CHALMERS
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Large-scale agile transformation

A case study of Volvo Cars' transformation process

Master's thesis in Quality and Operations Management

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Abstract

This master's thesis has been conducted at Volvo Cars to investigate and evaluate their agile transformation process. Three research questions were formulated to investigate what success factors and metrics needs to be focused on during an agile transformation. In addition, an evaluation was made of the used framework at Volvo Cars, namely Scaled Agile Framework (SAFe). The data collection has been primarily based on semi-structured interviews and a self-completion questionnaire. A total of 24 interviews were conducted with employees with a managerial position. A self-completion questionnaire was sent out where 1405 answers were received, out of those, twelve percent of the respondents had a managerial position.

Nine success factors were identified, which are all important for an organization's agile transformation. The success factors 'understand why to transform', 'training', 'management support' and 'support from an agile coach' are the four most important success factors when taking general change management theories and previous agile transformations in consideration. The study identified 16 metrics, which can be used before, during and after an agile transformation. It is important to understand where the metrics should be measured, because an organization changes and thus, the metrics' results can be misguiding if measured at the wrong occasions. The most important metric to be focused on during an agile transformation is employees' well-being, while the most important metric to be measured before and after an agile transformation is quality.

Volvo Cars has utilized the framework SAFe to scale the agile approach throughout the entire organization. In SAFe, there are four core values which have been evaluated to see if Volvo Cars has fulfilled them or not. These core values are alignment, built-in quality, transparency and program execution. Due to the fact that Volvo Cars was within the actual transformation process the evaluation was difficult, but there were some clear areas for improvement. These improvements are within the core values alignment and transparency, where there is a misalignment between managers and employees and between the four major departments within research and development at Volvo Cars. The work has resulted in six recommendations for Volvo Cars and their ongoing agile transformation, which are presented in the end of this report.

Keywords: agile, transformation, change, SAFe, success factors, metrics, KPI, evaluation, core values

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1 Introduction

This master's thesis comprises a case study at Volvo Cars to investigate their agile transformation process. The transformation from a traditional-oriented organization to an agile-oriented organization aims to increase Volvo Cars' innovative and efficient capabilities, to cope with the increase of global demand within the automotive industry. An agile organization is considered more flexible than a traditional organization and can better respond to changes in customer needs (Solinski & Petersen, 2016). Thus, the agile framework is important to implement, to stay competitive in the automotive industry.

1.1 Background

Ever since the introduction of the first car in the 1880s the automotive industry has undergone drastic changes and improvements (Benz, 2017). Now, over 100 years later, the automotive industry is ever more competitive, where only having high quality products is not good enough. Today, companies need to not only improve their products but also their ways to work and develop new products, because of the necessity to deliver faster and more efficient.

In a global point of view, the automotive industry is becoming more dependable on efficiency in the development of new vehicles (Zapata & Nieuwenhuis, 2010). This can be explained by the competitiveness that globalization have brought and the fast development of new technologies, which in turn has made it even more important to be efficient in the product development process (Zapata & Nieuwenhuis, 2010). This is partially due to the increased awareness of environmental and sustainability issues, which has caused new regulations and demands regarding, for example fuel efficiency and air pollution (Miller et al., 2000). Consequently, organizations need to drastically change their ways of working, in order to meet these new regulations and demands, as well as the global competitiveness.

The environment for the automotive industry has changed where the level of competition has increased, vehicles' life cycle has shortened and new technologies are constantly appearing (Holweg, 2008; Sabadka, 2013). Therefore, in order to stay competitive, companies need to transform their organization to become more flexible, innovative and efficient. One way to accomplish this is by working more agile, which aims to facilitate these factors. Today, Volvo Cars is going through an agile transformation and has chosen to transform their traditional way to work and develop new vehicles to a more agile approach. Going through a transformation towards an agile-oriented organization has its difficulties, due to major changes in the way to work and to develop products. Therefore, a standardized framework to implement agile has been developed, referred to as Scaled Agile Framework (SAFe), which is also the framework Volvo Cars has chosen to use in their implementation. Even with the use of a framework it is still difficult to implement agile into an organization and therefore, it is important to know what to focus on to succeed with the transformation.

1.2 Purpose

The purpose with this master's thesis is to better understand what success factors and metrics are valuable in an agile transformation and to critically evaluate Volvo Cars' implementation of agile within the chosen framework.

1.3 Problem analysis and research questions

For an organizational change to succeed, the organization need to plan and prepare the organization and its employees in several ways, both before and during the actual transformation process. The need for clearly expressed actions are also of utmost importance, to facilitate and implement the transformation in a smooth and effective manner. These appropriate actions can differ for organizations, depending on the environment and culture at the specific organization. For this master's thesis, the possible actions will take Volvo Cars' perspective and situation in mind. The first research question has been developed to investigate what appropriate actions are needed during an agile transformation:

RQ1: Are there actions that are considered important during an agile transformation and in that case, which ones?

An organizational change for larger organizations is difficult and challenging to carry through. One way for the organization to make better decisions and ensure that they are on the right track during the transformation process is to have metrics, which can be called Key Performance Indicators (KPIs). These metrics can be appropriate, depending on different situations and for different organizations, and that is why it can be important to find and generate the appropriate factors to measure. The identified metrics for an ongoing transformation can differ from the appropriate metrics after the transformation, which is why it is important to be aware of this and keep them apart. During this master's thesis at Volvo Cars, the focus is to investigate what metrics are considered important in the agile transformation process. There is also a need to evaluate if the generated metrics are valuable or not to be used after the agile transformation has been implemented. Therefore, the second research question is formulated as following:

RQ2: Can the progress of an agile transformation be measured and in that case with what metrics?

The framework at Volvo Cars is used to scale the agile approach throughout the entire organization and ensure the development of products according to it product-based value flow. Hence, the implementation of the framework is a major process, which is why it is interesting to investigate and evaluate if the agile principles are kept in the framework and if Volvo Cars has successfully implement the framework based on its core values. Therefore, the third research question is expressed as:

RQ3: How has Volvo Cars succeeded with the implementation of the agile principles and the SAFe framework?

1.4 Delimitations

Since this case study is performed at Volvo Cars, the obtained information and knowledge has mostly been based on the internal information available at Volvo Cars. Volvo Cars was already in the transformation process when this case study was started and the findings are therefore based on an ongoing agile transformation.

2 Theory

In order to understand this research study and the benefits of agile, the agile ideology will be described, including its difference to a traditional way of working. Thereafter, the agile methodology will be briefly explained to understand the basics and then the framework used at Volvo Cars to scale the agile-oriented approach to the entire organization will be explained. To better understand an agile transformation, general change management theories will be presented and previous agile transformations will also be investigated and presented.

2.1 The agile ideology

The introduction of the agile approach emerged due to dynamic markets, in which customer's needs were constantly changing, and where there was a need for rapid response and flexibility (Petersen, 2010). These markets included, in particular, software-developing markets, but has later expanded into physical products, given that software and hardware are often connected (Karlström & Runeson, 2006). Agile is used to describe the approach for the work that is conducted, where the main goal is to satisfy the customers (Alliance, 2001). Accordingly, the agile approach shares many features from earlier quality management concepts, for example lean, total quality management (TQM) and Six Sigma, even though the specific features differs. As companies implement agile methods, they want to be able to satisfy customers' needs more effectively, through the use of the tools and techniques related to the specific method.

The characteristics of agile can be described in many ways, but the common description and explanation of agile is the communication process. This process is described by Berczuk (2007) as "*frequent, good quality, feedback to facilitate the ability to change direction as business needs change.*" Thus, the iterative process for communication brings people closer together, as well as closer to the market, and can therefore respond faster to changes in customer's needs. A prerequisite for this to work is to bring different people together, that is cross-functional teams, and support these teams and make room for continuous communication and feedback (Berczuk, 2007). The agile manifesto by Alliance (2001) addresses the importance to have co-located teams and the ability to meet face-to-face with the people involved in the development process.

Another prerequisite, to allow for a high level of flexibility and rapid response, is to minimize the number of artefacts in the development process (Berczuk, 2007). This means that the agile team rely more on collaboration and frequent feedback, and agile reduces documentation and design documents. As a result, the agile team can devote more time and resources for the actual project and the development time is reduced. It is also important to not have to rely on single individuals, with respect to knowledge, and instead have team-based competence, where the team possesses the knowledge (Berczuk, 2007). This is achieved by sharing knowledge within the teams and have team development activities as well. As a result, more team members can focus on specific and prioritized activities and work more efficient.

2.1.1 The principles of the agile manifesto

The agile manifesto was originally developed within agile software development and consists of twelve principles, which aims to improve the development of software (Alliance, 2001). These principles are presented below.

Principle one: "*Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.*" (Alliance, 2001)

Principle two: "*Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.*" (Alliance, 2001)

Principle three: "*Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.*" (Alliance, 2001)

Principle four: "*Business people and developers must work together daily throughout the project.*" (Alliance, 2001)

Principle five: "*Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.*" (Alliance, 2001)

Principle six: "*The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.*" (Alliance, 2001)

Principle seven: "*Working software is the primary measure of progress.*" (Alliance, 2001)

Principle eight: "*Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.*" (Alliance, 2001)

Principle nine: "*Continuous attention to technical excellence and good design enhances agility.*" (Alliance, 2001)

Principle ten: "*Simplicity--the art of maximizing the amount of work not done--is essential.*" (Alliance, 2001)

Principle eleven: "*The best architectures, requirements, and designs emerge from self-organizing teams.*" (Alliance, 2001)

Principle twelve: "*At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.*" (Alliance, 2001)

2.1.2 Traditional versus agile development

To further understand the concept of an agile-oriented organization, the approach is compared to its counterpart, which is the traditional approach, which is also called the waterfall approach or the stage-gate approach. A traditional-oriented approach in development projects are commonly characterized as a linear step-by-step process, which is a sequential order of the phases (Awad, 2005). In each of the phases, several activities and deliverables are defined, and have to be accomplished before the next phase can be started. All these phases constitute a development cycle, from start to finish, and can be visualized in Figure 1 below.

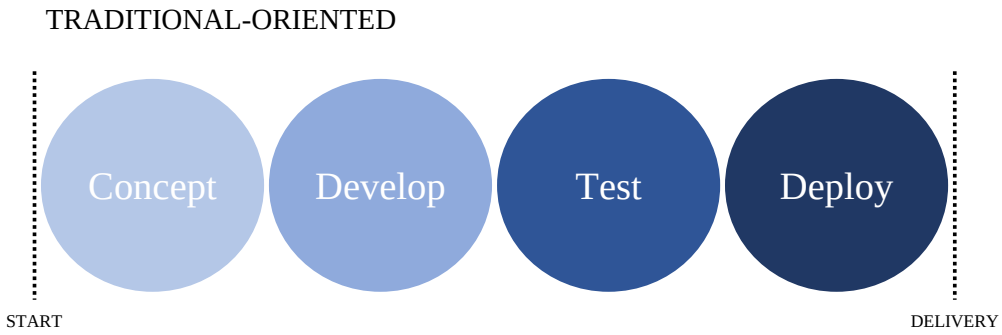


Figure 1: A traditional-oriented development process.

An agile-oriented approach constitutes the same phases as a traditional-oriented approach, but are instead accomplished in a parallel order, with a number of iterations between each development cycle. Accordingly, the work tasks in an agile approach are divided and accomplished, with close collaboration, between the members, see Figure 2 below.

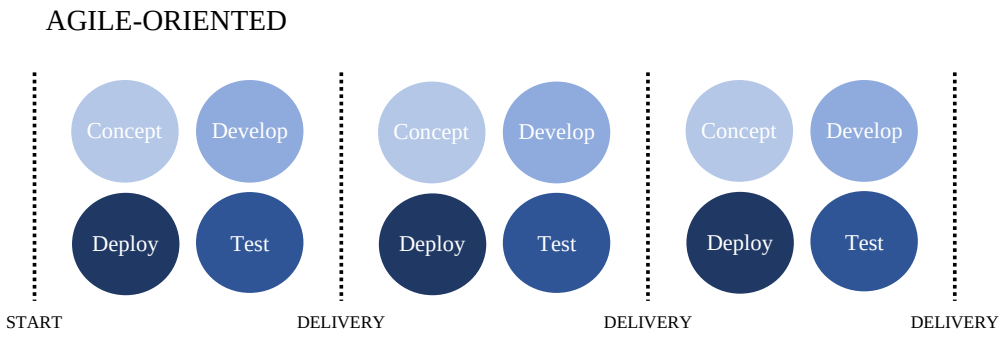


Figure 2: An agile-oriented development process.

The difference between the two approaches is that an agile approach has shorter development cycles and hence, has shorter time to market and can develop products faster to the customers (Sliger, 2006). This is achieved by having cross-functional teams, which have the ability to work with the different phases of the development cycle closer together. Thus, the development time is shortened and likewise, the delivery is more reliable and the work is more effective (Sliger, 2006). Short development cycles and iterations allows for changes to be made much easier and decisions can be made faster, due to close collaboration between the members (Cohen, Lindvall, & Costa, 2004). Cohen, Lindvall and Costa (2004) does also emphasize on the positive effect from having a lot of driving force from the team members, which results in a responsive and flexible project. How the iterations and development cycles are designed, varies depending on how the agile method is structured, but the fundamental core remains.

2.2 Scrum methodology

Within the agile framework, several methods exist with its own unique practices. Common methods are Extreme Programming (XP), Scrum, Crystal and Feature Driven Development, where the two formers are considered the more common and documented agile methods (Cohen, Lindvall, & Costa, 2004; Abrahamsson, Salo, Ronkainen & Warsta, 2017). This chapter presents and describes the Scrum method, due to the fact that Volvo Cars uses the method in their agile work. The Scrum methodology can be described and explained using the Scrum lifecycle, which highlights the different steps and practices in its process. This lifecycle is built around a Sprint, which is also called an iteration, and within these Sprints is where the actual work is conducted (Cohen, Lindvall, & Costa, 2004). The Sprint can be explained as a

development cycle where the value-added work is conducted. The entire Scrum lifecycle can be divided into three phases, namely pre-sprint phase, sprint phase and post-sprint phase. These phases are individually presented in the underlying chapters.

2.2.1 Pre-sprint phase

Before each Sprint, a planning phase is conducted where the Product Backlog is reviewed. A Product Backlog is simply explained as a list of all the prioritized activities, which are changes and features, that have not yet been completed (Awad, 2005). The Product Backlog is owned by the Product Owner, who is responsible for the project and its outcome (Abrahamsson, Salo, Ronkainen & Warsta, 2017). The Scrum Master on the other hand is responsible over to support and ensure progress from the team. The project team is called a Scrum Team and together with the Scrum Master the activities from the Product Backlog are assigned to several Sprint Backlogs (Abrahamsson, Salo, Ronkainen & Warsta, 2017). These are a list of the activities that are supposed to be completed during the upcoming Sprint by a Scrum Team (Awad, 2005). A Sprint goal is also stated in this phase, to decide upon what is expected from the Sprint (Cohen, Lindvall, & Costa, 2004).

2.2.2 Sprint phase

Within the Sprint phase the actual work is conducted and lasts usually between two and four weeks (Berczuk, 2007; Awad, 2005). In the beginning of the Sprint, the Sprint Team distribute the activities from the Sprint Backlog among its team members (Awad, 2005). During the Sprint, Daily Scrum meetings are conducted for approximately 15 minutes to keep track of progress and address potential obstacles (Awad, 2005). This meeting is conducted by the Scrum Master, who also has the task to ensure that the process is carried out according to the Scrum approach (Abrahamsson, Salo, Ronkainen & Warsta, 2017). As a result, the Sprint is supposed to result in a smaller increment, which is sometimes called continuous integration, to the product.

2.2.3 Post-sprint phase

Lastly, in the end of each Sprint, the progress made by each Scrum Team is reviewed and demonstrated to the Product Owner and other interested parties (Awad, 2005). In this phase, the Sprint progress is analyzed to adapt and identify a more efficient approach for the upcoming Sprint (Abrahamsson, Salo, Ronkainen & Warsta, 2017). The Scrum lifecycle, with its three phases, including the steps and practices is visualized below in Figure 3.

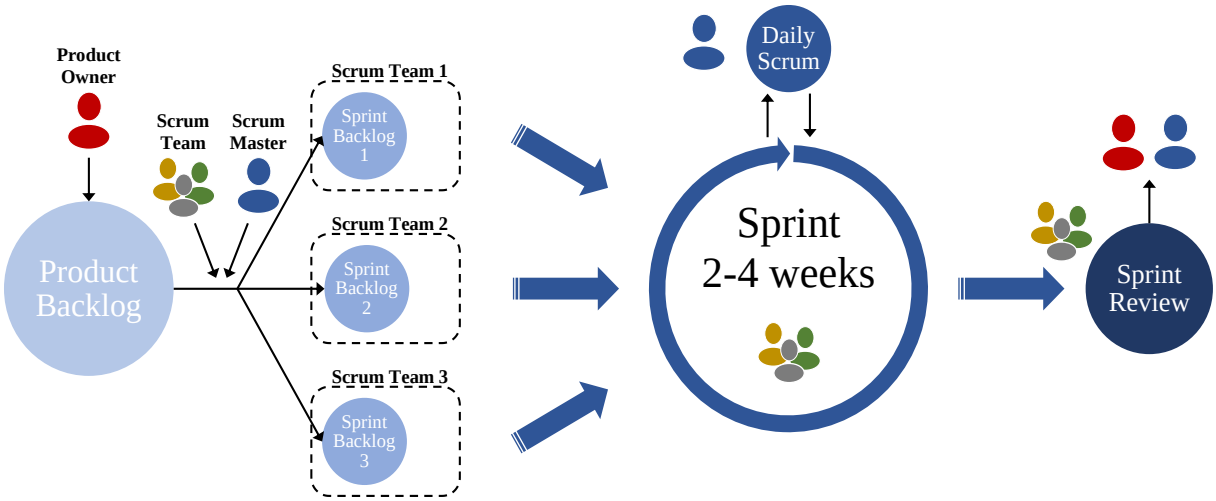


Figure 3: The Scrum lifecycle.

2.3 Scaled Agile Framework

The Scaled Agile Framework, also called SAFe, is a framework specifically created for larger organization to apply and implement a combination of lean product development principles and agile principles (Scaled Agile Framework, n.d.). SAFe is a relative new framework, which was first mentioned in 2007 by Leffingwell (2007) in his book. However, its first version, version 1.0, was first published in 2011 and has constantly been improved to the current latest version, version 4.5, which was published in 2017 (Scaled Agile Framework, n.d.). Implementing SAFe into an organization can have many benefits. Based on several case studies presented by Scaled Agile Framework (n.d.) it has been demonstrated that implementing SAFe will decrease the product defects by 25 to 75 percent, increase productivity by 20 to 50 percent, decrease the time-to-market by 30 to 75 percent and even increase the motivation of the employees by 10 to 50 percent (Scaled Agile Framework, n.d.). There are four kinds of SAFe at the moment, which are Essential SAFe, Portfolio SAFe, Large solution SAFe and Full SAFe (Scaled Agile Framework, n.d.). The main difference between them is what levels are included, whether it is Team level, Program level, Large Solution level and/or Portfolio level, see Figure 4 (Scaled Agile Framework, n.d.). Which kind of SAFe an organization should implement depends on its size, where smaller organizations are more suited for Essential SAFe, while Full SAFe is more appropriate for larger organizations consisting of thousands of people (Scaled Agile Framework, n.d.).

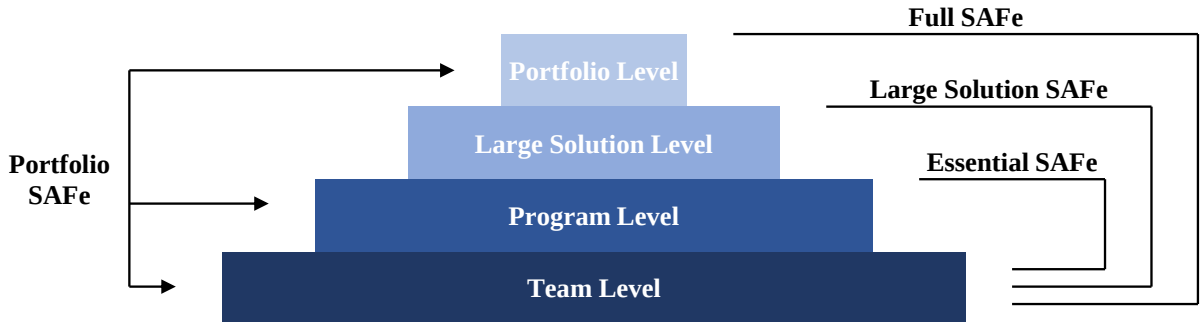


Figure 4: The different SAFe implementations and its respective levels.

SAFe is a framework used to implement agility into an organization and it is important to note that SAFe is a template used to start the implementation and that organizations needs to

customize and modify the framework according to their situation and needs, in order to be successful with the implementation. (Scaled Agile Framework, n.d.)

2.3.1 Team Level

The first level, which is the Team level, operates like Scrum and Kanban, but it can also be a combination of the two. The teams consist of five to nine developers and testers, who work cross-functionally to deliver what is expected and delivers every two weeks and each of these delivery cycles is referred to as a sprint or iteration. The person who is in charge of the sprint backlog is the product owner and it is the product owner who, together with the team, starts the sprint by having a planning meeting. During this meeting the product owner and the team decides on what the team can deliver from the sprint backlog within one sprint, called *story*. During the entire sprint, the product owner and the team has daily meetings to discuss the progress, called daily scrum. After the two weeks, when the sprint is done, and the demo version has been delivered by the team, the product owner and the team retrospect how to improve the next sprint. All this is guided by a scrum master who make sure the team is working without any restrictions and continues to improve after each sprint. (Scaled Agile Framework, n.d; LeanSamurai, 2014)

2.3.2 Program Level

The program level is quite similar to the team level, but scaled up. On the program level there is not only one team who works to deliver something, but here there are between five to twelve teams who are working together to deliver fully working solutions and not a demo version as it is on the team level. The cycle is called Program Increment (PI) and lasts about five sprints, which corresponds between eight to twelve weeks. The metaphor behind this cycle is called Agile Release Train (ART), due to its constant and frequent delivery. On this level the name of the people in charge is the product management and they, similarly to product owner on the team level, determines what each PI should deliver out of the content of the program backlog, which is called *features*. On this level there is a Release Train Engineer (RTE), who acts as a scrum master for the ART, meaning that he/she makes sure everything runs smoothly and according to plans. This is achieved by having weekly meetings with the scrum masters of the different teams. (Scaled Agile Framework, n.d; LeanSamurai, 2014)

Similarly to the team level, each PI starts off with a planning meeting where all teams, product management and RTE meets to discuss what *features* can be completed at the end of the PI. This is achieved by each team discusses the *features* and what they can accomplish during each sprint and this is later discussed with the remaining teams, in order to plan what *feature(s)* and when the *feature(s)* should be completed to complement each other. For instance, team A may need team B to be done with a specific *feature*, in order to be able to start with one of their *features*, and therefore, team B should priority this specific *feature* so that team A can start with their *feature* after the first sprint. It should also be mentioned that during the last sprint, called HIP sprint, the teams, product management and RTE perform three things, namely Hardening, Innovation and Planning (HIP). During the hardening part, the teams perform tests that would otherwise not be possible to carry out and verify that they have accomplished the *features* of the PI. In the next part, which is innovation, the teams explore innovative ideas by creativity. In the last part, namely planning, the teams do a retrospect on how the next PI can be improved and also plans it. (Scaled Agile Framework, n.d; LeanSamurai, 2014)

2.3.3 Large Solution Level

On the previous level, the program level, ART was introduced and can be described as teams of teams. On the third level, namely large solution level, the element is called solution train and can be defined as teams of teams of teams. The purpose of the large solution level is to cover those difficult solutions that a single ART cannot generate. On this level the content of the backlog is called *capability*, which consist of several *features*. The person(s) with highest authority is called solution management and works with Solution Train Engineer (STE), who acts as a guide for the ARTs. There is also a solution architect on this level who makes sure the correct architecture is being used in the ARTs. (Scaled Agile Framework, n.d.)

2.3.4 Portfolio Level

The fourth and final level is called portfolio level and on this level there is a Lean Portfolio Management (LPM), which is the responsible group that helps and supports by allocating budgets, investments and resources. On this level there is also a product backlog, in which the content is called *epics*, which the ARTs product management need to address during each PI. On this level there is a Kanban system to limit the amount of portfolio initiatives and make sure the ARTs are focusing on finishing specific initiatives rather than starting new ones. (Scaled Agile Framework, n.d.; LeanSamurai, 2014)

In Figure 5 below the connection between the different SAFe levels can be seen and how the content in each backlog is connected, as well as broken down, between the different levels. The portfolio level represents the backlog to the left in the figure, which is the highest level of SAFe, with the following levels to its right: large solution level, program level and team level. (Scaled Agile Framework, n.d; LeanSamurai, 2014)

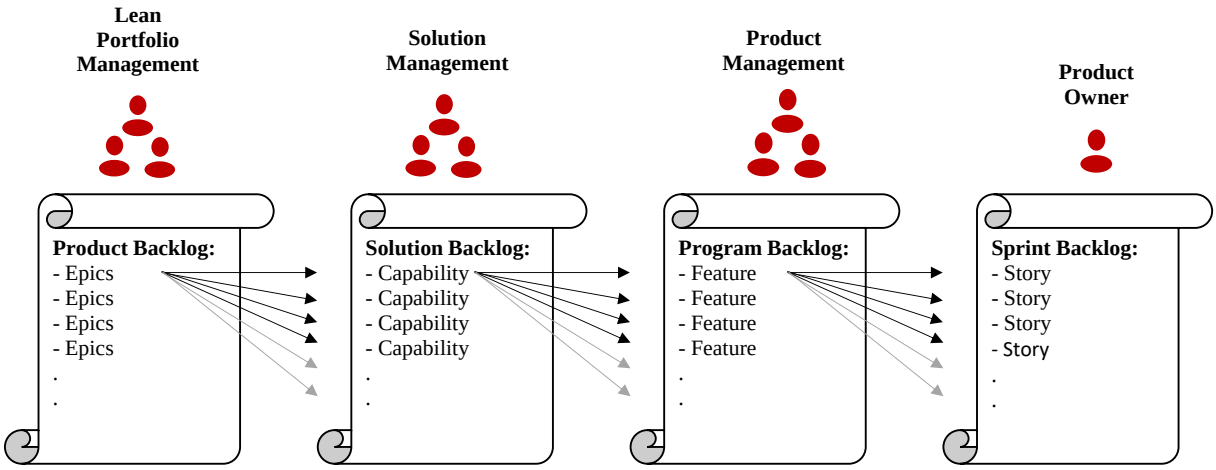


Figure 5: The connection and breakdown between the different SAFe levels.

2.3.5 The foundation of SAFe

The foundation of SAFe contains six elements which are focused on principles, SAFe mind-set and roles. The list can be seen below. (Scaled Agile Framework, n.d.)

Lean-Agile Leaders
Like in many organizations, leaders have a responsibility for the outcome, and in SAFe it is no different. It is essential that the leaders understand, think and operate in a lean-agile way. A lean-agile way implies the understanding and application of both lean and agile principles and

practices. The leaders in SAFe are as teachers, with the purpose to train and guide their employees. (Scaled Agile Framework, n.d.)

Core values
There are four core values in SAFe, which are: alignment, built-in quality, transparency and program execution, where each of those values are important to fulfil. The first core value, namely alignment, indicates that each and every employee, regardless of role and position, are aligned with the same vision and a common mission. Built-in quality implies practices in which ensures every action and component fulfils the quality standard that have been placed. With transparency the focus is to build trust by having an environment where everyone feel that they can share the facts without consequences. The fourth and final value is program execution, which signifies having all employee accepting and believing in the change. (Scaled Agile Framework, n.d.)

Lean-Agile mind-set
It is also important to have the correct mind-set in SAFe about its beliefs and actions, in order to truly think and act in a lean-agile way. This begins with the leaders, which have the responsibility to first learn and then become teachers of the principles and practices that defines SAFe. This mind-set combines lean product development and agile principles and practices. (Scaled Agile Framework, n.d.)

SAFe principles
SAFe consists of nine fundamental principles which embraces the roles and practices of SAFe. These principles are presented below. (Scaled Agile Framework, n.d.)

- Principle 1: Take an economic view.
- Principle 2: Apply system thinking.
- Principle 3: Assume variability; preserve options.
- Principle 4: Build incrementally fast, integrated learning cycles.
- Principle 5: Base milestones on objective evaluation of working systems.
- Principle 6: Visualize and limit WIP, reduce batch sizes, and manage queue lengths.
- Principle 7: Apply cadence, synchronize with cross-domain planning.
- Principle 8: Unlock the intrinsic motivation of knowledge workers.
- Principle 9: Decentralize decision-making.

Implementation Roadmap
For a successful implementation of SAFe there is an implementation roadmap which consists of twelve steps on what necessary changes an organization needs to make. The implementation roadmap is a guideline since not all organizations need to begin their transformation from step one and therefore, needs to be modified and customized in order to be applicable for the organization. Thus, there is often many steps that have already been taken before the actual implementation roadmap in SAFe is initiated. The twelve steps can be seen below: (Scaled Agile Framework, n.d.)

- Step 1: Reaching the Tipping Point.
- Step 2: Train Lean-Agile Change Agents.
- Step 3: Train Executives, Managers, and Leaders.
- Step 4: Create a Lean-Agile Centre of Excellence (LACE).
- Step 5: Identify Value Streams and ARTs.

- Step 6: Create the Implementation Plan.
- Step 7: Prepare for ART Launch.
- Step 8: Train Teams and Launch ARTs.
- Step 9: Coach ART Execution.
- Step 10: Launch More ARTs and Value Streams.
- Step 11: Extend to the Portfolio.
- Step 12: Sustain and Improve.

SPC
SPC are the SAFe Program Consultants, which are SAFe experts who are there to improve the organizations SAFe implementation process by their knowledge and experience within SAFe. (Scaled Agile Framework, n.d.)

2.4 Change management theories

Regardless of industry and size, organizations need to be effective in order to stay competitive. This forces organizations to make significant changes, whether it is to implement total quality management, lean production, cultural changes or SAFe, where the wanted outcome has been the same, to improve and become more competitive.

2.4.1 Lewin's change model

In 1940 Kurt Lewin introduced his model for how organizational changes can be implemented and the model is known today as the "*Unfreeze-change-Refreeze*" model and is, according to Schein (1996), the theoretical foundation on how changes occur. The model is a change process on three stages where the first stage focuses on unfreezing the current ways of working, in order for the organization to become able to change (MindTools, n.d.). During this stage it is important for the organization to understand why there is a need to change and consequently, accept the transformation (MindTools, n.d.). Schein (1996) argued that the people whom are going through a change need to have a feeling of being safe after the change has been implemented, and only then will they discard the old behaviors and be willing to change. By achieving this and understanding that the change is necessary for the company's survival, the employees will accept and become motivated towards the transformation (MindTools, n.d.). This can be done in numerous ways, where one way is to explain different factors for why today's ways of working will not continue to work in the future (MindTools, n.d.). Once this has been achieved, the foundation of the organization needs to be question whether or not they need to change for the coming transformation (MindTools, n.d.). This stage is the most challenging stage in the process since the foundation of the organization is based on the norms, beliefs, attitudes, behaviors and so on within the organization (MindTools, n.d.).

The second stage in the change process is the actual change and it is during this stage that the people begin to change their old ways of acting and behaving to support the transformation (MindTools, n.d.). For some people, this occurs quickly while others need more time and therefore a transformation should never have a specific time indication (MindTools, n.d.). In this stage it is important for the people to have both time to adapt and the ability to communicate freely (MindTools, n.d.). During this stage it is also important to not only communicate the organizational benefits from the transformation, but also how the change will benefit the people in their daily tasks (MindTools, n.d.).

The third and last stage is to refreeze and during the refreeze-stage the organizational changes need to be standardized, meaning that all changes should be embedded into the new culture and be performed naturally (MindTools, n.d.; Burnes, 2004). This is the main point of this stage, making sure the new behavior and mind-set has been implemented and are safe from backsliding into the old ways of working (Burnes, 2004). This is achieved by supporting the people and being present when questions appear regarding how things should be done (MindTools, n.d.).

2.4.2 Kotter's eight steps to transform your organization

Kotter (1995) brought up eight steps as an implementation plan and highlights possible errors that organizations tend to meet during an organizational change. The eight steps are presented below. As can be seen, a lot of Kotter´s eight steps to transform your organization are like Lewin´s change model. However, what Kotter has done is to break down Lewin's model into eight steps from the previous three stages, where step one to four is similar to Lewin's Unfreeze stage, step five and six is similar to the Change stage, and step seven and eight is similar to the Refreeze stage.

Step one - Establishing a Sense of Urgency
Kotter's first and most important step is to create a sense of urgency, in order to motivate the people that changing is the only choice for survival. Kotter emphasized that organizations which are implementing a change are in one of the two scenarios: they are either making good business or the opposite. Regardless of scenarios, organizations have both advantages and disadvantages, where one advantage is the other's disadvantage. In the scenario when everything is already going well the people will be much more difficult to convince, however, in such scenarios the organization will have a lot more resources for implementing the change. When changing the scenario to an organization with bad business, the opposite will occur and the people are much more convinced of the change but now there are far less resources for supporting the organizational change. (Kotter, 1995)

Step two – Forming a Powerful Guiding Coalition
The second step in the process is to form a group who is leading the change forward. This group needs to be powerful in order for the people to listen and this does not have to be in terms of rank, but can also be in terms of connections, reputations and knowledge. According to Kotter (1995), this group can be small during the first years of the transformation, but for larger organizations this group needs to increase in size after the first years. (Kotter, 1995)

Step three – Creating a Vision
The third step is to create a vision in which clarifies where the organization is heading and what they want to achieve. This vision does not necessarily need to be specific, but Kotter (1995) emphasized that it can in fact be somewhat blurry in the beginning and after a few months, become more precise and detailed. Also, during this step the organization need to develop strategies on how the vision shall be reached. (Kotter, 1995)

Step four – Communicating the Vision
The fourth step builds on the previous step, which is to communicate the new vision and its strategies across the entire organization. Kotter (1995) mentioned one example of such which is to focus the weekly newsletter on spreading the new vision. He also emphasized the importance of teaching all employees the new behaviors by examples. (Kotter, 1995)

Step five – Empowering Others to Act on the Vision
The fifth step is focused on encouraging employees to act according to the new vision. This is not only by encouraging new activities, ideas and behaviors but also by changing the old structures and systems in which are obstacles for the new vision and its strategies. All this does yet again not need to occur simultaneously and as soon as possible in the transformation process. However, actions need to be taken in order to show the employees that upper management supports the new vision. (Kotter, 1995)

Step six – Planning for and Creating Short-Term Wins
The sixth step is to make short-term improvements by planning for them and creating them. Kotter (1995) mentioned that the majority of the employees need some kind of results after one to two years of the transformation in order to stay motivated or else they will join the employees who are resisting the organizational change. During this step it is also important to identify and give out rewards to those in which have been a part of the improvements. (Kotter, 1995)

Step seven – Consolidating Improvements and Producing Still More Change
The seventh step is not partially a step but something organizations need to take into considerations and that is to not declare victory too soon. Kotter (1995) specified how many organizations tend to declare victory even though the transformation has not been completed, simply due to a few wins. It is recommended to instead of relaxing and believing that the worst is over, organizations need to hire, promote and educate their employees to benefit the vision and the change. Kotter (1995) also recommends to not stay passive in this state but to answer with more radical changes such as changing old cultural structures and launching new larger projects. (Kotter, 1995)

Step eight – Institutionalizing New Approaches
The eighth and final step is to make sure the changes and new behaviors are embedded into the culture and that they stay there, even after the change executives have retired. That is one of the two factors in which can undo the organizational change that have been implemented, where it dies with the older generation of leaders. The other factor is to not link the new approaches and attitudes with the new accomplishments of the improved performances, which in turn will have the same effect as the previous factor. (Kotter, 1995)

2.4.3 Nadler's and Tushman's change theory

Nadler and Tushman emphasized on the difficulties when implementing organizational changes where they have divided the transition into three states. There is the current state, which is before implementing any changes, and the state which the organization is planning to reach after implementing the new changes, referred to as the future state. Nadler and Tushman also brings up the transition state, which is the state in which the organization will be in when transforming the organization from the current state to the future state. It is within this state that many of the problems arise and therefore, making preparation are important. However, it should be mentioned that Nadler and Tushman believes that the future state is just as critical as the transition state. (Nadler & Tushman, 1997)

Nevertheless, Nadler and Tushman continuous to elaborate upon the transition state and present three typical problems that arise during an organizational transformation. The first mentioned problem is the problem of power, where Nadler and Tushman emphasizes how there is always a political competition of power between certain individuals and groups, and that this behavior intensities during the transition state due to the coming opportunity to gain power. The second

problem is the problem of anxiety which naturally arise when going from something you know to something you do not know. Nadler and Tushman explains how questions arise, such as if the people's competences will be needed or appreciated in the new organization, or if they will even fit or enjoy working in the new organization. Thoughts like these may result in increased stress levels and the feeling of anxiety. These is turn may result in changes of behaviors and how the people perform. The third and final problem is the problem of organizational control. What signifies this problem is the simplicity in losing control of the organization during a transformation due to all new changes. What makes the organization difficult to control, during the transition state, is that most usual ways of managing and arranging do not apply during a transformation and are therefore, not useful and misguiding to use. (Nadler & Tushman, 1997)

Nadler and Tushman continues to elaborate on actions needed when the three problems appears. Before the problem of power starts occurring it is essential for management to plan and manage the upcoming political dynamics. This can be handled in four areas, first is to group a number of people which supports the change and the employees listens to. This step is essential in a transformation since, according to Nadler and Tushman: "*change cannot succeed unless there is a critical mass of support*". This in turn can be achieved by first identifying the relationship of power, which is the key players, followed by convince them to support the change. This can be done primarily by participation, which according to Nadler and Tushman reduces resistance and increases support, and if that does not work by bargaining. There may still be those who cannot be convicted by neither participation nor bargaining, these people need to be either isolated or, in worst case scenario, be removed from the organization due to the necessity of minimizing their negative impact on the transformation. The second way to handle the problem of power is by focusing on the leaders since they already have good influence on the employees. This can be done in five ways: to act and behave in favor of the change, inform and describe the future state, reward individuals which have started to work according to the new ways of working, provide support by resources or removing barriers, and send out signals regarding where the organization is heading. The third area is focused on symbols which are related with the transformation, example of such can be language, social movements and events. The final area focuses on stability and here it is important to prepare the people of the coming steps of the change by, for instance, providing information. It is also important for the manager to be consistent with their information in order to create a sense of stability among the employees. Another action to increase stability is to communicate what will not change during the transformation. (Nadler & Tushman, 1997)

The second problem is the problem of anxiety and this problem, like the problem before, is broken down into four areas. The first area is to make the people dislike the current state and this can be achieved by communicating its flaws and also why it will not be essential in the future. It is also helpful to visualize this from an economic point of view as well as from the customers' perspective. Nadler and Tushman explains how people's anxiety is created from their imagination that the future state will be problematic and that the current state is flawless. This can be dealt with by educating the people and creating a need to transform, however, this may need to be done several times since people may be unable or unwilling to listen the first times. Therefore, repetition of information can be very useful during a transformation when trying to disperse the vision. The second actions area is focused on participation, which can work as a way to motivate people to change. Participation may improve decisions due to the input from a broader perspective, however, it will take more time and is more demanding. Therefore, it may be difficult to know when participation should be used. The third action area concerns rewarding. It is important to reward those who are living up to the new ways of working as both motivation and as an example for the rest of the employees. It is crucial to

change the reward system from the old one to the new one in order to promote and encourage the new behavior. However, other management approached recommends not to give out rewards since it will only increase the external motivation and not internally (Liker & Hoseus, 2008). This means that an employee will not do something out of own desire but solely for its reward. Nevertheless, rewards are not only in money, but can also be in terms of feedback and recognition. The fourth action area is focused on giving the individuals time to change and some may associate the change with a loss since the current state´s culture is a part of them and their daily work. Management can be helpful for these individuals by encouraging them to talk about their feelings and emotions, and eventually they can let go of their psychological attachment to the current situation. (Nadler & Tushman, 1997)

The final mentioned problem is the problem of organizational control and during this problem it is essential for managers to manage the transformation to the same degree as they would with any other project. This problem has been broken down into four action areas. The first area concerns communicating how the future state will look like and this is done by designing as much as possible how the future state will look like and then communicate this throughout the entire organization. It is also important to have a vision and a statement in which it is planned to reach in the future state, while simultaneously avoid major modifications or changes during the transformation. During this problem it is also important to communicate, repeatedly, why to transform by different platform. Nadler and Tushman explains that it is important to not only tell the information but also to sell it and persuade the employees. The next action area focuses on minimizing the poor fit, which means to plan, monitor and predict different flaws that may arise during the transformation due to the obvious reason that many of the old structures may still be present while implementing. The third action area includes using techniques during the transition state that are usually not used during neither the current state nor the future state. These are a transformation manager, transformation resources, transformation structures and a transformation plan. The fourth and final action area is to have feedback to management on how the transformation is going. During the transition state people will be more hesitant to share bad news and therefore, it is important to create a feedback system such as interviews, surveys and focus-groups. (Nadler & Tushman, 1997)

2.5 Previous agile transformation

Organizational changes and transformations entails great difficulties and resistance. There is no exception for an agile transformation and therefore, earlier transformations in this area are interesting to investigate, in order to better understand and meet these challenges. In a survey by Campanelli, Bassi and Parreiras (2017), the difficulty of agile success factor implementation was investigated from 328 valid practitioners' responses. The result from the practitioners varied depending on the amount of work experience and experience within the agile framework. Nevertheless, the most challenging success factors to implement were: training, measurement model, coaching and mentoring, change of mind-set for project managers, and new mind-set and roles (Campanelli, Bassi & Parreiras, 2017). On the contrary, the easiest identified success factors to implement were: management buy-in, technical activities and skills, incentives and motivation to adopt agile methods, knowledge sharing and team involvement (Campanelli, Bassi & Parreiras, 2017).

In a case study at Ericsson the large-scale agile transformation was investigated and evaluated (Paasivaara, Behm, Lassenius & Hallikainen, 2018). From the study, one of the result was four lessons learned, that were formulated from the information and experience during the case study. The four lessons learned are summarized below:

- Lesson 1: "*Consider using an agile mindset and taking an experimental approach to the transformation.*" (Paasivaara, Behm, Lassenius & Hallikainen, 2018)
- Lesson 2: "*Using a stepwise transformation approach is good in complex large-scale settings, where the transformation takes place during an ongoing development effort. Concentrating on one major topic at a time keeps the attention on the most important change topics.*" (Paasivaara, Behm, Lassenius & Hallikainen, 2018)
- Lesson 3: "*In a large-scale complex product any cross-functional team might not be able to work on any item from the product backlog, instead team specialization might be needed.*" (Paasivaara, Behm, Lassenius & Hallikainen, 2018)
- Lesson 4: "*A lack of common agile framework to start with, a lack of common trainings across sites, and a lack of sufficient and unified coaching may lead to a lack of common direction in the agile implementation.*" (Paasivaara, Behm, Lassenius & Hallikainen, 2018)

A literature review by Dikert, Paasivaara and Lassenius (2016) investigated challenges and success factors related to large-scale agile transformations. The review included 52 publications and resulted in a total of eleven categories with a total of 29 success factors (Dikert, Paasivaara & Lassenius, 2016). The categories of success factors and the percentage of occurrence in the publication in brackets were: management support (38), commitment to change (17), leadership (17), choosing and customizing the agile approach (48), piloting (33), training and coaching (36), engaging people (12), communication and transparency (17), mind-set and alignment (40), team autonomy (24) and requirements management (24) (Dikert, Paasivaara & Lassenius, 2016). As a summary, the authors concluded that a large-scale agile transformation is difficult and has to be adopted to the organization, where many success factors are crucial in the process (Dikert, Paasivaara & Lassenius, 2016).

The previously mentioned literature review was investigated and validated through a pilot study by Paasivaara and Lassenius (2016). In this study, the challenges and success factors was evaluated at XP2016 Large-scale agile workshop. From the result, the experienced success factors and importance of success factors were "*Management support*", "*Recognizing the importance of the PO role*", "*Providing training on agile methods*", "*Showing strong commitment to the transformation*" and "*Creating and communicating positive experiences in the beginning*" (Paasivaara & Lassenius, 2016). Further success factors were also mentioned by Agile247 (2017), in which the report mentions the five most important success factors for agile transformation. These factors were "*Internal agile coaches*", "*Executive sponsorship*", "*Consistent process and practices*", "*Implementation of a common tool across team*" and "*Agile consultants or trainers*" (Agile 247, 2017).

From the previous agile transformations, several success factors are common among the authors. The most mentioned success factor has been training, which means to train and educate the people in the agile methods and practices. There has also been a clear need for agile coaches during an agile transformation, to help and support the people and make sure the transformation proceeds in the right direction. In addition, to have management support during an agile transformation has also been frequently mentioned and to understand and adopt the new mind-set in agile, to have an alignment throughout the organization among the people. Furthermore, it is also important to modify the agile approach for the organization, which implies to experiment and pilot the agile approach to fit the new model in the organization. Another important success factor is to have motivated people, who show commitment to the transformation and are engaged to change according to the new ways to work.

In three of the previous agile transformations, two authors have been present in each of them. Even though two authors have been present, the three studies are in different areas and differs significant, where one is at Ericsson, one is a literature review on agile success factors and the last a pilot study to test the success factors from the literature review. The only identified success factor that is similar among the three studies is training. Furthermore, similar success factors can be seen between two studies, but not in all three. Therefore, with that in mind and the fact that they have been identified in different situations, the identified success factors are considered appropriate and reliable in this case study.

3 Method

The research methodology concerning this master's thesis is presented below, which includes the research strategy, research design, quality of research, research method and ethics.

3.1 Research Strategy

A business research strategy constitutes the framework for which the conduction of a master's thesis is based upon. This master's thesis concerns qualitative information and knowledge, which entails a qualitative research. However, a quantitative research method has also been used, which comprises a quantitative research. Depending on the relationship between theory and research, a master's thesis can be deductive or inductive (Bryman & Bell, 2015). A deductive research approach is characterized by identifying theory, and then building up your empirical data to support that theory, while an inductive research approach uses your empirical data to build up theory (Bryman & Bell, 2015). The aim of this master's thesis was both to review existing information and to discover new theory, which implied that both a deductive and inductive approach were used. Hence, the combination of a deductive and inductive approach is characterized by an abductive approach, where the research data is generated and tested in an iterative process (Bryman & Bell, 2015). Therefore, an abductive approach was used for this research study.

3.2 Research Design

A research design explains how data are collected and further analyzed, which is also called a framework for the data collection research process (Bryman & Bell, 2015). The design chosen for this master thesis was based on a case study design, which is characterized by the collection of data from a single organization to obtain in-depth information and knowledge (Bryman & Bell, 2015). Hence, due to the aim and consequently the research questions in this master's thesis, the level of analysis has been conducted on an organizational level. This means that the main unit to measure and analyze is linked to an organization, which can also be regarded as a workplace, and that the research has not focused on certain individuals or groups of people.

3.3 Quality of research

According to Bryman and Bell (2015), there are four quality criteria which are important to consider in a qualitative research study to achieve trustworthiness and these are: credibility, transferability, dependability and confirmability. Credibility was ensured by only using reliable literature sources from Google Scholar, a thoroughly completed interview guide with a pilot test and thoroughly notes were taken during each interview. A total of 24 interviews were conducted with people that were in some way connected to the agile transformation and all of them had a managerial position at Volvo Cars. The criteria transferability and dependability can be difficult to ensure, because the case study was carried out at a closed organization and the findings might only apply at this context. The findings were shown to be aligned with general change management theories and previous agile transformations, which is why the findings can be argued to be generalizable in other contexts. Confirmability was ensured by having frequent meetings with the supervisors at both Chalmers University of Technology and Volvo Cars. This criterion was also achieved by constantly focusing on being objective with the information obtained during the research study and by considering personal values and previous experiences, which might affect the outcome and conclusion. Triangulation was used

by taking general change management theories and previous agile transformation studies into consideration, which aimed to increase the confirmability of the research study.

The quality criteria for quantitative research are reliability, replication and validity (Bryman & Bell, 2015). In a quantitative research, reliability concerns if the results are repeatable. It is therefore important to have a sufficient sample size, where the same results will be obtained if the same method is used again. In this situation, the population was taken from all employees within research and development at Volvo Cars, which almost consists of 8000 employees. From this sample, the self-completion questionnaire received 1405 answers where the distribution of the respondents' departments was evenly distributed between the four major departments within research and development. This signifies a response rate at almost 18 percent of the population that received the self-completion questionnaire. Thus, the sample size and response rate was considered reliable for this research. Replicability entails if the study is well documented, that is the procedures, and can easily be repeated by another researcher. The steps and procedures taken during this research study has therefore been stated. The interview guide and the different questions in the self-completion questionnaire used is placed in the appendix to clearly show the questions asked.

Lastly, the validity of the study is influenced by how careful the different steps have been prepared and performed. Thus, the quantitative preparation was firstly based on previous experiences and opinions, which was partly obtained during the interviews, and later piloted on a number of subjects, to identify the deficiencies. To test if the data was statistically significant, the built-in data analysis tool: "*t-Test: Two-Sample Assuming Equal Variances*" in Microsoft Excel Professional Plus 2013 was used with an alpha value of 0.05. The alpha value is the probability to make a false conclusion that there exists a difference between two data's mean value when there is no actual difference, where 5 percent is a commonly used and recommended alpha value. Thus, if the calculated p-value was less than 0.05, between two samples' mean values, it would signify that the difference is statistically significant.

It is worth considering the respondents' attitude towards the entire agile transformation at Volvo Cars, where the respondents can constitute the more positive or negative people at Volvo Cars. However, due to that the answers have shown to be very varying and spread within the given intervals at each question, the respondents are considered trustworthy to represent the employees at Volvo Cars. During this case study, the success factor 'training' was previously referred to as 'education', but has later been changed to 'training' to avoid misinterpretation of the word. As, 'education' only referred to the three hour introduction course in agile, scrum and SAFe it is more correct to refer to it as 'training' to avoid it being mixed up with actual education at university.

3.4 Research Method

The research methods for this master's thesis were based on literature reviews, semi-structured interviews and a self-completion questionnaire. The underlying motives for these methods were to investigate general change management theories, previous agile transformations studies, the agile framework called SAFe as a whole, and to examine the already ongoing transformation at Volvo Cars. Accordingly, the information obtained was compared with general change management theories and previous agile transformations, to discover opportunities and shortcomings. Suitable approaches were also interesting to investigate at Volvo Cars, to adapt the transformation to its local culture. Consequently, the use of multiple methods aimed to

increase the validity of the study by investigating the results from the respective method and comparing them with one another, which is called triangulation (Bryman & Bell, 2015).

3.5 Ethics

The following chapter presents the ethical principles and the legal considerations, which have been considered during this master's thesis.

3.5.1 Ethical principles

During a business research, four ethical principles should be considered, which: are harm to participant, lack of informed consent, invasion of privacy and deception (Bryman & Bell, 2015). These ethical principles consider human values and hence, take into account how these people should be treated. Bryman and Bell (2015) describe harm to participant as both physical and mental damage, as well as harm to career related issues and future employment. Therefore, during this master's thesis the participants' principles and views was taken into consideration and with respect and this implies that no information was disseminated. This applies both for the semi-structured interviews and the self-completion questionnaire. Lack of informed consent entails if the participants are given enough information about the research to understand the whole purpose of it. The participant may not want to participate if they know the true purpose of the research and where the information will be used and published. Thus, before each interview and within the self-completion questionnaire, the participants were thoroughly informed about the purpose of the research and how their answers would be used, presented and then published. In both methods, the participants were anonymous and had the possibility to participate or not.

Invasion of privacy is simply the degree in which a participant's privacy is invaded. This can be explained as how personal a question is, which depends on a lot on factors, such as culture and age. Different people can interpret invasion of privacy differently and therefore, it is important to prepare for sensitive situations and adapt the questions thereafter. During the semi-structured interviews, the interviewees had the possibility to skip questions in order to not invade their privacy. Since this ethical principle differs between people, the best way to tackle the issue is to give the participants the possibility to skip questions, which was therefore made possible. Although, the participants in self-completion questionnaire did not have the possibility to skip the questions, they did have the possibility to choose to answer the survey or not due to the reason that it was not mandatory.

The last ethical principle is deception, which means presenting the results differently than what it actually is. In order to avoid deception, the results from this research does only include the given material and information achieved from the participants involved. In addition, the results have also been attempted to be presented objectively, in such way not to steer the result in any preferred way.

3.5.2 Ethics and legal considerations

Bryman and Bell (2015) continuous to elaborate on the ethical framework and presents four legal considerations that needs to be considered when performing a research study, which are: data management, copyright, reciprocity and trust, and affiliation and conflicts of interest. The focus on data management considers who owns the data, is responsible for its usage, legal rights for the data subjects and whether the research is allowed to be carried out from a legal

standpoint (Bryman & Bell, 2015). In this case, Volvo Cars owns the data and thus, is responsible for its availability and usage. The data subjects have only been towards Volvo Cars' employees since the research is a case study specifically at Volvo Cars. The data subjects' rights have therefore been taken into considerations in relation to the gathered data so that their rights were not violated. During the research, a new law by the name of GDPR was enforced, which in short does not allow storage of any personal data in which can be traced back to the individuals (Chalmers, 2018). Therefore, the raw data from the self-completion questionnaire were modified in order to not violate this law when the data was handed over to Volvo Cars. Even though Volvo Cars owns the data, the research and its information is also published by Chalmers University of Technology. This occurred after that Volvo Cars approved its content and ensured its content and secrecy.

Copyright considers interviews where the interviewee owns the copyright to the spoken words, while the transcriber owns the copyright of the transcription of the interview (Bryman & Bell, 2015). Reproducing a picture does also fall under the category of copyright and in order to be allowed to use a photo one must get approval from the photographer and the subjects which have been photographed (Bryman & Bell, 2015). In this report, the only reproduced picture is the picture on the cover page which has been approved to use by Volvo Cars. Figure 19 may also fall under this category as it has been adapted and produced based on another picture. The information behind this picture is, however, referenced to the author in the text.

Reciprocity and trust is about striving to have mutual benefits for everyone involved and linked to the data, which are researchers, owners and participants (Bryman & Bell, 2015). This shall be achieved by generating results in which will benefit the participants, Volvo Cars and their employees, in forms of recommendations for future agile implementations. The outcome is also supposed to offer a better understanding about success factors and metrics during the actual transformation process and an evaluation of the ongoing agile transformation progress. This ethical consideration was achieved by sharing the knowledge, which was developed through the research, frequently during different workshops and later a presentation where the entire work was presented.

Affiliation and conflicts of interest regards founding issues, such as having the results and the outcome being influenced by the founders of the study (Bryman & Bell, 2015). In this case the founders are Volvo Cars and one way to avoid their influence was by having regular meetings with the supervisor from Chalmers University of Technology.

4 Result

Below the result from the case study is presented, which includes the semi-structured interviews and the self-completion questionnaire.

4.1 Semi-structured interviews

A total of 24 interviews were conducted with employees internally at Volvo Cars. Out of these people, all had a managerial position within the company and where in some way involved in the agile transformation process. In addition, the age was equally even between 32 and 62 years, where the mean was 45 years. The majority of the interviewees were from the departments Vehicle Software & Electronics (94000) and Vehicle Hardware (93000), where 94000 accounts for 63 percent and 93000 for 17 percent. The two other major departments Vehicle Propulsion Engineering (97000) and Complete Vehicle Engineering (91000) accounts for 8 percent each. The distribution of work experience at Volvo Cars and experience with agile methods for the respondents can be seen below in Table 1 and Table 2.

Work experience at Volvo Cars	
Less than 1 year	16,7%
1 to 10 years	33,3%
11 to 20 years	25,0%
21 or more years	25,0%

Table 1: The interviewees' distribution of work experience at Volvo Cars.

Experience with agile principles	
Less than 1 year	16,7%
1 to 2 years	29,2%
3 to 5 years	20,8%
6 to 10 years	12,5%
11 or more years	20,8%

Table 2: The interviewees' distribution of experience with agile principles.

Two of the questions during the interviews were what the interviewees felt was most beneficial during the transformation and what was most important to keep track of during one. In this case, these can be regarded as success factors, which are beneficial actions during the agile transformation at Volvo Cars. The interviewees had different views and opinions, but there was still a clear pattern, regarding the success factors. In Figure 6 below the votes for each success factor is visualized, showing which success factor that received most votes from the interviews.

Figure 6: A summary of the identified success factors from the interviewees.

During the interviews, the interviewees were asked about how they perceived their employees´ attitude towards the transformation, both when it was first initiated and the current view. 75 percent of the interviewees answered that it has become better, compared to when the transformation was first initiated, and 25 percent answered that the employees attitude were unchanged. Thus, none perceived that the employees' attitude had deteriorated. Out of the interviewees that answered that the employees' attitudes were unchanged, one was from 93000, one was from 97000 and the rest from 94000.

Out of 24 interviewees, only 14 of them measured something during the agile transformation. The most common metric was the amount of trained people and refers to the three-hour course in basic knowledge within agile, scrum and SAFe, which was mentioned by six people. Furthermore, the number of ARTs created was mentioned by three people to investigate the progress of the agile transformation and if the teams were able to implement the new way to deliver. Other mentioned metrics was the well-being of the organization and the employees, team's status, bugs in apps, team's competence, interested employees and employee's perception of the transformation.

However, 20 of the interviewees felt that there was a need to measure something during an agile transformation and the employees' well-being was mentioned by ten of them. This metric was considered very important because the people constitutes a major part in a large organization's transformation. In addition, the need to regularly measure this factor during a transformation was also of high importance, because people's well-being changes frequently during major organizational transformations. The second most frequent metric was the progress of implementation plan, which was mentioned by five interviewees. Two other important metrics, mentioned by four interviewee each, were performance metrics and deliveries. Performance metrics consider simply the organization's capability to efficiently deliver new features and products. Deliveries is the organization's predictability of the actual delivery, which implies if the organization can deliver according to what was initially planned.

Thereafter, to measure quality of the product and lead time was mentioned three times each and the employees' understanding and mind-set and was mentioned two times. A summary of the proposed metrics can be seen in Figure 7 below.

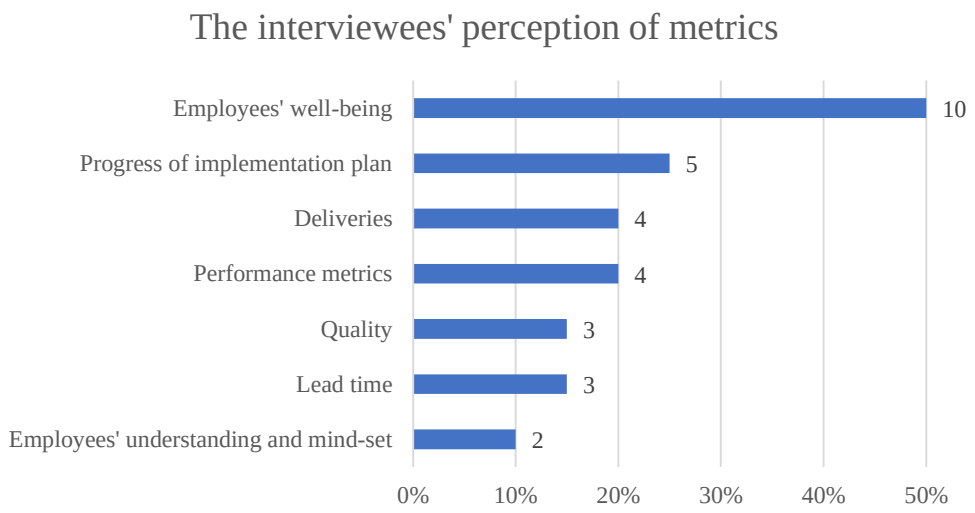


Figure 7: A summary of the mentioned metrics from the interviews.

4.2 Self-completion questionnaire

The self-completion questionnaire was sent out to the majority of the employees at Volvo Cars within Product & Quality, also known as department 90000, and resulted in 1405 answers. The respondents had an average age of 41 years and had worked at Volvo Cars for an average length of 11 years. In Figure 8 below, the distribution of the respondents' position in each department can be seen.

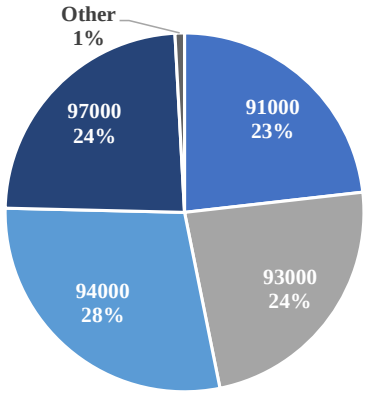
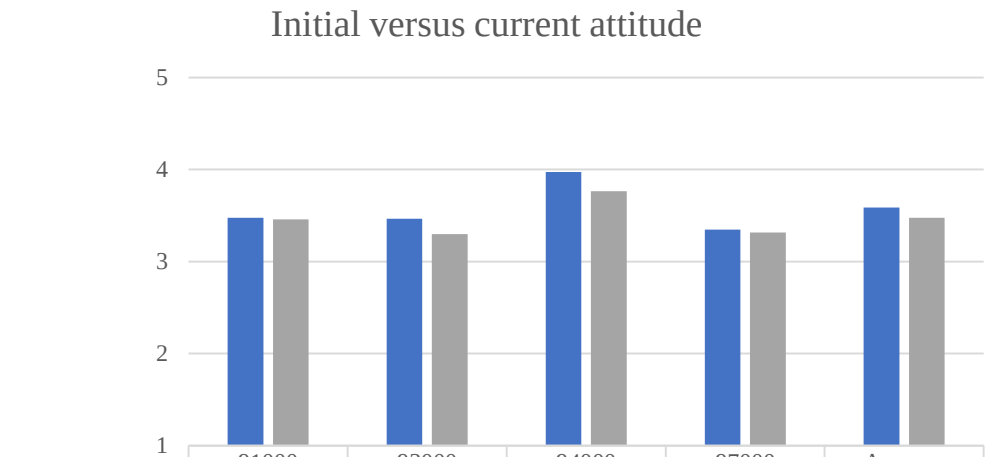


Figure 8: The division between the respondents' department.

From the figure, it can be seen that the respondents are evenly distributed between the major departments at Volvo Cars. In addition, "Other" represent the respondents that entered a department aside from the four major ones. These numbers represent, of all Volvo-employees, 15 percent at department 91000, 31 percent at department 93000, 35 percent at department 94000 and 25 percent at department 97000. Although, even if the distribution of answers is even between the four major departments, the proportion of the entire departments varies as much as between 15 and 35 percent. Furthermore, only 173 respondents had a managerial

position, which equals 12 percent. Thus, the majority of the respondents had not a managerial position, which equals 88 percent of all respondents.

The respondents were asked about their attitude towards the agile transformation, both their initial attitude and their current attitude. The result has been divided with respect to the respective department, because each department are in different stages in the transformation process. In Figure 9 below, the respondents voted between one and five for the initial and current attitude towards the transformation.



	91000	93000	94000	97000	Average
Initial attitude	3,48	3,46	3,97	3,35	3,59
Current attitude	3,46	3,30	3,76	3,32	3,48

Figure 9: The respondents' initial versus current attitude towards the agile transformation.

In fact, the actual values for department 91000 and 97000 are very close, but the current value is slightly lower than the initial, which implies that the attitude towards the transformation has slightly decreased. For department 93000 and 97000 the current attitude has clearly decreased, compared to the initial attitude. Accordingly, the calculated p-values for the initial and current attitudes were 0.005 for department 94000 and 0.007 for the average values and thus, below the alpha value of 0.05 and statistically significant. However, department 93000 p-value was calculated to 0.056 and was therefore very close to the alpha value of 0.05. In this situation, the average value decreased from 3.59 to 3.48 for all departments. The initial and current attitude was unchanged for managers, which was 3.69, but decreased for employees from 3.57 to 3.44. Furthermore, the amount of people that had attended the introduction course in agile, scrum and SAFe were investigated, which resulted as follows, see Figure 10.

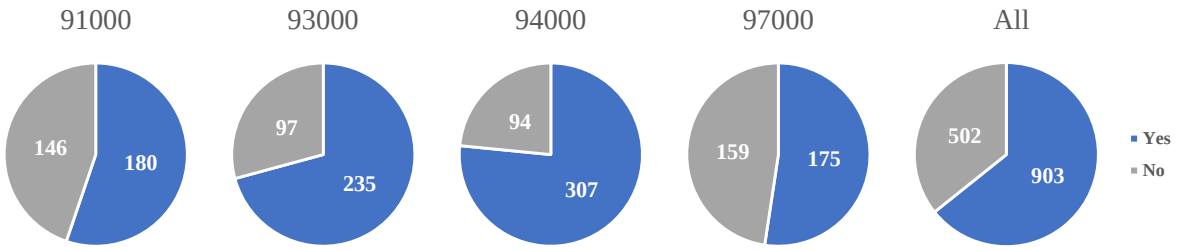
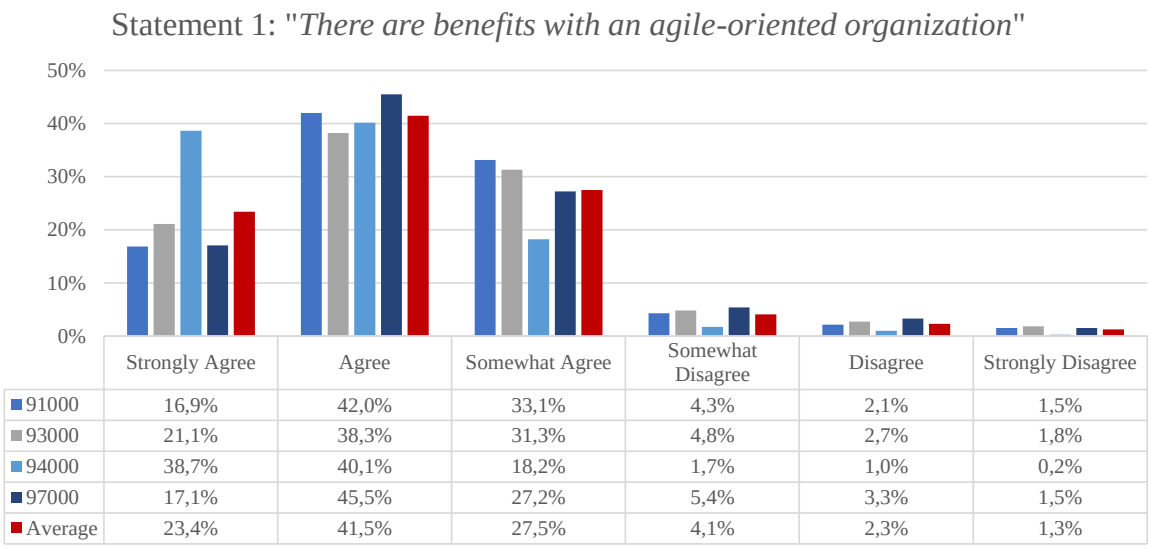


Figure 10: The distribution of trained departments.

It can be seen from the figure that in the departments 93000 and 94000, approximately three quarters of the respondents have attended the introduction course in agile, scrum and SAFe. On

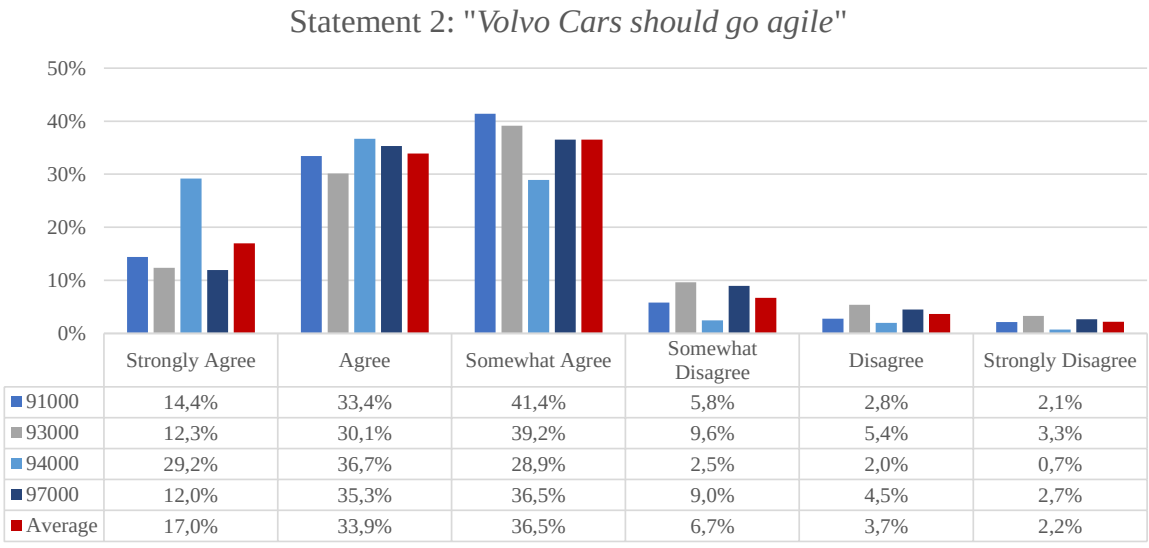
the contrary, only about half of the respondents in the departments 91000 and 97000 have attended the introduction course. Accordingly, just over 63 percent of all the respondents have attended the introduction course at Volvo Cars. It was also shown that 77 percent of the managers had attended the introduction course, while 62 percent of the employees had attended the same course.

Two statements were asked, where the respondents answered if they agreed or disagreed with the statement. Each statement had six different weighted answers between "*Strongly Agree*" and "*Strongly Disagree*". The first statement reads as follows: "*There are benefits with an agile-oriented* organization" and the second: "*Volvo Cars should go* agile". The answers are shown in the two figures below, see Figure 11 and Figure 12.



	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
91000	16,9%	42,0%	33,1%	4,3%	2,1%	1,5%
93000	21,1%	38,3%	31,3%	4,8%	2,7%	1,8%
94000	38,7%	40,1%	18,2%	1,7%	1,0%	0,2%
97000	17,1%	45,5%	27,2%	5,4%	3,3%	1,5%
Average	23,4%	41,5%	27,5%	4,1%	2,3%	1,3%

Figure 11: The respondents' distribution of answers towards statement one.



	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
91000	14,4%	33,4%	41,4%	5,8%	2,8%	2,1%
93000	12,3%	30,1%	39,2%	9,6%	5,4%	3,3%
94000	29,2%	36,7%	28,9%	2,5%	2,0%	0,7%
97000	12,0%	35,3%	36,5%	9,0%	4,5%	2,7%
Average	17,0%	33,9%	36,5%	6,7%	3,7%	2,2%

Figure 12: The respondents' distribution of answers towards statement two.

From Figure 11, it is clear that the respondents are positive towards the statement that there are benefits with an agile-oriented organization. Additionally, department 94000 was most positive towards this statement and the rest were somewhat on similar levels. The second figure, namely

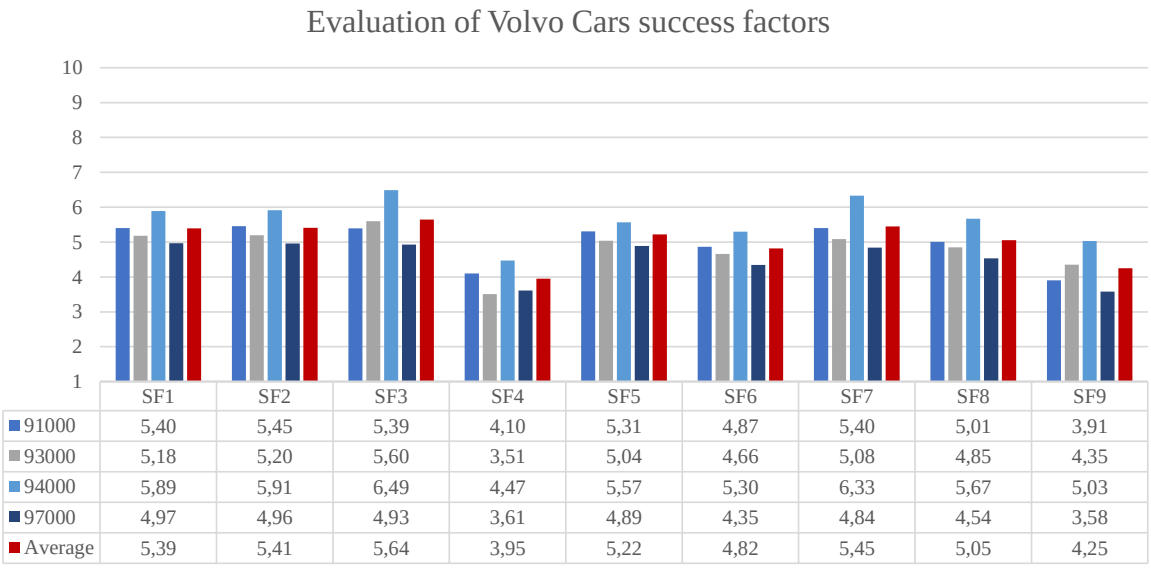
Figure 12, show similar pattern compared to Figure 11, where the respondents are positive towards the statement and that department 94000 was most positive.

Furthermore, the respondents were asked to rank success factors, both from Volvo Cars' perspective and from their own perspective. Below, the result from the ranking can be seen, which includes data from both perspectives in the same chart, see Figure 13. Note that the success factors are arranged according to the highest ranked success factor for the respondents' perspective and that this arrangement does not correspond to the evaluation for Volvo Cars' perspective. The difference in the ranking of success factors between the two different perspectives were proved to be statistically significant for all success factors except for the following ones: support from an agile coach, achieve transparency throughout the organization and management support.

Figure 13: The respondents' difference in the ranking of success factors.

From Figure 13, it can be seen that 'training', 'management support' and 'clearly defined and stated roles and responsibilities' were ranked the highest among the success factors. An interesting result is that the two success factors to 'understand why to transform' and 'make the people interested' were ranked significant higher for Volvo Cars' perspective compared to the respondents' perspective.

The respondents were then asked to evaluate each success factor based on how well Volvo Cars have succeeded with these specific factors for them personally. This evaluation was done with a value between one and ten, where one represents bad and ten represents excellent. In Figure 14 and 15 below, the result from each department is shown and in Table 3 the different success factor is presented with its abbreviation.



	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9
91000	5,40	5,45	5,39	4,10	5,31	4,87	5,40	5,01	3,91
93000	5,18	5,20	5,60	3,51	5,04	4,66	5,08	4,85	4,35
94000	5,89	5,91	6,49	4,47	5,57	5,30	6,33	5,67	5,03
97000	4,97	4,96	4,93	3,61	4,89	4,35	4,84	4,54	3,58
Average	5,39	5,41	5,64	3,95	5,22	4,82	5,45	5,05	4,25

Figure 14: The respondents' evaluation of success factors for each department.

From Figure 14, the evaluation of success factors commutes around the value five, where success factor four (SF4) received the lowest score. Success factor three (SF3) and seven (SF7) received the highest evaluation and were considered most successful for the respondents. It is also possible to see that department 94000 evaluate the success factors slightly higher, compared to the other departments. Department 93000 and 97000 evaluated the success factors lowest, compared to the other departments.

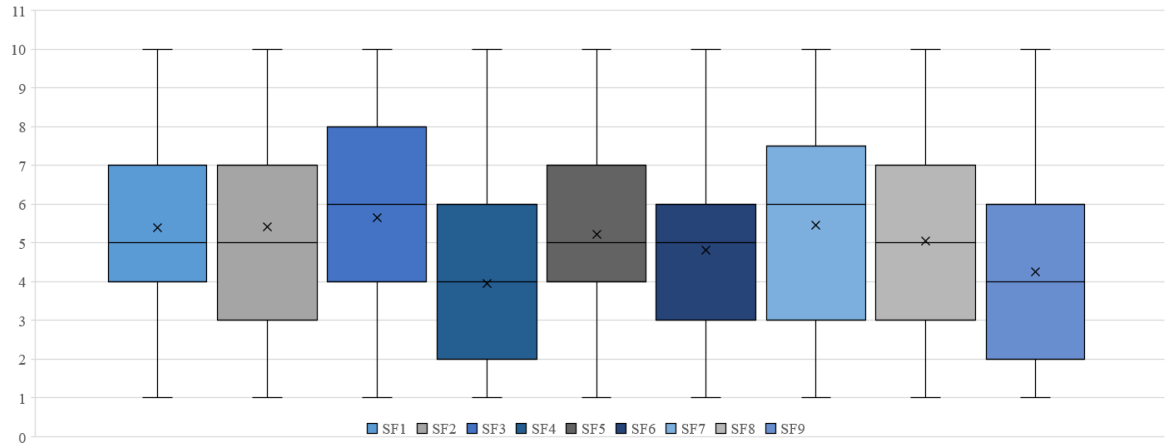


Figure 15: A box-and-whisker plot for the evaluation of success factors.

Figure 15 shows the result in a box-and-whisker plot, in order to visualize how the values are spreading and their centers for each success factors. The box contains 50 percent of the data set, which is the first and third quartile, where the line represents the median value and the cross the mean value. Lastly, the minimum and maximum values are shown with the dashes above and beneath the box.

Success factor abbreviations	
SF1	Management support
SF2	Training
SF3	Possibility to ask questions
SF4	Clearly defined and stated roles and responsibilities
SF5	People's well-being
SF6	Achieve transparency throughout the organization
SF7	Understand why to transform
SF8	Make the people interested
SF9	Support from an agile coach

Table 3: The abbreviations for the success factors.

Lastly, the respondents were asked if they believe that one should measure anything during an agile transformation. Again, the result is shown for each department, see Figure 16 below.

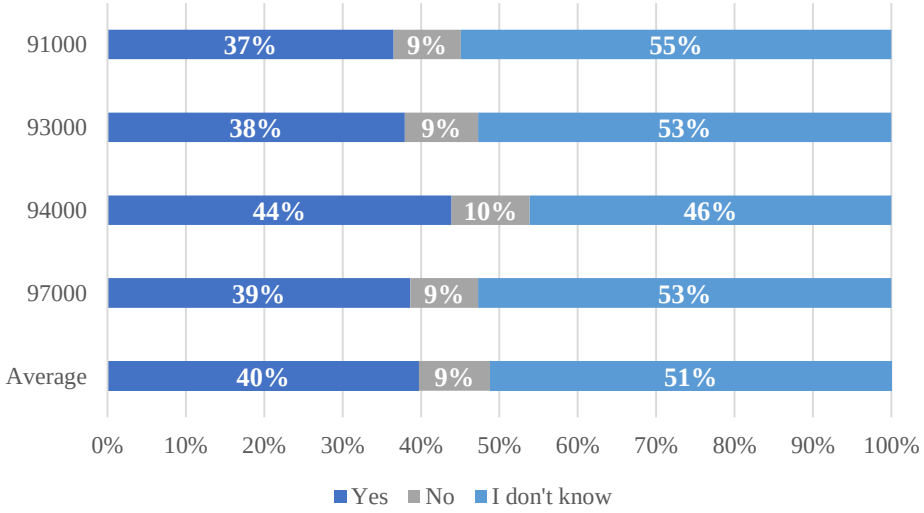


Figure 16: The respondents' distribution of answers towards if one should measure anything.

In Figure 16, the answers between the different departments were similar and the average value for how many of the respondents that thought that one should measure anything during an agile transformation was 40 percent. The respondents that thought that one should measure anything during an agile transformation were asked a follow up question, where they could express themselves freely, to state what they thought should be measured. These metrics have been generated by analyzing and categorizing the 557 answers and grouped according to similar propositions, in order to better understand and grasp the different perceptions. A summarized graph of the metrics can be seen below in Figure 17. Note that the graph has been divided according to the employees', managers' and all's perception and that these percentages are calculated according to the respective respondents.

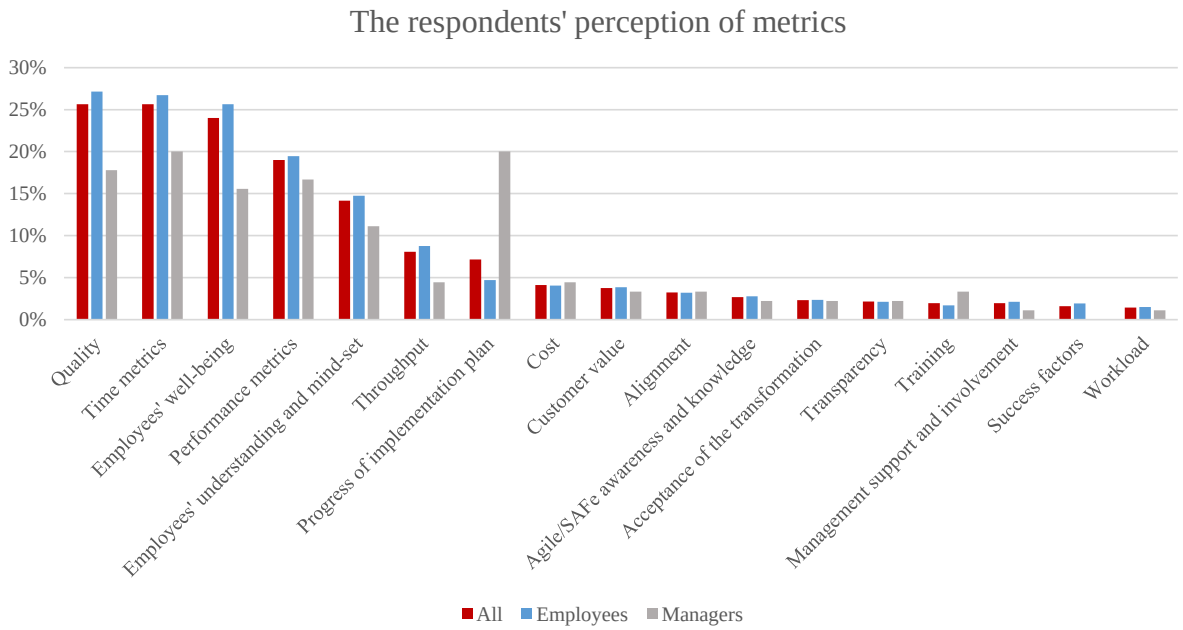


Figure 17: The perception of metrics, as well as divided for employees and managers.

The grouped metrics ended with 17 different metrics, which is seen in Figure 17 above. Several of the metrics are more often mentioned by the respondents and that over ten of the metrics are seldom mentioned. To measure quality, time metrics and employee's well-being are most mentioned by all respondents and more specific, even the employees. When looking at only managers, similar pattern occurs, but time metrics, progress of implementation plan and quality are the top three perceived metrics. An interesting difference is the perception of the metric to measure the progress of implementation plan, which was perceived among the highest for the managers, but not for the employees.

5 Discussion

In the discussion the research questions are answered. This is done by first discussing the information and data obtained at Volvo Cars and then taking change management theories and previous agile transformation information from the theory chapter into consideration to make a general discussion concerning the findings. Additionally, the third research question is an evaluation of Volvo Cars' implementation of agile and SAFe. This implies that the theory of SAFe and the agile principles are used to evaluate Volvo Cars compared to the information and knowledge obtained at Volvo Cars.

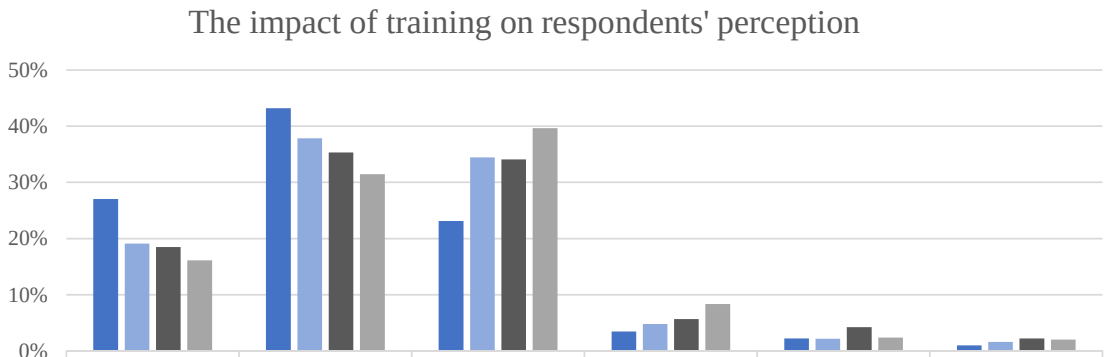
5.1 Answer to research question 1

RQ1: Are there actions that are considered important during an agile transformation and in that case, which ones?

The agile transformation at Volvo Cars utilizes the framework SAFe to scale the agile approach throughout the entire organization. During a transformation several difficulties and challenges are normal to encounter, which implies that beneficial actions are important to know and utilize. In Volvo Cars' situation, these beneficial actions can also be perceived as success factors and from the conducted interviews during this case study, 16 success factors were mentioned. Out of these success factors, nine of them were more frequent mentioned by the interviewees and were used as a foundation in the upcoming self-completion questionnaire. All identified success factors from the interviews can be seen in Figure 6 in the result chapter.

The four most frequent success factors from the interviews were: 'clearly defined and stated roles and responsibilities', 'understand why to transform', 'training' and 'management support'. Similarly, from the self-completion questionnaire the ranking of success factors resulted as quite similar, where 'training', 'management support', and 'clearly defined and stated roles and responsibilities' were in the top. Also, the success factor to understand why to transform was highly evaluated from the respondents' perspective. From Figure 13, it is also interesting to compare if the respondents perceive each success factor as equally important for themselves and for Volvo Cars. It is shown that all, but two, success factors are on similar level. These success factors are: 'understand why to transform' and 'make the people interested', which were higher evaluated for Volvo Cars, then compared to the respondents. As a consequent, the respondents do not evaluate these success factors as high for themselves, as compared for Volvo Cars. This implies that for Volvo Cars, the success factor to understand why to transform is considered more important to succeed with the transformation, than compared to how important the success factor is for the respondents.

Training is especially an important success factor, as it was found that those respondents who had been trained in the subject could better see the benefits of agile and more felt that Volvo cars should go agile. How the respondents' perception changed, with respect to the two statements when trained, can be seen in Figure 18 below. The two statements are expressed as S1 and S2 in the figure, where "Yes" and "No" indicates if the group had attended the training or not at Volvo Cars. The impact of training was found statistically significant for the overall perception between the two statements and for the department 94000.



	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
Yes (S1)	27,0%	43,2%	23,1%	3,4%	2,2%	1,0%
No (S1)	19,1%	37,8%	34,5%	4,8%	2,2%	1,6%
Yes (S2)	18,5%	35,3%	34,1%	5,6%	4,2%	2,2%
No (S2)	16,1%	31,5%	39,6%	8,4%	2,4%	2,0%

Figure 18: Respondents' different perception based on training.

The two statement questions, mentioned in Figure 11 and 12, are highly connected to the success factor to understand why to transform and is therefore dependent on training. When trained, more respondents understood the benefits with agile and did also thought that Volvo Cars should go agile. Therefore, training is one of the most important success factors, because more success factors have a positive impact from it.

From a more general perspective in an organizational transformation, both Lewin and Kotter emphasize on the importance for an organization and its employees to first understand why there is a need to change (Schein, 1996; Kotter, 1995). This is also supported by Nadler and Tushman (1997), who emphasize on the importance to convey the new state and why the organization must go there. Hence, the success factor to understand why to transform was the second most mentioned success factor from the interviews and was ranked high in the survey. Therefore, the success factor to understand why to transform is not only important in an agile transformation but is also important in any organizational transformation. Furthermore, Lewin, Kotter, Nadler and Tushman continue with the focus on employees, where there is a need to make sure they feel good, are motivated and interested, and have support and sufficient knowledge about the new ways. This corresponds to the success factors ‘training’, ‘management support’, ‘possibility to ask questions’, ‘people's well-being’, ‘clearly defined and stated roles and responsibilities’, and ‘make the people interested’. These six success factors received many votes from both the interviews and the survey and are also important in a general organizational transformation. The two remaining success factors, namely ‘support from an agile coach’ and ‘achieve transparency throughout the organization’ can be considered to support the employees to better understand the new ways to work. Thus, all identified success factors, except ‘support from an agile coach’, can be considered relevant and important in a general organizational transformation, which is why they can be considered valid and reliable in an agile transformation as well. Nadler and Tushman does also insists that it is important to talk about what is not going to change, to decrease the amount of anxiety among the employees and to give them enough time to change into the new ways. They do also recommend having constant feedback on how things are going, to make sure the transition is going in the right way and for management to have better control over the situation.

In several previous agile transformations, success factors were identified and investigated. The most frequent success factors were ‘training’, ‘management support’ and ‘support from an agile

coach' from these previous agile transformations. In addition, 'agile mind-set', 'understand why to transform', 'knowledge sharing and involvement', and 'customizing the agile approach' were also frequent success factors. From these previous success factors, it can be concluded that the identified success factors from this case study show similar result, where only the success factor to 'customizing and modifying the agile approach' was not present. There is a clear pattern of success factors from this case study that are in line with general change management theories and previous agile transformations, where 'training' and 'management support' have always been present and important.

5.2 Answer to research question 2

RQ2: Can the progress of an agile transformation be measured and in that case with what metrics?

The outcome from this case study shows that the progress of an agile transformation can be measured, but metrics can be misguiding. Thus, the metrics may give an incorrect view of the situation that does not corresponds to the reality in either a more positive or negative way, depending on how the metrics were produced and when they were measured. Therefore, while discussing what metrics can be measured, a critical evaluation of those metrics will be conducted together with a critical evaluation of metrics in general in the end.

As can be seen in Figure 19, some metrics, such as 'Performance' and 'Productivity', may drastically change as a J-curve due to the transformation (Prime Design Projects, 2017). With that being said, metrics have been divided into three categories, namely 'Input metrics', 'Output metrics' and 'Process metrics'. Input metrics are the metrics which are suitable to measure before the transformation has begun, which is the current state in Figure 19. These metrics may differ from the rest of the metrics due to the fact that they also visualizes how much the organization already have succeeded with implemented the coming transformation´s changes, for instance its core values. This is due to the fact that not all organizations start their transformation from the same starting point. In this case, Volvo Cars has since before implemented lean product development and therefore, already implemented some aspects of the transformation, considering that SAFe partly contains lean principles. Output metrics are the metrics which are more suitable to measure after the transformation, which is during the future state. These metrics visualizes the positive, respectively the negative, results from the transformation. Consequently, the same metrics need to be measured before the transformation in order to see its affects. Process metrics is the last category of metrics and these metrics are suitable to measure during the transformation, also referred to as the transition state, as an indication that the transformation is on the right track and that everything is going smoothly. In this research study, since the focus is on metrics during the transformation and therefore on the process metrics, the input and output metrics have been categories together. This is also something Nadler and Tushman (1997) emphasizes as they suggest that there should be different metrics during a transformation than before and after.

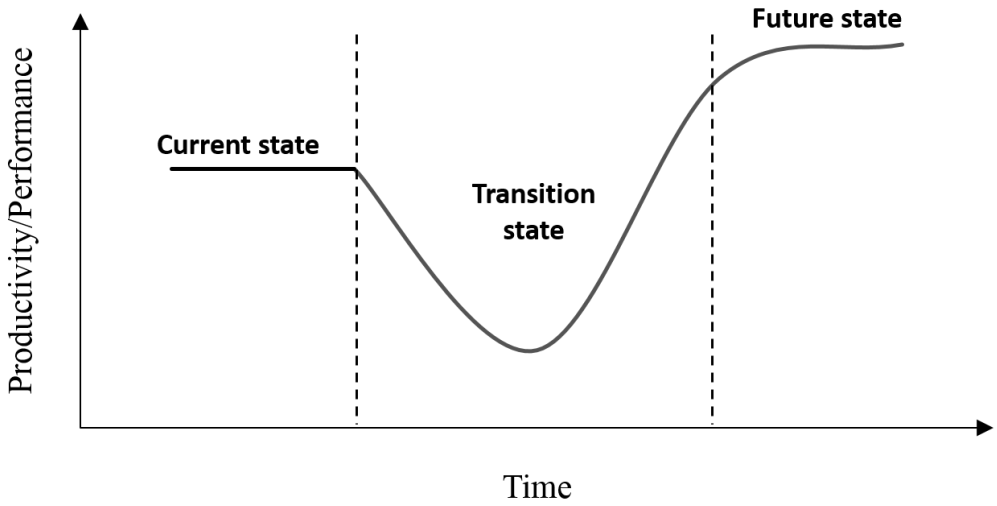


Figure 19: The decrease of productivity/performance during the transition state.

As can be seen in Figure 16, more than half of the respondents either do not know or believe there should not be any metrics during an agile transformation. However, 40 percent, which corresponds to 558 respondents, believe there should be metrics during an agile transformation and have also provided examples of such metrics. These metric, together with the interviewees' perception and the theory chapter, are what the discussion below is based on.

Metrics before and after a transformation

Based on the results from this case study it is clear what the 558 respondents believe should be measured during an agile transformation. However, as mentioned above, some metrics may be misguiding to measure during a transformation and should therefore not be the primarily focus to measure. Nevertheless, these metrics should be measured before and after implementing an organizational change, since it will clearly visualize if and how much the organization has improved compared to before the transformation. Metrics of such have been categorized as input and output metrics. These metrics are 'quality', 'time metrics', 'performance metrics', 'throughput', 'cost', and 'customer value'. These are considered general KPIs that reflects how well an organization is performing. Why these metrics are more suitable to measure before and after the transformation can be seen in figure 19, where the current state and future state represents before and respectively after the transformation.

Quality is a very broad topic and therefore can be measured in several ways. For instance, quality can be measured by measuring the number of returned cars out of 1000, repairs per 1000 cars, quality issues, and the number of faults that has been slipped through and reached the customers. However, quality can also be seen as the quality of work and this can be measured by conducting a survey where you ask employees if their ways of working have improved or not and in this case whether the new agile way of working have improved their quality of work and why. This will indicate one aspect of the result of the transformation as well as reasons behind it, which will be helpful for continuous improvement.

Time metrics have also been brought up several times during the conducted interviews as something an organization should measure. However, similar to quality, time metrics can be defined differently. Metrics that fall under this category can be development time, delivery time, time to market, transformation time, value added time, time for solving an issue, time spent of administration or other related activities, and time for implementing a change. In short, what falls under this category is everything that is measurable and is related to time.

Performance is also a very broad subject and, in most cases, very technical in forms of how flexible or effective the organization is. However, performance is not only technical but can also be how the employees interpret how productive they are in their daily work, which can be measured by conducting a survey. Metrics that fall under the category of throughput are related to the results that the organization is generating, for instance, deliveries and number of releases. This does not have to be organizationally but also on smaller levels, such as teams.

Cost can also be broken down into different metrics in forms of development costs, project costs, PD costs, warranty costs, budget, profitability cost, and transformation costs. In short, everything related to cost and profit. Customer value is the last metric and is a typical metric to evaluate how satisfied the customers are with the produced products. Similarly, to the above-mentioned metric, customer value can be measured in different ways, for instance by measuring the number of complains. The difficulty with measuring customer value is that it is based on their perception which in turn depends on their expectations level (Alänge, 1994). Hence, factors such as quality may increase but still result in lower customer satisfaction due to higher expectations (Alänge, 1994). Therefore, when measuring customer value, it needs to be taken into consideration what expectation the customers may have. The same applies for metrics that are focused on the employees' perception, which is further discussed below.

Metrics during an agile transformation

Not all metrics are misguided during an organizational transformation and some metrics are more suitable to measure during one than before and after. These metrics have also been brought up during the interviews and the self-completion questionnaire, and those are 'employees' well-being', 'employees' understanding and mindset', 'progress of implementation plan', 'alignment', 'Agile/SAFe awareness and knowledge', 'acceptance of the transformation', 'transparency', 'training', 'management support and involvement', 'success factors' and 'workload'. Figure 19 is not applicable to all of these metrics as some are not affected by the transformation, those metrics are 'progress of implementation plan', 'training' and 'Agile/SAFe awareness and knowledge'.

The people's well-being is the most frequent metric from the interviews and one of the third most frequent from the self-completion questionnaire. This can be measured in several ways, such as to measure the amount of sick leave, the number of employees leaving the organization, their stress level and how satisfied they are in their daily work. These metrics may decrease during a transformation, but it is a good metric to keep track of in order to see that the employees' well-being has not decreased far too much. Therefore, it may be misguided to only focus on this metric and say that the employees are feeling worse simply due to the transformation since going through a change is in most cases stressful for individuals, regardless if you accept the change or not. This can be referred to Nadler and Tushman (1997), and Coutu (2002), who emphasizes on the difficulties and anxiety regarding learning new things and changing. Coutu (2002) also highlights that people change due to two reasons, either they want to change or they feel as then have to change to survive, and when they feel forced to change it will create more discomfort and thus, decrease the people´s well-being. Nadler and Tushman (1997) sees two approaches to changing people, either by participation and bargaining or by isolation and removal, where the latter two will most likely decrease the well-beings of the remaining employees and are therefore not desirable.

Employees' attitude and mindset signifies the employees' attitude and mind-set during the transformation. Metrics that fall under this category are 'employees' motivation', 'engagement',

‘involvement’, ‘interest’, ‘commitment’, ‘behavior’ and ‘attitude towards the change’. These metrics are difficult to measure without asking direct questions to the employees about their attitude. Nevertheless, some of the metrics can be measured without direct questions. One example of such is how the employees' interest can be identified by creating an information page where you measure the number of visits per day. However, this metric may be misguiding since one manager can inform their employees far more than another one and thus, indicate lower employee interest. Therefore, when measuring this metric, it becomes crucial to also measure other influencing factors, such as how much their manager inform them. Nevertheless, by measuring similar metrics they will together visualize the progress of how the employees think and act during the transformation and more specifically, their attitude and mind-set. However, enthusiastic managers who constantly inform and sell the new changes can increase the employees’ expectation level, which in turn may result in a more negative attitude the next time this metric is measured, as was mentioned above for ‘customer value’ and emphasized by Alänge (1994). Nevertheless, it should be mentioned that changing how someone think and act is difficult (Couto, 2002). Thus, trying to change this metric may be more difficult than anticipated. Couto (2002) believes that people will only start to change when their learning anxiety, that is being afraid of learning, is lower than their survival anxiety, which is the need to change in order to survive. Therefore, organizations can either increase survival anxiety, by threatening employees with being laid off, or decrease learning anxiety, by making them want to change due to internal motivation (Couto, 2002). Nadler and Tushman (1997) on the other hand, believes in creating a need to transform by creating dissatisfaction with the current state, participation, reward system and provide time for the employees to change.

One of the most mentioned metrics during the interviews is the progress of implementation plan, which is also within the top mentioned metrics from the results of the self-completion questionnaire. Progress of implementation is directly linked to the transformation as it visualizes how far the organizational has come and completed in the transformation. Metrics in this category can be how many teams that have aligned to the new ways of working, number of projects that have changed and the amount of ARTs that have started their PI-planning. Until now, all mentioned metrics have had approximately the same distribution of what to measure regardless if the respondent had a managerial position or not. In this case, and in this case only, there is a significant difference between the distribution of votes of those who have a managerial position and those who do not, se Figure 15. Since the interviews where focused only on respondents with managerial position, it is clear why this metric has received such high frequency from the interviews and therefore, also why it is one of the highest mentioned metrics among the managers from the self-completion questionnaire. This does not come as a surprise since progress of implementation is more a general view from the top on how far the organization has come in implementing SAFe, which is more interesting to know about as a manager than an employee.

Two other metrics, which were generated from the self-completion questionnaire, are Agile/SAFe awareness and knowledge, and training. The two metrics do not have to be linked to each other since an individual can attend a training but not learn. Thus, by measuring the two metrics and getting the result above, the organization will find out how rewarding the training is and whether it needs improvements. It should also be mentioned that Agile/SAFe awareness and knowledge is not only focused on the actual knowledge regarding the framework, but also how much they understand their new roles and responsibilities. This metric signifies how far the organization has come in educating their employees and also their knowledge within the new ways of working and this also makes it reliable to measure during an agile transformation. Measuring the number of employees in which has been educated is important. As was

previously mentioned, the respondents which have been educated within the new framework were also significantly more positive towards if Volvo Cars should go agile, see Figure 18. This has also been mentioned by Nadler and Tushman (1997) as a way to create a need to transform as well as to communicate the new vision.

From the self-completion questionnaire, it was also recommended to measure two of the SAFe core values, mainly alignment and transparency, which can be measured indirectly by researching upon the perspectives and opinions on the different levels of the organization. This has been within the scope of the project as will be further discussed below. These metrics may be misguided to measure during a transformation since implementing a change will take time, and even longer to achieve the different cultural aspects of it. In this case, it is to achieve the four core values of SAFe and having it embedded into the culture. Depending on the previous culture of the organization, for instance if they already have implemented lean mind-set into the culture, it varies how long it takes to change the existing culture. As previously mentioned, Coutu (2002) highlights the difficulties in changing culture and behavior, and by measuring the different characteristics of the people´s mind-set it will be clear how far the organization has come in changing it. In this case, one of the aim with SAFe is to achieve the core values and consequently, change the mind-set of the people.

During an agile transformation, or in general any organizational change, the employees need to be addressed. Nadler and Tushman, Lewin, and Kotter emphasize the importance in communicating why there is a need to change and transform the organization (Schein, 1996; Kotter, 1995; Nadler & Tushman, 1997). By achieving this, the people will be convinced and therefore accept the coming changes. This brings us to the next metric, namely acceptance of the transformation. This metric will indicate the percentage of employees which have accepted the change and started to work by the new ways of working. This metric is directly linked to the transformation and therefore, can be very useful and reliable to measure during one. Nadler and Tushman (1997) believes the primarily reason for why people do not want to change is due to their imagination that the current ways of working is better than the future ways of working. They believe there are two approaches to this issue. Either by convincing them by participation and bargain, or by isolation and removal (Nadler & Tushman, 1997). Nadler and Tushman (1997) also emphasized on the topic as it is important for management to have control over the organization and one way to achieve this is by having a feedback system where the employees can freely speak about their thoughts and feeling and this is turn will also help them to let go of the current state and improve their acceptance of the transformation.

During an agile transformation, or in general any organizational transformation, the employees need support from their manager in order to understand the transformation and the reasons behind it. Therefore, management support and management involvement should be measured during an agile transformation, which have also been brought up during the self-completion questionnaire, as can be seen in Figure 15. What makes this metric reliable during a transformation is that it is solely from the perspective of the employees, regardless if they are in a transformation journey or not, and they should feel as their manager is providing enough support. This metric is linked to several metrics since employees which are getting enough support from their manager are usually more acceptable and positive towards the new changes due to the reason that they have gotten their questions answered and have a better view of the situation. Nadler and Tushman (1997) emphasizes on this topic by explaining how leaders can influence their employees by involvement, support and communication.

In a changing organization, there are different factors which are important to fulfill in order to become successful in the transformation and some can be found in Table 3. Therefore, it is important to measure how much the organization has fulfilled the different success factors, as has been done within this case study.

The last-mentioned metric that was generated from the self-completion questionnaire is workload. Workload can be measured not only during the transformation, but also before and after the transformation to see whether the new changes has improved it or not. This metric may be misguiding since during a transformation, the amount of workload can increase, and in some cases decrease and this makes it not the most reliable metric. Also, Nadler and Tushman (1997) explains how anxiety results in behavior changes which in turn affect how people perform. Therefore, even though the workload has not decreased it may seem so. Nevertheless, experiencing higher workload results in higher stress levels and therefore, decreases the employees' well-being. Thus, the workload of the employees should be measured, even during a transformation due to its connection to the employees' well-being.

Critical evaluation of metrics

Many of the metrics, which are recommended to measure during an agile transformation are subjective, meaning that their results are based on how the individuals perceive and believe. This in turn depends on what state they are in and what expectation they have. For instance, take ‘employees’ attitude and mindset’ as an example. Measuring this the first time can result in expectations on the managers to act. If this does not occur, the employees’ attitude will most likely have become more negative when measuring this metric the second time. Other subjective metrics are ‘people´s well-being’, ‘acceptance of transformation’, ‘management support and involvement’, ‘the success factors’, ‘workload’ and ‘customer value’, which was previously mentioned. In Figure 20, it can be seen how expectation level and fulfillment level affect if a person, customer or employee, is satisfied or not. In the current state the fulfillment level is higher than the expectation level and thus the person is satisfied. However, even though the fulfillment level has increased during the transition state the person is unsatisfied in the future state due to that the expectation level has become higher than the fulfillment level. Therefore, when measuring subjective metrics, it should be taken into considerations what other factors there are behind its result. This also makes it difficult to compare the subjective metrics with the objective metrics since objective metrics are based on data, such as amount of people which have been educated, and therefore, do not share the same influencing factors.

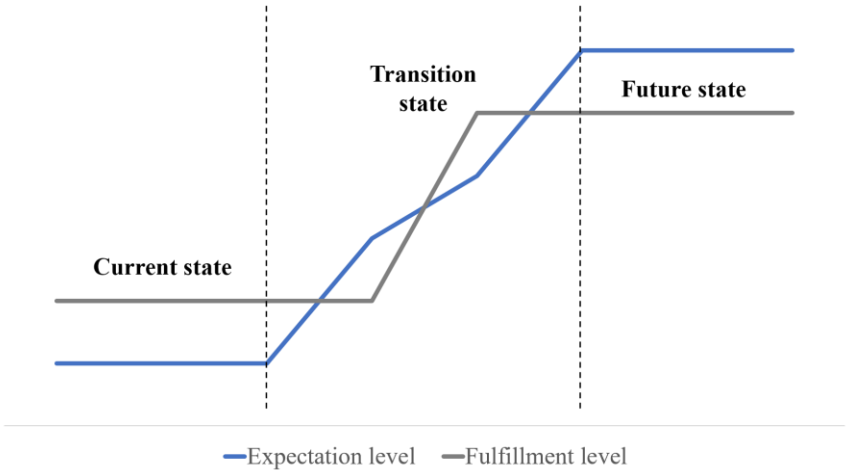


Figure 20: Expectation level´s impact on satisfaction with regards to fulfilment level

Another issue with metrics, which need to be taken into consideration, is the type of metrics. As mentioned above, there are three different categories of metrics, namely input metrics, output metrics and process metrics, where each type is more suitable to measure depending on whether it is before, after or during the transformation. In order to fully understand the meaning behind the metrics' result, the metrics' category need to be identified. For instance, if measuring an output metric during the transformation, its results may be misguiding. A more specific example of an output metrics which may be misguiding to measure during the transformation is performance. Going through a transformation will most likely result in a J-curve for performance, meaning that its result will first decrease and then followed by an increment as can be seen above in Figure 19 (Prime Design Projects, 2017). Therefore, if this metric would be measured during the transformation and if it occurs that its results have decreased, it may be mistakenly to assume that performance has decreased due to the transformation and it will not change unless new actions would be taken.

Applicability for other organizations
There is theory regarding what to measure during a transformation but it has not been found what to measure specifically during an agile transformation. However, the information and the answer to the second research question is still applicable and useful for other organizations which are conducting an agile transformation. However, it is important to understand the context behind the result to know what metrics are applicable for other organizations. To understand this, the organization need to know how the information has been collected during the case study and from where Volvo Cars comes from. Therefore, it is important to know that Volvo Cars was previously owned by Ford for several years and that it may have affected the culture. Volvo Cars had also before the transformation already implemented lean product development which may have simplified the implementation of agile in the organization since SAFe contains lean principles. The answer is also useful for Volvo Cars for future transformation since the answer has been generated based on internal answers from the conducted self-completion questionnaire and the interviews.

5.3 Answer to research question 3

RQ3: How has Volvo Cars succeeded with the implementation of the agile principles and the SAFe framework?

A large organization going through a major transformation is always difficult and the performance has previously in the report shown to decrease, before it has increased. Thus, the evaluation of an organization within the transition of the transformation can be argued to be even more difficult, but it can still be performed to better understand the progress of it. It is therefore important to understand that the evaluation is done in the middle of Volvo Cars' transition and that this must be considered and kept in mind. Henceforth, Volvo Cars' transformation is evaluated with respect to the SAFe core values and the agile principles.

5.3.1 Evaluation of Volvo Cars' implementation of the SAFe core values

Alignment
The core value alignment can briefly be explained as that employees and managers have a common mission with the same goal to help the customers. In Volvo Cars' situation, one way to evaluate alignment is to compare the different perspectives and opinions in each department. From the self-completion questionnaire, there is a clear pattern that department 94000 perceive the transformation more positive. This is especially clear from the initial and current attitude,

the two statements and the evaluation of the success factors. In a way, this is not surprising because the transformation started within department 94000 and hence, have come the farthest. Consequently, the other major departments have not come as far and are not as positive towards the transformation. It can therefore occur a mismatch between the employees, with different perceptions and an uncommon mission.

There is also a difference between employees' and managers' initial and current attitude, where managers' initial and current attitude are higher, compared to the employees' initial and current attitude. The current attitude was valued to 3.44 for employees and 3.69 for managers, on a scale between one and five, which proved to statistically significant with a p-value of 0.005. In addition, the reason for this behavior could be explained by that 77 percent of the managers were educated, while only 62 percent of the employees were educated. Thus, a mismatch between the employees' and managers' attitudes might create an uncommon mission, similar to the effect mentioned above. It is therefore important for Volvo Cars to focus more on the employees, to create a more common attitude towards the transformation.

Another way to evaluate alignment is to investigate the perspective of the vision to transform, which is the success factor to understand why to transform. This can be investigated and evaluated in two ways. The first way is to investigate the respondents' perception of the corresponding success factor, which was ranked among the highest for managers and in sixth place for employees. Though, there is a distinct difference how employees and managers perceive the success factor to understand why to transform. Again, the need to inform and educated the employees are important to create a mutual vision between all employees. The same success factor was evaluated second between the different success factors and Volvo Cars has therefore succeeded relatively well.

The second way is to compare the respondents' different answers on the two statements, which were if there are benefits with an agile-oriented organization and if Volvo Cars should go agile. These two statements can be interpreted as to understand why to transform, because the connection between the benefits with agile is highly connected to if Volvo Cars should transform. Although, when comparing Figure 11 and Figure 12 the values in the respective department have decreased from the positive side towards the negative side. The calculated p-values for this difference were calculated to 0.023, 3.656E-6, 4.995E-5 and 3.315E-4 for the respective department and are therefore statistically significant. This shows that the respondents are not as positive towards that Volvo Cars should go agile, as that there are benefits with an agile-oriented organization. A conclusion from this result could be that Volvo Cars has not conveyed the vision to why there is a need to transform the organization to go agile.

Alignment is also explained as the understanding of the roles the employees and managers play in the transformation. This fact was investigated in the evaluation of success factors, which received the lowest score among the different success factors. One might argue that Volvo Cars lacked to convey this information to its employees. The lack of information and understanding can cause the employees to reject the transformation, due to misunderstanding and frustration.

Built-in quality

Built-in quality can be explained as increased customer satisfaction, frequent and reliable deliveries, manage innovation and to take risks. This core value is difficult to evaluate because no data exists to make any assumptions and because Volvo Cars is within the actual transformation transition. Hence, it is too early to draw any conclusions on this core value. Many of the suggested metrics can be used to ensure built-in quality.

Transparency
This core value can simply be explained as being opened and honest. During the interviews and the survey, one might argue that Volvo Cars has not achieved transparency. This is based on the differences in thoughts and opinions regarding whether the attitude among the employees has improved since it was initiated that Volvo Cars will go agile. Based on the interviews, where the interviewees had managerial positions, the attitude have only improved or remained the same since the initiation of SAFe. When comparing the results from the self-completion questionnaire, which is for most part employees without managerial positions, the attitude amongst the respondents were more negative in all departments since SAFe was initiated. Accordingly, the employees might not have conveyed their actual thoughts and opinions to their managers, which implies that the employees have not been open and honest. There could also be a lack of interests from the managers' side, where the employees might not have been asked.

During an organizational transformation it is important to motivate the employees to be engaged and involved. One way to do this in Volvo Cars' situation has been to present positive work and progress, where the negative work is excluded from the discussions. Hence, this approach is not in aligned with one of the core values of SAFe, but can still be perceived as an advantageous approach to motivate employees. However, the withholding of information from employees can be considered deceptive and the trustworthiness towards the organization from the employees can be questioned.

Program execution
The last core value is explained as an organization that supports the agile and lean principles, where the employees accept and believe in the change. In Volvo Cars' situation, this core value is difficult to evaluate since Volvo Cars is in the middle of the transformation and many of the elements in the value stream has not yet been changed or updated to the new approach. Although, the data obtained during this case study can in some situations be used to evaluate this core value. The first way is how the respondents in the self-completion questionnaire evaluated the success factors, which are used to transform an organization successfully. From Figure 14, the complete evaluation can be seen, and one might argue whether the results are considered good or bad. Although, from the 24 interviews conducted, the initial perception was considered high, where Volvo Cars has performed well on its success factors. When comparing this initial perception with the result on the evaluation of success factors, the result is lower. Thus, evaluation was lower than anticipated, which can be considered as misjudged and the alignment between managers and employees slightly displaced.

Again, the evaluation was conducted in the middle of Volvo Cars' transformation and the slightly lower values might be due to the organization's place in the transformation process. In other words, the low values on the evaluation can be considered normal considered Volvo Cars' situation. Another interesting comparison is the difference between the initial and current attitude among the employees and managers. The current attitude had decreased with four percent, compared to the initial attitude for the employees, where the attitude for the managers were unchanged. One conclusion from this result is that employees does not believe in the change as much as managers do.

The most obvious investigation was the respondents' view on the two statements, where the difference between the two can be explained as how much the respondents do not believe in the change. In Figure 21 below, the two statements are presented in the same graph to show the difference between the answers.

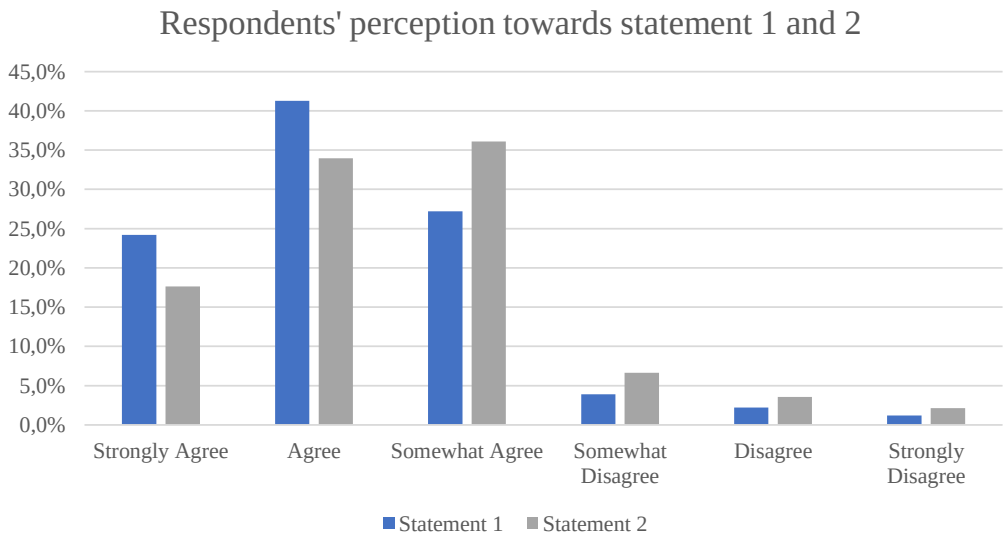


Figure 21: The respondent's different perception towards statement 1 and statement 2.

From Figure 21 it is clear that the respondents are not as positive towards that Volvo Cars should go agile, compared to that there are benefits with an agile-oriented organization. Consequently, there is a lack of trust for the employees towards the transformation and the need for more and better insight to understand the need for Volvo Cars to go agile.

5.3.2 Evaluation of Volvo Cars' preservation of the agile principles

Principle one: In the SAFe framework, customers are considered the most important value, which also is one of the main parts in the lean-agile mindset. The lean-agile mindset combines lean and agile principles and practices, where the value in lean revolves around the customer. Two core values in SAFe, namely alignment and built-in quality does also have its focus towards the customer and to satisfy them. Thus, the first principle is an essential part in SAFe. However, during this case study, the customer was rarely mentioned and present in the interviews, and at the work that was done at the company. It is therefore possible to conclude that the focus on the customer in Volvo Cars' situation may lack what is desirable.

Principle two: The use of a constantly updated backlog in the teams gives the possibility to make changes during the development process. It is therefore possible to state that Volvo Cars' use of the Scrum methodology fulfills this agile principle.

Principle three: The use of iterations between two and four weeks in the developments cycles in the SAFe framework and the Scrum methodology, means that deliveries are frequent. It is therefore one of the major parts in the agile way to develop products. There is a clear use of this approach in Volvo Cars' situation and their approach has short iterations, which deliver frequent.

Principle four: An important part in SAFe is for business owners, developers and customers to come up with successful solutions together. The business owners do not work daily together with the developer, which implies that there could be a miss-match between this agile principle and the SAFe framework. In Volvo Cars' situation, the organization is located too early in the transformation process and there is too little information regarding this to make an evaluation.

Principle five: A scrum team constitutes individuals who work cross-functional and together at a specific location. The team is given the authority to make its own decisions to finish job, which is in align with the principle. This way of working is a part of SAFe and Scrum, and Volvo Cars follows this approach for their scrum teams.

Principle six: Within the Scrum process, daily scrum is conducted every morning to align the team. The team is also placed together, to facilitate the communication directly. It can therefore be concluded that Volvo Cars complete this principle and the approach can also be found in the SAFe framework.

Principle seven: The primary metric in SAFe is considered to be working solutions, which is in align with the agile principle. Because Volvo Cars has not completed the transformation there is too little information to evaluate the principle.

Principle eight: Once again, because Volvo Cars has not completed their transformation, it is too early to evaluate if the principle is fulfilled. It is not possible to see the connection in the framework SAFe, where it is only stated that the development should be in the shortest sustainable way.

Principle nine: One of the core values in SAFe is built-in quality, which aims to maintain and ensure quality in every step in the development process. This principle is therefore a part in SAFe, but it is not possible to evaluate if Volvo Cars has fulfilled this principle. The reason for this is because no data has been collected to evaluate this principle.

Principle ten: In SAFe the responsibility is flattened down to the lower part in the organization. This change makes it easier for the teams to make decisions and to get answers. Principle ten is therefore a part in SAFe and Volvo Cars has also made this change in their organization.

Principle eleven: The core in SAFe is its cross-functional, self-organizing and self-managing teams that develop and deliver. Hence, the use of SAFe and the Scrum method means to embrace the value in these kinds of teams. Therefore, Volvo Cars embrace this principle, which means that they believe in the power of these kinds of teams.

Principle twelve: In the end of each iteration, the team reflects and identifies items in the backlog and how the work has proceeded and can be improved. Thus, the principle is a normal part in the work and therefore, a part in both SAFe and in Volvo Cars' process.

From the evaluation of the agile principles with respect to the framework SAFe and Volvo Cars, it can concluded that ten out of twelve principles are part of SAFe. For Volvo Cars' situation around half of the principles are clearly present and fulfilled. The underlying reason for that Volvo Cars has not fulfilled more agile principles is that it is too early to evaluate if they have fulfilled them or not. It is important to understand that the fulfilment of some of the agile principles are linked to the organization's history, where some of them are already implemented and therefore fulfilled.

6 Conclusion

The following chapter presents the summary of the findings for each research questions. The evaluation of Volvo Cars' transformation has resulted in several recommendations for their upcoming transformation and different aspects to focus more on to be successful.

6.1 Summary of findings

Summary on research question 1

RQ1: Are there actions that are considered important during an agile transformation and in that case, which ones?

This case study at Volvo Cars' agile transformation has identified 16 success factors and out of these success factors, nine received more votes and are considered more appropriate for an organization. Ranking of success factors have shown to depend on several factors, such as if the respondent has a managerial position or if the respondent has been trained within the agile approach. However, the success factor 'training' has been considered the most important success factor by both employees and managers. 'Training' was shown to have a positive effect on other success factors, where the quantitative data was statistically significant. Thus, the respondents who were trained in a three-hour course within the agile approach could better see the benefits with agile and more felt that Volvo Cars should go agile. From the self-completion questionnaire, the success factors 'management support' and 'clearly defined and stated roles and responsibilities' did also receive the highest ranking from the respondents. However, the benefits of success factors during an agile transformation can differ for the organization or for the people in the organization. From this case study, two questions were asked where the respondents ranked the success factors from their perspective and from Volvo Cars' perspective. Many of the success factors received similar rankings, but the success factors to 'understand why to transform' and 'make the people interested' received a higher ranking in the survey for Volvo Cars' perspective compared to the individual's perspective. Therefore, a success factors can be more beneficial for either the organization or for its people during an agile transformation. Thus, the benefit of success factors vary depending on perspective, which was also the case in this situation.

If the identified and ranked success factors from this case study are compared to general change theories and previous agile transformations, the result is similar. From a general perspective, all identified success factors have been mentioned and considered important. The success factors to 'understand why to transform' has been mentioned in all theories and considered crucial in an organization's transformation. From previous agile transformations, the success factors 'training', 'management support' and 'support from an agile coach' have shown to be most important. This research support that the four success factors: 'understand why to transform', 'training', 'management support' and 'support from an agile coach' are the four most important success factors for an organization's transformation. The other identified success factors from this case study, namely 'clearly defined and stated roles and responsibilities', 'possibility to ask questions', 'people's well-being', 'achieve transparency throughout the organization' and 'make the people interested' are also important in an organization's transformation.

Summary on research question 2

RQ2: Can the progress of an agile transformation be measured and in that case with what metrics?

There are a lot of different metrics an organization can measure. However, it varies when the metrics are suitable to measure in order for its results not to be misguiding. In order to visualize the effects of the transformation, it is important to measure before starting the transformation and also after the transformation. Metrics that are appropriate for this comparison are 'quality', 'time metrics', 'performance', 'throughput', and 'cost', all of which are objective, meaning that they are based on data which is not affected by people's perception. 'Customer value' does also fall under the category to measure before and after the transformation, as it visualizes how satisfied the customers have become. Nevertheless, this metric is subjective and therefore can fluctuate depending on factors such as customers' expectations.

Appropriate metrics to use during the transformation are more focused on the progress of the transformation and the employees, where the metrics that are focused on the progress are objective, while the metrics that are focused on the employees are subjective. Subjective metrics signifies metrics that have influencing factors, which in turn affects the result, for instance expectation, belief and perception. Metrics that fall under the category of transformation metrics are: 'people's well-being', 'employees' attitude and mindset', 'progress of implementation plan', 'Agile/SAFe awareness and knowledge', 'training', 'SAFe core values', 'acceptance of the transformation', 'management support and involvement', and 'workload'. Even though there are both objective and subjective metrics to measure during a transformation, their results should not be compared with each other without the knowledge whether the metrics are subjective or objective. The reason behind this is that subjective metrics are affected by expectation levels while objective metrics are not.

Many of these transformation metrics are misguiding to measure during the transformation, depending on what category the metrics falls under and whether it is a subjective or an objective metric. Nevertheless, it is still recommended to measure the metrics but with that knowledge in mind in order to avoid misunderstanding the results. As was mentioned in the discussion above, the answer and its information is applicable for other organizations. However, organizations need to take into considerations what context is behind the answer in order to understand what aspects can be applied to their agile transformation.

Summary on research question 3

RQ3: How has Volvo Cars succeeded with the implementation of the agile principles and the SAFe framework?

The evaluation of Volvo Cars has been done with the use of the four core values in SAFe, namely alignment, built-in quality, transparency and program execution. All four core values have been difficult to certainly evaluate due to Volvo Cars being in the actual transformation process and much are going on and changing at the moment. However, many connections and assumptions can be made from the collected information regarding these core values. There is a clear pattern that managers are more positive and believe in the transformation more compared to the other employees. This assumption was based on that managers expressed a more positive attitude towards the transformation, managers ranked the vision to transform higher than employees and that managers thought that much have become better, while it did not. For employees the attitude has become more negative to the transformation, which could be explained by the lack of information regarding the new roles and responsibilities, or that the employees feel anxiety about sharing their thoughts. It could also be explained by that managers

have not found out the employees' attitude towards the transformation. This specific success factor, namely clearly defined and stated roles and responsibilities was ranked the lowest among the success factors.

There was also a clear pattern that the software-based department 94000 was more positive overall towards the transformation, compared to the other three hardware-based departments, but this could be explained by that they have come the furthest in the transformation. Not as many respondents thought that Volvo Cars should go agile, as that there are benefits with an agile-oriented organization. This shows that there are respondents that do not think that Volvo Cars needs to transform, which can be explained as a lack of trust towards the transformation and the need to clearly express why to transform from Volvo Cars' side. It was also shown that managers did not have the same understanding on the employees' feelings and perception about the transformation. Another aspect was that Volvo Cars was not open about the progress of the transformation, since they focused a lot on the positive things instead of everything. Thus, Volvo Cars has still work to do to better fulfill the core values in SAFe, where there is a lack of alignment, transparency and execution in the program.

From the evaluation of the agile principle with respect to SAFe and Volvo Cars, ten agile principles were clearly present and an important part in SAFe. There were difficulties to evaluate the presence of agile principles for Volvo Cars, because of the situation and the fact that Volvo Cars is in the actual transformation. However, more than half of the agile principles can be seen in the organization and their approach towards agile. The rest of the agile principles are too early to evaluate if applied or will be applied in the organization after the transformation. During the interviews in this case study the customers were rarely mentioned and many of the discussions excluded customer satisfaction. This could be seen as a major issue, since customer satisfaction is the most important aspect for an organization, and Volvo Cars might have an incorrect focus in their transformation process. If this is true, Volvo Cars must work more closely with their customers and include them more in the transformation.

6.2 Recommendations towards Volvo Cars' transformation

From this case study, six recommendations have been formulated for Volvo Cars' agile transformation. These recommendations are stated below.

1. The success factor 'clearly defined and stated roles and responsibilities' received most votes from the interviews and was ranked among the highest from the survey. However, this success factor received the lowest fulfillment by the respondents in the survey and it is therefore important to put time and effort into this to better succeed with this success factor.

2. Due to the positive impact from 'training', it is highly recommended to as fast as possible train all employees in agile, scrum and SAFe, regardless of position, to make the employees and managers see and understand the benefits with agile and to support and accept the agile transformation. Thus, to train employees and managers simultaneously aims to align the organization.

3. Many of the metrics identified from this case study at Volvo Cars constitutes employees' perception. The employees have also proven to perceive the value of the agile transformation lower, than compared to managers, and it is therefore important to measure their well-being, attitude, mindset, awareness and understanding, and

acceptance to ensure their support and commitment. This is supposed to better understand the employees' situation, to better respond to their needs, from the organization's perspective. By measuring the employees and managers the degree of alignment and transparency between them will become clear.

4. The core values in SAFe are important to fulfill for an organization. Two of the core values, namely alignment and transparency, lack clear fulfillment. Therefore, it is important for Volvo Cars to mediate both the positive and negative aspects of the transformation, to appear more trustworthy for the employees. In addition, alignment must also receive more focus and energy, in terms of having a common vision and opinion between employees and managers, as well as between the major departments.

5. Focus and put more energy on the departments that perceive the agile transformation the most negative, which are the hardware-based departments 93000 and 97000. This is especially important to align the organization and have a common vision towards where the organization is heading.

6. The primary purpose with the agile transformation is to better satisfy the customers. Therefore, Volvo Cars must not forget the customers in their agile transformation and it is important that Volvo Cars involves the customers as much as possible.

6.3 Future research

This master's thesis has identified appropriate success factors and metrics during an agile transformation. In the literature study there were no suggestion on what metrics to measure during an agile transformation, which is why the focus on metrics are considered most important for future research. Therefore, a future research on how to practically measure the identified metrics from this master's thesis is recommended.

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Appendices

A: Interview guide

Introduction
We are two master students from Chalmers University of Technology who are doing our master's thesis at Volvo Cars within SAFe. The intention with this work is to research and investigate the agile framework and the agile transformation, which is currently occurring at the company. The outcome from our work aims to facilitate the agile work and to better understand what works well and what works less well during an agile transformation. From this interview, we hope to gain more knowledge and better insight into the agile transformation.

Before starting, we would like to ensure you that you will be anonymous during this work. During this interview, you will have the possibility to skip certain questions, if you do not want to answer them or cannot answer them. You are also permitted to stop the interview, to ask for clarification or change the pace of the interview.

We would like to ask you if you approve that one of us takes notes during this interview and after the interview, you will have the opportunity to review these notes taken, to add, remove or change the answers?

Are you ready to start?

Name: xxx

Date: 2018-XX-XX

Warm-up questions

Question 1: How old are you?

Question 2: What is your role in the company?

Question 3: Which department do you work in?

Question 4: How long have you worked for Volvo Cars?

Question 5: Have you worked within agile?

Question 5A: How long have you worked within agile?

Question 5B: What does it means for you to work agile?

Interview questions

Question 6: What were the first steps in the agile transformation?

Question 7: Which steps / actions have been most beneficial during the transformation?

Question 8: What have been the greatest challenges during the transformation until now?

Question 9: How did you handle the difficulties you encountered?

Question 10: What could have been done better in the transformation?

Question 11: What do you think will be most difficult onward?

Question 12: How would you describe the attitude among the colleagues regarding the agile transformation when it was initiated?

Question 13: Has the colleagues attitude changed?

Question 14: Do you measure any factors/metrics during the agile transformation?

Question 15: Which factors do you consider one should measure during a transformation?

Question 16: What will you do differently during your upcoming transformation?

Question 17: What is most important to keep track of during a transformation?

Question 18: What do you think is valuable to identify/find, which is valuable for you?

B: Self-completion questionnaire

This survey aims to investigate the agile transformation and what is considered important during one.

Question 1: How old are you?

Question 2: How many years have you been working at Volvo Cars?

Question 3: Which department do you work in (e.g. 94753)?

Question 4: Do you have a managerial position?

Question 5: What was your INITIAL attitude towards the agile transformation?

Question 6: What is your CURRENT attitude towards the agile transformation?

Question 7: Have you attended the "Basics in Agile, Scrum and SAFe" 3h introduction course?

Question 8: Do you agree or disagree with the following statement: "There are benefits with an agile-oriented organization".

- Strongly Agree
- Agree
- Somewhat Agree
- Somewhat disagree
- Disagree
- Strongly Disagree

Question 9: Do you agree or disagree with the following statement: "Volvo Cars should go agile".

- Strongly Agree
- Agree
- Somewhat Agree
- Somewhat disagree
- Disagree
- Strongly Disagree

Question 10: How do you motivate your answer in questions 8 and 9?

Question 11: Rank the following factors based on their benefits for an agile-oriented organization, where 1 is the most beneficial.

- Deliver faster
- Better quality
- More flexible
- Better workflow
- Continuous integration
- Transparency throughout the organization
- Increased customer value
- Team-based competence instead of individual-based

Question 12: Rank the following factor based on their importance for VOLVO CARS during the agile transformation, where 1 is the most important.

- Management support
- Education
- Possibility to ask questions
- Clearly defined and stated roles and responsibilities
- People’s well-being
- Achieve transparency throughout the organization
- Understand why to transform
- Make the people interested
- Support from an agile coach

Question 13: Rank the following factor based on their importance for YOU during the agile transformation, where 1 is the most important.

- Management support
- Education
- Possibility to ask questions
- Clearly defined and stated roles and responsibilities
- People’s well-being
- Achieve transparency throughout the organization
- Understand why to transform
- Make the people interested
- Support from an agile coach

Question 14: How has Volvo Cars succeeded with "Management support" for you?

Question 15: How has Volvo Cars succeeded with "Education" for you?

Question 16: How has Volvo Cars succeeded with "Possibility to ask questions" for you?

Question 17: How has Volvo Cars succeeded with "Clearly defined and stated roles and responsibilities" for you?

Question 18: How has Volvo Cars succeeded with "People's well-being" for you?

Question 19: How has Volvo Cars succeeded with "Achieve transparency throughout the organization" for you?

Question 20: How has Volvo Cars succeeded with "Understand why to transform" for you?

Question 21: How has Volvo Cars succeeded with "Make the people interested" for you?

Question 22: How has Volvo Cars succeeded with "Support from an agile coach" for you?

Question 23: Do you think one should measure anything during an agile transformation?

Question 24: What do you believe should be measured?