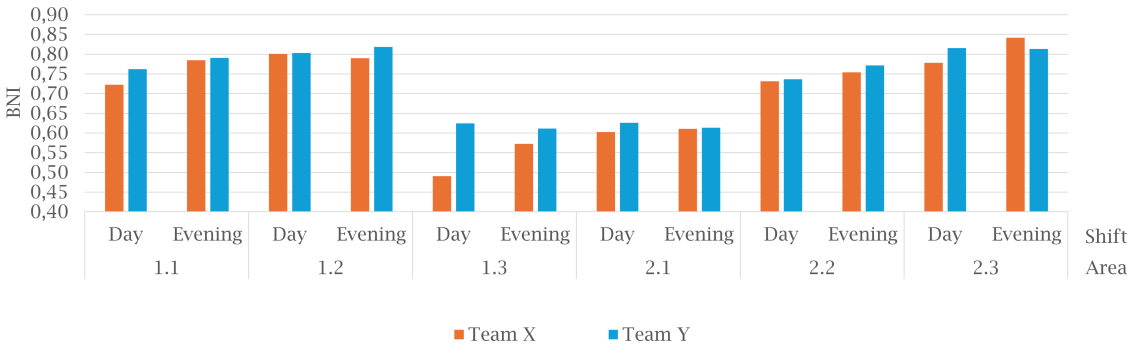


Figure 4.5: Bottleneck Index for each Shift and Area

From the observations, production area 1; team Y was highlighted as a high performing team with regard to openness and problem-solving. When comparing the bottleneck index between the shifts of area 1, team Y is clearly better than team X. Compared to area 2 there is barely any difference between shift X and Y. Important to note is that team X and Y rotate between day and afternoon shifts each week. When investigating with first-line managers the causes as to why lines were the best performing in different shifts, they could not explain why, and were surprised with the data.

KPI Scorecards
The company uses the same system to track performance at all levels in the organization. When reviewing the scorecards on the predetermined dates when they

should be filled out, they were completed to different degrees in different areas in the factory, see Table 4.2. The table presents areas and their total number of KPIs in their scorecard, together with the set of updated KPIs and the percentage of KPIs that had a set target level.

Table 4.2: KPI status

Area	**Number of KPIs**	**Updated KPIs**	**Target level set**
Plant	18	100%	100%
Factory A	28	100%	93%
Area 1	16	44%	69%
Area 1.1	22	4%	27%
Area 1.2	22	50%	95%
Area 1.3	22	0%	23%
Area 2	17	59%	88%
Area 2.1	23	87%	91%
Area 2.2	23	96%	100%
Area 2.3	22	0%	64%

Background diversity
The average tenure for managerial roles within production is 17,3 years with an average age of 46,4 years. The lowest tenure for a manager within the production organization right now is 7 years.

4.4 Main Study (Case Factory B)

Within the case company, there exist several other plants and factories. One of them was chosen as the second case subject to be able to generalize the findings and finish the recommendations.

4.4.1 Mapping the Case Factory

The second case subject, case factory B, is an assembly factory. There are two main flows, which are takted at a set pace. It is designed in such a way that if there is a stop at any point in the flow, the whole flow stops. There are smaller buffers within this flow, which makes it crucial that the operation is carried out within the cycle time.

In this factory, there are set shifts, which means that you either work the day, evening, or night shift. Every shift then has their first-line managers and middle managers, so that everyone besides the middle managers has their managers present during the entire shift. Due to the high level of manual work, the first-line managers are responsible for one production line each to have an appropriate amount of employees.

4.4.2 Observations

Daily start up, Factory management team
The meeting agenda is the same as described in 4.1.3 for factory A. In addition to this description, a virtual dashboard was used to present the main issues with data-driven evidence and details such as causes, implications, and time loss.

Daily start up, Plant management team
The agenda is the same as described in 4.1.3 as it is the same meeting. However, in contrast to case factory A, case factory B attended in real life which resulted in both informal and formal communication before and after the meeting with colleagues.

Improvement presentations
Two production lines were presenting their improvement work. At the first line the three team leaders for each shift presented why and how they had improved and changed the standard of operation for one station. One of the team leaders took the lead and presented the cause of the improvement, which was that the product mix had changed. He then followed explaining the problem-solving path that then led to the change, while another team member presented the change, and the third presented the results of the change. The second presentation came from a team that had experienced errors in the assembly. Then, two team leaders presented the problem-solving by demonstrating the cause of the issue and showing the new way of working. Lastly, they showed the new results that had followed the change.

After those presentations, the factory management team, the plant manager and the quality manager, sat together and reflected on what they had witnessed. Each member of the team presented their thoughts on how the teams performed compared to what their expectations were. Then they collectively decided who did well and who needed additional support in their learning and how they would provide that support. Lastly, they decided to nominate one of the lines presentations for an award at the plant for exceptionally good work in terms of process and presentation of their improvement efforts.

Throughput evaluation meeting
Each week, the management team has a follow-up meeting to analyze the factory's hinders in terms of throughput. There is a bottleneck analysis where they look at the trend for the previous week and compare the production areas and shifts. The distinction between shifts helps them guide the analysis and assume the cause of the issues. For example, if the value differs a lot between the shift, it indicates a

process or a personnel issue, and the analysis can start from there. If the value is low, with little to no difference between the shifts, the issue is more likely related to equipment or standard processes. During the meeting, actions related to the issues are presented and evaluated on the basis of impact on the bottleneck index.

4.5 Analysis

To synthesize the results of both case factory A and B, the STS framework by Davis et al. (2014) is used to show the interactions between the elements people, technology, culture, goals and processes. This is presented below in an analysis of the present state and then in the identification of best practices. All findings are gathered from different data sources, and are shortened as:

- Observations: Obs
- Informal observations: iObs
- Interviews: Int
- Informal interviews: iInt
- Numerical data: Num

4.5.1 Present State

To answer research question two, *How can managers throughout a manufacturing organization align daily operations with top-down directives?*, an analysis of present state findings from the case study was conducted with Davis et al. (2014) STS framework. The findings are once again presented by element.

People
The element People covers the system where all people with their varying skills, experiences, behaviors, and knowledge (Davis et al., 2014). In Table 4.3, the findings and data sources are presented.

Table 4.3: People findings and evidence sources

Finding	Obs	iObs	Int	iInt	Num
Lack of diversity (background and experiences)	x	x		x	x
Lack of common understanding between functions	x	x	x	x	
Low presence at meetings	x	x	x	x	
Lack of clear guidance (leadership)	x	x		x	

Three interviewees expressed that there is a lack of diversity in backgrounds of white-collar workers and what they call ”light-blue”-collar workers. Many have a similar background and education, which could make collaborations one-dimensional, with

everyone attaining a similar skill set. According to van Knippenberg & Schippers (2007), to have a wider knowledge and skills relevant to the task, the diversity of the work group is crucial. This diversity benefits the performance and solving of non-routine problems (Bantel & Jackson, 1989; van Knippenberg & Schippers, 2007). To have different perspectives on tasks and ideas, a diverse work group can be more competitive with continuous improvement and problem-solving (Hong & Page, 2004), which is also correlated with Lean thinking and Kaizen ideas (Liker & Hoseus, 2008; Zandin, 2001).

Two interviewees also mentioned that the level of education is low and it can be difficult to help and collaborate when the level of knowledge differs. In addition, there is a perception that time management, independence, focus, and the ability to take initiative are lacking. To support employees despite the varying levels of education, leaders in a Lean organization must motivate and form a culture of learning-by-doing, belonging and provide a challenging environment where they can feel confident and use their skills for development (Deci et al., 2017). The ability to generalize and innovate was also observed as poor within the organization. As many in the organization adapt system 1 thinking, where single-loop and automatic thinking is eminent, operational excellence and opportunity for growth and innovation are missed (Hess, 2014).

Continuing in the field of clear guidance and leadership, where a repeated quote from the study was that ”if they do not know, they should have asked”, the lack of coaching and clear leadership hinders the employees in adapting a system 2 thinking. Operational excellence and opportunities for double-loop thinking help organizations with innovations and grow, improve performance, and align with strategic goals (Hess, 2014; Gagnon et al., 2008). The quote reoccurred each time an expectation was not met, even for repeated mistakes. During observations, employees appeared overwhelmed with tasks and especially uncertain about expectations, how to address issues, and how to proceed and continue with different situations. Employees are a key factor for sustainable success and must understand the tools and methods (Dombrowski & Mielke, 2013). In several forums, deficiencies and problems were highlighted, but then employees were left alone to solve them without further guidance. This resulted in inadequate resource management and poor priority of urgent matters, compared to top-down priorities.

To achieve operational excellence and succeed with functional diversity, communication, and knowledge sharing, a good learning environment with well-functioning coaching must be prioritized within the organization to avoid resistance and errors (Kristensen et al., 2022; Liker & Meier, 2007). In addition, employees must be able to learn first before being coached (Rother, 2009). An issue in the case company is misalignment both vertically between management levels and horizontally between functions, to cope with this, it requires the right people in the right places and leaders who, from the beginning, strive for operational excellence and safe learning environments (Kristensen et al., 2022). With lack of clear leadership, the risk of errors and miscommunication increases, and guidance is crucial to ensure that em-

ployees can learn from their mistakes and improve overall performance rather than blame employees of possible errors (Döös et al., 2004; Liker & Meier, 2007).

Continuing, a lack of common understanding of collaboration was observed in several instances between the functions. Formally and informally, employees expressed frustration with collaboration and relations with other functions. The main issue being different priorities in schedule, hindering the cross functional collaboration. This collaboration requires guidance, standards, and communication where good communication is a key component for successful collaboration across specialties and shifts (Liker & Meier, 2007). Lack of communication can lead to resistance (Simoes & Esposito, 2014), misunderstanding, and errors among employees (Liker & Meier, 2007). In general, leaders should engage team members to collaborate to find efficient ways of working (Liker & Hoseus, 2008).

Technology
Continuing on Technology which covers the set of tools that help people do their job, daily tasks, and meet goals (Davis et al., 2014). Table 4.4 below presents the findings and sources of evidence.

Table 4.4: Technology findings and evidence sources

Finding	Obs	iObs	Int	iInt	Num
Inadequate equations				x	x
Non-comparable data				x	x
User interface based on ”customer” not end user				x	x

The main calculation investigated was the bottleneck index, which was under construction and changed during the case study. In the flows, the production systems are not identical and the line balance of work and waste differs throughout the flows. The technical solution for this index is in itself not completely accurate, partly due to the non-comparable data and also because the equations are still being constructed. To fully benefit from these calculations and their implementation, employees must understand how, why, and when to use them (Almström et al., 2017; Bellgran & Säfsten, 2010).

As of now in the case company, KPIs and calculations are presented digitally in different user interfaces. In general, most user interfaces are designed by someone higher up in the organization, but it is the shop floor employees who use them and the data most often. This has caused some confusion, and employees expressed concerns about understanding and adapting the user interfaces. When structuring and designing them, it is important to design to fit the end user to simplify adaptation in the organization at all levels (Bellgran & Säfsten, 2010). When reviewing the data boards, there was only a division of days and time, and not between shifts and teams. This made it harder to find patterns in performance between the shifts, and

by that enable best practice discussions.

As a significant part of understanding is mental models and memory systems, the end user must be able to use the systems to spread knowledge and uncover implicit knowledge stored in the mental models (Pantförder et al., 2017). Mental models are visual and abstract, which can be difficult to convert to speech or words (Pantförder et al., 2017; Osvalder, 2015), and help problem-solving and decision-making. To fully transfer knowledge and models, the equations, KPIs, and user interfaces must be adapted to the end user for understanding, participation, implementation, and appropriate use (Pantförder et al., 2017; Elvnäs, 2017).

Culture
The cultural aspect covers systems operating with shared beliefs, assumptions, values, and norms (Davis et al., 2014). Table 4.5 displays the findings and evidence sources.

Table 4.5: Culture findings and evidence sources

Finding	Obs	iObs	Int	iInt	Num
Tolerance of low attendance	x	x		x	
Tolerance of non evidential work (ord)	x	x	x	x	
Operative state of mind in production organization		x		x	
Lack of best practice sharing and collaboration		x		x	
Misalignment between old and new management		x	x	x	

The observations revealed that low attendance is the norm, where only 46% of the observed meetings had full attendance from invited participants. This behavior is allowed to proceed, and there is little to no reaction to the low attendance. With the lack of standards and common agreement about attendance, the risk of misalignment and resistance among employees increases significantly (Deci et al., 2017). As standardized processes are one of the main pillars of a Lean production system, it is crucial that the organization implements those to communicate the agreements to enable collaboration and organizational development (Langstrand & Drotz, 2016; Liker & Franz, 2011).

In several instances and situations, the problems were explained based on perceived causes and effects rather than concrete evidence. Statements, analyses, and proposed solutions were often unsupported by data, which appeared to be the norm in the factory. In particular, for improvement initiatives and PDCA cycles, it is crucial to gather data to formulate a plan for improvement (Imai, 1986). To learn from initiatives and new ideas, countermeasure evaluation is crucial for learning and understanding (Liker & Franz, 2011) and this requires concrete evidence and data. Furthermore, to analyze humans and understand mistakes in the organization, there

must be a collection of data both for the analysis and design of error-resilient processes (Döös et al., 2004) before you can present statements and solutions.

Culture in an organization influences all aspects, strategy, goals, and future visions (Bortolotti et al., 2015; de Camargo et al., 2023). With culture often ruled over by strategy, change initiatives should align with cultural strengths rather than imposing new values (Katzenbach et al., 2012). The operative state of mind seen in the production organization is spread throughout the organization on several levels where it is more work with details rather than someone taking the lead. With a culture this well developed, it is automatically passed on to new members and guides their behaviors (Schein, 2016). To change behaviors and further implement best practice sharing in the company culture, leaders must engage competent and willing people in Kaizen and PDCA processes (Liker & Hoseus, 2008). This requires trust, guidance, and discipline with integrated vision and goals in daily decision-making to create a team and not a "us versus them" culture in organizational improvement initiatives and cross-functional processes (Kotter, 2007; Liker & Hoseus, 2008). However, even with a sense of urgency and strong leadership, the vision must be clearly communicated so that employees can align their efforts and changes with organizational goals (Kotter, 2007). Lastly, to reduce the risk of inefficiencies and low workforce engagement and ensure productivity, efficiency, and long-term competitiveness, the strategic alignment between top-down directives and daily operations is crucial (Kristensen et al., 2022; Trevor & Varcoe, 2017).

For several weeks, the target areas for the bottleneck meeting were the same lines in both flows; however, they did not once visit each other to learn from each other. The risk of not collaborating between areas, both in the large and small perspectives, is that you lose long-term profits (Saabye et al., 2022). Best practice sharing is an important part of continuous improvement, often called Yokoten within Lean organizations (Liker & Franz, 2011). Another risk of not implementing best practice sharing is misalignment and loss of innovation and improvement possibilities in the organization (Imai, 1986; Liker & Convis, 2012).

At case factory A, the current factory manager took the role in 2023, and this brought a new leadership style. The cultural differences have been expressed by several interviewees and observation targets. In the old management culture, it was stated that you were told exactly what to do and that initiatives were not accepted. However, the current management team is in the opposite state of mind. This type of change is complex for all levels in the organization and as Katzenbach et al. (2012) states, culture trumps strategy every time, and it is crucial to try to match both while focusing on people. Based on the literature findings, the previous leadership style can be described as more traditional and current leadership is characterized by transformational and Lean philosophies (Eaton et al., 2024; Judge & Piccolo, 2004; Liker & Convis, 2012). As culture is strongly reflected in leadership styles (Cameron & Quinn, 2006), and culture does not follow when leadership style changes, the new styles create misalignment further down in the hierarchy. This misalignment causes confusion, resistance, and discouragement within the organization (Katzenbach et

al., 2012; Kotter, 2007). As employees are adopters of the new leadership style, it is important to keep them motivated and able to interpret the new leadership, to ensure that they are more likely to adapt to it (Greenhalgh et al., 2004).

Goals

The goals system is a set of goals and metrics that measure performance and the people working in the system (Davis et al., 2014). Table 4.6 below shows the findings and sources of evidence.

Table 4.6: Goals findings and evidence sources

Finding	Obs	iObs	Int	iInt	Num
No prioritization of goals	x	x		x	
A lot of KPIs		x			x
KPIs not updated	x	x	x	x	x
Unattainable target levels	x	x	x	x	x
Low fluency in KPIs and how they correlate	x	x		x	

During the observations, all goals were followed up and commented on to what seemed like the same extent and not with any particular prioritization. This took a lot of time and on several occasions, they did not finish before the end of the meeting. Observed in the pilot study was the fact that employees did not see the relationship between goals, how they influence each other, how to prioritize, and what activities contribute to a change in measurements. When targets are imposed, employees are more unlikely to take ownership (Meekings et al., 2011), which is the case in this situation. However, if they were negotiated, there is an incentive to suggest lower targets that are easier to reach. When goals are clear and understandable, employees can also know what is expected and how their individual efforts contribute to the organization (Elvnäs, 2017). In the case company scorecards, every KPI has a dedicated owner that fosters ownership and engagement (Elvnäs, 2017), however, lack of cooperation and, as mentioned above, low level of understanding, ownership does not serve its purpose.

When reviewing the case company's documentation, not all KPIs were updated. This raises concern for both the results for each month and the registration of a target level. Some of the goals are rarely or never reached. To simplify the use and understanding of KPIs, it is important to differentiate the goals and decide which indicators are key and which are not (Bellgran & Säfsten, 2010). This helps in sorting and prioritization, as well as managing cooperation to achieve goals and KPI measures (Seijts & Latham, 2012; Bellgran & Säfsten, 2010). In several instances, the target levels were described as unattainable, which could also be a cause of the KPIs not being updated. To change this system, the organization can break them down into tangible tasks to further facilitate engagement and simplify the moni-

toring of progress (Deci et al., 2017; Seijts & Latham, 2012). Furthermore, when defining KPIs, they should be SMART; Specific, Measurable, Assignable, Realistic, and Time-related and based on current and future process capabilities (Almström et al., 2017; Meekings et al., 2011).

In total, there are many KPIs that the organization measures and evaluates. With such a high number, it obstructs understanding and could possibly lead to stress and loss of motivation when it is hard to achieve them all (Meekings et al., 2011). To further enhance understanding and enable simpler implementation, the role of top management is to divide key and non-key performance indicators and clearly communicate the strategy (Sull et al., 2018), possibly with standard procedures to ensure support for employees to help understand how and what to measure in each KPI (Almström et al., 2017). In highlighting the alignment of strategic goals and performance targets, Kaizen and Hoshin Kanri principles can be demonstrated and further improve the organization through the sharing of best practices (Liker & Convis, 2012).

Processes
All systems use processes, tasks, and practices to achieve goals. This aspect also covers the way work is organized (Davis et al., 2014). Table 4.7 below shows the findings and sources of evidence in this aspect.

Table 4.7: Process findings and evidence sources

Finding	Obs	iObs	Int	iInt	Num
Not understanding consequences of ill planned activities		x			
Acting fast to stimuli		x		x	
Low reliance on technology	x	x		x	
No standard for covering for others	x		x		
No process for transferring/retaining knowledge		x	x	x	

The main measurement currently evaluated in the factory is the operational rate. It is never reached, while it is the main focus in improvement efforts. A bottleneck index has been developed to find the main constraining line in the flows. The lowest ranking line according to the bottleneck index is evaluated each week where the team leader and first line manager of the line and area invite process technicians, maintenance technicians, process engineers, and the management team. They listen and participate in the analysis, give feedback, and decide on the appropriate support. However, chairs are rarely prepared enough to meet the management standards and everyone leaves with more questions than they had when they arrived. This is repeated each week with little to no change in structure or clarity. Lack of structured processes and clarity on how to work with different projects or procedures

hinders continuous improvement initiatives in an organization (Liker & Franz, 2011).

An observed consequence of these poorly prepared gatherings is that participants have full schedules filled with meetings where the agenda is not set with unclear expectations from each participant. There is already an issue with the support functions not prioritizing production meetings, and this could lead to resistance and decreased trust, and to an even more strained relationship between the functions in the future. With these types of cross-functional meetings, where collaboration is crucial, it is important that everyone feels motivated and knows the purpose of the meeting and their attendance (Deci et al., 2017). The ARC-model by Fowler (2014) must be taken into account for leaders to support autonomy by involving employees in decision making, foster relatedness through transparent communication and trust, and build competence by enabling success and recognizing progress (Fowler, 2014). This can help individual engagement and contribute to greater organizational adaptability and resilience (Fowler, 2014).

In general throughout the production organization the Plan-Do-Check-Act (PDCA) cycle is present in improvement initiatives; however, Plan and Check phases are lacking. The PDCA cycle is a significant part of continuous improvement, and to see benefits and improvements, all phases must be run to ensure sustained initiatives and ideas (Imai, 1986). With the PDCA cycle, you should also compare different countermeasures to find the best solution that aligns with organizational strategy, but the lack of fully developed PDCA cycles places the risk that strategic goals will not be achieved and long-term sustainability will fail (Liker & Franz, 2011). The bottleneck index initiative follows the delivery numbers quite well, see Figure 4.4, and is analyzed every week. However, it lacks execution, analysis, and reflection of the results with a strategic follow-up to see the bigger picture; in other words, check, act, and plan repeated sequences of the PDCA cycle.

Related to the lack of knowledge of the KPIs and the technological interface that is designed by those more experienced in data analysis, is the lack of reliance on data as evidence for statements and process changes. Measurement and analysis of the bottleneck index is dependent on a user interface that many have expressed being not straightforward in the shop floor implementation, and an under-reliance on the technology is present. The technical solution is not optimal, but the issue lies in understanding and adopting the tool. Lack of proper preparation and adjustments makes the concept unreliable. With help and more follow-up from coaching leaders, it can benefit the end user to implement and use the technology so that it can be a fully functioning process (Dombrowski & Mielke, 2013).

The process of finding replacement personnel who covered your work differed between the employees of the case company. Some always had a replacement, while others had a vacant spot at meetings. This led to confusion and questions like; should we wait to start the meeting? Do they have something else urgent that we would need to help with? Or did they just not mind sending someone else? People being absent or sending a replacement also led to more inefficient meetings due to

replacements being unprepared and ill equipped, while in other cases there were no noticeable differences in the meeting. As this was present through several levels of the organization, it seemed to be part of the culture. Culture forms the organization and it is important to align the strategy with actions, goals, and standard routines to truly influence culture (Bortolotti et al., 2015). And, as management expresses the importance of preparing replacement personnel, it is important that they align their words with actions to truly show and set a standard for the organizational culture they want (Bortolotti et al., 2015). Standardized processes and procedures are the key to consistent performance and achieving improvements (Liker & Meier, 2006). This is also part of Lean leadership with Hoshin Kanri, to ensure long-term improvement and allocation of resources, leaders set consensus goals and standards to align bottom-up with top-down goals and improvements (Liker & Convis, 2012).

The interviews indicate that no one had a process for retaining and transferring specific knowledge. However, when observing the activities in the factory, it was clear that stepping in and covering meetings and tasks for the closest manager served as an ”unofficial” knowledge transfer. This point of view with trial and error could be one way to learn, but it is not suitable in all situations (Döös et al., 2004). The case company has stated that it is a ”learning organization”, where employees can improve and the organization can maintain long-term performance and competitiveness (Kristensen et al., 2022). To ensure that knowledge is transferred within the organization, good communication and leaders who facilitate safe learning environments where employees can learn from each other are crucial aspects of success (Kristensen et al., 2022; Worley & Doolen, 2006).

Infrastructure
The final element of the STS framework is infrastructure. This includes the physical structures and underlying components that support the operations of a system (Davis et al., 2014). However, this has not been evaluated because there were no significant findings on this topic.

4.5.2 Best Practices

To answer research question one, *What is best practice for goal fulfillment in the case plant?*, the best practice findings, based on the literature study, pilot study, case study A and case study B, are summarized in Table 4.8.

Table 4.8: Best practices

Element	Finding	Source
People	Clear leadership	Theory
	Diverse groups	Theory
	ARC Model	Theory
Technology	Standardized technology	Theory
Culture	Questioning flaws without criticizing and still addressing issues	FLM Area 1 Shift Y
	Peer KPI accountability	FLM Area 2.2
	Organizational culture	Theory
Goals	Full scorecard	Plant MT, FLM Area 2.2
	Key PI vs PI	Theory
	SMART KPIs	Theory
Process	Taking time to analyze an event and agree on actions	MT Case Factory B, Theory
	Flawless launch by early involvement	Case Factory A, Theory
	Utilize transfers from case factory B to upskill others	Case Factory B
Infrastructure	No investigation	–

People

With varying competence, lack of understanding, high turnover, and decentralized operations within the case company, a best practice for the element People was difficult to map out. Theory shows that for goal fulfillment and aligned daily operations, employees must be aligned with organizational strategies, visions, and goals, and the leadership must be clear with well functioning communication and good learning environments where knowledge can be passed on (Baumard, 1999; Gagnon et al., 2008; Kristensen et al., 2022). The case company has many Lean philosophies present. For employees to thrive and perform in a Lean environment, leaders must provide clear leadership to involve team members in value-adding activities and find efficient ways of working (Liker & Hoseus, 2008). With constant room for improvement and humility, patience, and respect, leaders can foster a culture of innovation and high-performing employees at all levels of the hierarchy (Liker & Convis, 2012; Liker & Hoseus, 2008). In a Lean manufacturing environment, shop floor workers are key to sustainable success, and they must be understood and themselves understand tools, methods, visions, and directions (Dombrowski & Mielke, 2013). In the 4P model, People and Partners is the second top layer, and is built on Process

and Philosophy, for the people aspect to succeed, the philosophy and process of the organization must be aligned (Dombrowski & Mielke, 2013; Liker & Hoseus, 2008).

There were no findings in the study that demonstrate the use of diverse groups as best practice. However, theory suggests that functional diversity where team members have different professional backgrounds, experiences, and perspectives can stimulate task conflict, a type of disagreement centered on the task rather than personal issues (Jehn et al., 1999). Task conflict can encourage thorough analysis and creative problem-solving while being constructive (Jehn et al., 1999; Lovelace et al., 2001; Pelled et al., 1999). Diverse groups can also offer a wider range of knowledge and points of view relevant to the task, which can improve decision making and innovation (van Knippenberg & Schippers, 2007). Furthermore, diversity fosters more complex discussions and innovative group discussions, especially in non-routine problem-solving (van Knippenberg & Schippers, 2007). However, the relationship between diversity and performance is not clearly supported in the theoretical findings (Bantel & Jackson, 1989; Hong & Page, 2004). Despite this, the theoretical foundation is strong enough to argue that working in diverse groups is a best practice in team design, especially in organizations that aim to increase adaptability, performance, learning, and innovation (Hong & Page, 2004).

Deci et al. (2017) further emphasize the importance of motivation and that Lean leaders should enable a culture of learning-by-doing and confidence to create a sense of belonging and purpose in a challenging environment. Motivation is crucial to ensure sustained commitment and engagement, effective change processes, and quality of actions (Deci et al., 2017; Fowler, 2014). This is based on motivational theory and the ARC-model of basic psychological needs formulated by (Fowler, 2014) that includes Autonomy, Relatedness, and Competence. With the fulfillment of these, motivation can be sustainable (Fowler, 2014). In particular, in change efforts, which are more likely to succeed and establish when these aspects are supported by leaders (Deci et al., 2017; Fowler, 2014). With participation in decision-making, sense of relatedness through clear and transparent communication, trust, and competence to enable success and recognize progress, organizations can see greater adaptability and resilience, and people who own change and daily tasks (Fowler, 2014).

Technology

To fully exploit the potential of the implemented technologies, it is important to design and structure user interfaces to fit the end user to simplify adaptation (Bellgran & Säfsten, 2010). Currently, the case study showed that the problem is not technology, but availability. For example, employees who do not know how to navigate interfaces to find information might be a consequence of not having previously looked up data themselves, instead receiving blind directives on what to do. To simplify the use of technology, reliable and standardized adaptations can help guide employees toward a common solution to understand the use of different technologies (Langstrand & Drotz, 2016; Larsson, 2021). As Liker (2004) says, standardization is not only about finding the best way, but also about stabilizing a process to simplify and reduce uncertainty, which can be applied to implement technologies.

Culture

During the observations, one discussion stood out between one middle manager and one group of first-line managers. This discussion was about the issues of others with the intention to help and improving the entire flow without criticizing, while still questioning the issue. This group had a high average for participants per area (Figure 4.3) and the shift stood out compared to the other day shift in the bottleneck index; see Figure 4.5. This shows that their problem-solving skills and communication capabilities as a group are reflected in the bottle neck indexes and show better performance. The findings show transformational leadership (Eaton et al., 2024; Judge & Piccolo, 2004) with an open culture and mindset that is crucial to enable continuous improvement and strategic alignment (Schein, 2016; Liker & Hoseus, 2008). Although individual motivation and challenging employees are important for continuous improvement (Deci et al., 2017; Liker & Hoseus, 2008), it is also crucial to align the issues with the overall goals and strategy of the organization. To enable this, the best practice sharing and spreading of organizational knowledge must be addressed and applied at all levels of the organization (Liker & Convis, 2012). Furthermore, with a culture of allowing people to raise their concerns and issues to a group with the intention of solving and not criticizing on one level, it is more likely that this type of culture will spread throughout the organization (Liker & Hoseus, 2008). As culture influences all aspects of an organization with strategies, goals, future visions, and choices (Bortolotti et al., 2015; de Camargo et al., 2023) it is important to allow an open culture throughout the organization to be able to align all levels of the organization, in other words, Hoshin Kanri (Liker & Convis, 2012).

The informal interviews gave the impression that, in the work with KPIs, one TLM group, Area 2.2, has shown best practice with the scorecard documentation with 96% updated KPIs. This has succeeded because they hold each other accountable. They have an internal culture of helping each other in order for everyone to succeed. Although their management does not follow up on the scorecard documentation, they must ensure that it is done correctly internally to have efficient performance in their daily operations. This must be spread through the hierarchy levels to keep track of KPIs to know why, how, and what should be done (Almström et al., 2017) and also spread this knowledge for a greater understanding at shop floor level. After all, it is the shop floor workers who perform the greater part of the daily operations. Therefore, it is crucial that they understand the purpose of their work, as they are held accountable. However, with this approach, there is a risk of adapting a controlling leadership style where the leader controls actions (Anand et al., 2009). This type of leadership often results in resistance and misalignment with employees, and for organizations to develop and cultivate effective leadership, they must match the leadership culture, objectives, and values of the organization and employees (Cameron & Quinn, 2006).

Consistent alignment between strategic goals, organizational culture, and daily operations is a continuous challenge in the case company and other manufacturing organizations (Birkinshaw et al., 2016; Kristensen et al., 2022). According to Cameron

& Quinn (2006), there is great power in developing a strong and unique culture to reduce uncertainty, create continuity, improve collaboration and have a common vision for the future. However, to reach a strong organizational culture, it is important to align the leadership style with the culture to further enhance organizational performance (Cameron & Quinn, 2006). To align organizational culture and drive innovation efforts, there must be clear leadership and powerful guidance to clearly communicate visions (Kotter, 2007) for all individual adopters to understand and embrace goals (Greenhalgh et al., 2004). Furthermore, Silvian et al. (2014) further emphasize the leadership style to align with the culture to succeed in providing direction and maintaining the values of the organization. With clear leadership and a consistent leadership style through different parts of an organization, culture is more likely to align through collaborative cross-functional environments at all levels of the hierarchy (Cameron & Quinn, 2006).

Goals

After reviewing the factory scorecards, only one was complete and it was the plant management team where all KPIs were updated and had target levels. Looking at the teams lower in the hierarchy, the level of fulfilled scorecards vary but the rate is significantly lower. One can argue that it is easier with strategic alignment in top-level management with smaller groups, higher level of education, and a common language (Anand et al., 2009; Zandin, 2001). However, since there is no linear relationship further down in the organization, it is difficult to point out the issue of a lower management level of KPI fulfillment. In terms of best practice, the plant management team has completed the scorecard. Since they set the standard for organizational culture, it (Liker & Hoseus, 2008) is crucial that they apply Hoshin Kanri and spread strategies and visions throughout all levels, from senior leaders to first-line managers, of the organization to ensure alignment and shared strategic direction and commitment to goals (Gagnon et al., 2008; Sull et al., 2018).

As mentioned in the present state analysis, when identifying and defining performance indicators, the organization must differentiate between which are key and which are not (Almström et al., 2017). As the case company is a big and complex organization with several factories with different requirements, there are many performance indicators. However, this means that the management team responsible for defining and choosing what to measure must also prioritize and state the importance of each measure (Almström et al., 2017). This should be done to avoid overwhelmed employees and to provide an understanding of how, why and when to use performance indicators (Almström et al., 2017; Elvnäs, 2017). The definition of Almström et al. (2017) on SMART performance indicators should be visible through all levels of the organization with Specific, Measurable, Assignable, Realistic and Time-related goals. To further amplify collaboration and knowledge sharing, standardized instructions could help employees understand and implement each performance indicator, enabling best practice sharing (Almström et al., 2017). With clear instructions and cross-functional collaboration, KPIs can also more effectively motivate performance and encourage engagement in achieving the targets (Seijts & Latham, 2012).

Process

When visiting another factory within the company, after each improvement report from the shop-floor workers, the management team reflected on the efforts of the presenters. Each member stated if they thought that they were properly equipped to perform the presentation and analysis and suggested actions to take if they did not meet the expectations. This quick reflection made it possible for the presenters to have gained the proper tools to perform according to expectation the next time. Leadership styles like this also provide a guide and understanding from leaders that motivate individuals to ensure engagement and sustained commitment throughout different processes (Deci et al., 2017; Fowler, 2014). Furthermore, the reflection and discussion seen in case factory B also aligns with basic problem-solving and PDCA cycles (Liker & Franz, 2011) where, in case factory A, a lack of Check and Act has been observed. To succeed in the entire organization with continuous improvement and ensure that the benefits of new initiatives last, it is crucial to have the standards and conditions stabilized and run through and iterate the PDCA cycle (Imai, 1986). With this best practice in case factory B, the strategy could be shared to fully benefit from new initiatives in other parts of the organization. In the sharing process, Yokoten practices must be considered in which the recipient should adjust the strategies to their own situation to fit local conditions (Liker & Convis, 2012; Liker & Franz, 2011).

"Flawless launch by early involvement" is a mindset used in case factory A, applied to the implementation of new products in the production environment. The core of this mindset lies in the PDCA plan phase, with significant work in formulating a plan for improvement prior to implementation (Imai, 1986). However, it could also be possible to apply this mindset to other changes related to daily operations. This requires a clearly communicated vision and direction from leaders so that employees can align efforts with goals and objectives (Kotter, 2007). Furthermore, culture often outweighs strategy; with this in mind, it is important that change efforts align with cultural strengths with a focus on people in the organization (Katzenbach et al., 2012). A possible best practice sharing opportunity could be workshops for alignment and involvement. Here, leaders can integrate vision and goals with change initiatives in daily operations to avoid confusion and disengagement (Kotter, 2007). With open discussions and the use of resistance to gather feedback and refine strategies, leaders could have the opportunity to improve their understanding before the implementation of the change (Ford & Ford, 2010).

The observations showed that the employees transferred from case factory B stood out in meeting environments with better structure and analysis skills. In addition, when touring this factory, a culture of reflection and check before act was observed. These strategies, knowledge and processes should be utilized in case factory A to upskill the employees there. Organizations rely on operational excellence, and learning-to-learn is a key enabler for continuous improvement (Hess, 2014; Saabye et al., 2022). The group diversity with different backgrounds is also beneficial in stimulating task conflict with different points of view, ideas, and opinions (Jehn et

al., 1999). With task conflict, and an open culture, groups are more likely to discuss countermeasures to find the most suitable solution to different processes (Jehn & Mannix, 2001; Liker & Franz, 2011). However, to enable this process of knowledge sharing and utilization, it is important to hire the right people to make it sustainable and successful (Kristensen et al., 2022).

4.5.3 Recommendations

To answer research question 2, *How can managers throughout a manufacturing organization align daily operations with top-down directives?*, the gaps between the present state and the best practices were investigated and presented in the STS Figure 4.6 below. As there were no findings for Infrastructure, this element is not connected to any other element. The lines connecting the other elements indicate their interdependence, and the thicker and red lines suggest stronger connections than the thinner orange lines. The color scale from green to red of the individual elements represents their importance for increased alignment, where red is the most critical and green the least. All elements are crucial in aligning shop floor initiatives with top-down directives and this image is to guide the order of action. This visual emphasizes the importance of a holistic approach to organizational management, where each element influences and supports the others.

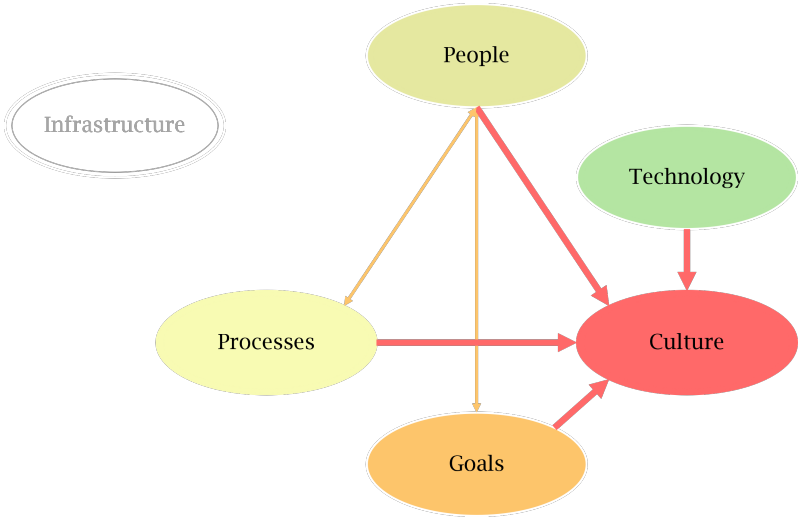


Figure 4.6: Findings summarized in Davis et al. (2014) STS framework

According to the Liker & Hoseus (2008) 4P model in Figure 2.3, starting from the bottom is the strategy, before securing the processes. In this study, it was found that the strategy was not completely aligned, which then negatively affected the processes. As visualized in Figure 4.7.

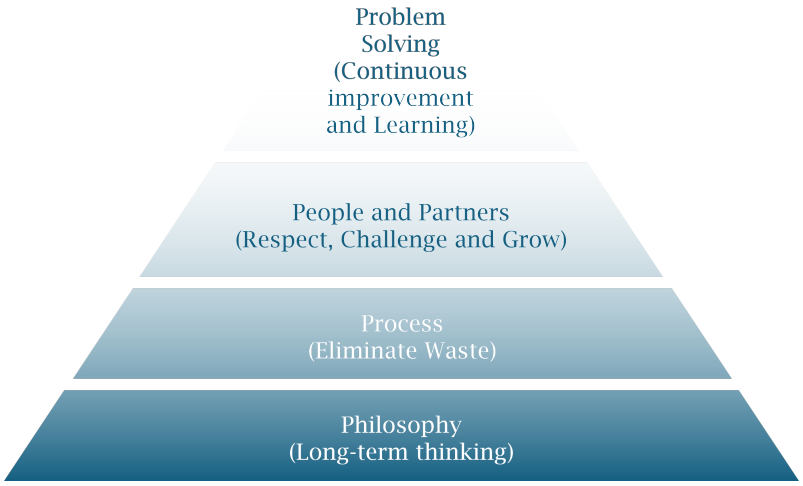


Figure 4.7: Liker & Hoseus (2008) 4P model adapted to the case plant

This was obvious from the STS analysis, where most of the shortcomings regardless of category could be related to culture as seen in Figure 4.6. This is assumed to be related to the culture clash between old and new management. Where the old management practiced traditional leadership with clear directives and instructions for each action, while the new transformational leadership promotes self-leadership and decisions bottom-up. If one practices Lean leadership but does not have a Lean organization from the ground up, it instead resembles avoidant leadership Barber & Warn (2005).

The gap between these cultures hinders the processes in the factory where management waits for action to be taken from the bottom-up and the older employees and further down in the hierarchy wait for direction. Greenhalgh et al. (2004) describes the gap by saying that innovation must have meaning for it to be adopted, and motivation is based on the values, goals, and skills of the adopter. If the culture is not aligned in the organization, the best practices will not spread naturally. Figure 4.8 describes how top managers must meet their employees half way.

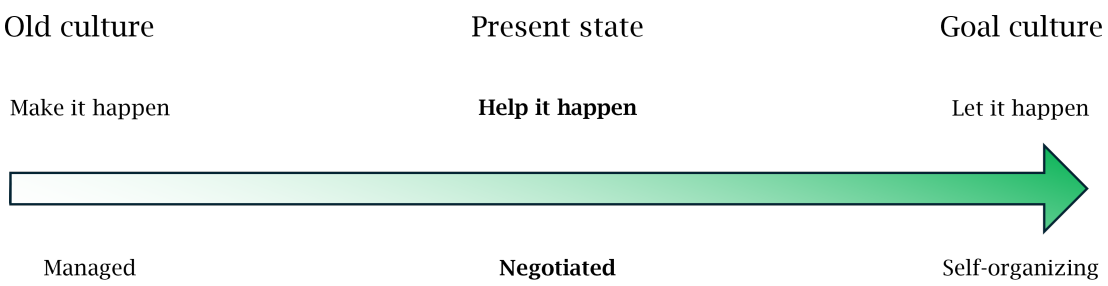


Figure 4.8: The proposed path from old to new culture

The BNI evaluation process is a good way to follow up on the bottlenecks that restrict the flow. Figure 4.4 shows that the BNI is a decent indicator of the daily amount of products produced, which is the current main goal. However, with the misalignment in expectations on who takes initiative, the cross- functional and hierarchical involvement is not capitalized. When participants in the teams base their actions on different goals and values, prioritization differs leading to absence at meetings, expectations are unclear, and the collaboration remains stagnant. In the 4P model in Figure 4.7, a misaligned vision leads to worse processes, less respect for other people, and lastly worse problem-solving activities.

The best practices found are a great way to improve operations and subsequently increase throughput volumes. However, in order for it to stick or work at all, the values must be aligned first. This is also assumed to be the reason why the continuous improvement culture is not as prominent as intended in the present state. The ”why” and ”how”, need to be settled first, which are related to the alignment of strategy and purpose (Seijts & Latham, 2012), or misalignment in this case. To align culture, one should start by honoring the strengths of the existing culture (Katzenbach et al., 2012). As found in the best practices, there already exist two cultural best practices in the organization. Katzenbach et al. (2012) continues by saying that, in rewarding them, it will also seem more like a shared idea rather than something that is forced top-down. When key behaviors are celebrated, employees will spread the practices (Katzenbach et al., 2012). Do not underestimate the effect of cultures in strategy deployment (Katzenbach et al., 2012), because culture always wins over strategy.

5
Discussion

This section discusses the findings and implications of the case study. The chapter is divided into a result discussion, methodology discussion, and recommendations for future research. The study results section answers the research questions. In the methodology discussion, both the study design and validity are considered. The future research section presents recommendations based on the limitations of the study.

5.1 Study Results

What are best practices for goal fulfillment in the case plant?
To achieve better alignment of strategies and operations, best practices for goal fulfillment were investigated. In this project, several best practices were found within the company. Additionally, some best practices from existing research were found. All the best practices listed in Table 4.8 could be spread throughout the organization. Successful adoption of them would achieve better goal fulfillment in more areas, and thus get closer to the overall throughput goal.

A big issue in this case study was that it was hard to find numerical data that was fair to compare the production lines with. Or rather finding data that the employees did trust to make a fair comparison. This was an issue when it came to following up on improvement activities and identifying best practices. Sometimes, a good enough indicator will do, when it comes to differencing improvement activities from just changes. Most importantly, the organization should be able to find best practices in line with their main goals on their own. It should be part of their Lean culture routine to practice Yokoten by evaluating ways of working and trying to spread them.

How can managers throughout a manufacturing organization align the daily operations with top-down directives?
To achieve better alignment of strategies and operations and to adopt the best practices, the organization must be aligned in terms of purpose and values. Before forcing the adoption of best practices, the gap between old and new culture needs to be mended. At this state, spread and adoption do not happen naturally, which stresses the need for help. With hard work and time, better alignment can be achieved, which will make the organization more self-organized, but until then it is important to help the changes happen, as seen in Figure 4.8.

Lean manufacturing is a popular trend within production and one of the main risks in adopting it is that the adoption is not adapted to local conditions (Liker & Convis, 2012; Liker & Franz, 2011). This study is another case where continuous improvement is encouraged, but the conditions for it are not yet fully met. To make the most out of problem-solving activities such as those mentioned in Lean philosophy, the organization must first align in terms of values and culture. If the daily operations are not aligned with the purpose and goals, it could result in a waste of resources if making inefficient and non sustainable investments. If these investments do not achieve what was intended, it would need further investments and resources in the long run to reach the top-down goal. This is a further incentive of increased alignment, to attain environmental and economical sustainability.

5.2 Methodology and Study Execution

The methods used and their execution will influence the interpretation and analysis of the study (Bell et al., 2019; Yin, 2009). Research cannot be free of bias and value, which means that researchers can only try to be reflexive in relation to their values (Bell et al., 2019). By being aware of the possibilities for bias, values, and ethical implications, analyses can remain as objective and as just as possible (Bell et al., 2019).

5.2.1 Study Design

It is hard to say what the minimum number of samples should be in qualitative research (Bell et al., 2019), and when reviewing an organization while conducting research, it is necessary to be satisfied with the availability of participants. However, in this project, participation was higher than expected and with the convergence of evidence seen in Figure 3.4, the data collection is assumed to have been sufficient. Too much data could result in the fact that there is not enough time to properly analyze it (Bell et al., 2019), which could have been the more plausible risk of the sampling methods. Access to social settings is one of the main issues in ethnography (Bell et al., 2019). However, instead the researchers had to decline opportunities for more data due to the limitations of the project. The attitude towards the project within the case organizations was positive, and the employees wanted to help and be a part of the study more than what was possible in terms of time and resources. Trust is another important factor in these types of studies. Bell et al. (2019) mention that to gain access, you must establish trust, mutuality and integrity. In this case, the pilot study was not only to test methods, but also an opportunity to gain trust before collecting hard evidence (Bell et al., 2019).

One common fear is that people worry that their statements will be presented for management (Bell et al., 2019) or that the researchers are there to report discrepancies. In the study, most of the interviews were conducted in the top management office due to the availability of conference rooms there. However, the interviewees may have associated the setting with their performance evaluation meetings with

their managers, which could have affected the answers.

When conducting the interviews, the questions were deliberately not presented to the interviewee beforehand. This was done to make sure the answers were as honest as possible and to give interviewees no time to change opinion between reading the questions and answering. However, due to the fast-paced nature of a manufacturing environment, the interviewees had time to discuss the questions with each other after the first interview. This made it possible for the rest of the participants to reflect on and come up with new ideas that did not exist prior to this research's involvement. Although it is positive that the questions were valid and served as a direction for their work, it decreased the quality of the interviews' results when they had time to reflect and come up with suggestions of solutions for issues that were highlighted in the interviews.

To give participants a chance of giving informed consent (Bell et al., 2019), the roles of the researchers were clear from the beginning of the study. This came with the potential drawback of the quality of the research. The interviewee might adjust their responses in various ways to please the interviewers (Osvalder et al., 2008). Another drawback is that interviews cannot be used to draw far-reaching conclusions about what a specific target group thinks about a particular issue. An interview only conveys what the interviewee says, known as self-reported data.

During informal interviews, it is hard to tell who comes up with the idea when it is a discussion. In addition, it is hard to tell how the conclusion is constructed. Hopefully, these discussions will lead to a better understanding of processes, and further discussions include more original ideas and input for research. Informal interviews were used to complement the data or further describe the picture. It could also be used to validate the findings and check for bias (Descombe, 2017).

5.2.2 Validity and Reliability

The observations had a small sample size. In particular, some settings were only observed once, which means that the findings could be coincidental. However, they are still true for those occasions. Changes have been made in the company throughout the duration of the case study and the conditions will continue to change in the future. This is a present state analysis that can only tell how it has been during the period of research. As graduating students in the same line of business as the case company, organization biases could occur by wanting to get a job at the company after completing the project. However, the company had a hiring freeze that should decrease the risk of bias due to ulterior motives. The research had no funding, and the researchers had no previous relationship with the company or the employees. The researchers have the same gender, age, ethnicity, and educational background, which could limit the analysis.

When designing the study, the research relied a lot on the guidance of employees as the case company. Recommendations on who to interview and observe and

what data to review were given. This was necessary because of the researchers' unfamiliarity with the company and people, but it did not come without risks. Random sampling is commonly used to decrease the risk of bias (Bell et al., 2019) and includes assigning each employee a number and then randomizing a selection of numbers. However, this method could possibly not have provided enough information to plan the project in a successful way.

External analysis could be performed using more than one case study or reviewing the existing literature (Yin, 2009). In this case, the intention was to do both Factory A and B at the same scale, but the Factory B study was cut short. The study still pass Yin (2009) four tests for validity. However, the changes in information between the pilot study and the main study suggest that the evidence could differ between studies. Using an additional case subject makes it possible to generalize (Yin, 2009), which would have further strengthened the results of this study.

Aside from numerical data, which in this case was unavailable for many of the findings, the formal interviews were the least informing data source. When asked about expectations and feedback, almost all first-line managers said that they knew exactly what was expected of them and that they had proper tools to do their work. However, at several occasions, the middle managers had expressed that their employees did not meet their expectations and that they should either know what to do or ask about it. This misalignment suggests that either both the first-line managers and the middle managers are wrong in thinking that the first-line managers know what is expected. With the misalignment of expectations about who should make decisions, as seen in Figure 4.8 this is explained. After analyzing the data, the most common discrepancy in the evidence was that first-line managers gave different answers to the interview questions than what was observed. This was especially clear with the questions related to KPI understanding and alignment of expectations, where most interviewees stated that the KPI understanding was better than what had been observed and documented. Additionally, they stated that they knew what was expected of them, yet their managers were disappointed in their performance and the first-line managers seemed insecure during their presentations and deliveries.

5.3 Future Research

In this case, the data analysis tools were not optimal. However, adoption and understanding seemed to be the real issue at the case plant. This makes it interesting to follow up on improvement efforts and analyze the results of different KPIs. Since the best practice changes are yet to be completed, the predicted results could only be confirmed by existing research. From this project it is assumed that more products with the same resources leads to increased economic sustainability, higher margins can lower prices and lead to higher accessibility of the products for people. With the limitations of available quantitative data this could not be investigated within this study. This relationship could be investigated further in future studies by comparing improvement efforts to economic gain, and in turn decide on what the best

economic practices are. An increased economic sustainability could in term provide better social security with less risk of lay-offs. Fulfilling the aim for self-governance within the case company could further increase the social sustainability where everyone gets a say in decision making in day to day activities. This could also be denied of confirmed in further studies. Increased efficiency would limit the need for overtime work, which not only would decrease resource use in terms of electricity for instance, but would also allow more time for maintenance of the machines. Case factory A with a robot to operator ratio of 1.2 is assumed to benefit of a preventive maintenance plan, which could lead to longer lifespans of equipment and increased environmental sustainability. This relationship could be investigated further in future work.

From the point of view of the case plant, it would have been interesting to evaluate all three factories. During the course of 20 weeks, this might not be possible. However, as a separate case study, it would be interesting to compare the findings and learn more about the relationship between the factories and how they impact each other. Not only performance wise with how they starve or block each other, but also how their organizational cultures interplay. With all these recommendations, it would be interesting to follow up on the effects to answer if they were good or not. With this amount of data, it would be interesting to have someone else analyze it and see if the conclusions would be the same or if other research questions could give more insight given the same dataset. The study in case factory B could have been conducted on the same scale as in case factory A. In addition, other plants within the company could be visited to compare, find best practices, and analyze based on a cultural perspective of nationality. In this thesis, cultural clashes were identified within the factory, and it would be interesting to see how it is in other countries. Without expanding the data set, a future step could be to implement the recommendations and evaluate the outcome of this study.

6
Conclusion

In this case study, the aim was to achieve better alignment of daily operations and top-down directives at all organizational levels in the case plant. With a main focus on finding best practice for goal fulfillment, the study findings were set to form recommendations for the case company to align top-down goals with daily operations.

The analysis revealed how cultural conditions and lack of data reliability are prominent challenges. Cultural misalignment hinders both change initiatives and effective activities for continuous improvement. Reliable and trustworthy data are essential for a fair comparison of production lines and to follow-up on improvement activities. Without it, identifying and validating best practices becomes challenging. Although cultural challenges are the most prominent, the trust and reliance of data is concerning. These results add to the expanding field of digitalization in manufacturing and the relationship between organizational culture and technology adoption could be explored in future work.

Key findings include that you must start from the present state when evaluating the performance and that how employees act depends on current conditions. It may be frustrating that the intended changes cannot happen over night, but employees should not be punished for acting according to the current culture. By focusing first on alignment of the culture and fixing resulting errors later, change is more likely to occur and be sustainable. Important to note is the high employee engagement and their loyalty to the company. Despite these troubles, employees remain happy to help, which is a great condition for change efforts. However, if the cultural clashes remain and the differences in expectations continue, employees might lose trust in the organization.

References

Almström, P., Andersson, C., Öberg, A. E., Hammersberg, P., Kurdve, M., Landström, A., ... Zackrisson, M. (2017). *Sustainable and resource efficient business performance measurement systems – the handbook*. Chalmers University of Technology.

Anand, G., Ward, P., Tatikonda, M., & Schilling, D. (2009). Dynamic capabilities through continuous improvement infrastructure. *Journal of Operations Management*, *27*(1), 444-461.

Bantel, K., & Jackson, S. E. (1989). Top management and innovations in banking: Does the composition of the team make a difference? *Strategic Management Journal*, *10*(1), 107-124. doi: 10.1002/smj.4250100709

Barber, E., & Warn, J. (2005). Leadership in project management: from firefighter to firelighter. *Management Decision*, *43*(7/8), 1032-1039. doi: 10.1108/00251740510610026

Bass, B. (1985). *Leadership and performance beyond expectations*. New York: Free Press.

Baumard, P. (1999). *Tacit knowledge in organizations*. SAGE Publications, Limited.

Bell, E., Bryman, A., & Harley, B. (2019). *Business research methods* (5th ed.). Oxford University Press.

Bellgran, M., & Säfsten, E. (2010). *Production development: Design and operation of production systems*. Springer London.

Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How do firms adapt to discontinuous change? – bridging the dynamic capabilities and ambidexterity perspectives. *California Management Review*, *58*(4), 36-56. doi: 10.1525/cmr.2016.58.4.36

Bortolotti, T., Boscari, S., & Danese, P. (2015). Successful lean implementation: organizational culture and soft lean practices. *International Journal of Production Economics*, *160*, 182-201.

Burns, J. (1978). *Leadership*. Harper & Row.

Cameron, K. S., & Quinn, R. E. (2006). *Diagnosing and changing organizational culture*. Jossey-Bass.

Camp, R. (2015). *The lean leader: a personal journey of transformation* (1st ed.). CRC Press.

Davis, M., Challenger, R., Jayewardene, D., & Clegg, C. (2014). Advancing socio-technical systems thinking: A call for bravery. *Applied Ergonomics*, *45*(2), 171-180. doi: 10.1016/j.apergo.2013.02.009

de Camargo, R. Q., Facin, A. L. F., da Silva, M. T., & Gonçalves, R. F. (2023). The role of organizational culture in the transformation to industry 4.0. In *Advances in production management systems. production management systems for responsible manufacturing, service, and logistics futures* (p. 487-500). Springer Nature Switzerland. doi: 10.1007/978-3-031-43662-8_35

Deci, E., Olafsen, A., & Ryan, R. (2017). Self determination theory in work organizations: The state of a science. *The Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 19-43. doi: 10.1146/annurev-orgpsych-032516-113108

Descombe, M. (2017). *The good research guide: For small-scale social research projects* (3rd ed.). Maidenhead: Open University Press.

Dombrowski, U., & Mielke, T. (2013). Lean leadership – fundamental principles and their application. *Procedia CIRP*, *7*, 569-574. doi: 10.1016/J.PROCIR.2013.06.034

Döös, M., Backström, T., & Sundström-Frisk, C. (2004). Human actions and errors in risk handling - an empirically grounded discussion of cognitive action-regulation levels. *Safety Science*, *42*, 185-204. doi: 10.1016/S0925-7535(03)00026-2

Eaton, L., Bridgman, T., & Cummings, S. (2024). Advancing the democratization of work: A new intellectual history of transformational leadership theory. *Leadership*, *20*(3). doi: 10.1177/17427150241232705

Eisenhardt, K. (1989). Building theories from case study research. *The Academy of Management Review*, *14*(4), 532-550. doi: 10.2307/258557

Elvnäs, S. (2017). *Effektfull: detaljerade studier av ledarskap - så ökar du effekten av din tid [impactful: Detailed studies of leadership – how to increase the impact of your time].* Volante.

Emiliani, M. (2008). Standardized work for executive leadership. *Leadership & Organization Development Journal*, *29*(1), 24-46. doi: 10.1108/01437730810845289

Ferenhof, H. A., Cunha, A. H. D., Bonamigo, A., & Forcellini, F. A. (2018). Toyota kata as a km solution to the inhibitors of implementing lean service in service companies. *VINE Journal of Information and Knowledge Management Systems*, *48*(3), 404-426. doi: 10.1108/VJIKMS-11-2017-0083

Ford, J. D., & Ford, L. W. (2010). Stop blaming resistance to change and start using it. *Organizational Dynamics*, *39*(1), 24-36. doi: 10.1016/j.orgdyn.2009.10.002

Fowler, S. (2014). *Why motivating people doesn't work... and what does: The new science of leading, energizing and engaging.* Berrett-Koehler Publishers.

Gagnon, M., Jansen, K., & Michael, J. (2008). Employee alignment with strategic change: A study of strategy-supportive behavior among blue-collar employees. *Journal of Managerial Issues*, *20*(4), 425-443.

Greenhalgh, T., Robert, G., MacFarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *The Milbank Quarterly*, *82*(4), 581-629.

Hess, E. (2014). *Learn or die: Using science to build a leading-edge learning organization*. Columbia University Press. doi: 10.7312/hess17024

Hong, L., & Page, S. (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proc. Natl. Acad. Sci. U.S.A.*, *101*(46), 16385-16389. doi: 10.1073/pnas.0403723101

Imai, M. (1986). *Kaizen: The key to japan's competitive success*. McGraw-Hill Education.

International Organization for Standardization. (2025a). *Iso 14001:2015 – environmental management systems.* Retrieved from `https://www.iso.org/standard/60857.html` (Retrieved February 24, 2025)

International Organization for Standardization. (2025b). *Iso 9001:2015 - quality management systems – requirements.* Retrieved from `https://www.iso.org/obp/ui/en/#iso:std:iso:9001:ed-5:v1:en` (Retrieved February 21, 2025)

International Organization for Standardization. (2025c). *Standards.* Retrieved from `https://www.iso.org/standards.html` (Retrieved February 21, 2025)

Jehn, K., & Mannix, E. (2001). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance. *Academy of Management Journal*, *44*(2), 238-251. doi: 10.2307/3069453

Jehn, K., Northcraft, G., & Neale, M. (1999). Why differences make a difference: A field study of diversity, conflict and performance in workgroups. *Administrative Science Quarterly*, *44*(4), 741-763. doi: 10.2307/2667054

Judge, T., & Piccolo, R. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology*, *89*(5), 755-768. doi: 10.1037/0021-9010.89.5.755

Karunanayake, K., Fernando, M., & Kulatunga, U. (2022). Knowledge management practices to minimize the impact of staff turnover. In (p. 612 – 624). doi: 10.31705/WCS.2022.49

Katzenbach, J., Steffen, I., & Kronley, C. (2012). Culture change that sticks. start with what is already working. *Harvard Business Review*, *90*(7), 110-117.

Kotter, J. P. (2007). Leading change: Why transformation efforts fail. *Harvard Business Review*, *85*(1), 96-103.

Kristensen, T. B., Saabye, H., & Edmondson, A. (2022). Becoming a learning organization while enhancing performance: the case of lego. *International Journal*

of Operations & Production Management, *42*(13), 438-481. doi: 10.1108/IJOPM -10-2021-0676

Kuhlman, J., & Farrington, J. (2010, 11). What is sustainability? *Sustainability 2 (2010) 11*, 3436-3448. doi: https://doi.org/10.3390/su2113436

Langstrand, J., & Drotz, E. (2016). The rhetoric and reality of lean: a multiple case study. *Total Quality Management & Business Excellence*, *27*(3-4), 398-412. doi: 10.1080/14783363.2015.1004307

Larsson, Ö. (2021). *The golden standard*. 4S.

Liker, J. K. (2004). *The toyota way: 14 management principles from the world's greatest manufacturer*. McGraw-Hill Education.

Liker, J. K., & Convis, G. L. (2012). *The toyota way to lean leadership: Achieving and sustaining excellence through leadership development*. McGraw-Hill Education. doi: 10.1036/9780071780797

Liker, J. K., & Franz, J. K. (2011). *The toyota way to continuous improvement: linking strategy with operational excellence to achieve superior performance*. McGraw-Hill Education.

Liker, J. K., & Hoseus, M. (2008). *Toyota culture: The heart and soul of the toyota way*. McGraw-Hill Education.

Liker, J. K., & Meier, D. (2006). *The toyota way fieldbook: a practical guide for implementing toyota's 4ps*. McGraw-Hill.

Liker, J. K., & Meier, D. (2007). *Toyota talent: Developing your people the toyota way*. McGraw-Hill Education.

Lingard, H., Hallowell, M., Salas, R., & Pirzadeh, P. (2017). Leading or lagging? temporal analysis of safety indicators on a large infrastructure construction project. *Safety Science*, *91*, 206-220. doi: 10.1016/j.ssci.2016.08.020

Lovelace, K., Shapiro, D. L., & Weingart, L. R. (2001). Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective. *Academy of Management Journal*, *44*(4), 779-793. doi: 10.5465/3069415

Meekings, A., Briault, S., & Neely, A. (2011). How to avoid the problems of target-setting. *Measuring Business Excellence*, *15*(3), 86-98. doi: 10.1108/ 13683041111161175

Nesensohn, C., Demir, S. T., & Bryde, D. J. (2012). Developing a "true north" best practice lean company with navigational compass. In *20th annual conference of the international group for lean construction.* Retrieved from `http://www.iglc.net/papers/details/814`

Osvalder, A.-L. (2015). Tyst kunskap och kompetens - utveckling av metod för att överföra erfarenheter från processtyrning [tacit knowledge and competence –

development of a method for transferring experience from process control]. *Energiforsk.*(199).

Osvalder, A.-L., Bohgard, M., Karlsson, S., Loven, E., Mikaelsson, L.-Å., Mårtensson, L., ... Ulfvengren, P. (2008). *Arbete och teknik på människans villkor [work and technology on human terms].* Prevent.

Pantförder, D., Schaupp, J., & Vogel-Heuser, B. (2017). Making implicit knowledge explicit - acquisition of plant staff's mental models as a basis for developing a decision support system. *Communications in Computer and Information Science*, 358-365. doi: 10.1007/978-3-319-58750-9_50

Pawlak, S. (2024). The impact of selected lean manufacturing tools on the level of delays in the production process. a case study. *Management Systems in Production Engineering*, *32*(1), 103-107. doi: 10.2478/mspe-2024-0011

Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict and performance. *Administrative Science Quarterly*, *44*(1), 1-28. doi: 10.2307/2667029

Roser, C., Nakano, M., & Tanaka, M. (2002, 06). Detecting shifting bottlenecks. In *International symposium on scheduling* (p. 59-62).

Rother, M. (2009). *Toyota kata: Managing people for improvement, adaptiveness, and superior results.* McGraw-Hill Education.

Runa Patel, B. D. (2019). *Forskningsmetodikens grunder - att planera, genomföra och rapportera en undersökning [the basics of research methodology – planning, conducting, and reporting a study]* (5th ed.). Studentlitteratur AB.

Saabye, H., Kristensen, T., & Edmondson, A. (2022). Developing a learning-to-learn capability: insights on conditions for industry 4.0 adoption. *International Journal of Operations & Production Management*, *42*(13), 25-53. doi: 10.1108/IJOPM-07-2021-0428

Schein, E. H. (1984). Coming to a new awareness of organizational culture. *Sloan Management Review*, *25*(2), 3-16.

Schein, E. H. (2016). *Organizational culture and leadership* (5th ed.). John Wilson & Sons, Incorporated.

Seijts, G. H., & Latham, G. P. (2012). Knowing when to set learning versus performance goals. *Organizational Dynamics*, *41*(1), 1-6. doi: 10.1016/j.orgdyn.2011.12.001

Silvian, P., Resmi, A., Gemini, V., & Kuriyan, K. (2014). Leadership, commitment, culture and employee turnover – a deeper examination. *Int. J. Enterprise NetworkManagement*, *6*(1), 1-13.

Simoes, P., & Esposito, M. (2014). Improving change management: how communication nature influences resistance to change. *Journal of Management Development*, *33*(4), 324-341. doi: 10.1108/JMD-05-2012-0058

Sull, D., Sull, C., & Yoder, J. (2018). No one knows your strategy - not even your top leaders. *MITSloan Management Review*. Retrieved from https://sloanreview.mit.edu/article/no-one-knows-your-strategy-not-even-your-top-leaders

Swedish Institute for Standards. (2025). *What is a standard?* Retrieved from https://www.sis.se/en/standards/what-is-a-standard/ (Retrieved February 21, 2025)

Thomas, R., & Hardy, C. (2011). Reframing resistance to organizational change. *Scandinavian Journal of Management*, *27*(3), 322-331. doi: 10.1016/j.scaman.2011.05.004

Trevor, J., & Varcoe, B. (2017). How aligned is your organization? *Harvard Business Review*. Retrieved from https://hbr.org/2017/02/how-aligned-is-your-organization

van Knippenberg, D., Dreu, C. D., & Homan, A. C. (2004). Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology*, *89*(6), 1008-1022. doi: 10.1037/0021-9010.89.6.1008

van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology*, *58*, 515-541. doi: 10.1146/annurev.psych.58.110405.085546

Wittenberg, G. (1994). Kaizen - the many ways of getting better. *Assembly Automation*, *14*(4), 12-17. doi: 10.1108/EUM0000000004213

Worley, J., & Doolen, T. (2006). The role of communication and management support in a lean manufacturing implementation. *Management Decision*, *44*(2), 228-245. doi: 10.1108/00251740610650210

Yin, R. (2009). *Case study research: Design and methods* (4th ed.). Sage, Thousand Oaks.

Yorio, P. L., Haas, E. J., Bell, J. L., Moore, S. M., & Greenawald, L. A. (2020). Lagging or leading? exploring the temporal relationship among lagging indicators in mining establishments 2006–2017. *Journal of Safety Research*, *74*, 179-185. doi: 10.1016/j.jsr.2020.06.018

Zandin, K. (2001). *Maynard's industrial engineering handbook* (5th ed.). McGraw-Hill.

A

Appendix 1 - Keywords

- **Study (set1)**
  - "case stud*" OR "literature review"
- **Field/sector (set2)**
  - Manufacturing
  - AND NOT construction
- **Target group (set3)**
  - Operator* OR employee*
- **Topic (set4)**
  - Communication
  - ”Change management”
  - Lean
  - Strateg* w/2 Align*
  - Strategy
  - ”daily management”
  - productivity
  - efficiency
  - understanding OR knowledge
  - support OR help
  - turnover
  - empower*
  - ”organizational culture”
- **Topic (set5)**
  - ”kata” AND definition
  - ”5s” AND definition
  - ”transformational leadership”
  - ”traditional leadership”
  - ”transactional leadership”
  - ”industry 5.0”
  - ”industry 4.0”
  - ”performance measure*”
  - KPI
  - ”bottleneck analysis”
- **Search query**
  - TITLE-ABS-KEY (set1 AND set2 AND set3 AND set4)
  - TITLE-ABS-KEY (set1 AND set2 AND set5)

B

Appendix 2 - Observations

Table B.1: Protocol for Observations

Protocol for observations	
"Quantitative" observation	
Team name	
Meeting name	
Time	
Participants (roles)	
Information type	
Additional notes	
"Qualitative" observation	
Number of active participants (no/total)	
Do they talk aside from their report	
Reporting/discussion	
Reference to bigger picture	
Use of tools (whiteboard/tv etc)	

Table B.2: Protocol for Observations First Line Managers

Protocol for Observations First Line Managers	
"Quantitative" observation	
Team name	
Meeting name	
Time	
Participants (roles)	
Information type	
Additional notes	
Agenda (do they or do they not)	
Plan for the daily goal – what should be achieved today?	
Plan for how resources should be allocated (e.g., in case of absence, rotation, etc.)	
Plan for safety/quality checks, inspection, and maintenance	
Plan for how changes should be handled	
Deviation handling and real-time training	
Additional notes	
"Qualitative" observation	
Number of active participants (no/total)	
Do they talk aside from their report	
Reporting/discussion	
Reference to bigger picture	
Use of tools (whiteboard/tv etc)	

C

Appendix 3 - Interview Questions

The interview questions with corresponding themes are presented in the list below in the language used at the interviews, Swedish. This is followed by a translated list in English. Finnaly, the themes with corresponding template is presented in Table C.1.

Successionsplanering

1. När en TF ska gå in, hur förbereds dom för sin uppgift?
   (a) Sker det gång till gång eller finns en tydlig plan/struktur för hur TF ska sköta rollen?
      i. Hur gör du när detta sker?
   (b) Finns det dokumenterat för vad varje roll förväntas göra i alla sammanhang så att en TF kan kolla upp, eller att du kan dubbelkolla?
   (c) Finns det fall som går/gått mindre bra när någon varit TF? Finns det något mönster i det? Vilka förutsättningar påverkar?
2. Baserat på vad sker valet av ersättare?
   (a) Är det olika i olika sammanhang?
   (b) Vad vill du att de ska ta med sig från att vara ersättare? Vad är syftet?

Turnover

1. Pratas det något om personalomsättning av FLM, och med vilka i så fall?
   (a) Vad tror du är anledningen till rotation?
   (a) På din nivå och under

Förmedla tydliga förväntningar

1. Känner du dig säker på vad som förväntas av dig?
   (a) Från överordnade
   (b) Från underordnade
   (c) Från kollegor
2. Finns det något fall där det är extra svårt att förstå förväntningarna? (Något sammanhang, någon roll, någon?)
3. Är det tydligt vem som har vilka ansvar i samarbeten (i vissa fall så förväntas ägarskapet vara större än vad det är längre ner i kedjan)? Vad beror det på?
4. Vad är överenskommelsen med stödfunktionerna (UH/GEO/TEKNIKER) för närvaro på RTM-möten (på FLM-nivå)? Hur följs det upp?
5. Tycker du att du får tillräckligt med feedback (både från över- och underordnade och kollegor) för att du ska kunna förstå förväntningarna på dig i ditt arbete?

   (a) Hur hanterar du feedbacken? Något specifikt verktyg eller hjälpmedel t.ex.?
6. Har du någon struktur för att ge feedback för att möjliggöra kontinuerlig förbättring för dina medarbetare?

Hitta info

1. Mycket info är verbal, vad finns för system för att säkerställa att den går fram? Upplevs detta som ett problem?
2. Finns det verktyg, till exempel digitala eller visuella, som hjälper dig att hitta eller förmedla information som behövs för att du ska kunna uppnå mål i dagliga arbetet? I så fall vad/vilka?
3. All hjälp är inte bara dokument, utan mänsklig hjälp.
   (a) Vet alla vem de ska fråga?
   (b) Vad upplever du att supportteamet (Teknik, UH...) gör för att hjälpa?
4. Finns det standarder som du använder i ditt dagliga arbete? I så fall till vilken utsträckning och hur ofta använder du dem? Vad för typ av standarder? Är de satta av dig eller av överordnad?

Meningsfulla KPIer

1. Hur arbetar du för att skapa förståelse för organisationens KPIer som rör det dagliga arbetet?
2. Är ansvaret för KPIer uppdelat i grupperna? Varför/hur?

Ge rätt verktyg

1. Känner du att du får rätt stöd? Eller vad skulle du behöva för att göra ett bättre jobb?
   (a) Reflekterar ni tillsammans efter "projekt" på om förutsättningarna var tillräckliga till exempel?
2. Hur känner du av behov av din support från dina kollegor och anställda (dagligen)? Har du något system?
3. Är det olika förutsättningar och stöd när ni jobbar dag/kväll? Hur tacklas det i så fall?
4. Hur justeras möten och rutiner för aktuella förutsättningar och problem?
5. Har du någon plan för att utveckla dina ledare? Exempelvis, ges det tillfälle att låta underordnade vara TF för att ge möjlighet till utveckling (och inte bara vid frånvaro av överordnad)?
6. Känner du att du kan bidra till organisationen/verksamheten på det sätt du önskar i din roll? Tycker du att det finns forum för att kunna bidra till utveckling av organisationen?
7. Hur tycker du funktionen problem-solving/Kaizen fungerar idag?
   (a) Vilka verktyg används för att distribuera ansvaret vid problem-solving?
   (b) Hur ser du till att alla (som vill) får chansen att vara involverade i denna typ av förbättringsarbete?
8. Hur lär ni av varandra (ni som har samma roll på olika områden)?

HR-Relaterade

1. Finns det någon uttalad strategi för utveckling av personal (utbildning/livslångt lärande)?
2. Vad finns det för utmaningar, till exempel språkbarriärer, olika utbildningsbakgrund och kulturella skillnader? Hur jobbas det i så fall med dem?
3. Är det faktiskt meningsfullt med utbildningar eller är de designade för case factory B? Vad är det som, trots ett robust motivationssystem, gör att rotationen är hög?
4. Görs det någon analys/utvärdering kring turnover?
5. Vad upplever du gör skillnad för att behålla personal? (och jämfört med andra områden)
6. Varför tror du att rotationen är så hög?
7. Vilka frågor jobbar ni med kopplat till social hållbarhet?
8. Jobbar ni tillsammans med andra funktioner i case factory A?

Interview Questions Translation

Succession Planning

1. When a temporary replacement (TR) is about to step in, how are they prepared for the task?
   (a) Does it happen ad hoc or is there a clear plan/structure for how the TR should handle the role?
      i. What do you do when this happens?
   (b) Is it documented what each role is expected to do in all contexts so that a TR can look it up, or so that you can double-check?
   (c) Are there cases where things have gone less well when someone has been a TR? Are there any patterns? What conditions affect this?
2. What is the selection of a replacement based on?
   (a) Does it vary in different contexts?
   (b) What do you want them to take away from being a replacement? What is the purpose?

Turnover

1. Is there any discussion about staff turnover by FLMs, and with whom, if so?
   (a) What do you think is the reason for rotation?
   (a) At your level and below

Managing Expectations

1. Do you feel confident about what is expected of you?
   (a) From superiors
   (b) From subordinates
   (c) From colleagues
2. Are there any cases where it's particularly difficult to understand expectations? (Certain context, role, or person?)
3. Is it clear who holds what responsibilities in collaborations (in some cases ownership is expected to be greater than it actually is down the chain)? What causes this?

4. What is the agreement with support functions (UH/GEO/TECHNICIANS) regarding attendance at RTM meetings (at the FLM level)? How is it followed up?
5. Do you feel you receive enough feedback (from both superiors, subordinates, and colleagues) to understand the expectations for your role?
   (a) How do you handle the feedback? Any specific tools or aids, for example?
6. Do you have a structure for giving feedback to enable continuous improvement for your employees?

Finding Information

1. Much information is verbal — what systems are in place to ensure it gets through? Is this perceived as a problem?
2. Are there tools, such as digital or visual aids, that help you find or convey information needed to achieve daily work goals? If so, which ones?
3. Not all help is in documents — some is human support.
   (a) Does everyone know who to ask?
   (b) What do you feel the support team (Tech, UH...) does to assist?
4. Are there standards you use in your daily work? If so, to what extent and how often do you use them? What types of standards? Are they set by you or by a superior?

Meaningful KPIs

1. How do you work to create understanding of the organization's KPIs related to daily work?
2. Is the responsibility for KPIs divided within the teams? Why/how?

Providing Support

1. Do you feel you receive the right support? Or what would you need to do a better job?
   (a) Do you reflect together after "projects" about whether the conditions were sufficient, for example?
2. How do you sense the need for your support from colleagues and employees (on a daily basis)? Do you have any system for this?
3. Are there different conditions and support during day/evening shifts? If so, how is it handled?
4. How are meetings and routines adjusted for current conditions and problems?
5. Do you have a plan to develop your leaders? For example, are there opportunities to let subordinates act for their manager to provide development opportunities (and not just in the absence of a superior)?
6. Do you feel you can contribute to the organization/business in the way you wish in your role? Do you think there are forums for contributing to the development of the organization?
7. How do you think the problem-solving/Kaizen function works today?
   (a) What tools are used to distribute responsibility in problem-solving?
   (b) How do you ensure that everyone (who wants to) gets the chance to be involved in this type of improvement work?

8. How do you learn from each other (those of you with the same role in different areas)?

HR-Related

1. Is there a stated strategy for staff development (training/lifelong learning)?
2. What challenges exist — for example, language barriers, different educational backgrounds, and cultural differences? How are these handled?
3. Are the trainings actually meaningful or are they designed for case factory B? Despite a robust motivation system, what is causing the high turnover?
4. Is any analysis/evaluation done on turnover?
5. What do you feel makes a difference in retaining staff? (Compared with other areas)
6. Why do you think the rotation is so high?
7. What issues are you working on related to social sustainability?
8. Do you collaborate with other functions in case factory A?

Table C.1: Interview themes with corresponding template where theme is included

Theme	**Template**
Successionsplanering (Succession planning)	B, C, E
Turnover	B, C, E
Förmedla tydliga förväntningar (Managing expectations)	A, B, C, D, E
Hitta info (Finding information)	B, C, D, E
Menignsfulla KPIer (Meaningful KPIs)	A, B, C, D, E
Ge rätt verktyg (Providing support)	A, B, C, D, E
HR-Relaterat (HR-Related)	F

DEPARTMENT OF INDUSTRIAL AND MATERIALS SCIENCE
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden
www.chalmers.se

CHALMERS
UNIVERSITY OF TECHNOLOGY