

IMPORTANT FACTORS AND STRATEGIES FOR SUCCESSFUL DIGITAL TRANSFORMATIONS IN MANUFACTURING ORGANIZATIONS

*A CASE STUDY AT VOLVO GROUP TRUCKS
OPERATIONS*

BSc in Industrial Engineering – Business Engineer
- Machine Technology

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Abstract

Overcoming resistance to change is crucial for organizational changes. In manufacturing companies, changes and digital transformations are more frequently occurring and in faster paces.

The purpose of this thesis is to study how digital transformations can be implemented successfully in manufacturing organizations by analyzing important factors and strategies in change management and offer solutions for deficient processes.

This thesis is an inductive qualitative case study. The theories brought up in this thesis are regarding change management, digital transformation, the theory of planned behavior, the psychological contract, employee involvement and digital design, all regarding change management. By analyzing the organizations implementation-, change management- and digital transformation processes, important factors were extracted to develop the organizations digital transformation strategy. A total of 10 interviews were held with team leaders and production leaders and 4 observations were held. The collected data and researched theories were analyzed to fill the discovered gaps in the organizations change management.

The results show that there are gaps in the communication within the organization and a deficient communication chain. Results show that there is a selective involvement of employees in new implementation- and digital transformation processes and that regularly involved employees in new implementation processes and digitalization initiatives show more positive expectations and attitudes towards change whilst uninvolved employees expressed more negative. The results also show that the absence of support functions such as HR, ergonomics, IT technicians etc. in the evening shifts may contribute to role ambiguity and role conflict in the evening shift production leaders and contribute to resistance to change due to added workload and insufficient support.

By involving more employees and departments in implementation processes, standardizing communication methods and engaging support functions in the evening shift new digital transformation initiatives can be implemented more successfully.

Sammanfattning

Att övervinna motståndet mot förändringar är avgörande för organisatoriska förändringar. I tillverkningsföretag sker förändringar och digitala transformationer oftare och i ökande takt.

Syftet med detta examensarbete är att studera hur digitala transformationer framgångsrikt kan implementeras i tillverkande organisationer genom att analysera viktiga faktorer och strategier inom förändringsledning och erbjuda lösningar till bristfälliga processer.

Denna avhandling är en induktiv kvalitativ fallstudie. Teorierna som tas upp i detta examensarbete gäller förändringsledning, digitala transformationer, teorin om planerat beteende, psykologiska kontrakt, medarbetarengagemang och digital design, allt med avseende på förändringsledning.

Genom att analysera organisationens implementerings-, förändringslednings- och digitala transformationsprocesser extraherades viktiga faktorer för att utveckla organisationens digitala transformationsstrategi. Totalt hölls 10 intervjuer med lagledare och produktionsledare och 4 observationer genomfördes. Den insamlade data och de studerade teorierna analyserades för att fylla de upptäckta gapen i organisationens förändringsledning.

Resultaten visar att det finns gap i kommunikationen inom organisationen och en bristfällig kommunikationskedja. Resultatet visar att det finns ett selektivt engagemang av medarbetare i nya implementerings- och digitala transformationsprocesser och att regelbundet involverade medarbetare i nya implementeringar och digitaliseringsinitiativ visar mer positiva förväntningar och attityder till förändring medan oengagerade medarbetare uttryckte sig mer negativa. Resultaten visar också att frånvaron av stödfunktioner som HR, ergonomer, IT-tekniker etc. på kvällspassen kan bidra till rollklarhet och rollkonflikt hos kvällsskiftets produktionsledare och bidra till motstånd mot förändring på grund av ökad arbetsbelastning och otillräckligt stöd.

Genom att involvera fler medarbetare och avdelningar i implementeringsprocesser, standardisera kommunikationsmetoder och engagera stödfunktioner i kvällsskiftet kan nya digitala transformationsinitiativ implementeras mer framgångsrikt.

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This case study was conducted together with Sarah Nemet Ahmed.

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1. INTRODUCTION

This chapter gives an overview of digital transformations effects on organizations and its employees. It gives the reader an introduction to the thesis and a description of the current problem and the purpose of this case study. Further, the delimitations of this project and description of the research questions are presented.

1.1. Background

Digital transformation can be a big challenge for large scale organizations. Overall, all change initiatives on organizational scales can be met with resistance and failed implementations. Although digital transformation and change management are two very related terms, research and literature regarding digital transformation can have different definitions of what digital transformation actually is and what type of challenges come with it. Essentially, digital transformation is the integration of digital technology into an organization, industry or business, and the scale and the goals of digital transformation initiatives could vary depending on the organization, but usually are to reach business improvements, process improvements, enhance stakeholder experience or in some way positively impact the organization (Vial, 2019). However, around 70% of digital transformations or organizational change initiatives fail (Kotter, 1996, Saldanha, 2019).

1.2. Problem Discussion

There are possibilities of unaccounted for changes in processes, infrastructure, organizational cultures, job assignments and even replacement or addition of roles, that may be included in the outcome of digital transformations (Vial, 2019). Such changes amongst other factors may contribute to change resistance or unsuccessful implementations. In manufacturing industries, unsuccessful change management strategies or change initiatives could negatively affect various areas such as production quality, work culture, employer-employee relationships and employee behaviors (Freese et al, 1998, Rashid, Zabid, 2003, Arendt et al, 1995).

1.3. Purpose

The purpose of this study is to analyze change management and digital transformation processes in a manufacturing organization in order to find effective ways to close the discovered gaps by utilizing existing theory and collected quantitative data.

1.4. Delimitations

The development of One Operation Interface is in an early phase and yet not a fully functioning interface. The purpose of implementing the pilot version of the interface in the production is to receive feedback from stakeholders as well as to familiarize them with the digitalization. The first pilot users are aimed to be the team leaders, production leaders and production technicians. However, only the production leaders and team leaders are interviewed in this study due to time limitations. Therefore, the interview questions will be conducted based on their roles and responsibilities. Furthermore, the local plant in Tuve is the pilot plant for the

first implementation of IOI hence the limitation of only collecting data from that plant, meaning the empirical findings in this study may or may not be actual in other segments of the organization or other similar organization.

1.5. Description of Research Questions

In order to fulfill the purpose of this thesis, the research question have been divided into three sub-questions. The main question focuses on answering how a manufacturing facility can enable change management mindset in digital transformation projects:

What prerequisites are required for a successful digital transformation in a manufacturing facility?

The research question is a very broad question. Three different sub-questions have been formulated from the main question which has been decided to help with answering the main research question. These questions are:

- *How can change management be utilized in a digital transformation project?*
- *What are the success factors and activities for a fully completed digital transformation project?*
- *How well does change management function in a digital transformation project in a manufacturing organization and how can the gap between theory and practice be closed?*

2. THEORETICAL FRAMEWORK

This chapter includes theories regarding Change Management, Digital Transformation, Theory of Planned Behavior, Psychological Contract, Skeuomorphism, Change Resistance and Employee Involvement. The purpose of this chapter is to give support to answering the research questions with proof from theoretical frameworks.

2.1. Organizational Cultures Impact on Change Management

Organizational change can be defined as transformational changes that are organization wide (Grandia et al, 2014). These changes can refer to components such as culture, technologies, operational infrastructure or internal processes. The way an organization reacts to change depends to a large extent on the organizational culture it has (Rashid, Zabid, 2003, Pool, 2000, Ahmed 1998). Organizational culture is described as a combination of artifacts or practices, values, beliefs and underlying assumptions that organizational members share about appropriate behavior in the organization (Gordon, DiTomaso, 1992, Schein, 1992, Schwarts, Davis, 1981). Managing humans in organizational change is considered the most difficult part of change management as each human has its own preference, attitude, value toward activities (Linstone, Mitroff, 1994). Attitudes are harder to change in organizations where people have developed a tradition of work and where work generally does not require risk taking (Dunham, 1984, Carnall, 1990). Iverson (1996) found that workers with higher levels of organizational commitment, motivation and satisfaction are more likely to be receptive to change. On the other hand, workers with too big workloads, role conflicts and union memberships are shown to be less likely to accept change. Studies also show that there is a direct link between employees' relationships with their supervisors and work team and their attitudes towards the organization (Tierney, 1999) and that the quality of the relationship between employees and their supervisors has an impact on how the change is viewed by the employees (Rashid, Zabid, 2003). In a study conducted by Rashid & Zabid in 2003, where organizational culture was defined in terms of two dimensions; sociability and solidarity, based on prior research by Goffee & Jones (1998), organizational culture was categorized in four different types. Sociability was defined as friendliness in the relationships between the organizational members and solidarity was defined as the ability to pursue shared goals efficiently and effectively for the larger good of the organization without much regard to impacts on individuals and their relationships. The four culture types were defined as communal, fragmented, networked and mercenary culture.

Sociability	High	Networked	Communal
	Low	Fragmented	Mercenary
		Low	High
		Solidarity	

Figure 1 Description of the relationship between sociability and solidarity and its different factors.

The study presented by Rashid & Zabid consisted of 258 participants ($n = 258$) and the chi-square (χ^2) analysis test value was significant at $p < 0.0001$. Characteristics in the study included gender, ethnic origin, age, work position and educational level. The participants' work roles were CEOs, general managers, HR managers, production managers and managers (others). The statistical analysis implied the association between organizational culture and overall attitude towards change. The results, for each culture, were categorized in either positive attitude towards change or strongly positive attitude towards change.

In cultures with low solidarity and low sociability, 90% of workers had a positive attitude towards change and 10% had a strongly positive attitude towards change. In cultures with high sociability but low solidarity 79.3% had a positive attitude towards change and 18.4 had a strongly positive attitude towards change. In cultures with low sociability but high solidarity 19.8% had a positive attitude towards change and 78,5% had a strongly positive attitude towards change. Lastly, in cultures with both high sociability and solidarity 40% had a positive attitude towards change and 57.5% had a strongly positive attitude towards change.

To summarize, people working in organizations with cultures that have high solidarity, namely where workers have the ability to pursue shared goals efficiently and effectively for the larger good of the organization without much regard to impacts on individuals and their relationships, were more prone to have a stronger positive attitude towards change (Rashid, Zabid, 2003).

2.2. Utilizing the Theory of Planned Behavior in Change Management

TPB is originally derived from the Theory of Reasoned Action by Ajzen & Fishbein in 1980. It is a cognitive decision-making model which states that individual decision making depends on information available to the decision maker (Ajzen, 1991). Generally, the TPB applies for everyday decision making for individuals, but is also applied in several businesses and marketing strategies. The TPB argues that the most proximal determinant of behavior is intentions (Jimmieson, Peach, White, 2008), where intentions are defined as the indication of an individual's willingness to perform a given behavior. Studies suggest that intentions account for 22% of variance in behavior on average (Armitage, Connor, 2001). In TPB there are three main determinants: personal attitude, subjective norm, and perceived behavioral control. Some variations of the model include some predeterminants. The first determinant, personal attitude, refers to the degree an individual has favorable evaluation of the behavior in interest, or their opinion or attitude. The second determinant, subjective norm, refers to a collective attitude or opinion towards the behavior in interest. This can be cultural norms, peer-pressure or influence from an individual's social network. The third determinant; perceived behavioral control, refers to the individual's perception of how difficult or easy it is to display or perform the behavior in interest. The more perceived control an individual has, the higher the chance of displaying the behavior of interest (Ajzen, 1991). Perceived behavioral control is argued to have both an indirect and direct effect on behavior through intentions. (Ajzen, 1991, Ajzen, Madden, 1986) and therefore can be considered the most influential determinant.

In change management and digital transformation, an individual's personal attitude would refer to their opinion on or attitude towards the change. If the individual has a positive opinion on or attitude towards the change, they are less likely to show resistance to change (Arendt et al., 1995, Herscovitch, Meyer 2002). Similarly, the subjective norm would refer to the workers collective attitude towards the change. A risk for a negative collective attitude could be that the change or new implementation does not live up to the expectations the workers have, or that the change or new implementation is not correctly understood, leading to a bad reputation amongst the workers. Lastly, the third determinant, perceived behavioral control, refers to the amount of information, support and effective communication the workers receive from the organization. Allowing workers to participate in the planning of changes and implementation processes also adds to their perceived control, meaning they will be less likely to display resistance to change. By involving the workers to participate directly in the planning and implementation process, organizations can overcome resistance to change whilst also taking the needs of individual workers into account (Bronson, 1991, Cummings, Worley, 1993, Darcy, Kleiner, 1991).

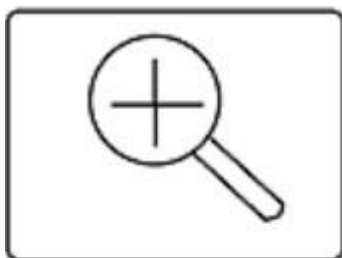
Regarding change management and digital transformation, it is easy to realize that the three determinants can be influenced by organizations efforts put in on effective communication, providing support throughout the change process, and engaging the workers in the planning and implementation processes. Effective communication partially removes feelings of uncertainty, improves information spreading about change and reduces speculations and fears amongst the workers. (Covin, Kilmann, 1990, Bronson, 1991, Covin, 1993). Engaging workers

in the planning process allows the organization to align the organizational goals with the individual workers goals, creating a pro-change attitude and behavior (Arendt et al, 1995), resulting in less resistance to change (Campbell, Freese, Schalk, 1998) and could also improve the relationship between the organization and its workers. The influences of the relationship between organizations and workers are often described as their psychological contract, and its impact regarding change management and digital transformation is present in this study.

2.3. Digitalization of Reality - Impact of Skeuomorphs in Digital Design

A skeuomorph is an attribute that refers to a feature or function in an artifact’s previous iteration (Hayles, 1999). Skeuomorphs are used to provide familiarity in unfamiliar domains by making new things mimic their previous older appearances or iterations (Gessler, 1998), extending the frame of reference which assigns value to an object or function thus creating new value in technological change by association and connotation (Blitz, 2015). Apple Inc is renowned for excessively using skeuomorphs to express their intentions of their user interfaces, although their use of skeuomorphic design elements have decreased through the years since their technology is no longer unfamiliar to their product users (Downer, 2012). Some prime examples of skeuomorphic design elements would be the icon for email applications often depicted as an envelope or the camera shutter sound effect emitted when photographing with certain smartphones. Skeuomorphs can be physical features or “material metaphors” (Cass, Lauer, 2004). These features or metaphors assist people with their transition to understand new technological processes (Cass, Lauer, 2004, Lakoff, 1993). Cass and Lauer argue that the use of skeuomorphs, even when they serve no actual function, may ease the transition between old and new technological implementations.

In a study consisting of three experiments, it was found that the inclusion of skeuomorphic elements in the design of gambling games increased the amount of money gambled by players, compared to games without skeuomorphic design elements included in them (Leary, Meng, 2021). Leary and Meng proposed that skeuomorphism interacted with the players' illusion of control and influenced their behavior. One might argue that skeuomorphism affects people's perceived control and personal behavior and attitude regarding the theory of planned behavior.



Zoom In



Figure 2.1 (left) Illustration of a magnifying function button depicted as a magnifying glass.
Figure 2.2 (right) Illustration of an e-mail icon depicted as an envelope with a letter.

2.4. **Psychological Contracts Influence on Behavior and Attitude Regarding Organizational Changes**

The concept of the psychological contract refers to individual expectations, obligations, ambitions and beliefs perceived by an employer and its employee (Rousseau, 1990, Robinson et al, 1994). The concept was first introduced by Levinson et al. in 1962 and Argyris in 1960. Unlike a physical legal contract of employment, the psychological contract is often implicit and unspoken, and indicates the formal relationship between a worker and its organization. It is often described as the understanding of the relationship between an employer and its employee, and their workplace behavior (Guest, 2004, Rousseau, 1990). If there is a misunderstanding of the psychological contract from either of the parts it can lead to incongruence in the psychological contract, meaning the expectations, ambitions and obligations between the parts can be misunderstood from both sides (Dick, 2010). The concept is useful for understanding how changes in employment relationships affect employees' experience at work, which in turn affect employees' attitudes and behavior (Briner, Conway, 2009). Like most relationships, it is argued that trust is fundamental in the relationship between employers and employees (Guest, 1998, 2004). Distrust can occur when employees perceive those obligations, expectations or beliefs, in other words their psychological contract, is somehow violated (Conway and Briner, 2002, Freese, Schalk, 1996, Freese, Campbell, Schalk, 1998). Implications of the psychological contract, whether they are positive or negative, influence employees' attitudes (Freese, Schalk, 1996, Freese, Campbell, Schalk, 1998, Ajzen, Fishbein, 1980), which in turn translate into actual workplace behavior (Tett, Meyer, 1993)

Regarding change management, studies show that effective communication, effective support and allowing employees' to participate and involve them in planning the change, significantly improve the relationship and psychological contract between employees and employers (Freese, Campbell, Schalk, 1998, Conway, Briner 2009), and that good relationships between employees' and their employers affects their behavior and attitude at work positively (Rousseau, 1990, Freese, Campbell, Schalk, 1998), which in turn leads to positive behavior and attitudes towards change. (Freese, Campbell, Schalk, 1998). For employees', to be able to participate in planning and implementation processes also asserts stronger group identification with the organization, increasing their perceived control (Greenaway et al, 2015.) and therefore positively affect their attitude and behavior towards the change (Bronson, 1991, Darcy and Kleiner, 1991) In addition, strong group identification, promotes healthy mental states in workers, and can reduce anxiety, stress and depression (Greenaway et al, 2015) Weaker or no group identification on the other hand has shown to have an opposite effect, promoting unhealthy mental states (Khan et al., 2014, Greenaway et al. 2015).

2.5. Employee Involvement in Change Management

Before beginning any planning strategy for an implementation of a new project in an organization, a future state visioning is recommended to conduct. Future state visioning is a powerful methodology in organizations to move forward and constantly improve. It allows organizations to vision their stance in the future and better create goals. The purpose of creating a future state vision is to get a better view of the stakeholders' perspective, to understand their needs and desires based on the responsibilities they hold. When engaging stakeholders, it is important to put effort on the support from the top management. It is reported that the employee engagements become more successful when there is support from the top management. The reasoning behind this is that the managers are more likely to provide opportunities for employee involvement when they believe that the employees have the knowledge and skills to improve organizational processes (Tesluk, et al, 1999).

With an FSV, an organization can easily visualize the future environment and ask the question “*what can we be*” before taking the present into consideration. When provided with a goal for the future, the comparison of the present state and the future state becomes more comprehensive. Identification of the barriers and opportunities of reaching the vision becomes easier as well. From that state, the organization can make the project actionable and participative in order to make the planning strategy easier (Tesluk, et al 1999). Raub (2016) recognizes the importance of employee involvement and participation as a tool that increases satisfaction and productivity amongst the employees. An important aspect of FSV is to avoid planning before developing a future state. The purpose of FSV is to be used as a method to develop plans. There is a five-step process when using the FSV methodology (Raub, 2016).

Step 1 - Stakeholders and Participants

Stewart (1993) emphasizes the importance of identifying the stakeholders and planning their participation in the first step. In order to get a better understanding of what the needs and desires are for the future, the stakeholders need to be involved in the visioning. All types of stakeholders, whether it be the customers or the employees working within the organization, should be included. Creating a participative environment not only broadens the perspective and makes it easier to create a vision that benefits everyone, but it creates opportunities to spread knowledge and values of the visioning in order to provide everyone an understanding of the reasoning behind the future project (Stewart, 1993). Raub further explains the benefits of the involvement of stakeholders. First and foremost, the managers in charge become required to delegate their responsibilities, power and control to the stakeholders which signals to them that the managers trust them. This in turn will build up a trust for the managers from the stakeholders' perspective (Raub, 2016).

Step 2 - Assessing the Future Environment

Further, it is described to assess the future environment by creating a clear view and reasoning to why the stakeholders are involved and make the uncertainties sensible for them. By participating in the assessment of the future vision, the team becomes more coherent, and they

develop an understanding and respect for each other's perspectives. J.M. Stewart describes the discussion of the future environment based on trends as a trap. The future state of the environment should be observed without the influence of the present trends. A vision of the future with the influence of predicted trends should be assessed instead (Stewart, 1993, Raub, 2016).

Step 3 - Building the Future State Vision

Since future state visioning tries to avoid barriers of the present state and instead put focus on the desired future state, the third step focuses on building the actual FSV. “*What do we want to be*” and “*what would our stakeholders like us to be*” are questions that are asked during this step. The participants should have high aspirations that are practical. The visioning breaks down into two segments, the hard dimension and the soft dimension where the hard dimension observes the organization's competitive positioning, and the soft dimension observes the organizational behaviors. At the same time, the visioning should be described in actionable concepts, concepts that are realistic. Focusing on only discussing the future state will at the same time have positive effects on the organizational structure. The discussion of the change strategies should be restricted in this early phase and instead be focused on later in the process. This is because the assessment of the organizational structure will instead distract the participants to discuss more personal considerations instead of visioning a future state (Stewart, 1993, Raub, 2016).

Step 4 - Contrasting the Present State with the Future Vision

When a detailed description of the future state has been provided, the present state becomes easier to understand and compare to the desired future state. Before moving on to the planning phase, the current state should be thoroughly described. This provides opportunities to create contrasts between the present and the future and further provide a base foundation for the planning phase where an action plan and strategy is created. Creating a contrast between the two states also provides a better understanding for the participants to fully comprehend the issues the organization has. Stewart Raub emphasizes employee involvement as a sensemaking process. By providing the stakeholders the opportunity to be involved in the process, stakeholders can understand firsthand the differences these activities contribute to (Stewart, 1993, Raub, 2016).

Step 5 - Supporting the Vision with Values

An important factor to take into consideration is the value the participants hold. The vision will be non-manageable if it conflicts with the values of the participants. Creating a new value is wrongly described. Instead, the values will be based on those that the organization holds. Most of the time, the values provided by authorities are less desirable rather than those that the participants have engaged in. Making sure to engage the participants in the creation of values for the future enhances unity and commitment to them (Stewart, 1993, Raub, 2016). Yaw A. Owusu (1999) explains the value visualization process in 5 steps with the first step being assessing the current culture of the organization. Further, the second step focuses on identifying the prerequisites of the change followed by bringing awareness to the new attitude acquired by

the organization. The fourth step explains listing actions and activities that are required to implement the change and the process is closed by creating a systematic and nurtured environment for better communication and management (Owusu, 1999).

2.6. Kotter's Strategic Eight-Step Model for Transforming Organizations

John Kotter's eight step model was first introduced in his book "Leading Change" in 1996 and is one of the most widely used models of change used in the world (Drindorfer, Jones, Mento, 2002). Kotter developed the model after studying over 100 different organizations varying in sizes and industry types, in a time lapse over four decades long (Kotter, 1996). The model is based on eight described errors that cause failed organizational transformation, hence the eight steps, which are recognized as the common success factors extracted from his studies. Kotter expresses that the key to avoiding these errors lies in understanding why organizations resist change. The errors and their consequences as well as the eight steps are presented in figures 5 and 6. However, regarding any change model, as stated by Kritsonis in her comparison of several famous change theories and models, is that they can not be regarded as exact science, since every change and organization is different (Kristsonis, 2004).

Eight Errors Common to Organizational Change Efforts and Their Consequences

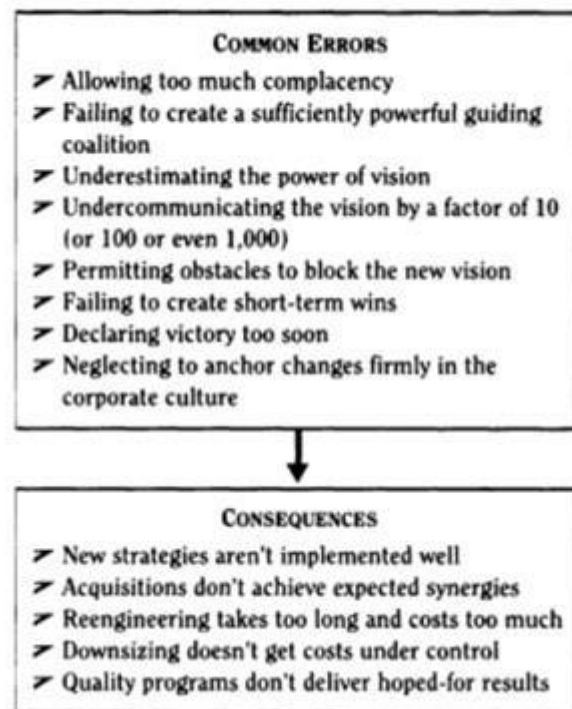


Figure 5 The eight errors and their consequences. Extracted from Kotter's book "Leading Change".

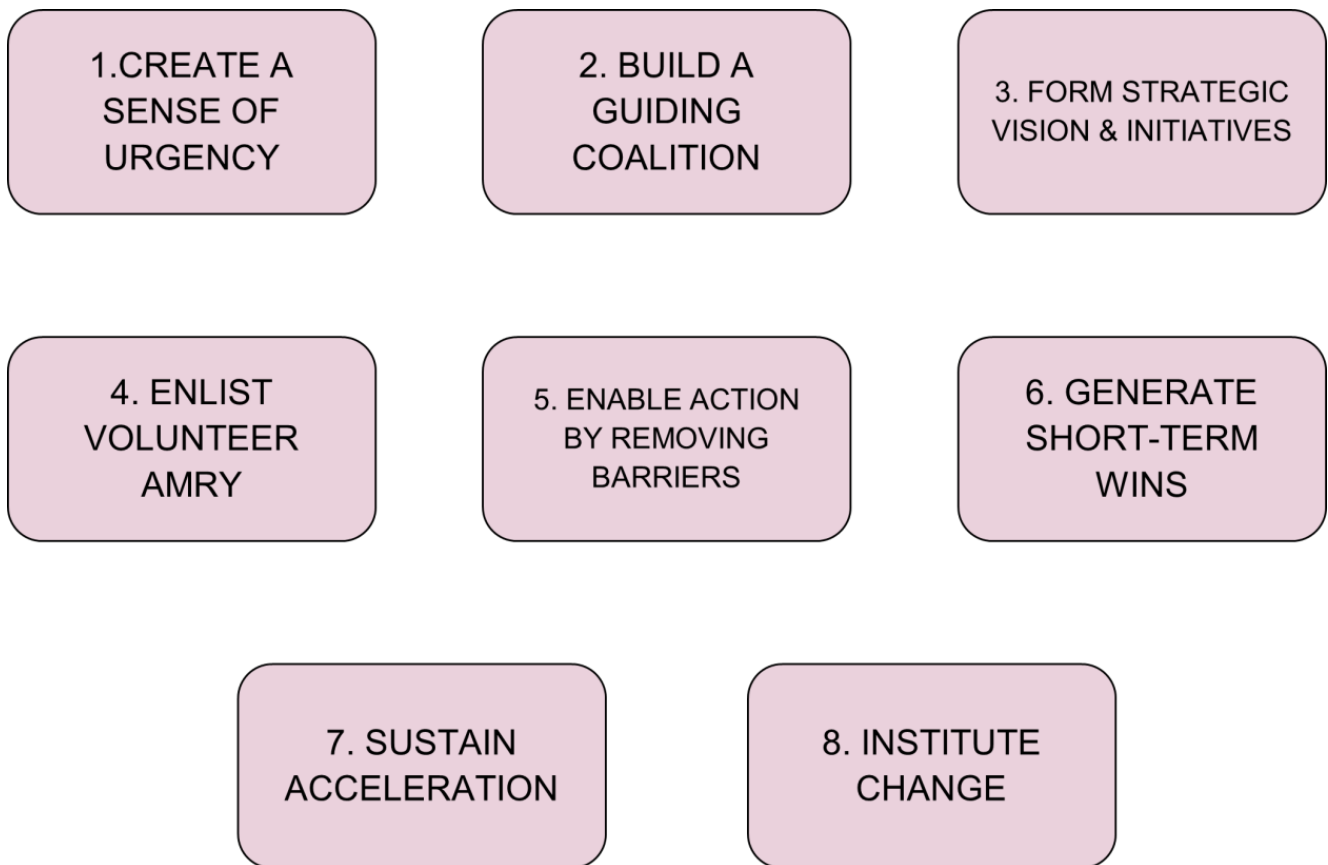


Figure 6 Kotter's eight step model

Kotter goes in depth on all the eight steps and their significance in his book with a separate chapter for each step, but also demonstrates how leadership, management, cultural norms and other factors have significance in or affect handling change. In the book Kotter describes that failure in the first step; establishing a sense of urgency, often depends on senior management staff underestimating or lacking in motivating employees to change. He expresses that the best way to start a major change process is to insert a sense of need to change into the employees. The guiding coalition is described as a group consisting of stakeholders with leadership roles from multiple layers of the hierarchy, with different work roles that receive information from all levels in the organization. The guiding coalition should then be utilized in sharing the vision with the volunteer army, which is a selected group of enthusiastic workers in their respective departments and in forming a strategy for the adaptation of change for the purpose of aiding in spreading the vision throughout the organization. Kotter then refers to barriers as identified processes that slow down the employees' initiatives of adapting to change or acting on the vision. Kotter states that by empowering employees to act, without having bureaucracy and other barriers act as resistors, the organization can keep its momentum and therefore decrease the risk of failure of change initiatives. Kotter also states that generating short term wins and celebrating them is important for keeping the momentum, enthusiasm and drive for change amongst the employees. In the seventh step, sustain acceleration, Kotter clarifies that the pace of the change, and therefore scaling of change initiatives, must be increased, whilst the organization is still celebrating short-term wins. Lastly, in the eight step he describes how sustaining the new way of working and the new behaviors is crucial for the change to be embedded in the culture of the organization, suggesting that employees with leader roles continuously demonstrate that the new way of working is better than the old way to their workers (Kotter, 1996).

2.7. Why Do Companies Fail to Implement?

According to Higgs & Rowland, Kotter and Saldanha, about 70% of change-oriented organizations fail to implement successful plans (Kotter, 1996, Higgs, Rowland, 2005, Saldanha, 2019). Further stated by Waterman (1988), the reason why organizations fail to implement plans is because of weak application of the strategies (Waterman et al., 1988). A study conducted by Köseoglu, Barca and Karayormuk (2009), refers to failed plans having their root cause at the formulation process. They conducted questionnaires answered by 418 managers that shared their experiences. The researchers concluded that the planning process is more important than the implementation process. The most common problems occurred in the formulation process are *“Lack of consensus among decision makers”, “Lack of identification of major problems”, “Lack of effective role formulators”, “Unsuitable training system”* and *“Unclear regulation and executive policies.”* The common problems occurred during the implementation process are mainly organizational issues where the specific problems are *“Incompatible organizational culture”, “Competing activities among people”, “Lack of adequate communication”, “Lack of effective coordination”* and *“Lack of adequate information system”* (Köseoglu et al. 2009).

Given this information, it can be concluded that in order to maintain a successful implementation, the formulation and planning process needs to be carefully planned. Without clear responsibilities within the organization, unsuitable training and lack of understanding of the problems it will be difficult to conduct a successful plan. Starting with an unsuccessful plan may lead to unsuccessful implementation. One can assume that the reason why the implementations fail are because of poor planning. As reported by Köseoglu, et al, (2009), the failures of the implementation are because of lack of communication, lack of information systems, unsuitable organizational cultures and competition of activities among the people. This can be reflected to the poor planning that lacked information about responsibilities, qualification and problem description that in turn will lead to the problems mentioned in the implementation process (Köseoglu, et al., 2009).

2.8. Dealing With Resistance to Change

Another aspect of why some implementations fail to succeed are because of the resistance to change from the employees. Resistance occurs on all levels of an organization as well as on an individual level and occurs in different forms in the formulation and implementation stages. The importance of good communication and good planning during the formulation stage bases on counteracting resistance to change. When presenting a new idea without any perception, the stakeholders might become resistant since there is a lack of interpretation and understanding as well as low motivation of the need to change. Pardo del Val & Fuentes (2003) lists a few points of reasons for resistance during the two stages. The authors state that the inability to see into the future of the company, not accepting undesired information, implicit assumptions, lack of communication, lack of involvement within the organization, different interest and lack of motivation amongst the employees, inactive leadership, past failures and high costs from the

project are all factors of resistance (Pardo del Val, Fuente, 2003). Coch & R. P. French JR (1948) emphasizes that resistance's primary problem is grounded in the lack of motivation. They mean that resistance usually results in employees showing feelings such as frustration, loss of hope, failure and low levels of aspiration. Overcoming these types of resistances needs to be taken into consideration in order to successfully implement a new project. In order to do that, the psychological future of the employees needs to be planned aligned with the psychological present. Studies show that the employees base their resignation on the amount of hope they feel in the present and the future. If an employee sees a hopeless future, the risk of resigning is higher (Coch. L., R. P. French. JR., 1948).

Watson (1971) described reduction of resistance by presenting four statements, *who brings the change, what kind of change, climate for change and procedures in instituting change*. The author claims that if the participants work with a project wholeheartedly and feel as if the project is their own as well as receiving full support from top officials, the resistance will be less. He also points out that the resistance will be less if the participants can see the results of the change process. Continuous updates about the project, making sure that the change is aligned with the participants own values and ideals, offering new interest and preserving the participants security reduces the resistance towards the change. Further stated, the author presents points such as group decision making, emphasizing with opponents, highlighting importance for feedback and creating a climate where participants look forward to a better future are all factors of reducing resistance (Watson, 1971).

2.9. **Adapting Change Management to Digital Transformation**

Technology and digital transformations are constantly evolving at a rapid pace, bringing many changes in organizations. Digital transformation changes many activities in an organization such as processes, models, products, etc. which in turn affects the organizational culture to improve user experience and innovations. To implement digital transformations smoothly, there needs to be communication maturity within 6 areas. Understanding, organization, prerequisites, functioning, practices and competencies (Lugonja, 2020). Many times, there are resistance from employees and operators regarding digital transformations because of lack of understanding and comfortability with the present use of material. Digital transformation becomes a difficult obstacle to handle. There needs to be thorough practices to learn the new digital transformation and motivation for wanting to use it. According to Jerman and Cernetic (1997), there needs to be acceptance towards the transformation and to receive it, the affected stakeholders should be involved in the planning and implementation process. The authors emphasize on inspiring, implementing and integrating the digital transformation. During the inspiration step, the employees are informed and motivated to why the change is occurring. During the implementation step, the authors emphasize that the new tool should be used by employees every day and support should be included from the managers. Lastly, during the integration stage, regular follow-ups should be made (Jerman, Cernetic, 1997).

3. METHOD

In this chapter the methodology of this case study is described in detail. The research design, research strategy, data collection, data analysis, quality criteria as well as ethics and morality are presented. The data collection includes observations, literature reviews and interviews. Combining methods, such as interviews with observations, provided better understanding of the collected data.

3.1. Research Strategy

The research strategy of this study will be approached with data collection and evaluating the data with the collected literature reviews, hence the choice of composing this study as an inductive case study. Since there is no specific standardized guideline on how to collect data, it became concluded to develop this research study with an inductive approach. According to Gratton & Jones (2009), an inductive approach makes the study more flexible and makes it easier to adhere to the topic. Composing an inductive study usually results in using qualitative methods for data collection. Since this study is based on understanding the cause of different phenomena occurring, it is deemed to be more appropriate to take a qualitative approach (Gratton, Jones, 2009). Denzin & Lincoln (2000) has highlighted that qualitative research involves an interpretive and naturalistic approach. This statement is interpreted as researching phenomena at its natural setting and its connotation people bring to them (Denzin, Lincoln, 2000).

3.2. Case Company

The company Volvo Group Trucks Operations is part of the big global manufacturing corporation, Volvo Group. Volvo Group was first established in 1927 and is today responsible for developing trucks, buses, marine technologies and construction equipment and is one of the biggest actors in the industry. Volvo Groups had in the year 2021 around 95 850 employees of which 11 500 of are employed at Volvo Trucks Operations. There are around 2 400 employees working at the local Tuve plant.

According to the company's own analysis, 80% of the organizations employees are in daily need of information about the assembly. The information is being searched after on many different programs and systems. The information sources consist of paper, screens, PC, phones, monitors and tablets. These sources are used for communication, reporting deviations, instructions and sprints for the manufacturing processes and visualizing performance and quality, etc. However, all information cannot be accessed from one source. The employees need to search for the information from multiple sources which results in waste of effective time. The employees have reported to experience high cognitive load and the quality of the trucks are generally lower than what is expected. The lead times in the plant are also longer since they need to repair the trucks that don't go through the Key Performance Indicator (KPI), First Time Through (FTT), which is a quality performance measurement tool. Flexibility and mobility have become notably limited and non-valuable time has increased in proportion. Volvo Group prints approximately

over 100 million paper per year.

The company is continuously improving and moving forward, although improvement works have been uneven in the plant. Certain assembly departments have digital implementations while others do not. Pilot areas of new implementations have been continuing working with the new implementations which have not been implemented in the rest of the plant. One reason for this is that a new interface, One Operation Interface - *IOI*, which is planned to be fully implemented by 2027, is supposed to replace recent digital implementations. The piloting of this interface started in May 2022 (VolvoGroup, 2021).

Volvo Group have planned to take big digitalization initiatives in its production facilities across the globe. A new interface is currently under development which is being piloted in the Trucks Operations Tuve plant in Gothenburg. Costly investments can fail not implemented successfully and (Higgs, Rowland, 2005) and enforcing major changes in organizations can have negative impact on organizations if not handled correctly (Lugonja, 2020)

The interface is planned to be implemented in all Volvo Group Organizations, with functions adapted to each stake holder (Volvo Trucks Tuve Plant, 2022). There will be functions and tools available for all types of workers, both blue- and white collars. Processes and activities in the Tuve plants change management and digital transformation strategies need to be improved for more successful implementations of digital technologies.

3.3. 1OI - One Operation Interface

One Operation Interface is a currently developing interface that aims to collect all the data and information from the different systems and make it available in one place, a digital screen or a pad. This will allow different systems within the organization to communicate with each other and also with machinery in the production line. The purpose of 1OI is to simplify and ease the work, enable new ways of effective communication, collect data and enable the cooperation between different independent systems. Depending on the role of the user, the interface will provide different functions and tools. As mentioned above, the employees work mostly with paper and a variety of different tools. In practice, this means that the operators, team leaders and production leaders need to search for data and information on different platforms, as the company collects different types of data in different systems. The aim of 1OI is to assist and serve the employees the data needed instead of them seeking for it. All relevant data, depending on the user, is to be available on the interface. Not only will the interface be connected to different systems, it will also be connected to the machinery on the assembly line allowing communication between machinery and digital systems (Volvo Group, 2021)

3.4. Implementation of One Operation Interface

The new interface is planned to be fully developed and implemented and utilized in the company by 2027, with the first piloting starting in May 2022. As stated earlier, the interface will provide various functions, depending on its users, and the first pilot consists of testing the functions for team-leaders and production-leaders. Four different departments have been chosen as pilot areas where the interface is tested one department at a time. During this period the interface is used parallel to the tools it is supposed to replace, in a read-only mode, with the purpose of gathering feedback for further development, whilst also familiarizing the workers to the new implementation. The finished interface will be an outcome of the feedback collected from its pilot users, providing them the opportunity to request additional features and functionalities, change the layout and design of the interface and request removal of functions they consider unfitting.

3.5. Stakeholder Persona

To provide better understanding of this study, the piloting participants personas are presented since there can be differences in workloads, job assignments and authority for the work roles in the organization where the study was conducted compared to other similar organizations (Jansen et al., 2020). The personas are derived directly from the organization's management (Volvo Trucks Tuve Plant, 2022).

Team Leader persona:

- Reports to: Production Leader
- Work areas: production or logistics
- Responsibilities and authorities:
 - All activities are to be aligned with Volvo AB values
 - Responsibility to build an environment where problems, deviations and challenges are handled in appropriate manners
 - Responsibility to ensure that all team members are trained and informed on how they are to perform their work
- Main tasks
 - Act as Andon
 - Maintain own competence on workstations where team members are stationed in order to replace them when necessary (during absence, training, or other activities team members may partake)
 - Contribute to continuous improvements in the team by:
 - Performing audits to improve ways of working (5S, standardized work etc.)
 - Prioritizing and systematically solving problems (Andon/quick response quality control)
 - Participating in and positively supporting team development and engagement

by utilizing supervisors and other resource assignments, implementing improvements with support from team members and using tools such as rotations schedule, Kanban boards etc.

- Providing daily reports and relevant information, ensuring in shift start, end and handover to another shift
- Plan and document department meetings and activities together with production leader
- Inform and communicate regularly with the team, in meetings and with individual team members regarding operational questions
- Assist production leader in allocation and redistribution of team members
- When in need participate in workload balancing and adjust workstations
- Competence, skills and experience
 - Ability to guide, train, communicate, involve and affect the team and contribute with expertise
 - Ability to cooperate and work cross-functionally
 - Communication and networking skills
 - VPS knowledge
 - Knowledge about the product, processes, tools and routines
 - English language skills

Production Leader Persona:

- Reports to: Area Manager
- Work area: production
- Purpose and content of the role
 - Deliver trucks to customers to the right quality just in time.
 - Develop business and be accountable for assembly, kitting and control.
 - To manage and allocate operation to fulfill defined targets (SQDCEP)
- Responsibilities and Authorities
- Full authority within own function if:
 - All Volvo AB authorization rules are followed.
 - Volvo AB policies and procedures are followed.
 - Regular follow up meetings are held with the Area manager.
- Main tasks
 - Build trucks within specifications
 - Check built truck in accordance with processes and regulations set out by Tuve Plant Quality organization
 - Take full responsibility for implementation of VPS including rollout communication in own dept
 - Perform regular training of direct reports in problem solving policy deployment and the concept of VPS/LEAN
- Knowledge, skills and experience
 - Skilled in assembly processes
 - Good knowledge and skills in leading coworkers
 - Proficiency in English language

- Customer orientation mindset
- Ability to work in international and multicultural environment
- Strong leadership skills
- Structured with good analytical skills
- Logical thinking and ability to analyze and solve problems
- Ability to coach on problem solving methodology
- Desire to take challenges
- Strong continuous improvement skills
- Excellent communication skills
- Ability to define priorities
- Experience in manufacturing environment, quality and engineering

The production leaders are the link between the blue collars and the white collars in the organizational hierarchy and the communications chain. Some responsibilities and authorities can be exchanged between the team leaders and their production leaders, e.g., calling in student workers, etc. These exchanges can differ in each department and shift.

3.6. Data Collection

In order to provide a solid study, the authors of this thesis decided to collect data from interviews and observations and develop it further by comparing it to previous research and literature reviews. The collected data and knowledge were analyzed, and different solutions were conducted. The different solution ideas were carefully analyzed and compared to the analyzed data in order to find the best approach to solve the issue.

3.6.1. Observations

Before mapping and analyzing a problem, it is crucial to understand the work culture, why some process activities occur and the extent to which the problems occur. This is done by spending time where the problems occur. The Japanese terms *Gemba* (*real place*) and *Genchi Genbutsu* (*go and see*), highlights the importance of observations. It is important to be available, ask questions, listen and act and receive knowledge in order to create an understanding of the scope of the problem (Sörqvist, Bergendahl, 2013).

Observations were held at the designated pilot areas. The participants were observed while interacting and working with the IOI interface, and their behavior was analyzed to gain understanding of potential resistance to change and other factors that may impact employees' attitude towards change and digital transformation.

3.6.2. Interviews

The interviews of participants, in conjunction with observations, will provide individual opinions and perspectives from participants on their experiences throughout the digital transformation process. The questions were prepared by focusing on success factors provided from studies on the Theory of Planned Behavior with supporting evidence from studies on

Psychological Contract regarding the impact of communication between organizations and workers, participation in change and new implementations, support from organizations for workers, and relationship between an organization and its workers, on change management and digital transformation. An example of a question is, “*How do you think an implementation should go in order for it to be successful?*”. The interview questions are posted in the appendix.

The interviewees consisted of 10 participants, whereas 7 of them were team leaders and 3 production leaders. The interviews ranged between 45-60 minutes and were recorded if consent was given. The questions are designed to gather both the team leaders and production leaders’ perspective of change management within the organization. The information provided by the interviews were later analyzed and presented in order to improve areas and guide the company towards better handling of the change and digital transformation.

3.7. Coding Strategy – The Grounded Theory

The qualitative research strategy choice for this thesis was the grounded theory. The methodology was first developed by (Glaser, Strauss, 1967). Although this method is used for the purpose of constructing theory (Creswell, 2013), it is also used when preexisting theories were derived from data collected from participant groups that may differ from the new research participants group.

The latter statement is the reason for this choice of methodology as the participants in this thesis study were a combination of blue- and white collars within the same organization.

The utilization of the grounded theory methodology in this thesis can be compiled into three main steps which are listed below.

1. **Open Coding:** After all interviews were transcript, line by line coding was conducted and key phrases and concepts were identified. This process was completed three times over in order to ensure the full identification of valuable data and understanding of the data. After each transcript was broken down into a collection of key phrases and concepts, they were compared to key phrases and concepts from all other transcripts, allowing theorization and reflection of the collected data (Glaser, Strauss, 1967).
2. **Axial Coding:** The identified key phrases and concepts were allocated into subcategories and eventually categories allowing identification of the relationships and connections between the categories (Glaser, Strauss, 1967).
3. **Selective Coding:** With the support from preexisting theories, the connections and relationships between the core categories were authenticated and refined, resulting in integration of the categories and eventually the identification of significant factors for this research (Glaser, Strauss, 1967).

3.8. Literature Reviews

Relevant peer-reviewed literature regarding change management, digital transformation, theory of planned behavior, skeuomorphism and psychological contract were researched in order to provide scientific evidence and support for the approach on the thesis problem. The search engines were primarily Google Scholar and Primo - University of Borås library. The subchapters 2.5, 2.7, 2.8 and 2.9 were primarily written or partially written by Sarah Ahmed – another student from The University of Borås studying Industrial Engineering – Business Engineer – Construction Technology.

3.9. Data Analysis

The data collected were divided into two groups. The literature reviews and the data collected from interviews and observations. The first data analysis consisted of investigating the literature and defining its primary use in praxis as well as analyzing the different perspectives of the issue. The second part of the analysis consisted of analyzing the collected data from the interviews and comparing it to the literature. The comparison gave a better understanding of what approaches needed to be taken in order to answer the research question.

3.10. Ethics and Morality

A crucial part of a research study consisting of participants is ethics and morality. The participants of the report must have the security of anonymity, confidentiality and information of consent. The researchers also took the potential harm of participants into consideration. First and foremost, the potential harm to the participants were evaluated based on the topic of this research. This research focuses on Change Management and how it affects the employees during implementations. When conducting interview questions, the questions were structured in a way that ensures that the participants are not harmed psychologically or on one's career. Since this report's purpose was based on finding an effective way of implementation that benefits the participants, the authors took note of not affecting the participants negatively. The interviews were initiated with a presentation of the thesis and the purpose of the interviews. The participants were also informed about the consent. If desired, they were able to reject the interview, withdraw their statements and end the interview immediately. The interviewees were also asked to approve the recording of the interview. They were also informed that the interviews and observations would be handled anonymously.

3.11. Trustworthiness

Measuring reliability and validity is difficult when writing a qualitative report. High reliability does not guarantee high validity and high validity assumes there will be high reliability. Hence, measuring reliability and validity was found to be difficult when the results are based on feelings, thoughts and opinions. Measuring trustworthiness was deemed to be more appropriate. In order to establish trustworthiness of this thesis, four criteria were taken into consideration to ensure quality of the research: conformability, credibility, dependability and transferability.

Criteria	Purpose	Activities
Credibility	Confidence establishment in order to trust that the results are true, credible and believable.	<ul style="list-style-type: none"> ● Conducted interviews with 10 participants ● Researched relevant knowledge of how to conduct interviews ● Researched relevant theories of the research question topic
Transferability	Establish transferability such that the results can be generalized in other contexts.	<ul style="list-style-type: none"> ● Providing a thorough description of the research context
Dependability	Ensure repeatable results if the investigation occurred within the same unit of participants, context and coders.	<ul style="list-style-type: none"> ● Detailed description of selected method approaches ● Track record of the data collection ● Investigation of suitable coding method
Confirmability	Ensure the confidence of the results so that the results will be confirmed by other researchers.	<ul style="list-style-type: none"> ● Weekly journals and meetings with supervisors

Table 1 Illustration of trustworthiness. The four criteria credibility, transferability, dependability and confirmability is presented by explaining their activities and purposes.

4. FINDINGS

In this chapter, the analyzed results from the interviews and observations will be presented. The results may have direct or indirect relevance to change management and digital transformation and the research questions.

4.1. **Role Ambiguity and Role Conflicts in the Evening Shift Production Leaders and Cultural Differences in the Shifts**

Quantitative data from interviews with production leaders working in the evening shifts suggests that they experience both role ambiguity and role conflicts. The role ambiguity would ultimately lead to role conflict. During interviews, production leaders working the evening shift stated that there is an uncertainty towards what responsibilities and work tasks are expected from co-workers and colleagues. The production leaders also implied that the lack of support functions during evening shifts, such as HR, VPS coaches, ergonomics etc., forces them to act as such roles themselves in order to complete their own work tasks. When asked why they take on the tasks of absent support functions they stated *“it is necessary for me complete my own job tasks”* and *“if I want to do a good job and do the work that is expected from me I have to do it”* Production leaders expressed that *“no one keeps track of how big workloads us white-collars have”*, *“much of our work relies on support from support functions”* and *“we need support functions in the evening shift”* when asked about if their jobs demand too much time and effort and why. All support functions in the plant work solely during day shifts, and production leaders working the evening shift state it is forcing them to come in before their shift starts during day shifts to attend meetings and to take on the roles of absent support function workers in the evening shifts, without attaining any sort of compensation. Production leaders in the evening shifts described that their jobs caused stress, demands more time than their working hours and that the absence of support functions leads to uncertainty in their jobs and inability to perform optimally at work.

This could be partial consequences of a priorly poor managed change within the organization, namely the increased production in evening shifts. Priorly the takt time in the production was thirty-five trucks per evening shift, which has been increased to the current seventy trucks per evening shift, matching the day shifts takt time. This means that half of the total production is done in the evening shifts without available support functions. The majority of the interviewed production leaders working evening shifts stated that the absence of support functions during their working hours forces them to rely on their contact network to get the proper support needed. These contact networks were described as coworkers and colleagues, who may have the role of a support function or have experience in the process of which the support is needed. Employees falling in the latter category would often also work during the evening shifts, resulting in, as described, a formed unity between the evening shift employees, where they rely on each for support, but also stated if a production leader does not have an established contact network, that *“then it will extremely hard for them”* to do their work.

Although to act as support functions in their absence is not described in the Production Leader persona provided by the company, it is described that they should have “*ability to solve problems*”, “*desire to take challenges*” and to “*check built trucks in accordance with processes and regulations set out by Tuve Plant Quality organization*”. Overall, all interviewed employees stated that their general relationship with the organization is good, very good or excellent, but data suggests that there is some uncertainty regarding what is expected from a production leader that works in the evening shift, meaning there may be some incongruence in the psychological contract between the production leaders in the evening shift and the organization.

4.2. Experiences from past Organizational Changes and Digital Transformations

Digitalization in the plant has been implemented inconsistently between the departments. Most digitalization consists of digital interactive screens for the operators that replace paper form data or tools such as SOPs, assembly instructions etc. or screens that are used to present data in team meetings. Some departments have fully replaced all paper forms of data and tools for operators while others have partially replaced. These screens are planned to be used by operators for the One Operation Interface in the future. One reason that some departments are ahead of others in the digital transformation process is that they are used as pilot areas for new implementations. After being developed and tested in the pilot areas, implementations are spread to the rest of the production departments. One particular department in the Tuve plant, Cabtrim, is used for piloting new implementations frequently.

According to the collected data, team leaders and production leaders working in pilot areas, namely recurrently involved employees, receive much more positive experiences of change than team leaders and production leaders in other departments, stating that prior implementation processes “*worked out quite well actually*” and “*overall, preparations and communications were good*”, and data collected both from production leaders and team leaders also show that the experiences are more positive when changes or implementations are internally issued by departments themselves. Internally issued changes or implementations are typically small and only affect the department or a specific group within the department. Although internally issued changes or implementations are usually small, there are many factors according to scientific literature that contribute to the more positive experiences, namely participation and involvement in both the planning and implementation processes, sharing a common goal of the change or implementation, cooperation between the department workers and leaders and potentially external workers, the ability to give feedback to adjust the change or implementation, opportunities to show commitment to the organization, the ability to take current work cultures and work loads into consideration, having more control of the change or implementation process, more clearer and visual communication and more frequent updates. These factors are derived from scientific literature regarding the change management, theory of planned behavior, psychological contract, employee involvement in work settings, and from change management models which themselves are derived from scientific organizational research. These factors are also derived from the quantitative research, which aided in pinpointing out

processes that were perceived deficient by interviewees' regarding changes in the organization.

The team leaders and a production leader from the Cabtrim department during piloting perceived the communication with the organization, the involvement in planning and implementation processes, the training and overall preparation of change more positively than other department workers, stating that *"it was not stressful"* during implementation processes, *"the support was good"* and *"it went smooth"*. Other department workers often described that new changes or implementation on an organizational level *"often appear out of nowhere"*, or *"with very little time for preparations"*. The time to adapt to changes is perceived to be longer in departments that are not pilot areas, and the deviance in production is also higher while adapting to change in departments that are not pilot areas versus departments that are pilot areas according to the departments respective team leaders. Communication, training and overall preparation for change is perceived better when changes are internally issued or when departments are used as pilot areas. Resistance to change is also perceived more often in departments that are not pilot areas. Team leaders described that changes that affect the working ways for operators was the promptest cause of resistance to change, and that they handled such situations by demonstrating how the change was beneficial and needed. The time to overcome resistance varied from days to several weeks.

4.3. Ineffective Communication

Depending on the department and shift, the recorded answers differed when asked about the communication at the plant. A main point that most of the participants stated was that the communication between day and evening shift is inadequate. It was also stated by some interviewees that the communication between the other departments lacks as well, in both shifts. The team leaders answered that they receive factory information beforehand which they in turn give to the operators. However, the team leaders also stated that the *"operators are left behind"* when asked about information spreading and awareness, and a *"culture of whispering game ravages in the plant"* was described as a consequence of ineffective communication, where information sometimes gets lost on the way down the communication chain. The team leaders also shared their views on their production leaders, stating that they are pleased with the communication they have with them, and they experience that the production leaders solve problems quickly. The production leaders are always available for them, and they have daily meetings. Both team leaders and production leaders complained about the lack of communication with the production engineers and project developers, mainly from the evening shift. As stated by one of the production leaders when asked about the overall communication *"...communication is 50/50..."*. According to the leaders working during the evening shifts, the managers and production engineers are mostly not available during the evening shift and a desire from them has been to have the management working half of the dayshift and half of the evening shift. The evening shift experiences less support and inequity from the management department since they are not available for them at the same extent as the dayshift. Pointed out by a team leader from part 3, the communication between the quality control department and the team leaders can improve and become better. This gives a better understanding that the communication deficiencies are not only between the leadership team and the managers, it is

also between day shift and evening shift and between the different departments within the production line. When asked for possible solutions to solve the problems, answers such as “*create a SharePoint between the departments to share ideas and solutions*”, “*better platforms for communication with production engineers*” and “*introduce a handover standard during shift change and better support between the shifts*” were given.

Shifting focus to previous implementations, the leaders from the day shift answered that they were mostly satisfied with the arrangement and planning of the projects. They were provided with information and feedback early on and had time to mentally prepare for the change. During the implementation phases, they had good support and communication with the engineers that was direct and smooth. However, they felt that the content of information was lacking, and the purpose wasn't clear enough, creating resistance from the operators. The answers from the leaders during the evening shift differed. They stated that some of the projects were implemented without early notice while others were implemented with lack of support.

4.4. Demand of Visualization of Information

Results from the interviews indicate that the participants put emphasis on the visualization of projects, implementations and the plant. The participants reported that the plant lacks a sensible structure. One participant commented “*...the plant lacks a fishbone structure. The layout is very weird and unclear where departments are...*”. The participants further stated that the structure of the plant is difficult to understand and learn. When it comes to previous implementations and projects, it has been reported that the visualization has been lacking. One participant reported that the SOPs and sequence sheets weren't prepared or provided before being introduced to the new version of the trucks. The participants also reported that the new variants weren't taught in advance since they only occur rarely. The educators provided the operators with verbal information and CAD designs of the variants which caused confusion amongst the operators. Further stated by the participants were the lack of visualization on newly implemented systems. One participant stated “*...I was given a link to the new program without any information of how to use it. I tried to figure it out by myself. Since I couldn't see any pictures of the deviations, I stopped using the program*”. The participants did not only comment on the visualization regarding projects. One participant brought up the visualization on their workplaces stating that it is untidy and that there has been material in places in various years.

4.5. Employee Involvement and Change Attitude

Studying the interviews, the participants have given different answers and results depending on which department they work at. The results show that the participants from Cabtrim, the reoccurring pilot department for implementations, are positive and look forward to the implementation of One Operation Interface in the production. The participants from the other departments are also positive about the implementation, however they are more skeptical about the interface and have given statements such as “...*skeptical towards it...*”, “*I don't think this will work out very well*”, “...*I hope this will be implemented quickly.*” and “*This (the implementation) will take more time than expected*”. Looking at the answers to the questions about previous implementations, the participants from Cabtrim have stated that they have been conducted very well. The participants brought up that the information about the implementation has been given early prior to the learning. They have been able to try it out before implementing it on the production line. Some participants have however commented on poor communication from the developers, but it hasn't been affecting them on a bigger scale. The participants from the other departments have given different answers regarding previous implementations. Many of them commented that information has been given on short notice and the implementations have usually been thrown into the production line without any thorough training. In some cases, projects have been implemented without any notice at all. When asked what they would do differently, they commented that they would like to be more involved from the developing stage. Participants from all the departments put heavy emphasis on involvement in projects for the project implementations to be successful. The answers from the team leaders regarding involvement and communication with their production leaders were mainly positive, stating that their production leaders are always available for them and that they meet each other every day in the plant. Both the Team leaders and the production leaders brought up the lack of visibility of the developers in the production line and they would like to see them more in the plant.

5. ANALYSIS

In this chapter, the results will be analyzed according to the theoretical framework provided in chapter 2. The presented research questions in chapter 1.7. will be answered in this chapter where the findings of this study and theories will be compared to each other.

5.1. **How can change management be utilized in a digital transformation project?**

As Kotter described in his change model, the first step for a successful change transformation is to create an urgency for change. During the interviews and observations, it has been found that many employees were looking forward to the implementation of the One Operation Interface, mostly because it would make their work a lot easier. In other words, the employees' goals were aligned with the organization's goals with the change. Although only employees of pilot areas have been introduced to the interface, it is believed that presenting it and introducing it to all employees, prior to implementation, should be considered by the organization. There are a few reasons for this; by making sure all are informed, the risks for spreading invalid information and speculations are minimized. Secondly, to present an investment that benefits the employees could positively affect their psychological contract with the company. It could be presented as "giving something back" to the hard-working employees and a way to show appreciation for their commitment and hard work. Thirdly, employees working in departments that are not chosen as pilot areas could still contribute to the project with valuable input. Lastly, introducing all employees to the interface can be helpful in creating an organization-wide urgency and demand for change. By introducing the new digital implementation to all employees, it could positively impact two out of three determinants from the theory of planned behavior: their personal attitude and the social norm, and by so reducing the chance of resistance or even increasing the urge for change. By familiarizing employees to the digital interface prior to implementing it can also potentially positively affect the third determinant from the TPB, the perceived control, which increases with familiarity. Similar benefits can be reaped by adding skeuomorphic design elements in the interface. According to Kotter, the moving process or the actual implementation phase is where the most uncertainty occurs of the involved individuals. By introducing and involving employees outside of the pilot areas, this uncertainty can be reduced.

The right moment to introduce the new interface however should also be considered, as momentum can be a key factor in change management and digital transformation. Interviewees have stated that many prior digital implementations have been put on a hold. This is mainly due to implementations not being fully developed. Interviewees also stated they rather continue with old ways of working than using implementations that are flawed or not fully developed. Discussing this aspect further, if the organization still concludes the need to implement an interface that is not fully developed, the developers should clarify the imperfections of the interface and the reasons behind it. Mentally preparing and giving the employees reasons to be patient with the development is crucial in this case. Observations of the pilot teams and the introduction of One Operation Interface shows that the way the developers at Volvo introduce the project is a step in the right direction. The developers explain thoroughly that the interface

is not fully developed and put weight in clarifying the importance of the feedback from the pilots in order to satisfy their needs. They move forward with further explaining that the pilots need to be patient with the implementation and that it will be time consuming in order to get a perfect interface.

In digital projects, skeuomorphic design elements can reduce time for adapting to change and increase the users perceived control. Skeuomorphic design elements can give a sense of familiarity and by so trust in the project can be increased and time for adapting can be reduced, compared to adapting and trusting an unknown domain.

Regardless of which change model is used, the different steps lead ultimately to the same processes and activities. Adapting a change management strategy for digital transformations does for the most part also improve various activities and processes in general within organizations, whether changes are being made or not.

5.2. What are the success factors and activities for a successful digital transformation project?

In order to fully complete a project, an organization should start with understanding the group or groups being affected by the transition and evaluating the degree of change. The approaches chosen to be taken should depend on the organization structure since all organizations function differently. The main important successful factors brought up in the results are communication, involvement, support, clarification of responsibilities and tasks, visualization of information and good relationships with leaders or the organization in general. Analysis from the interviews show that the communication chain consists of gaps and unclear information of responsibilities. Mainly during the evening shifts, the production leaders have reported that they need to work overtime almost every day and they need to solve a lot of problems that are not within their responsibilities since there aren't any from the management department working during the evening hours. The interviewees have also reported that changes in information doesn't always make its way all the way down the communication chain leading to lack of information on team leader and production leader level. The leaders also reported that the implementations of projects are usually very good, and they feel involved. The preparations are usually very good, but they commented that there needs to be more detailed information and preparation as they feel that the implementations lack information.

Backing this up with previous cases and research, the EI, Employee Involvement, aids to involve employees from the very beginning of a project. The study highlights the importance of involving employees in the planning process of the project in order to receive their input and feedback regarding the areas that are desired to change. This gives an opportunity to emphasize and communicate the reason for the need to change and clarify the purpose of change before the project is completed and on an implementation stage. This gives the employees a feeling of appreciation and importance within the organization.

Visualizing the project to the participants is another aspect of successful factors to fully

complete a project. Communicating the project both verbally and visually gives the stakeholders better understanding of the project, decreases uncertainty and gives them a better foundation of adapting to the change. Choosing either verbal communication or visual communication will only result in lack of information, hence a combination of both is deemed more effective. As shown in the results, the interviewees reported that brief verbal information about new variants in the production caused them confusion about their work. Another interviewee stated that a link to a new program was given without any further explanation or preparation which resulted in the interviewee trying to figure out the program without any successful results. This caused the interviewee to give up and move on with the old way of working. This shows that the stakeholders are in need of both hearing and seeing the information given to them at the same time in order to understand the concept better. Other interviewees stated that new sequence sheets and SOPs were not prepared in advance which caused them further confusion when introduced to new standards. Another impactful factor that could ease the transition from analog to digital tools in a lean manufacturing environment is the digital design. Skeuomorphs are widely used to imitate reality in digitalization in order to make the transition from analog to digital easier through displaying familiarity. Using skeuomorphic design elements in the interface could ease the transition and decrease resistance and uncertainty in the employees. Analyzing the results regarding visualization, it is evident that preparation, verbal and visual communication as well as detailed information is crucial in order to successfully implement a project.

The project should be at least introduced in a broader perspective, meaning that before introducing the implementation to the pilots, it should be introduced to everyone potentially affected by the project. The reason behind this is to decrease misinformation and any resistance from the stakeholders that could be caused as a result from whispering games that presently exists in the plant. This is also effective in order to mentally prepare the stakeholders for the change, it gives them time to criticize and give feedback in advance, create a sense of involvement and importance as well as give the developers opportunities to perfect the project further. Introducing the project to the entire organization will also emphasize the importance and empower the weight of the project to the stakeholders. Depending on the organization, the project managers should use a strategy that fits the implementation. A base foundation for implementations is Kotter's eight step model for change. Reason why this is emphasized is because it will become much easier for the organizers to follow the progress of the implementation and the progress the pilots make while adapting to the change. This will provide both the developers and the pilots by giving and receiving more support and feedback. The involved personnel, managers, developers and pilots, can adapt to the change at their own pace and move forward to the next steps if it is deemed to be appropriate and everyone is on board with the change. The aim is to prepare the pilots to such an extent that when the new project is taken into action, there won't be any resistance from the users or obstacles that will affect the production negatively.

First and foremost, we believe that the organization should re-evaluate the present communication structure as data suggests that there are gaps in the communication chain. Data suggests that there exists an uncertainty towards whose responsibility it is to inform and communicate further down the chain. Clear communication is shown to decrease resistance of

change. Secondly, as we stated earlier, the organization should introduce the new interface to more if not all employees and involve more employees in the implementation and transformation process.

5.3. How well does change management function in a digital transformation project in a manufacturing organization and how can the gap between theory and practice be closed?

Overall new implementations and changes in the Tuve plant overcome resistance at some point in time. The length to overcome resistance does vary, and usually, according to data, these periods last from a few days to some weeks or months. Resistance to new ways of working is usually shown by older workers that have been in the organization for a longer period. The period also lasts longer if the old ways of working are still optional parallel to the new changes or implementations. Although all prior changes or implementations have been adapted, there are gaps in the change and implementation processes. Two main areas have been analyzed which could be improved for better change management and digital transformation: communication and involvement. As stated earlier, the changes or implementations that employees perceived more positively were either internally issued in their department or projects where their departments were used as a pilot area. Although these types of changes or implementations are usually small, there are many factors that contribute to the more positive experiences, namely participation and involvement in both the planning and implementation processes, sharing a common goal of the change or implementation, cooperation between the department workers and leaders and potentially external workers, the ability to give feedback to adjust the change or implementation, opportunities to show commitment to the organization, the ability to take current work cultures and work loads into consideration, having more control of the change or implementation process, more clearer and visual communication and more frequent updates. These factors are derived from scientific literature regarding the change management, theory of planned behavior, psychological contract, employee involvement in work settings and from change management models which themselves are derived from scientific organizational research. These factors are also derived from the quantitative research which aided in pinpointing out processes that were perceived deficient by interviewees' regarding changes in the organization.

In smaller changes or implementations, the communication chain is usually short, meaning changes in planning are informed in time and all the way down the communication chain. This decreases significantly the risk of spreading of invalid information, which has also been an issue within the organization according to collected data. Several production leaders and team leaders stated that updates or changes of plans regarding events or changes do not always make it all the way down the communication chain, leading to invalid information continuously spreading and being regarded as actual. The changes where employees perceived negative experiences were when the information and communication between them and the

organization, or those responsible for the change, was unclear. The information regarding dates, activities, plans and updates were stated to not always make it all the way down the communication chain, suggesting that there is an uncertainty as to whose responsibility and task it is to communicate such information. This was shown to be a bigger issue in the evening shift workers. The use of pilot operators shows positive effect only in the pilot areas, and not in other departments. The new implementations from pilot areas are not effectively introduced into the rest of the organization due to gaps in the information flow and lack of visual presentations in preparations.

5.4. What prerequisites are required for a successful digital transformation in a manufacturing facility?

In this study, the first step was to understand the impact and influence of the change on its stakeholders and the organization as whole. Organizational changes can vary significantly from just digital transformations, but it comes down to the common critical factor of making processes and activities as simple and smooth as possible for the stakeholders. Regardless of if the change is about digital transformation or relocation of facilities, some factors are universal in organizational changes. By analyzing the gaps in the organization in general, or in previous change or implementation processes, activities and processes which need improvement can be identified. This can effectively be done by collecting quantitative data from stakeholders, but some realization of ineffective processes or activities can and should also be recognized by the organization. The second step in this study was to collect and analyze historic data regarding change or implementation processes, but also by discussing hypothetical or potential future settings with the stakeholders in order to find important factors, as some interviewees were yet to be introduced to the implementation or have not been a part of organizational change priorly. The third step in this study was to compare relevant scientific literature to the collected data and finding underlying factors for each processes or activity. It was realized that optimal approaches or strategies could vary depending on different groups or areas within large organizations, in this case mostly because of cultural differences in the different shifts and because of underlying factors such as absence of support functions in the evening shift. The last step, which was not included in this study, is to adapt a strategy based on the prior steps. The strategy can be based on a model such as Kotters eight step model, with some adjustments to the steps, or be completely developed by the organization. However, it is crucial to recognize the important factors regarding the change.

6. CONCLUSION

The purpose of this case study was to analyze effective ways of adapting digital transformations in manufacturing companies using change management for a smooth transitions. This has been done by creating a theoretical framework and data collection by observations and interviews at Volvo GTO Tuve plant in Gothenburg, Sweden. The framework and data collection has been analyzed and discussed which in turn has given a conclusion which is presented in this chapter.

The main research question that was asked at the beginning of this report was “*What prerequisites are required for a successful digital transformation in a manufacturing facility?*”. This question has been divided into three sub questions that have helped with answering the main question. The conclusions drawn from the discussions are mainly regarding improvement in communication, involvement, visualization and support.

First and foremost, it is presented that involvement during the formulation process of a project is important for better communication and understanding organization wide. Involving the leaders and operators that work on the production line with conducting a plan for developing a project will give the developers better foundation and information of what actually needs to be changed and improved. The developers and managers will have better opportunities to bring awareness and declare the purpose of the project. This approach will improve the communication chain since the need to forward information decreases when everyone is involved from the beginning and receiving information directly from the source.

Secondly, visualizing the project and preparing visual presentations and material will provide the pilots with better understanding of the new standard. This will provide the operators and leaders with more support. Regarding support, in order to enable a change management mindset, the support should be re-evaluated and planned in a better way. Both shifts should receive the same type of support and during the same amount of time. Giving different types of support has resulted in role ambiguity. As mentioned in the previous chapter, the evening shift leaders need to work overtime almost every day and take on responsibilities that aren't in their own scope.

Thirdly, the gaps and differences between reality and theory are based on the size and scale of the company. Adapting change management when implementing a digital transformation in the whole plant will become much more difficult than when implementing it on a smaller scale. It is more measurable when implementing projects in smaller organizations. As for the Tuve plant, the implementation of One Operation Interface should include a bigger project team, if not more project teams that focus on different departments and shifts. Important aspects that are brought up in the theories of change management are communication and involvement. Maintaining a good communication chain and determining the involvement of everyone in the organization will also become much more difficult when implementing in a large organization. Hence the argument for creating smaller project teams but in a larger quantity that follow the pilot teams, provide them with support and determine that changes in information makes its way all the way down the communication chain.

7. Recommended Implementation Strategy For 10I

This recommended strategy is based on findings from the collected data in this study, Kotter's eight-step model and the researched theories presented in this study. It is intended that this strategy minimizes the gaps found in the plant and that the presented data from chapters 4 & 5 (Findings & Analysis) are taken into account when executing this strategy.

1. Present the Innovation to all stakeholders

After the piloting is complete and the interface is set for implementation, it is recommended that a visual and verbal presentation in front of all affected stakeholders from both shifts is held, with the details about the interface, the plans for implementation, the goals and purposes of the interface. This can ensure that almost every stakeholder is presented with the correct information from the very beginning. The approach of the presentation should be to “sell” the interface to the stakeholders, in a way that creates an urgency for change and demand. An example of this approach is the presentation held by Steve Jobs for the launch of the first iPhone. In the presentation, Jobs builds up for a new innovation that exceeds the audience's expectations, and by explaining the important details of the new smartphone and why it is more practical than the phones previous iterations, he created a massive demand. Jobs creates demand by demonstrating the efficiency and practicality of the new smartphone, and does not focus on technical product specifications. It is also important to exhibit that the interface and all its functions is for the purpose of making it easier for the stakeholders. This would likely create a demand for change whilst also greatly positively affecting the stakeholders psychological contract with the organization, shaping their attitude and behavior infor the implementation, by revealing an implementation that is for their benefit.

2. Work towards set goals and down the line

The implementation in the plant should be from section to section and not in random order. To start the implementation at section 1 and continuing down the production line to section 2, 3 etc. will be practical in different ways. Firstly, it will be easier to follow the progress of the implementation. Secondly, it will be easier for stakeholders to reach the developers after implementation in their section, as the developers will be in the next section close by. By fully implementing in one section at a time, issues and problems can be solved before continuing to the next section. It will also allow updates to the interface or changes to be made and tested before moving on to the next section. Thirdly, the communication will be much more clear with focus on a section at a time. It is of course crucial that stakeholders from both shifts are equally involved in the implementation, so it is recommended that the developers are present in the last two shifts during the dayshift and the first two shifts during the eveningshift, or in any other order that fits the developers.

3. Monitor & Be Present

As stated by Kotter in his eight step; *Institute Change*, it is very important to monitor post implementation and to continuously try to maintain and encourage positive attitudes and behaviors and point out the importance of the change. It is recommended that at least one support function is available in the evening shift post after a full implementation in the plant for issues regarding the interface. This can decrease the risk that employees from the eveningshift do not adjust to the change in the same pace as employees from the dayshift. This would also decrease the workloads of the production leaders or technicians, and issues regarding the interface would be handled directly and quickly by a developer or proper support function. To maintain a functioning and for the most part problem free interface will see that the employees do not turn back to their old habits, decrease resistance and speed up the transition itself.

8. RELEVANCE

This case study contributes to a better understanding of the management of change within the digital transformation spectrum. This study brings awareness to the perspectives of the employees that are directly affected by such projects. The psychological and social aspects of change management are brought up to better understand the certain resistant behaviors of employees and the reasons behind them. This case study will hopefully contribute to a better management within manufacturing industries where the employees are more included during the planning and implementation processes as well as creating an environment that is customized according to all the employee's needs.

An important note to consider is that the theoretical aspect of this case study is based on general theory of change management and digital transformation. The implications of the discussed theory in this project are the specificity of them. Some of the theories are used in more general terms while others are brought up as examples from other projects. All companies are different and function differently. To say that the theories apply the same way to all companies would be false. The implementation of change management will therefore be different depending on the company and what type of industry it is a part of. Adaptation of change management in different departments within a company will also differ. The theories of change management are supposed to be guidelines for companies during their implementations and are therefore relevant for all companies.

This study focuses on using the change management theory at the company Volvo GTO. The results, analysis and discussion are based on Volvo's achievements. Hence, the conclusion can be drawn that the theories in this case study is generalized with examples from other research projects while the results are from a specific company. This is to show how change

management can be adapted to digital transformation projects in an organization using the theories about the subject.

9. FURTHER RESEARCH

During this case, the authors followed several pilot teams from different departments and shifts. The authors noticed that the answers given by the participants varied depending on the area of responsibility, the department they worked at as well as the shift they worked. The main issue found to be the differences between the day and evening shifts. Further research that will be interesting to study is the differences between the shifts, the reasons behind it and the actions needed to be taken in order to make the shifts more alike each other.

Another angle of approach for further research is to investigate how long it takes for the pilots to adapt to the change and the new implementation as well as how much it affects the quality of the work during the implementation process. Other approaches can also be to investigate which model or method of change management is deemed to be more effective when implementing digital transformation.

It is recommended to study and research more deeply on each different factor regarding change management or digital transformation, such as communication or information spreading etc. By researching more deeply in e.g. “Improved communication skills” or “Effective information spreading” or alike, different processes and activities can be better understood and optimized. Improvements can always be made, and it is recommended that organizational members working with change management or digital transformations gain such knowledge and improve skills.

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APPENDIX

Appendix A: Interview Questions

The interviews were semi-constructed and would include supplementary questions that would vary depending on interviewee. Such questions are not listed in the appendix.

- What do you think about the new interface?
- Have you experienced any similar implementation priorly?
- How are the preparations for changes in the plant?
- How are good preparations done?
- What does stick out about times when changes have gone smoothly vs times changes have gone bad?
- How has the communication been between the organization and you in previous implementations? Do you receive enough support and information?
- How does it affect you in your work?
- How can such situations be handled differently?
- How should implementations be done in the factory, so they are successful?"
- What is important to take into consideration when working on a project like this?
- What obstacles do you think can come up with this implementation?
- How is the communication in general in the organization?
- Do you consider that you have the ability to propose new or affect current improvement works?
- Do you feel that the initiatives you take for improvements are noticed by the organization?
- How is the availability of those who are responsible for change initiatives?
- Do you feel that the organization cares about its employees?
- Is there anything that the organization can do to improve its relationships with its employees?
- Do you feel that you have room for small errors?
- Does your job require too much time?
- Do you find yourself in situations where you must work outside of your working hours?
- Would you change anything in the current work culture?
- Do you feel like the organization's goals align with your goals regarding work improvement?
- What do you think the organization will be like in the near future (3-5 years)?
- What are your expectations for 1OI?
- If you could add, remove, or change anything in the organization what would it be?

Appendix B: Interview Consent Form

Collected data from this interview will only be used for research purposes in the bachelor thesis “**Change Management and Digital Transformation - Analyzing Important Factors and Strategies for Successful Implementation of Digital Projects**” by the researchers.

The interview should last no longer than 60 minutes and if participants grant consent the interview will be **recorded**. Recordings will not be shared to anyone outside of the researchers. All participants and answers will be anonymous, and no name, age or gender shall be published. Results from the interviews will be published publicly in the form of a bachelor thesis report by students from the University of Borås.

All data will be protected by confidentiality under 4th chapter, 8§ of the Public Access to Information and Secrecy Act (2009:400)

All researchers in the thesis from the University of Borås are covered by the rules of confidentiality and professional secrecy. All data will be stored securely for a maximal period of 10 years in accordance with the guidelines for academic studies and will be stored in digital form only accessible to the researchers.

We ask that you agree to these terms and conditions by signing under: **I grant consent for the recording of the interview**

Signature _____

Date _____

I have read the terms and conditions and agree to participate in this interview

Signature _____

Date _____



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