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Understanding Factors that Influence On-Time Delivery: A Case Study at Volvo GTT

Master's thesis in Quality and Operations Management

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Abstract

In large organizations applying agile methods or frameworks, delays in delivery remain a recurring issue despite structured approaches. To better understand this challenge, this study investigates factors influencing on-time delivery, and how these factors relate to each other. To address this, a qualitative case study was conducted within a department at Volvo Group Trucks Technology (GTT), which applies the Scaled Agile Framework (SAFe). The collection of data was through semi-structured interviews, observations, and informal conversations. The study points to 28 factors that influence on-time delivery, categorized into four themes: organizational prerequisites, team prerequisites, communication and information sharing, and project prerequisites. Nineteen of these factors are supported by literature, such as defining work, dependencies, and team size. Nine are based on empirical findings not emphasized in the literature, including side tasks and information flow, and three were found in the literature but not in the empirical findings, for example personal characteristics. Furthermore, a visualization has been created to illustrate how the factors are related, based on the empirical findings. This aims to contribute to a holistic understanding of factors influencing on-time delivery through four main areas: dependencies, planning, side tasks, and execution of work. However, the study focuses solely on time as a success criterion, meaning that other key dimensions, such as cost and quality, fall outside this scope.

Keywords: Large-scale agile, SAFe, Success factors, On-time delivery, Agile projects, Agile project success.

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List of Acronyms

Below is the list of acronyms that have been used throughout this thesis listed in alphabetical order:

ART	Agile Release Train
IP	Innovation and Planning
PI	Program Increment
PM	Product Manager
PO	Product Owner
RTE	Release Train Engineer
SAFe	Scaled Agile Framework
ScM	Scrum Master
SF	Success Factor
EF	Empirical Factor

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1

Introduction

In today's fast-paced business environment, being competitive means being able to meet customers' needs and ensure their satisfaction (Atlassian, n.d.). This requires businesses to be more flexible and adaptable. As a result agile methodologies have become increasingly popular. However, agile methodologies was initially developed with small autonomous teams in mind (Kalenda et al., 2018). Consequently, scaling agile methods in large organizations with multiple teams brings challenges, such as interdependencies and coordination complexity. To address these challenges, large organizations often use structured frameworks to scale agile principles and practices effectively.

Although agile frameworks aim to bring order to large-scale agile projects, their implementation does not automatically guarantee successful results. This means that even in structured agile environments there are challenges, especially when it comes to delivering work on time (Chow & Cao, 2008). For maintaining stakeholder trust, meeting business objectives, reducing costs, and ensuring customer satisfaction, this aspect of on-time delivery is important (Kula et al., 2021).

One example of where this challenge related to on-time delivery is expressed, is within a department at Volvo Group Trucks Technology (GTT). Despite their use of an agile framework, namely Scale Agile Framework (SAFe) to structure and coordinate work across multiple teams, delivery delays are perceived as a recurring problem that they do not completely understand. As explained by one interviewee: *"For some reason, we continuously over commit. We plan more than we manage to deliver. We have tried to understand this, but have not been able to find out what is causing it"* (Interview 12). This statement highlights the uncertainty around what affects the ability to deliver work on time, underlining the importance of gaining a deeper understanding of the factors involved.

This study therefore aims to increase the understanding about factors that influence the ability to deliver work on time within a SAFe-based context at Volvo GTT. Understanding what facilitates or hinders on-time delivery is important. If these challenges are not addressed, the organization risks suffering from inefficiencies, reduced stakeholder satisfaction, increased delivery costs, and delayed time-to-market, which can ultimately weaken their competitiveness in a rapidly changing world.

1.1 Purpose

The purpose of this study is to increase the understanding about factors that influence on-time delivery. By increasing this understanding, Volvo GTT can begin address the factors that both enable and hinder on-time delivery, and thus reduce the risk of future delays.

1.2 Research Questions

The following research questions will be examined and answered:

RQ1: Which factors influence on-time delivery of work?

RQ2: How are these factors related?

1.3 Delimitations

This study will be delimited to one department of Volvo GTT, in Sweden. In addition, the study will be conducted internally and no external parts or processes will be analyzed. Further, due to time constraints, it will not be possible to interview everyone within the cross-functional department. Instead, interviews will be conducted with people who have extensive knowledge of the workflow to ensure relevant and valuable information.

1.4 Disposition of Thesis

The outline of the thesis is structured as follows. The introduction (Chapter 1) provides the reader with the purpose of the study, its research questions, and delimitations. Chapter 2 (Theory) introduces relevant theory to give the reader insights into the topic. The methodology (Chapter 3) is presented to give an understanding of how the study was conducted. Chapter 4 (Result) gives the reader insights into the empirical findings of the study. The discussion (Chapter 5) will compare the empirical findings with the literature and visualize how the empirical factors are related. Finally, Chapter 6 (Conclusion) will summarize the answers to the research questions, and present both limitations and future research.

2

Theory

In this chapter, relevant theory is presented and the following three sections will be addressed. Firstly, a brief introduction to agile methodologies. Secondly, a description of Scaled Agile Framework (SAFe). Finally, previous literature on success factors in agile projects.

2.1 Introduction to Agile

Abbas et al. (2008) describe that the meaning of the word agile varies in practice, but the understanding of an agile method can be described as: adaptive, iterative and incremental, and people oriented. It means that the approach embraces change to manage unpredictability, works and develops in iterations to improve functionality and incrementally expand the system, and values its people and customers. In addition, agile methodologies follow the values and principles of the Agile Manifesto.

This section briefly introduces the Agile Manifesto and explores how agile practices have been scaled in large-scale development contexts.

2.1.1 The Agile Manifesto

In 2001, the Agile Manifesto for software development was created by a group called "The Agile Alliance", consisting of 17 professional software developers (Highsmith, 2001). The Manifesto brought together several lightweight methods, such as Scrum, which were developed in the mid-1990s (Williams & Cockburn, 2003). The aim of the agile approach was to put people and customers at the center of work and to move away from traditional work structures (Highsmith, 2001). The Manifesto outlines four values and 12 principles to guide agile practitioners.

2.1.2 Large-Scale Agile Development

Agile practitioners and researchers concluded in 2002 that agile values and practices were best suited for teams that are co-located and consist of no more than 50 people, which can be seen as a limitation of agile methods (Williams & Cockburn, 2003). Dybå and Dingsøy (2008) also highlight this limitation as a common point of criticism against agile development methods. Despite this, agile methods has still been adopted by larger organizations (Dikert et al., 2016). The article define large-scale as an organization consisting of 50 people or more, or a minimum of six

teams, working on a common product or project.

According to Edison et al. (2022), the most popular agile methods in 2019 for scaling agile were: Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), Disciplined Agile Delivery (DAD), and Spotify model. As the case company in this study uses SAFe, this will be the only large-scale agile method considered. A more detailed description of SAFe follows in the next chapter.

2.2 Scaled Agile Framework (SAFe)

This section describes the basic elements of SAFe, such as core values, principles, and the different configurations. These elements provide an overall understanding of the framework, which is relevant since it influences how work is managed and carried out within the department. The section also describes the recurrent activities used to plan and follow-up the work.

2.2.1 SAFe Overview

Many organizations start applying agile practices in an structured way, usually starting with a single team (Scaled Agile Inc, n.d.). However, when these principles and practices are scaled up to include multiple teams, departments, or entire business units, challenges arise. Aspects that previously seemed simple, such as planning, coordination, communication, and role clarity, can become complex and difficult to manage when applied to hundreds of individuals.

A framework used to address these challenges is SAFe. It was developed by Dean Leffingwell in 2011, and it is a structured approach to scaling agile principles and practices in large organizations and complex environments (Scaled Agile Inc, n.d., 2021p). The framework provides guidance on the distribution of responsibilities and roles, how planning and management of work is carried out, as well as the values that should shape the way of working (Piikkila, n.d.). Further, SAFe promotes collaboration, alignment, and unified delivery in large-scale agile projects across multiple numbers of agile teams.

SAFe is built on values and principles (Scaled Agile Inc, 2021a, 2021m). The four core values, representing the fundamental beliefs of SAFe, are: coordination, built-in quality, transparency, and program execution (Scaled Agile Inc, 2021a). These are described as key to SAFe's effectiveness. The principles, known as the SAFe Lean-Agile Principles serve as a philosophical foundation that informs how SAFe is implemented in practice (Scaled Agile Inc, 2021a, 2021m). Together, the core values and principles form a shared framework of understanding that supports collaboration, decision-making, and agile ways of working at scale.

2.2.2 Core Values

The four core values of SAFe are described below:

Alignment:

Alignment ensures that everyone in the organization, from teams to managers, is moving towards the same strategic goals (Scaled Agile Inc, 2021a). This provides guidance in a rapidly changing environment while supporting decentralized decision-making by linking work to company goals.

Built-in Quality:

Quality is not just something added at the end, but is designed to be built into every stage of development (Scaled Agile Inc, 2021a). This approach ensures that solutions are reliable, scalable, and sustainable, which in turn reduces rework and enables efficient delivery.

Transparency:

Transparency fosters trust (Scaled Agile Inc, 2021a). Open communication, visible progress, and shared goals help teams make informed decisions and work together effectively, especially when challenges arise. Lean-Agile leaders have an important role to play, in order to create this environment of openness and trust.

Program Execution:

Program execution focuses on delivering value by helping multiple teams coordinate their efforts and thus be more aligned (Scaled Agile Inc, 2021a). This means that instead of working in isolation, teams work together towards common goals. If teams are not aligned and able to deliver shared value, the rest of SAFe will not matter.

2.2.3 SAFe Lean-Agile Principles

The 10 Lean-Agile Principles of SAFe are described below (Scaled Agile Inc, 2021m):

1. **Take an economic view** - Make decisions based on economic trade-offs to deliver the best value and quality while doing so in the shortest sustainable lead time.
2. **Apply systems thinking** - In SAFe, systems thinking means focusing on both the solution being developed and the organization building it. Not forgetting that the real improvements comes from understanding the whole system, not just its parts.
3. **Assume variability; preserve options** - Instead of locking in a design too early, SAFe encourages keeping multiple options open and using real data to choose the best path later in the process.
4. **Build incrementally with fast, integrated learning cycles** - Develop in short iterations to reduce risk and allow for early feedback.
5. **Base milestones on objective evaluation of working systems** - Use regular checkpoints working solutions, in order to ensure the investment is heading in the right direction, and also for assessing the progress.

6. **Visualize and limit work in progress, reduce batch sizes, and manage queue lengths** - Improve flow and efficiency by managing the amount of work in progress, breaking tasks into smaller pieces and reducing delays.
7. **Apply cadence, synchronize with cross-domain planning** - Use regular, synchronized planning cycles. Meaning, teams sync up and plan together, creating better coordination that helps them stay on track when things are uncertain or complex.
8. **Unlock the intrinsic motivation of knowledge workers** - Foster an environment where people feel trusted, have a purpose, and can influence decisions. Instead of an environment based on bonuses or rewards. This leads to stronger teamwork and better results.
9. **Decentralize decision-making** - A clear decision-making structure supports the decision-making process, empowers employees, and ensures the organization remains aligned. Fast delivery relies on allowing teams to make local decisions, while strategic decisions remain centralized
10. **Organize around value** - Instead of using traditional department-based structures that slowed things down, teams and workflows should now be organized around delivering value quickly and effectively to customers. This requires teams from different areas to work closely together.

2.2.4 Configurations

In order to apply the core values and principles effectively into different organizational contexts, SAFe provides four different configurations: Essential, Portfolio, Large Solution, and Full SAFe (Scaled Agile Inc, 2021k). Each configuration designed for different levels of complexity within an organization, reigning from small to large teams, multi-team solutions, and enterprise-wide portfolios. The different configurations are a specific setup of SAFe roles, mindset, and artifacts. In this way, the configurations help bring the values and principles to life in practice, ensuring that SAFe can be adapted to suit the needs of different organizations.

Essential SAFe

Essential SAFe is the most basic configuration of the framework (Scaled Agile Inc, 2021c). It provides the minimal structure including events, set of roles, and artifacts needed to apply SAFe successfully. The heart of Essential SAFe is the Agile Release Train (ART), which is the primary structure through which value is delivered. An ART consists of multiple agile teams typically around 5 to 12 teams. These teams are aligned and work collaboratively towards a shared mission, creating coordination across teams, alignment with business goals, and consistent delivery of customer value. The ART operates on a common schedule and uses synchronized planning and delivery cycles called Program Increments (PIs) to align their work.

To support coordination and delivery within the ART, SAFe defines a hierarchy of artifacts (Scaled Agile Inc, 2021o). These items represent different levels of system behaviors, from high-level business needs down to detailed tasks for agile teams. The hierarchy helps ensure that daily work aligns with long-term goals. In Essential

SAFe, there are two levels of artifacts: features and stories (Scaled Agile Inc, 2021c).

Features represents a service or functionality that provides a clear value to stakeholders (Scaled Agile Inc, 2021d). It is an artifact large enough to require planning and coordination, although small enough to be completed within a PI. The delivery of a feature typically involves multiple agile teams collaborating within an ART.

To make features actionable at team level, they are broken down into smaller units called stories (Scaled Agile Inc, 2021o). Each story represents a smaller, independent piece of functionality that can be completed within one to two weeks. A story is described from the user's perspective and is written in a simple language, to ensure that both technical and non-technical stakeholders can understand what it contains. Each agile team works with one or several stories, and when these are completed and integrated by the teams, they collectively contribute to the delivery of the feature. In this way, features are the goal, while stories act as building blocks that help teams deliver value in small, manageable steps.

For enabling effective collaboration and delivery of the work, Essential safe provides defined roles categorized into team roles and ART roles (Scaled Agile Inc, 2021c).

Team Roles:

- **Agile Team:** Agile teams consist of 5-11 people, working cross-functionally (Scaled Agile Inc, 2021c). These teams work iteratively and can build, test, and verify work.
- **Product Owner (PO):** Responsible for the agile teams' delivery, prioritizing the backlog, and defining stories (Scaled Agile Inc, 2021c).
- **Scrum Master (ScM):** Facilitates team events, removes blockers, and helps the team improve its processes and collaboration (Scaled Agile Inc, 2021c).

ART Roles:

- **Product Manager (PM):** Owns the program backlog and represents the voice of the customers (Scaled Agile Inc, 2021c). Works with the PO to understand and communicate customer needs.
- **Release Train Engineer (RTE):** Is the the ART's chief facilitator (Scaled Agile Inc, 2021c). This role ensures coordination across teams and is responsible for that events run smoothly.
- **System Architect/Engineering:** Provides technical direction and ensures that system-level design supports both current and future needs (Scaled Agile Inc, 2021c).
- **Business Owners:** They are the primary stakeholders of the ART (Scaled Agile Inc, 2021c). They provide input, approve progress, and ensure that ART delivers the expected business value.

The relationship between features, stories, and their associated roles is illustrated in Figure 2.1.

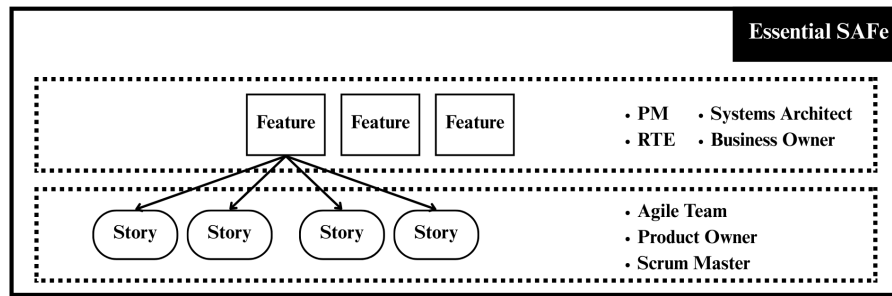


Figure 2.1: Essential SAFe.

Large Solution SAFe

Large Solution SAFe extends the Essential SAFe configuration to support large and complex projects, while preserving the core roles, practices, principles, events, and artifacts (Scaled Agile Inc, 2021f). These are projects of a scale that cannot be managed by just one team or even a single ART. When multiple ARTs, often, in combination with external suppliers, are working together to deliver a solution, the Large Solution SAFe configuration becomes necessary. In other words, this configuration is used when a solution becomes too large, critical, or interconnected for traditional agile methods, or even for Essential SAFe alone. Large Solution SAFe helps the organization remain agile at scale, without losing control over complexity.

To manage the increased scale and complexity, Large Solution SAFe introduces new roles and artifacts (Scaled Agile Inc, 2021f). These additions ensure that the work of multiple ARTs and suppliers stay aligned and coordinated. The additional artifact is called capabilities and they are large-scale artifacts that represent functionality across the entire solution (Scaled Agile Inc, 2021d). They operate at a higher level than features and are often too big to be completed by a single ART. Even so, capabilities are still planned to be completed within a PI and in order to make them manageable, they are broken down into features. Capabilities help maintain alignment, coordination, and a clear overview when multiple teams are working together in complex systems.

Supporting work in the increased scale and complexity, Large Solution SAFe introduces several new roles (Scaled Agile Inc, 2021f). These roles help guide value delivery, maintain architectural alignment, and ensure that multiple ARTs and suppliers are working together towards a common goal, in an effective way. This configuration introduces the following roles:

Solution Roles:

- **Solution Train Engineer:** Facilitates coordination, the work across multiple ARTs and providers, by being a leader and coach (Scaled Agile Inc, 2021f).
- **Solution Management:** Works with customers to understand their needs, define requirements, and shape the solution vision and roadmap (Scaled Agile Inc, 2021f).
- **Solution Architect/Engineer:** Provides technical direction to ensure the

technical parts fits together and support the overall objectives (Scaled Agile Inc, 2021f).

Figure 2.2 illustrates how Large Solution SAFe extends Essential SAFe by introducing capabilities above features and additional roles.

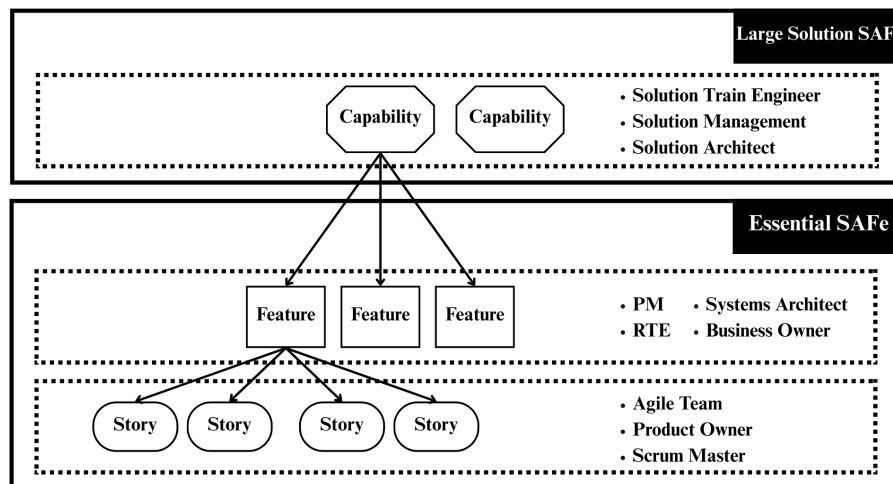


Figure 2.2: Large Solution SAFe.

Portfolio SAFe

Portfolio SAFe focuses on aligning an organization's strategy with its execution by managing multiple value streams across the entire business (Scaled Agile Inc, 2021h). In this configuration, the work is organized around long-term strategic goals and makes sure investments align closely with the company's overall objectives, rather than focusing on individual projects or teams. It builds on Essential SAFe, adding tools and practices to handle strategic planning, budgeting, governance, and coordination across different areas of the organization. It is important to note that Portfolio SAFe does not extend Large Solution SAFe, instead, it represents a separate configuration.

Since Portfolio SAFe operates at a strategic level, it requires artifacts aligned with this broader scope (Scaled Agile Inc, 2021h). Therefore, this configuration introduces larger strategic initiatives known as epics.

An epic contains the strategic work that a company aims to undertake and it captures the broader investments taking place within a portfolio (Scaled Agile Inc, 2021b). Epics typically affects many parts of the organization and are spanning over multiple PI, which means they can take a long time to complete. Due to their significant scope and impact, epics first need to be clearly defined, reviewed, and approved before they can be worked on by ARTs.

To support strategic alignment and investment decisions in this configuration, Portfolio SAFe also introduces several new roles:

Portfolio Roles:

- **Epic Owners:** Those who ensure that epics flow smoothly through the system, from idea to approval and on to development (Scaled Agile Inc, 2021h).
- **Enterprise Architect:** Makes decisions on strategy, funding, and priorities for the whole portfolio (Scaled Agile Inc, 2021h).

Figure 2.3 illustrates how Portfolio SAFe extends Essential SAFe by introducing epics above features and additional roles.

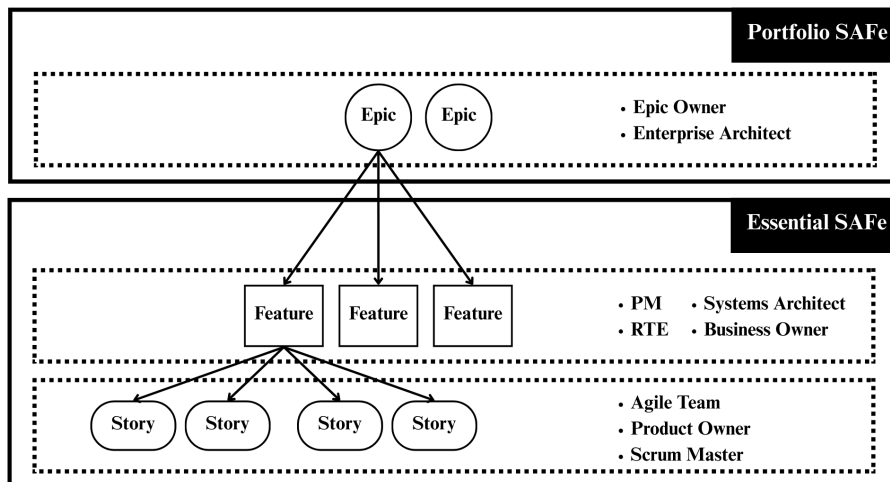


Figure 2.3: Portfolio SAFe.

Full SAFe

Full SAFe combines all other configurations: Essential SAFe, Large Solution SAFe, and Portfolio SAFe, including their artifacts and roles into a single structure (Scaled Agile Inc, 2021l). This configuration is used when many teams, multiple ARTs, suppliers, and business units work together toward common goals at both operational and strategic levels (Scaled Agile Inc, 2021k). It is typically implemented by organizations that develop complex systems and require alignment across teams, ARTs, and enterprise strategy.

This integration of configurations is illustrated in Figure 2.4, which shows how epics are broken down into capabilities, which are further broken down into features and finally into stories. The Figure also illustrates all the roles included in Full SAFe.

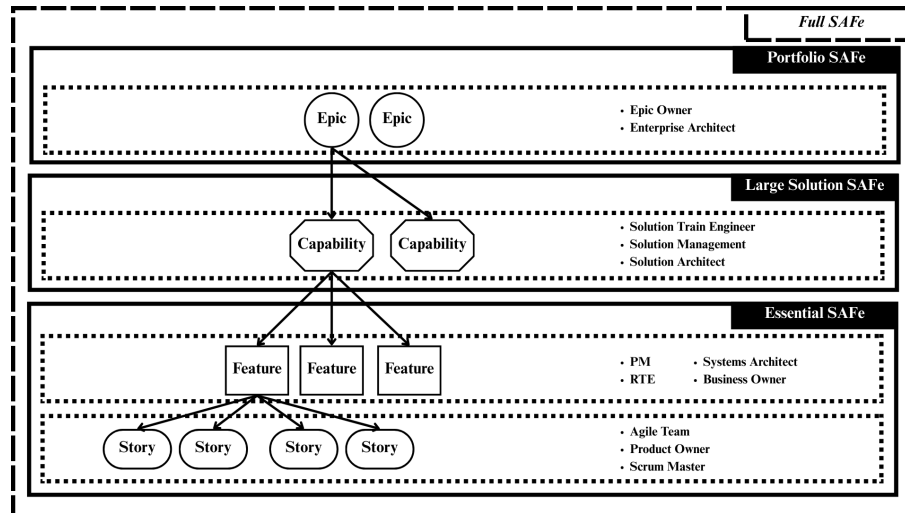


Figure 2.4: Full SAFe.

2.2.5 Program Increment (PI)

PI is a critical part of SAFe and is necessary for the framework to function effectively (Scaled Agile Inc, 2021i). It is a scheduled event within the SAFe framework, where each PI typically spans between 8 to 12 weeks. One PI is divided into four development iterations plus an innovation and planning (IP) iteration. The development iterations usually last one to two weeks and are referred to as sprints.

During each PI, multiple teams plan together, align around common missions, and coordinate their work toward shared goals (Scaled Agile Inc, 2021i). The reason for applying this rhythm and recurring structure of PIs is to provide a regular opportunity to plan the ART's next steps, monitor and limit ongoing work, receive feedback, and work iteratively. It also ensures that all teams across the ART consistently reflect on their progress, identify improvements, and apply lessons learned.

Figure 2.5 illustrates the structure of a PI for an ART, where the outer ring represents ART events and the inner ring shows the team events. The events within the PI will be further described below, where the first six events (from PI planning to Inspect and Adapt) are ART events, and the rest (from Daily Stand up to Iteration Planning) are Team events:

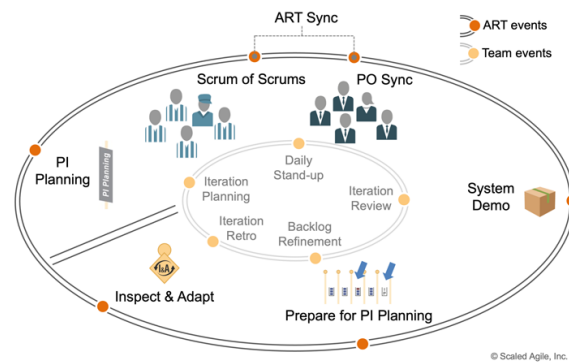


Figure 2.5: ART and Team events (Scaled Agile Inc, 2021i).

PI Planning: Each PI begins with a face-to-face PI planning event involving all members of the ART (Scaled Agile Inc, 2021g). This event takes place during the IP iteration and typically lasts two days. PI planning follows a standard agenda where the business context, vision, and planning activities are presented and facilitated by the RTE.

During the planning sessions, teams within the ART estimate what they intend to deliver during the PI, and highlight any requests or dependencies involving other agile teams or ARTs (Scaled Agile Inc, 2021i). The main goal of the PI planning event is to define the objectives that each team commits to achieving by the end of the PI.

Scrum of Scrums: The Scrum of Scrums is a time-boxed event, typically lasting between 30 and 60 minutes, and it is scheduled at least once per week (Scaled Agile Inc, 2021i). The purpose of the meeting is to coordinate dependencies across the ART but also to gain insight into the progress and obstacles that each agile team are face with. The event is facilitated by the RTE, who is responsible for communicating major impediments and challenges. All ScM's are required to attend the event.

PO Sync: Similar to the Scrum of Scrums, the PO Sync is also time-boxed around 30–60 minutes and is scheduled at least once per week (Scaled Agile Inc, 2021i). This event is for POs and PMs, and the purpose is to gain insight into the status of the PI objectives. It is also a forum for discussing and making decisions regarding issues, opportunities, and necessary adjustments in feature development. Additionally, the time can be used to prepare for future PIs by prioritizing and discussing upcoming features and backlog.

System Demo: The System Demo takes place every two weeks (Scaled Agile Inc, 2021i). Its an event where all teams within the ART present the latest version of their work. The purpose is to provide stakeholders with transparency on how things are progressing, to verify that the system is being built correctly, and to provide feedback.

Prepare for the Next PI Planning Event: This is not a single event but rather a continuous process with three main areas of focus (Scaled Agile Inc, 2021i). The first is to make sure that management agrees on the priorities. The second is to prepare the backlog with a well-defined content. The third is to manage the practical aspects of PI planning.

Inspect and Adapt: This event focuses on reflection, problem-solving, and improvement actions to increase speed, quality, and reliability in the next PI (Scaled Agile Inc, 2021i). It usually results in a set of improvement suggestions that are added to the backlog, helping the ART to continuously improve.

Iteration Planning: This meeting is the first event in the team's cycle (Scaled Agile Inc, 2021n). It is about going through the backlog, prioritizing the work, and setting clear objectives for what should be achieved during the next iteration, which usually lasts one to two weeks (a sprint).

Daily Stand-up: A short meeting (15 min) held every day where the team reviews what everyone is working on, discusses the plan for the day, tracks progress, and identifies any bottlenecks (Scaled Agile Inc, 2021j).

Iteration Review: The Iteration Review is a meeting held at the end of each iteration, during which the team showcases the work completed to the PO and stakeholders, and shares what they have learned (Scaled Agile Inc, 2021e). The event also provides an opportunity to gather feedback, celebrate progress, and update the backlog for the next iteration.

Backlog Refinement: During backlog refinement, the team reviews upcoming tasks by discussing and improving the items in their backlog (Scaled Agile Inc, 2021n). They estimate the size of the work and ensure that everyone has a shared understanding of what needs to be done. It is important to note that backlog refinement is not a one-time meeting, rather it is a continuous process that usually takes place once a week.

Iteration Retrospective: The Iteration Retrospective is the final event of the iteration, typically lasting between 45 and 90 minutes (Scaled Agile Inc, 2021n). During this session, the team reflects on the completed iteration, discussing successes, identifying problems, and evaluating how challenges were addressed. The aim is to generate actionable improvements, which are implemented as soon as possible or, if necessary, added to the backlog for future iterations.

2.3 Success Factors in Agile Projects

Several studies have examined different factors that influence agile projects. Understanding these and how they affect the project outcome can help guide users so that they know what is important to focus on, but also what may be lacking and thus create obstacles. This section provides a brief introduction to how success can

be measured. It also summarizes and describes the success factors that have been examined in the previous literature.

2.3.1 Measuring Success

A common way to measure and understand success in a project is to use the Iron Triangle model (Pollack et al., 2018). The model is traditionally based on three core criteria: time, cost, and quality, meaning that a project is considered successful if it is delivered on time, stays within budget, and meets the agreed level of quality. However, according to Pollack et al. (2018), it has also been argued that scope could be more relevant than quality in certain contexts. This indicates that there are different interpretations of the Iron Triangle depending on the context of the project. Despite these variations, the Iron Triangle has become an established standard for routinely assessing project performance, and therefore serves as a foundation for several studies that identify success factors.

2.3.2 Summary of Studied Success Factors

The following section presents the success factors identified in the reviewed literature. It introduces Table 2.2, which provides an overview of the factors, in combination with Table 2.1, listing the corresponding authors with their assigned number. The factors have been categorized into four different themes, according to the authors understanding about them. Furthermore, each factor is described more in detail following Table 2.2.

Table 2.1: List of authors with corresponding identification numbers.

#	Authors	Publication
1	Chow and Cao (2008)	The Journal of Systems and Software
2	Misra et al. (2009)	The Journal of Systems and Software
3	Stankovic et al. (2013)	The Journal of Systems and Software
4	Dikert et al. (2016)	The Journal of Systems and Software
5	Shameem et al. (2017)	Asia-Pacific Software Engineering Conference Workshops
6	Tsoy and Staples (2021)	Information Systems Management
7	Tam et al. (2020)	International Journal of Project Management
8	Kula et al. (2021)	IEEE Transactions on Software Engineering
9	Binboga and Gumussoy (2024)	IEEE Access
10	Pacagnella et al. (2024)	IEEE Transactions on Engineering Management
11	Barros et al. (2024)	Information and Software Technology

Table 2.2: Summary of studied success factors.

Themes	#	Success Factor	1	2	3	4	5	6	7	8	9	10	11	Total
Organization prerequisites	SF1	Task dependencies							x					1
	SF2	Management commitment			x	x	x			x	x	x		6
	SF3	Organizational environment				x				x	x	x		4
	SF4	Organizational culture		x					x			x		3
	SF5	Agile working environment									x	x		2
	SF6	Agile approach and maturity			x						x	x		3
Team prerequisites	SF7	Team capability	x	x	x	x	x	x	x	x	x	x	x	10
	SF8	Team dynamics				x				x	x	x		5
	SF9	Personal characteristics		x		x			x					3
	SF10	Team autonomy	x		x	x	x			x	x	x		7
	SF11	Training and coaching		x		x	x			x		x		5
Communication and information sharing	SF12	Communication			x	x				x		x		4
	SF13	Team location	x				x			x		x		4
	SF14	Team size					x			x	x	x		4
	SF15	Right amount of documentation										x		1
	SF16	Requirements refinement			x					x				2
Project prerequisites	SF17	Project type					x			x	x			3
	SF18	Project visibility				x								1
	SF19	Clear objectives and goals										x		1
	SF20	Customer involvement	x	x			x	x	x	x	x	x	x	8

Task dependencies

Activities or collaborations in the workflow can create dependencies between different teams, and if these dependencies are not resolved, it creates delays (Kula et al., 2021). The article illustrate that dependencies often occur between teams that are part of a common delivery chain and that do not work end-to-end on a product. In addition, Kula et al. (2021) highlight communication issues and misalignment as contributors to dependencies that remain unresolved.

Management commitment

Management commitment and support refers to their active involvement in executing strategic plans and allocating necessary resources (Kula et al., 2021). This is to enable the team's daily work and successful project delivery. Management support strengthen the teams decision-making process and raises motivation, which in turn positively impact project success (Pacagnella et al., 2024).

Organizational environment

The organizational environment refers to the broader context in which a project and its team work (Tsoy & Staples, 2021). It encompasses aspects such as organizational alignment, to ensure a shared vision and mission (Kula et al., 2021). Binboga and Gumussoy (2024) adds that when a company's mission aligns with its employees, it fosters greater commitment and improved performance. This suggests that these factors influence the conditions for agile practices and may either enable or hinder effective execution, team motivation, and timely delivery (Binboga & Gumussoy, 2024; Kula et al., 2021; Tsoy & Staples, 2021).

Organizational culture

An organizational culture that emphasizes collaboration, rapid communication, trust, and feedback is important to support agile practices (Misra et al., 2009). The culture is in turn influenced by societal culture, meaning that values, beliefs, and norms in society shape personal characteristics and behaviors, and vice versa (Misra et al., 2009; Tam et al., 2020). Differences in social culture can lead to friction between employees, while communicative, driven, and open-minded team members with shared social culture are associated with greater project success.

Agile working environment

Establishing an environment that supports agile practices creates conditions for co-located teams to engage in face-to-face communication, fast decision making, continuous feedback, and iterative improvement (Pacagnella et al., 2024). However, Binboga and Gumussoy (2024) notes that many companies have transitioned to a hybrid work model in response to the COVID-19 pandemic, and highlights that remote settings have the potential to increase employee motivation and engagement.

Agile approach and maturity

Customizing the agile approach is not only applicable in the implementation phase of agile methods, but rather an ongoing process to reflect the needs of the organization (Dikert et al., 2016). Teams that have adapted and modified agile practices, instead of following a strict interpretation of the textbook, performed better than teams that did not. However, Dikert et al. (2016) points out that it is important not to go against the agile principles when customizing the approach. Kula et al. (2021) continue describing that agile maturity, how teams evolve and improve their agility over time, allows teams to continuously improve their delivery performance. Binboga and Gumussoy (2024) adds that by applying agile-related events in the right way, productivity and efficiency increase.

Team capability

Team capability refers to the collective ability of a team to apply its knowledge in project environments (Tam et al., 2020). It includes technical expertise, experience, motivation, as well as the knowledge and support provided by individuals in leadership roles within the team. Experience and diverse expertise among team members can contribute to innovative solutions and faster problem-solving (Pacagnella et al., 2024). Teams with more experienced members have been reported to detect faults more quickly and to resolve unforeseen bugs and incidents more efficiently (Kula et al., 2021). The competence and experience of individuals in leadership roles, are also highlighted as important aspects of team capability, particularly in relation to communication, problem-solving, and fostering a motivating work environment (Binboga & Gumussoy, 2024).

Team dynamics

Team dynamics refers to how team members interact, communicate, and develop collaborative relationships over time, which is particularly important in agile project environments where conditions frequently change (Barros et al., 2024; Kula et al., 2021; Pacagnella et al., 2024). Furthermore, teams with strong dynamics, where individuals have worked together over an extended period, demonstrate flexibility in their roles, and feel psychologically safe to share ideas and admit mistakes. These teams are better equipped to coordinate their work and, consequently, to manage change effectively.

Personal characteristics

According to Tam et al. (2020), personal characteristics refer to non-cognitive abilities such as communication skills, empathy, resilience, motivation, honesty, and a collaborative attitude. These traits are considered part of the personal and interpersonal competences required to perform well in project environments. In practice, these characteristics are reflected in how individuals engage with agile ways of working. Dikert et al. (2016) emphasize the importance of involving individuals who are open to new approaches, willing to contribute actively, and who shares the agile

values. In such contexts, personal characteristics can support collaboration, commitment, and a shared sense of direction within the team.

Team autonomy

Team autonomy can be defined as the extent to which a team is able to make decisions on its own about how to perform tasks (Barros et al., 2024). When the team has a high degree of autonomy, intrinsic motivation increases, which in turn can lead to the development of more skills, leading to improved team capabilities. Dikert et al. (2016) also notes that autonomy improves productivity and morale.

Training and coaching

Training and coaching refer to the ongoing development of agile capabilities through both structured guidance and everyday learning (Dikert et al., 2016; Misra et al., 2009). In agile environments, continuous knowledge sharing through mentoring and informal discussions has been shown to support faster delivery and improved performance (Misra et al., 2009). At the same time, formal training and hands-on coaching play a critical role in organizations using agile methods, it ensures that teams understand and correctly apply agile principles in practice (Dikert et al., 2016). Without sufficient training and coaching, teams risk low motivation and misapplication of methods.

Communication

Effective communication between team members and teams, and with management and customers is important for project performance (Kula et al., 2021; Pacagnella et al., 2024). It supports knowledge sharing between team members, facilitates the creation of user stories, and increases team effectiveness (Kula et al., 2021; Shameem et al., 2017). Poor communication, especially with respect to task dependencies, can contribute to delays and unresolved issues (Kula et al., 2021). Agile methods emphasize informal face-to-face communication, which enables frequent dynamic interactions and helps teams respond better to changes (Pacagnella et al., 2024). This makes individuals' communication skills important in daily work activities. Pacagnella et al. (2024) also points out that organizational factors, such as office layouts, team location, and active management involvement, can further strengthen the communication culture and reduce barriers.

Team location

Co-location of teams allows for quick and informal conversations and improves collaboration (Pacagnella et al., 2024). If teams are in different geographical locations, especially in different time zones, collaboration becomes more difficult. Kula et al. (2021) adds that geographic location also contributes to communication challenges and thus reduces efficiency and creates delays.

Team size

Binboga and Gumussoy (2024) argues that larger team size can lead to communication and coordination problems. Furthermore, a larger team size makes it difficult to share tacit knowledge. Pacagnella et al. (2024) argues that small, self-organized teams with the right skills and experience demonstrate better integration, communication, and adaptability. Kula et al. (2021) includes team size as part of broader project size characteristics, noting that larger projects are linked to increased dependencies, parallel work, communication challenges, and greater efforts in testing and refinement.

Right amount of documentation

Binboga and Gumussoy (2024) discuss the importance of appropriate amounts of documentation. On one hand, they highlight that the Agile Manifesto values prioritizing working solutions over extensive documentation. On the other hand, they argue that knowledge sharing and maintenance become more difficult if there is no documentation. Binboga and Gumussoy (2024) also highlighted the need for more documentation during COVID-19, due to the setup of remote work and fewer opportunities for tacit knowledge sharing.

Requirements refinement

The process of defining high-level requirements, i.e. epics, capabilities and features, and breaking them down into user stories is described as challenging (Dikert et al., 2016; Kula et al., 2021). For teams to work effectively with the requirements, it is important that they are clear and sufficiently small. Dikert et al. (2016) therefore recommend investing in training to support the ability to break down requirements into user stories appropriately. Kula et al. (2021) also note that a well-functioning refinement process can help identify dependencies between tasks across different teams.

Project type

The project type is also mentioned in the literature as a success factor, with reference to whether similar projects have been conducted before or not (Tsoy & Staples, 2021). In projects where there is previous experience, it is described as easier to understand both what needs to be done and how it should be done. In projects where the team has not worked on similar assignments before, it tends to be greater uncertainty about both objectives and methods.

Project visibility

Shameem et al. (2017) highlight project visibility as a success factor, referring to the extent to which key stakeholders have insight into the project's status and progress. To enhance transparency, it is recommended that teams use accessible tools that support information sharing and help keep all stakeholders informed.

Clear objectives and goals

Formulating clear objectives and goals early in the project supports coordination and help the team work toward a shared direction (Pacagnella et al., 2024). In agile projects, where the initial scope is often broad and not highly detailed, a well-defined purpose can create focus and drive progress.

Customer involvement

Agile approaches emphasize customer involvement throughout the project life cycle to ensure high customer satisfaction through continuous delivery and rapid feedback (Binboga & Gumussoy, 2024; Misra et al., 2009; Shameem et al., 2017; Tsoy & Staples, 2021). Frequent collaboration with the customer helps manage expectations and prevent delays (Binboga & Gumussoy, 2024; Kula et al., 2021). A high level of customer commitment supports timely project completion, and working closely with customers reflects core agile values and principles (Chow & Cao, 2008; Tam et al., 2020). However, Misra et al. (2009) point out that it can also present practical challenges where customers resisted collaboration due to a preference for fixed contracts. Additionally, customer competence and training have been shown to enhance collaboration and project success (Binboga & Gumussoy, 2024).

3

Methods

In this chapter, the chosen research method will be described and the empirical context of the case company will be presented.

3.1 Research Strategy

To answer the defined research questions, a qualitative research strategy has been chosen. This method focuses on words while gathering and examining data, rather than primarily quantifying data as in a quantitative research strategy (Bell et al., 2019). Furthermore, qualitative research emphasizes individuals and how they understand their social world. This approach was chosen because of its alignment with the purpose of this study, to increase the understanding about factors influencing on-time delivery and how these are related. This enabled to capture nuanced, subjective experiences as well as social and organizational dynamics, which may not be visible through purely quantitative methods.

This study adopts an abductive approach, where the research process iteratively shifts between theory and data to develop explanations for the phenomena studied (Bell et al., 2019; Dubois & Gadde, 2002). Abductive reasoning begins with observations, and as new insights are gained, the original framework is modified and refined. Bell et al. (2019) add that this approach is used to overcome the limitations that are associated with inductive and deductive reasoning. This study has changed direction through the findings of initial observations and informal conversations combined with theory to better capture the need of Volvo GTT.

3.2 Research Design

This study will employ a case study design. This approach is particularly suitable for specific real-world settings, such as a single organization, a single location, a person, or a single event (Bell et al., 2019). The emphasis of this design is on an in-depth assessment of the situation. Given that the purpose of this study is to increase the understanding about factors influencing on-time delivery, as well as how these are related, in a cross-functional department, the chosen research design is the best approach.

The research process, illustrated in Figure 3.1, began with an initial literature review to build a foundation of theoretical knowledge. This initial review focused on un-

derstanding the framework used within the organization, and to investigate whether other large-scale organizations using SAFe or other agile frameworks have faced challenges in delivering on time. This initial review helped to provide preliminary insights and contextual information. Once a clearer understanding was formed, the research design followed an iterative process, where other data collection methods and literature review evolved in parallel, as can be seen in Figure 3.1. The design is inspired by the principles of systematic combining (Dubois & Gadde, 2002), where empirical insights and theoretical frameworks are continuously matched and refined throughout the research process.

The next step consisted of observations and informal conversations while the literature review was conducted in parallel. This allowed the preliminary empirical insights to guide the ongoing search for relevant theoretical frameworks and previous research. However, new theoretical perspectives provided other angles for the observations and conversations. This created an iterative interplay between theory and empirical exploration.

Based on the insights gathered through observations, informal conversations, and the literature review, a number of exploratory interviews were conducted. The purpose of these interviews was to gain a deeper understanding of emerging themes, as well as to identify key areas to focus on in the main data collection phase. The main phase consisted of semi-structured interviews and constitutes the primary empirical material of the study. These interviews were conducted with selected participants within the cross-functional department. Following the interviews, all material was transcribed and an analysis was conducted. The analysis focused on identifying recurring patterns and key factors affecting the ability to deliver on time within the cross-functional unit. Lastly, the conclusion of the study was presented.

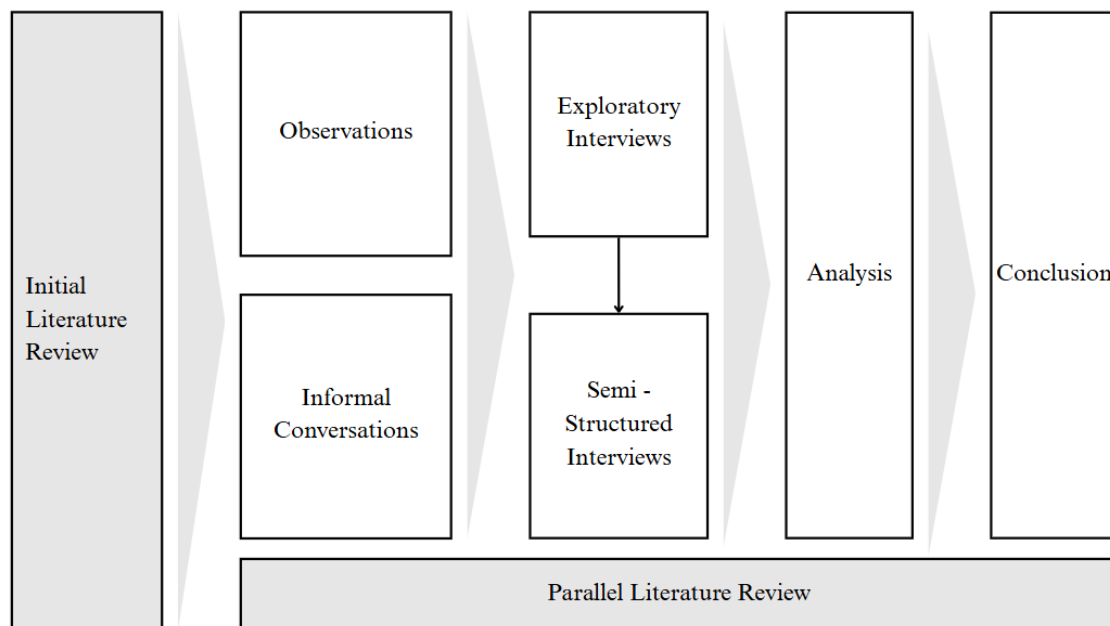


Figure 3.1: Illustration of the research design used.

3.3 Empirical Context

Volvo Group Trucks Technology (Volvo GTT) is the Volvo Group’s global organization for technology and product development for truck development (Volvo Group, 2025). Volvo GTT consists of almost 10,000 employees who work daily with the development of the Group’s trucks and busses.

Within GTT, the organization is divided into several departments and technical domains, where some of these are conducted within structures that follow the agile framework SAFe. This study will focus on a specific ART within a department at Volvo GTT, that are using SAFe 5.0, and have been using it since 2017. The ART is involved in the development of Advanced Driver Assistance Systems (ADAS), an area that includes both hardware and software development.

The ART is composed of about ten cross-functional teams, which vary in size. Some teams consist of 5-6 people, while others are larger and have between 8 and 12 people, bringing the total number of employees to around 70-90 people. Each team consists of at least one PO and one ScM.

3.4 Data Collection

A combination of literature reviews, semi-structured interviews, and complementary data in the form of observations and a brief review of historical data are used to collect data. These methods are chosen to combine theoretical concepts with practical insights and experiences.

3.4.1 Literature Review

A literature review is performed to review existing literature and, for example, learn what is already known about the subject and what concepts are relevant for the chosen research (Bell et al., 2019). Furthermore, the literature review serves as a baseline for linking and discussing the empirical findings in relation to the existing literature, which is important to demonstrate credibility in the study. In this study, a narrative review was applied, which according to Bell et al. (2019) is more suitable for qualitative research as it may require more flexibility due to its iterative research approach. They describe this review approach as more comprehensive in scope with less explicit criteria for inclusion or exclusion of studies. In addition, as described in Figure 3.1, the literature review was conducted in parallel with other data collection methods to better understand the phenomenon under study.

The following online databases have been used for the search of literature: Chalmers Library, Web of Science, Scopus, and Google Scholar. Bell et al. (2019) discuss the importance of identifying keywords that are within the area being studied and that will provide appropriate literature and references. The identified keywords for this study are “Agile”, “Scaled Agile Framework”, "Project Success", “Success

Factors”, "On-time delivery", “Dependency”, and "Large-scale agile project success". Furthermore, snowballing technique was applied by reviewing the reference lists of selected articles to identify additional relevant literature. Figure 3.2 illustrate an example of the literature review process applied in this study.

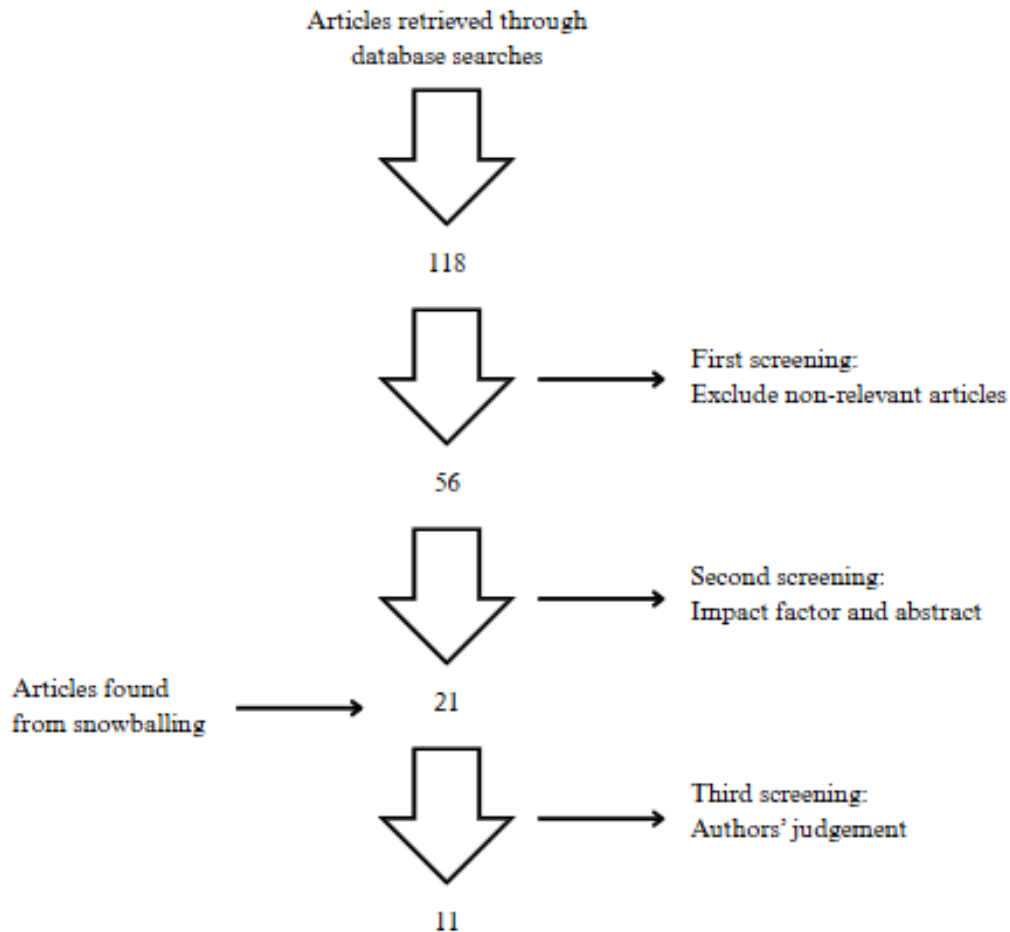


Figure 3.2: Illustration of the literature review process.

3.4.2 Semi-Structured Interviews

Qualitative interviewing aims to understand the interviewees’ point of view and semi-structured interviews are an example of this form (Bell et al., 2019). This structure provides flexibility to adapt the interview process as needed to allow for rich and detailed responses on the topic from the interviewee. The interview process for this study was divided into two parts, with the first part being exploratory in nature to gain a deeper understanding of the topic and identify key areas to pursue further. The second part consisted of semi-structured interviews to explore employees’ perspectives on possible factors influencing on-time delivery and to enable a deeper understanding of the context.

A stratified purposive sampling approach was used in the selection of interviewees, meaning that individuals or cases within relevant subgroups are selected (Bell et al., 2019). Furthermore, they describe that non-random selection of participants is common in qualitative interviewing and that it ensures that a wide range of individuals are chosen to provide different views on the topic. Table 3.1 provides an overview of the two parts of the interview process and shows the different roles interviewed, the number of interviews conducted, the time used for each interview part, and the date when the interviews were conducted.

Table 3.1: Interview overview.

Interview Part	Role	#	Time	Date
1: Exploratory	PO	1	30-40 min	April 2025
	ScM	1		
	Team Member	3		
2: Semi-structured interviews	ART leadership	3	45-60 min	
	PO	3		
	ScM	3		
	Team Member	4		

Bell et al. (2019) continue describing that semi-structured interviews often follow an interview guide containing more general and open questions, where the sequence can vary between different interviewees, and follow-up questions can be asked. Furthermore, closed questions, such as job status, can be included to obtain background information for the analysis of the more open questions. The interview guide used in this study is formed to understand which factors may affect Volvo GTT in terms of influencing on-time delivery of work. The questions are based on the reviewed literature, observations, and informal conversations. The interview guide, for the semi-structured interviews, can be found in Appendix A.

The interviews were conducted on-site and face-to-face, with one exception, which was held via Microsoft Teams. Furthermore, the majority of interviews were held in Swedish. Both authors were present during all interviews, but with different responsibilities. One person held all interviews to allow consistency across all interviews and reduce the risk of unconscious biases. The second author took notes and asked follow-up questions when relevant.

Recording and transcribing the interviews can help the interviewer to remember details of the interview and make an in-depth examination of the answers (Bell et al., 2019). In this study, the semi-structured interviews were recorded and transcribed, with the permission from the interviewee.

3.4.3 Complementary Data

Two drawbacks of qualitative interviews, as discussed by Bell et al. (2019), are that responses may be self-censored and tailored to fit the situation, and that such

interviews may not fully capture the essence of social interactions and behaviors. To address these limitations, this study also included informal conversations, non-participant observations, and a brief review of historical data. Informal conversations created a more relaxed environment, allowing for deeper contextual understanding. According to Bell et al. (2019), observations provide an opportunity to learn about participants' behavior. In this study, observations were conducted by attending various meetings, such as PI planning and sprint planning, and by sitting and working on-site. Relevant observations were documented, discussed between the authors, and compared with the results of the interviews. Historical data was mainly used to gain initial insights into the topic. However, as the study focuses on individuals' perception and experiences, this data was not central to the analysis.

3.5 Data Analysis

Bell et al. (2019) discuss the difficulties of analyzing qualitative research due to large amounts of data in the form of transcripts, field notes, and company documents. They present thematic analysis as a strategy to approach the analysis of quality research data. This study uses this approach, where themes were identified by looking for repetitions, similarities, and differences as suggested by Bell et al. (2019). Furthermore, these themes were compared with the studied success factors from previous literature.

3.6 Quality of Research

In order to assess the quality of this qualitative study, trustworthiness was used (Bell et al., 2019). Trustworthiness consists of four key criteria: credibility, transferability, dependability, and confirmability.

Credibility refers to the accuracy and trustworthiness of the results (Bell et al., 2019). In order to establish credibility in this study triangulating was used. This means insights from interviews, informal conversations, observations, and internal documentation was combined to cross-verify findings (Bell et al., 2019). Furthermore, participants with different roles and backgrounds were selected for the interviews to ensure a range of perspectives on the research topic to be captured. The interviews followed a semi-structured format, which provided flexibility and allowed for deeper follow-up questions when new or interesting topics emerged.

Transferability concerned whether the results can be applied in similar contexts (Bell et al., 2019). To support transferability, a detailed description of the process has been ensured, with the aim that others can use the same methods for similar studies. However, due to confidentiality agreements with the organization, some specific details cannot be shared. This may limit the ability of readers to fully assess the applicability of the results in other settings.

Dependability is about whether the research process is documented, consistent and

transparent, allowing the study to be understood and replicated by others (Bell et al., 2019). Therefore, every step of this research process been documented, including planning, participant selection, interview procedures, and data analysis. Even minor adjustments, such as refinements of interview questions based on early results, have also been documented to further strengthen the dependability of the study.

Confirmability is about ensuring that the authors' personal opinions or biases have not influenced the conduction of the study (Bell et al., 2019). In other words, that the results represent the opinions of the participants and not the authors. By documenting the study process and transcribing the interviews, conformability has been ensured. Therefore, the results are based on data and have not been influenced by personal assumptions.

3.7 Ethical Considerations

To begin thinking about the ethical aspects of business research, Bell et al. (2019) highlight four ethical principles: avoidance of harm, informed consent, privacy, and deception. Although there will not be any physical harm to participants in the study, it is important to ensure that they are not psychologically or professionally harmed when sharing experiences and opinions. When participants are sharing insights about their work during, for example, an interview, it could potentially affect how other teams and employees are perceived.

To mitigate these risks, participants are kept anonymous to protect their confidentiality and privacy. In addition, participants who have agreed to take part of the study, have been given a clear description of what the study is investigating and the expected outcome. Before the participants took part of the study, they were also informed about how the data will be handled and used, both during the study and afterwards. The information they received was that the data collected will be deleted at a certain point in time to ensure privacy and confidentiality and to prevent the data from falling into the wrong hands. To protect privacy and prevent fraud, no personal information will be shared without consent, and in all interactions with participants, transparency is essential.

3.8 The Use of Artificial Intelligence

Artificial Intelligence (AI) has been used as a writing support tool in this master thesis. Where the authors have used ChatGPT, to improve sentence structure, grammar, and overall coherence. However, the authors carefully reviewed all proposals and made final edits based on their own evaluation.

4

Results

This chapter outlines the findings from the semi-structured interviews, observations, and informal conversations. The material is organized according to the four overarching themes presented in Figure 4.1, which correspond to the themes presented in Figure 2.2: organization prerequisites (OP); team prerequisites (TP); communication and information sharing (CI); and project prerequisites (PP).

Table 4.1: Overview of identified factors from the interviews.

Themes	#	Factor	Frequency (n)	Frequency (%)
OP	EF1	Dependencies	11	85 %
	EF2	Management decision	6	46 %
	EF3	Management involvement	3	23 %
	EF4	Agile way of working	3	23 %
	EF5	SAFe in practice	11	85 %
	EF6	SAFe activities	3	23 %
TP	EF7	ScM role	5	38 %
	EF8	Experience	6	46 %
	EF9	Task ownership	8	62 %
	EF10	Knowledge sharing	2	15 %
	EF11	Teamwork	10	77 %
	EF12	Team capacity	3	23 %
	EF13	Resource constraints	4	31 %
CI	EF14	Communication and transparency	9	69 %
	EF15	Office layout	2	15 %
	EF16	Geographical location	2	15 %
	EF17	Team size	2	15 %
	EF18	Documentation	5	38 %
	EF19	Information flow	10	77 %
	EF20	Human factor	1	8 %
PP	EF21	Defining work	11	85 %
	EF22	Uncertainty	5	38 %
	EF23	Side tasks	9	69 %
	EF24	Project manager role	1	8 %
	EF25	Long-term goals	8	62 %
	EF26	Project milestones	4	31 %
	EF27	Limited project visibility	8	62 %
	EF28	Customer involvement	1	8 %

Table 4.1 presents the identified factors from the interviews, their corresponding

reference number (#), as well as the frequency and percentage of participants mentioning each factor, out of a total of 13 interviews. Note that several of these topics were included in the interview guide, based on observations, informal conversations, and literature. Therefore, the frequency of mention reflects instances in which responses provided analytical value or deeper insights.

4.1 Organizational Prerequisites

The ability of teams to execute and deliver work on time is influenced by **dependencies** (EF1). Interview 6 highlights that there are different types of dependencies: between the different teams within the ART, to other functions outside the ART, and to external suppliers. *"A team by itself cannot really finalize anything. [...] It's like minimum three, four teams which have dependency to each other. [...] And then you have all dependency outside or out. So yes, dependencies are quite big." (Interview 6).*

Different teams have different types of dependencies, and as Interview 1 highlighted, this can change between the different PIs. *"If maybe it's a PI, we have quite strong dependencies that are there. And then maybe the next PI, it changes to some other dependency that's there." (Interview 1).*

In order to manage and make these dependencies visible, the ART needs to acknowledge these in the planning stage: *"There is dependency, it needs to be highlighted quite early and that's where you need to have a correct planning and understanding of what can be done, what cannot be done [...]" (Interview 6).*

However, even if dependencies are planned for and made visible, they can still have a major impact on the timely delivery of work. The following quotations illustrate this in the context of external dependencies.

"And it is rather deadlines that come from outside that say when things should be ready than when we say it can be ready. And then it becomes a bit easy to exceed deadlines." (Interview 8)

"I would say that in my teams, there is very little we can do on our own. [...] We are very dependent on them [the suppliers] being able to respond in time. And also that we have made an accurate estimate of how long it will take to get a response. So that we have the resources available at the right time." (Interview 2)

"And if we don't get it from our supplier in time, we can't do that release. So there are a lot of external factors that determine when we can finalize things that we need. We don't have many tasks that are just about us." (Interview 3)

In addition, dependencies on other functions in the company can have a major im-

fact on when work are delivered, as highlighted in Interview 2:

"[...] our purchasing team wants some time to negotiate what it will cost to make this change. Unfortunately, as we have not been able to approve the change yet, this means that our factories cannot buy the right tools. This will lead to delays for them when they want to implement the system." (Interview 2)

As stated in the quote, decision making from other parts of the company can affect the work of the teams that rely on them. In addition, **management decision** (EF2) also have an affect on the timely delivery of work. This is exemplified by the following interviews.

"[...] perhaps we should have a slightly more robust decision-making process. That we are not constantly thrown back and forth between different now you should do this, now you should do that, now you should do this. Because it takes so much time to process it and to get on a new track when you were heading in a different direction. We lose a lot of working time being tossed back and forth like this. So I would like us to be better at being a bit calm with our decisions" (Interview 2)

"Sometimes lack of decision from our top management which avoids the team to be able to go forward as well is something that we are bad at. We are letting time take decision which make us waiting waiting waiting and when it's kind of too late we take the decision and it's obliging the team to rush in. So sometimes i would say we, our top management, have a hard time to take strong decisions." (Interview 6)

Managers not being able to make decisions or change the decisions affects the ability of teams to complete work on time. This in turn affects not only the accuracy of the delivery, but also the motivation, as mentioned in Interview 2: *"We are informed that yes, it is happening. Finalize all contracts like this week. And then all of a sudden it fades out. [...] And it's very difficult to stay motivated when you feel like that." (Interview 2).*

In addition to management decisions, two interviewees expressed a need for greater involvement from management (**Management involvement**, EF3):

"What can be missing sometimes is perhaps that you wish you had help and support to, well, how do we decide this or that, well, that you push something through in a certain direction." (Interview 2)

"I think we could do better with a bit more pressure. It can manifest itself in different ways. I don't think you should come with a whip and say why aren't you ready here, when will you be ready? Rather, show that you care about the result that comes out. You ask how things are going, you follow up and want to see when someone is ready and give

feedback on that. But also question after 10 weeks, why didn't you finish this? What was the problem? What have you learned along the way? How can we improve?" (Interview 13)

Interview 13 emphasizes that it is important for management to care about the result, while still pushing to understand why things were not completed. In contrast to this, Interview 1 highlights that there sometimes can be a push from management (**Management involvement**, EF3) when not enough features are closed: *"One comment that is usually made is that we don't close enough features. At the end of each PI, there are a lot of features still open" (Interview 1)*. This suggests that it is important for management to strike a balance between supportive and directive involvement.

One challenge raised in the interviews relates to the fact that teams do not operate in an isolated SAFe context (**Agile way of working**, EF4). In situations where teams collaborate with external parties, these actors rarely follow SAFe practices. This was perceived as a source of friction, particularly when delivery cadences and working methods differ. This is illustrated in Interview 1, when the following question was asked by the authors *"What do you find to take the most energy in the way you work today?"*: *"Yes, when you need to cooperate with people who don't really follow the same way of working" (Interview 1)*. This is also reinforced by a quote from Interview 3:

"GTO does not work with PI-planning, not that I know of anyway. Not that we are involved with them. And the people who work at Purchasing, for example, do not work with PI planning. And they have requests for us all the time. They don't care that we have PI planning. No one really respects it" (Interview 3)

The factor **SAFe in practice** (EF5), was discussed in 11 out of 13 interviews, with interviewees sharing positive and critical reflections. Some of the positive reflections were about coordination, different activities, and knowledge sharing, as highlighted in the following quotations:

"So what I've written here from last week is that I like that it's natural for everyone to be in the loop all the time, as I said. Most people can do most tasks, so to speak. We have quite a wide range of knowledge in the team." (Interview 11)

"What I find most helpful, which I actually think is fundamentally a very good idea anyway, is precisely these planning days we have. And the planning method where you get time set aside according to the way of working to actually plan your future work." (Interview 2)

"These daily syncs that you have, daily stand-ups, that's the most important meeting you have in a team. [...] It's actually good for everyone, you just have to get started, talk a bit and then if you have a problem, it

comes up there and then. Often someone else in the team can help with this problem. And then you save a lot of time so that a person does not have to sit alone and spend a whole day on something that someone else can solve in 10 minutes. So I think that's the most important thing.” (Interview 7)

At the same time, some interviewees felt that SAFe does not always fit for all types of work or teams. It was described that they would have liked to have the possibility to adapt the framework more to their own way of working, especially given the nature of the tasks, in order to avoid its application being too rigid (**SAFe in practice**, EF5) :

“I would have liked to loosen the boundaries. To try not to lock ourselves so much to the ten weeks. Keep it as some kind of foundation, starting point. But also to look beyond it and try to accept that this ten-week box may change shape over time.” (Interview 1)

“Then I can think that it does not fit the hardware quite so well. [...] Because we have very long lead times. We can't just think ten weeks ahead. Because we might have a test that will be ready in six months. We have to order samples for 20 weeks before we get them, for example. So the lead times for hardware development do not work well together. But you can still use it as a kind of planning tool, I think.” (Interview 3)

“But even if we break things down into 10 week increments or 2 weeks. We don't think about everything. We don't realize that, we discover things along the way.” (Interview 7)

This indicates that, although the framework has many strengths, there is a need for adaptation to the actual conditions of the ART. The experience that SAFe does not always align with all types of tasks or team structures suggests that a certain degree of flexibility may be crucial for the framework to function in practice and not become an obstacle in day-to-day work.

In addition to the perceptions of SAFe itself, variations in how it is applied also emerged, with teams describing themselves being able to decide which SAFe activities to include or not (**SAFe activities**, EF6): *“Yes, exactly, no one checks whether we have a backlog refinement, it's up to us.” (Interview 3)*. This flexibility was perceived as positive by the interviewees as you can, for example, prioritize activities when you feel other things take more energy, which was highlighted in Interview 9:

“We have removed some things. We don't have a demo, for example. I removed it when I was a scrum and it was really because we felt that we did not have time for it. And that's probably not good really. What do you prioritize? Is it to follow the way of working completely or is it to deliver. Even Retrospective we don't have that often, once per PI-max.” (Interview 9)

The fact that teams to some extent choose how strictly they follow different parts of SAFe may raise questions about the risks being overlooked, especially if important value-adding activities are not prioritized.

4.2 Team Prerequisites

In the interviews, interviewees described a number of internal conditions that influenced how the teams functioned in their day-to-day work. These included both structural aspects, such as roles, experience, and how tasks were handled within the team, as well as relational aspects related to teamwork.

The role of the ScM (**ScM role**, EF7) was described in the interviews as a combined role, where the ScM is responsible for both team facilitation and technical development. *“In the sense that everyone who is a Scrum Master is actually a developer who has become a Scrum Master.”* (Interview 10). The role is further described in Interview 9:

“The idea is that you should work 50 with Scrum and 50 with your role, whether it is documentation or development. But in reality is it 30% Scrum, 30% development and 40% just questions on the side or time between meetings as I talked” (Interview 9).

Interview 10 mentioned that part of the work as ScM is to filter and collect information from different parts of the organization. However, it was noted that this information is not always passed on to the team:

“So the goal is that as a Scrum Master you should take in a lot of information and then you can filter it out to your team and just, this is what I heard. And it’s very unusual to hear something that you want to pass on to the team.” (Interview 10).

Two interviews also expressed that the ScM role was not perceived as equally rewarding as the technical work, and that it could be difficult to stay motivated for Scrum-related tasks when these took time away from technical development. A complementary observation, confirmed by informal conversations, is that several of the current ScMs are relatively new to the organization, both in terms of age and length of employment. This, combined with a strong desire for technical development, can influence how the role is understood and prioritized in practice, which also can influence the team’s functioning and delivery ability.

Experience (EF8) within the team was only mentioned in one interview, but gives an insight into how it influences the team’s way of working. The interviewee explained: *“Sometimes it may be that someone who has worked in the function for a very long time defines stories. Because that’s who knows what to do.”* (Interview 10). This suggests that experience can play an important role in shaping the team’s

capabilities.

The interviews also highlighted differences in **task ownership** (EF9) between teams. Some teams operate in a more person-dependent way, with divided areas of responsibility and expertise, meaning they rely more on individual experience and initiative: *“And that we have more specialized roles, that we are more experts in our field. But we are not so diverse within the team.”* (Interview 9) and *“And then we also find it difficult to let everyone take any task. If everyone could do everything, everyone would have to be at everyone’s meetings.”* (Interview 3). Other teams were described as more person-independent, in line with agile principles where team members are expected to be able to take responsibility for any task within the team: *“We are working a lot on this and we have quite a T-shaped team so many people are involved in many areas. So it distributes the workload in a good way.”* (Interview 7). These descriptions reflect different ways of organizing work within the team, ranging from individual responsibility to a more shared and flexible approach.

Another aspect that influences the team was the way knowledge was shared within the team (**Knowledge sharing**, EF10). In some teams, it was described that the team actively shared their expertise and encouraged each other to take on unfamiliar tasks as a way to learn. One interviewee explained: *“We test a lot, that someone else tries to do a task that another person is more specialized in. So they can learn.”* (Interview 9). Another interviewee described how knowledge was regularly spread across the team: *“I think we’re pretty good, I would say, at sharing our area of knowledge within the team. To spread what we know, so that everyone can help out with a lot of things.”* (Interview 1). These descriptions point to a way of working that supports learning and flexibility by making knowledge more accessible across the team.

Teamwork (EF11) was also mentioned as something that could affect the team’s ability to deliver. Some interviewees described that when the team worked together and supported each other, it became easier to meet deadlines. One interviewee expressed: *“If you have a team that works as a team and everyone can help each other, it is easier to deliver on time, I think”* (Interview 12). Another described how the team could speed up delivery by putting collective effort into a task that was important to complete: *“Yes, but that’s a bit what we were talking about at the beginning, that if there is something that is really important to deliver, we can put a lot of pressure on it by helping each other and getting this out as quickly as possible.”* (Interview 11). Teamwork was also seen to be linked to motivation. One interviewee reflected on how working together, rather than doing things alone, made a difference: *“And then another thing that helps me a lot, which I noticed last PI that we have had. Teamwork, not doing things alone. It helps my motivation in any case”* (Interview 1).

In addition, it is also clear that **team capacity** (EF12) plays a key role in how well tasks can be performed. *“Yes, the capacity of the team has a very direct impact on our ability to deliver. It’s one to one, I would say.”* (Interview 11). Team capacity

is in turn affected by **resource constraints** (EF13) and the need for one person to fulfill multiple roles.

"I feel that it is a big problem that we are often forced to have many different roles for one person in our grouping. Precisely because there are so few of us, it is almost as if everyone has more than one role, I would say." (Interview 2)

This in turn also affects motivation: *"Such parts affect a lot and it is clear that a difficult resource situation where the team feels that you lose motivation because you still do not have time." (Interview 2).*

4.3 Communication and Information Sharing

A recurring theme in the interviews was the lack of communication (**Communication and transparency**, EF14) and lack of information (**Information flow**, EF19), as shown in these three quotations:

"[...] Yes, because I think that I believe that there is quite a lack in the flow of communication." (Interview 2)

"I hear from a lot of people that they feel we don't really know what is happening right now in our department. What are the other teams working on? That there is perhaps a lack of information." (Interview 2)

"This is an ongoing, or at least has been, very much an issue that has concerned the teams. They say they're not getting the right information." (Interview 12)

Lack of these two factors in turn affects the work of the teams: *"We are slowed down by not knowing. We do not know how it is intended" (Interview 3).*

Several interviewees pointed to different factors that may help explain why this lack of information occurs. One interviewee felt that there was a lack of communication between leadership and teams: *"But I think there is some kind of problem in communication more at the top. With management or how to prioritize and so on. There I think there are often some mismatches." (Interview 1).*

Some interviewees suggested that this was due to communication not reaching all the way, or lack of transparency in how information was shared.

"No, I would say it was not very clear because it was not communicated all the way. [...] But I could do my job and keep working, but you lose touch with the expectations and understanding of how it fits in" (Interview 8)

“[...] Maybe a bit linked to the fact that we are not transparent enough in showing what we are doing and what the status is.” (Interview 12)

When information is lacking, some people take it upon themselves to seek this information through informal conversations or to investigate it on their own, which in turn affects who does and does not receive information:

“Well, I should say. I guess I have that information because I talk to people a lot [...] But I don’t think the general teams always have the information about why we don’t get on time or what’s going on.” (Interview 9)

“It is often the case here at Volvo that you have to do some digging yourself. To find out what you need” (Interview 4)

“I would say I have regular meetings with the different people but then I quite like the corridor discussion around the coffee and things like that so formal and informal” (Interview 6)

One interviewee highlights the **human factor** (EF20) of not always being able to convey the right information: *“Yes, of course, now I have the role that it is really me who should come forward with the information. But of course, I don’t always succeed one hundred percent. So there are such occasions” (Interview 11).*

Another factor that may help explain why this lack of information occurs is the **geographical location** (EF16), as highlighted in these two interviews:

“On the one hand, when we have teams that are in different geographical locations [...], it makes things much more difficult. But not being able to meet as quickly and easily” (Interview 12)

“As we work globally, we do have meetings with our colleague in India. But we also have meetings with the US. And we try to have a meeting with someone who is in the US and India at the same time. It’s not really possible in terms of time. So that’s a problem.” (Interview 3)

While geographical location affects communication and information flow on a broader scale, the internal **office layout** (EF15) further influences this. As stated in Interview 5, when problem arise, it is easy to go and talk to people and get help because they sit so close to each other: *“Everyone is very helpful, so we have no problem. Usually you can almost. At the minute just go and ask if you can get help with something [...]” (Interview 5).* However, observations suggest that a lack of office space for all team members affects where people can sit and work, which in turn affects information sharing and team collaboration. It was also noted that that Microsoft Teams is commonly used for meetings, indicating that information is also communicated virtually in addition to in-person interactions.

Team size (EF17) is another factor raised by two interviewees, but with different aspects, suggesting that the team size influences the information exchange and facilitates it if it is a smaller team size.

“Because now the meetings tend to be quite long. If we go through what is it, 11-12 people?” (Interview 9)

“We are quite a few people so it is very easy to keep everyone updated” (Interview 1)

The findings further suggest that lack of documentation (**Documentation**, EF18) can create information gaps, as highlighted in Interview 12 where Jira (the departments working and documentation tool) was not updated:

“[...] I rely a lot on Jira to be there and can find the information then. [...] But if Jira is not updated, it is difficult to see easily. And you have to ask a lot more extra and go around and look. It becomes unnecessary and boring work that just takes energy.” (Interview 12)

Although documentation can enable information sharing, it is a task that is perceived to take time away from core activities and serves no purpose, as shown below:

“But many people think it takes too long to do the documentation part. [...] I think some people think it’s more administrative than it is valuable.” (Interview 4)

“I would say for the team they don’t care. It’s important for people who want to follow up what is happening and to have an idea.” (Interview 6)

4.4 Project Prerequisites

Within SAFe, PI planning is an important step where teams plan what they will deliver during the upcoming PI. During these planning sessions, teams define the work to be executed and make estimates of what is possible to deliver within the PI. The aim is to formulate realistic goals and create a shared commitment to what will be achieved.

Despite this, challenges related to planning were described. It was expressed that teams tend to overplan what can actually be delivered within the time-frame. *“For some reason, we continuously overcommit. We plan more than we manage to deliver” (Interview 12).*

In 11 of 13 interviews, it was highlighted that clear and well-defined work (**Defined work**, EF21) is perceived as important for realistic planning. It was described that if the work is well defined, both in terms of stories and features, is it a prerequisite

for being able to deliver what has been planned.

"It is partly well-defined stories. But also that the work is well defined. So you know what needs to be done and how much time it will take. Because then you can also see in good time if there are potential threats to the plan. And that you can solve it that way. And certainly that you are out in good time." (Interview 10)

"The clearer a story is, or a feature is, the easier it will be to understand how long it will take." (Interview 8)

But defining the work clearly is easier said than done. It emerged in several interviews that **uncertainty** (EF22) has an affect on the estimation of the work. Meaning when one has not worked on similar tasks or project before it often becomes difficult to estimate how long things will take. Interviews 7, 11, and 13 are some examples that address this:

"I think the biggest reason why we don't deliver on time is our ability to assess how long things really take. Even though we've been doing it for a few years. You don't learn. We have gotten better, much better over time. we can say that. But it still is. Yes, new things come in that you've never done before and it happens. Or it turns out that it is not as straightforward as you might have thought." (Interview 11)

"Yes, estimating when planning how long a job will take. It's quite difficult. Sometimes it's spot on and sometimes you think it's going to take two days and then it take two weeks instead. Often when you enter a new area, you don't really know how long it will take. Then the aftertaste gets worse too. So we have experienced that recently. That things take longer than we first thought." (Interview 7)

"We do redo things, but with some adjustments. For example, sensors and so on. [...] Redoing these things means that we know what we did before and how long it took approximately. Or yes, it can be anything. But if you have done something similar, then it is quite easy to do something. Estimate how long it will take next time." (Interview 13)

In addition to the challenges of defining the work and estimations how long something takes, **side tasks** (EF23) were also raised as a factor affecting the execution of the plan. In 9 out of 13 interviews, it was mentioned that side tasks, referring to tasks not included in the original PI plan, often arose but still needed to be handled. Interview 7 expressed that these tasks have a high priority and push aside already planned work, which means that the team is forced to re-evaluate their commitments in the middle of a PI: *"But things can come up quickly that are very important. And then you have to replan and deal with them." (Interview 7).*

Furthermore, side tasks not only affect planning, but can also disrupt work, create inefficiencies, and take energy:

“It’s when things come in from the side [...] It makes you less efficient and it disrupts a bit.” (Interview 10)

“[...] we have to do this now and you drop what you are doing. To start with it [the original assignment] again, you take it. It takes quite a while before you can pick up where you left off if you let it go because that’s how it is. It’s heavy too, so I’ll tell you, that’s what’s most disturbing now.” (Interview 5)

And at the same time it can also create frustration in the team: *“[...] It means that things come up that you haven’t anticipated and that need to be done quickly. There are some things like that that can take some energy. There is a little frustration in the team.” (Interview 11).*

To address this, several teams described that they now anticipate such tasks already in the planning stage. By planning a buffer or setting aside capacity for unplanned activities, they try to manage the unpredictable. One interviewee explains it as follows: *“You allow for such uncertainties that something comes in from the side that has to be done immediately. It usually works well” (Interview 7).* While another explained it like this: *“We have what we call a focus factor. So we only occupy ourselves up to a certain percentage. And it’s a bit different for different developers in the team” (Interview 13).*

It is important to note that, due to the spontaneous and unplanned nature of side tasks, they are usually not documented in Jira. This became evident during Interview 5, in response to the question: *“How do you handle tasks that come in from the side? Do you document them in Jira, or how does it work when it’s something unplanned?”* The interviewee explained: *“No, we do not do that.[...] We don’t document it anywhere, we just do things.” (Interview 5).*

Another perspective raised in one of the interviews concerned the overall responsibility for keeping the planning together over time (**Project manager role**, EF24). Currently, in line with SAFe, there is no formal project manager role responsible for ensuring that deliveries actually take place as planned. This was highlighted by one interviewee who believes that the introduction of a project manager who has specific responsibility for delivery would help ensure that deliveries are made on time: *“To have a project manager. [...] Because I will have someone who cares about delivery dates and who will drive all the different flows towards the same date.” (Interview 6).* The same interviewee said: *“[...] there is no one who cares about the schedule as a project manager” (Interview 6).* Although SAFe allocates responsibilities to different roles, this statement points to a perceived need for a more unified function that can support the delivery capability by coordinating, following up, and taking responsibility for the whole.

Lack of transparency in **long-term goals** (EF25) emerged as a recurring theme and was mentioned in 8 of 13 interviews. Several interviews described a lack of a clear overview of the direction ahead, which in turn made it difficult to understand how their individual work was connected to the larger goals. This led to descriptions of a lack of context and direction in their daily work. The following three quotations illustrate this:

"But maybe, it's a bit difficult with these long-term plans. I probably would have liked more of that after all. Than like, to feel more connected to what comes from far away." (Interview 1)

"Yes, for PI planning, it feels pretty well prepared. You have more of a list of what to do and what is prioritized. But then further ahead I think it's a bit more difficult." (Interview 10)

"Perhaps even more clarity and emphasis on what our work leads to. So you get an understanding of what you are working towards and feel motivated by it." (Interview 8)

In the third quote from above (Interview 8), it was emphasized how a better understanding of the big picture is linked to motivation. This is associated with a statement from Interview 1, where the interviewee described finding it difficult to feel engaged when the direction of the work was unclear or when it was uncertain whether their efforts were making a real difference: *"It's very frustrating when you do a lot of work that doesn't lead to anything or doesn't help in any way." (Interview 1)*. This can be interpreted as a consequence of the absence of the description of long-term goals. When it is unclear how current tasks contribute to future outcomes, it becomes difficult to feel a sense of purpose or connection to something bigger. This feeling is further reinforced by another statement from the same interview: *"Then there is also the feeling that you can somehow influence." (Interview 1)*.

These statements indicate that understanding the long-term goals is not only important for structural overview, but also for the individual's sense of belonging, participation, and responsibility of their work.

Even when long-term goals were clear, interviewees described them as being so far in the future that it was difficult to relate them to day-to-day work (**Project milestones**, EF26). From the interviews it was highlighted that the nearest project milestones were several years away, making it hard to see how current efforts contribute to the bigger picture. This is illustrated in the following quote, where postponing planned partial deliveries to the next PIs is not perceived as particularly problematic: *"Now that this milestone is so far ahead, the real one. Then you sometimes feel that it doesn't matter so much that it goes over to the next one, you just take it in the next PI." (Interview 7)*.

To address the perceived distance to the project milestones, the same interviewee described how the team themselves chose to concretize the overall goals by creating

smaller, more manageable sub-goals: *"But being able to discretize it a bit so that you have a few milestones along the way does quite a lot actually. You feel more motivated."* (Interview 7). This highlights the importance of translating long-term objectives into tangible, operational targets to foster a stronger connection to day-to-day work. When milestones are too distant, they risk losing their function as guidance in the daily work.

Another recurring theme was the limited visibility of how work flows between teams (**Limited project visibility**, EF27), which was mentioned in 8 of 13 interviews. These interviews described an uncertainty of how work flows between teams, within the ART, and how work relates to each other. This lack of understanding appears to contribute to fragmentation in day-to-day work, particularly when visibility into the progress of other teams and the overall interconnections is limited. The need for a clearer context and a shared understanding was notably articulated in Interview 8: *An explanation and justification of features is also very valuable to understand how things are connected to the rest of the ART, and that you get some of the understanding of how everything is connected, basically.* (Interview 8).

The absence of a common understanding of the process flow can also contribute to feelings of isolation between teams. This is expressed in another quote, where the interviewee reflects on the lack of transparency and interest from others:

"And if I say something about hardware, then everyone stops listening for a bit. Because it's so completely out of their. They don't know what I'm talking about. Because they have no idea what we do. So I can miss that, or I can find it a bit frustrating that there's not much interest in what we do. We are just there." (Interview 3)

Customer involvement (EF28) was not a common topic in the interviews. However, one interviewee highlighted the importance of involving external customers in the process, particularly through demos at the end of each PI. This was described as a valuable opportunity to receive feedback and strengthen the connection between what is delivered and what the customer actually needs:

"What gives the most value are our demos, I think. Because that's where we show what we've done and get feedback on it and discuss what to do next. And that's probably the most important thing. And maybe that's what we're the worst at, I think. In any case, doing it together with the customer, the one who actually cares about what we deliver, the one who receives our deliveries, has ordered, you could say. But that's something I'm trying to change, at least for our team, we have set up now that we have one at the end of every ten weeks, that we have a demo with together with our external customers. (Interview 13)"

Taken together, the empirical findings reveal a set of prerequisites factors that shape a team's ability to plan realistically and deliver effectively.

5

Discussion

This chapter discusses and analyzes the two research questions. Section 5.1 addresses RQ1 by highlighting and discussing the 28 factors that appear to influence on-time delivery in comparison with the revived literature. Section 5.2 addresses RQ2 and visualizes how these factors are directly or indirectly related, based on the empirical findings.

5.1 Comparing Empirical Findings with Literature

The empirical findings, regarding RQ1, have been compared to the literature, with Figure 5.1 providing an overview of what has been found across the two different areas. The x-axis represent the literature findings, while y-axis represents the empirical findings. Both axes have 'yes' and 'no' indicators, reflecting whether a factor was identified or not in each area. Figure 5.1 highlight three different categories: factors found in both the literature and empirical data; factors found only in the empirical findings; and factors found only in the literature findings. These three categories will be discussed in more detail below.

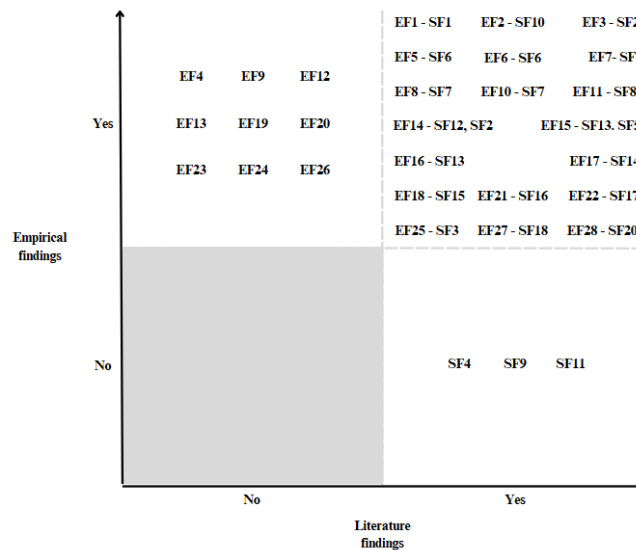


Figure 5.1: Comparison between factors found in the empirical study vs literature.

5.1.1 Factors in Both Empirical Findings and Literature

This section presents factors from the empirical material that are aligned with previous research and thus confirm existing success factors in agile working methods.

Dependencies (EF1)

Findings from the interviews indicates that the teams' ability to deliver work on time is highly influenced by dependencies (EF1). Interviewees described dependencies within the ART, to other functions outside the ART, and to external parties. These dependencies also vary between PIs, depending on what features are prioritized. The ART currently address dependencies by highlighting them early, to clarify what the teams themselves can and cannot do, enabling more realistic planning.

Task dependencies (SF1) are discussed in 1 out of 11 articles. Kula et al. (2021) highlights that if dependencies are staying unresolved, it creates more delays. Furthermore, they emphasize that poor communication regarding dependencies often leads to more delays. However, as found in practice, even when made visible, external dependencies often remain outside the teams' control, which limits their ability to deliver features on time. This indicates that despite SAFe's emphasis on coordination through PI planning and structured roles, dependencies remain a barrier to both predicting and completing delivery on time (Scaled Agile Inc, 2021c).

Management decision (EF2) and Management involvement (EF3)

The result indicates that when decisions from management (EF2) are delayed or frequently changed, it negatively affects the team's ability to deliver work on time. Another important aspect that emerged from the interviewees concerns the active involvement of management (EF3). Some participants expressed a desire for more support, while others felt the need for more pressure. This suggests a balance between supportive and directive management.

These findings can be linked to the success factors of management commitment (SF2) and team autonomy (SF10). Active management involvement enables successful delivery of projects and influences the team's decision-making process (Kula et al., 2021; Pacagnella et al., 2024). Literature highlights that team-driven decision-making indicates high-level of team autonomy, which is important for productivity and morale, something that was to some extent missing in the empirical findings (Barros et al., 2024; Dikert et al., 2016). This further aligns with Lean-Agile principle 8, explained in Section 2.2.3, fostering trust and empowering team decision-making (Scaled Agile Inc, 2021m). All of these factors influence the team's ability to complete work on time.

SAFe in practice (EF5)

SAFe is designed to provide structure, coordination, and defined roles to support agile at scale. In the context studied, these elements were generally in place, but the

interviews revealed variations in how the framework matched the reality of day-to-day work. Many participants described benefits, while others highlighted challenges between the framework and their work tasks (EF5).

In particular, several interviewees pointed to the fixed time structures of PIs as too rigid. Teams working with unknown tasks, dependencies, or long lead times described difficulties in estimating and scoping their work during PI planning. This made it challenging to commit to delivery timelines, as important information often emerged gradually. These challenges were especially noticeable in hardware-related work, but also mentioned in other settings related to uncertainty. The findings suggest that SAFe's standardized cadence may not fit all types of workflows or teams.

These reflections highlight the importance of adaptation to the context, which is emphasized in SF6 (agile approach and maturity). According to Dikert et al. (2016), agile methods need to be continuously tailored to reflect the operational reality of different teams. Applying a framework without taking these circumstances into account risks reducing its effectiveness and increasing friction in, for example, planning.

SAFe activities (EF6)

Another emerging theme was how differently SAFe activities (EF6) was applied across teams. While some teams followed the framework closely, others chose to opt out of certain activities due to workload or perceived value. This flexibility was appreciated, as it allowed teams to focus on what they considered most relevant.

This factor is in line with SF6. Where Dikert et al. (2016) emphasize that teams who tailor agile frameworks tend to perform better than those who apply them without reflection. Emphasizing the importance of tailoring the framework. However, the literature about SF6 also warns against discarding core agile principles. Although some adaptation is necessary, some activities are fundamental for team learning, coordination, and long-term delivery capacity. This means that tailoring the framework must be done with care to ensure that effectiveness is not compromised.

Scrum role (EF7)

The role of the ScM was described in several interviews as a dual function role, and it was also brought up that scrum-related tasks were deprioritized in favor of technical work. Additionally, it was observed that several ScMs were relatively new to the organization. These findings support the relevance of SF7 (team capability), which in the literature includes not only team members' collective skills and experience, but also the competence and leadership qualities of individuals in key roles (Binboga & Gumussoy, 2024; Tam et al., 2020). Which could mean, when a ScM role lacks clear focus, or when individuals in the role are inexperienced or less motivated to engage in facilitation, it may impact the team's ability to coordinate, reflect, and continuously improve.

Experience (EF8)

Experience in the empirical result was described as how individuals with more experience took the responsibility for defining stories. This is in line with SF7, which emphasizes the role of accumulated knowledge and experience in supporting effective delivery (Kula et al., 2021; Pacagnella et al., 2024). The literature also highlights that teams with more experienced team members contribute to faster problem-solving and more accurate scoping. Although this factor was only mentioned in one interview, the litterateur is highlighting its relevance.

Knowledge sharing (EF10)

Some teams described how they actively shared knowledge internally, for example, by encouraging members to try unfamiliar tasks or by spreading expertise across the team. Which SF7 brings up, where Pacagnella et al. (2024) discusses not only individual competence, but also how effectively knowledge is distributed and applied within the team.

Teamwork (EF11)

The interviews also pointed to the importance of EF11 to enable on-time delivery. Several participants described how collaboration, mutual support, and shared focus helped their teams to overcome challenges and meet deadlines. A strong sense of working together, rather than in isolation, was also linked to higher motivation and engagement.

The empirical findings confirm the relevance of SF8 (team dynamics), which highlights the role of interpersonal relationships, communication, and trust in supporting effective teamwork (Barros et al., 2024; Kula et al., 2021; Pacagnella et al., 2024). According to the literature, teams with strong dynamics are more adaptive, better at coordinating, and more resilient to change. The findings of this study support this view, showing that teamwork could be an enabler of on-time delivery.

Communication and transparency (EF14)

The results suggest that there is a lack of communication (EF14) within the ART. It was reported, in one interview, that lack of communication between management and teams cause misalignment in priorities and understanding. When there is a mismatch between what management expects and what teams perceive, it negatively affects the work being performed. The literature highlights the importance of effective communication (SF12) with management for project performance (Kula et al., 2021; Pacagnella et al., 2024). Pacagnella et al. (2024) further emphasizes that active management involvement (SF2) fosters a strong communication culture, which is essential for supporting agile practices and enabling teams to fully utilize the agile method. Without this, the ART's ability to deliver work on time is compromised.

In addition to general lack of communication between management and teams, the empirical findings suggest that important information is sometimes not communi-

cated transparently enough or does not reach all members (EF14). This lack can lead to misunderstandings and misalignment in priorities. In theory, as described in Section 2.2.5, SAFe include several practices to promote structured information flow and transparent communication, such as daily stand-ups, system demos, and Scrum of Scrums (Scaled Agile Inc, 2021i). However, as indicated in the interviews, even if these practices are in place, the information does not always reach all the way and to all relevant people.

Office layout (EF15) and geographical distribution (EF16)

Two factors raised in the interviews that could explained the lack of communication and information sharing were EF15 and EF16. According to Kula et al. (2021), team members who are dispersed (SF13) face greater challenges in collaboration and communicating efficiently, leading to reduced efficiency. This is consistent with what emerged in two interviews that highlighted difficulties when team members are spread across different countries and time zones. Pacagnella et al. (2024) supports this argument and discuss that co-located teams (SF13) benefit from quick and informal conversations, which in turn enhances collaboration. Further, an observations of limited office space constitute an additional obstacle to coordination and communication among team members. Moreover, empirical findings indicated that information is shared both through formal structured channels and informally, often through spontaneous conversations. While this can facilitate quick exchanges, it also creates a risk of uneven information sharing, especially in distributed teams where not everyone has equal access to these informal networks. In line with this, it was observed that communication often occurs both in person and digitally. This diverges from traditional agile practices that emphasize face-to-face communication (Pacagnella et al., 2024) (SF5). However, Binboga and Gumussoy (2024) notes that during the COVID-19 pandemic, many organizations successfully adopted hybrid work models, potentially leading to the need of reshaping how agile practices are interpreted in modern contexts.

Team size (EF17)

Another factor highlighted in both interviews and literature is team size (EF17, SF14). According to the interviews, larger teams were perceived to struggle more with communication and information sharing. This is supported by Binboga and Gumussoy (2024), who argue that larger teams often face both communication and coordination challenges. In addition, it may be more difficult for larger teams to utilize SAFe events, such as the daily stand-up as mentioned in Section 2.2.5. The purpose of this short meeting (15 min) is to quickly review the team's work (Scaled Agile Inc, 2021j). However, the larger the team, the more time it takes to review the team members work. This indicates that team size plays a key role in sustaining efficient information flows.

Documentation (EF18)

Lack of EF18 is another point highlighted in the interviews as a potential cause of creating information gaps, which in turn affects the team's work. One article discusses the importance of right amount of documentation (SF15) to balance agile values with knowledge sharing and maintenance (Binboga & Gumussoy, 2024). This indicates that documentation serves its purpose if utilized in the right way and in the right amount.

Defining work (EF21)

Several interviewees emphasized the importance of having clearly defined work (EF21), both at story and feature level, in order to plan realistically and deliver according to expectations. When the scope of work is well understood early in the process, teams feel more confident in their estimates and in their ability to meet deadlines. In contrast, vague or high-level requirements were described as a source of uncertainty in planning.

These findings confirm the relevance of requirements refinement (SF16), which is highlighted in the literature as a success factor. According to Dikert et al. (2016), breaking down high-level requirements into clear, actionable stories is important for predictability and coordination. Kula et al. (2021) also emphasize that a well-structured refinement process supports the identification of dependencies between teams.

Uncertainty (EF22)

The EF22 factor refers to the challenges teams face when working on things they have little or no previous experience with. Several interviewees described how new types of features or unfamiliar projects contributed to a sense of uncertainty. This made it difficult to plan and estimate work accurately, resulting in over-scoping. When the content of a feature is not well understood at the time of planning, teams struggle to make realistic forecasts.

The consequences of EF22 support the relevance of SF17 (project type), as identified by Tsoy and Staples (2021), who argue that the level of familiarity with a given project type significantly affects teams ability to define and estimate tasks. When teams have worked on similar projects before, planning is generally more reliable. In contrast, unknown or new projects entails a higher degree of uncertainty, which is confirmed by the interviewees in this study. This uncertainty appears to be a reason for difficulties in defining and forecasting delivery timelines.

Long-term goals (EF25)

A recurring factor in the interviews was the limited insight into long-term goals, especially in terms of how the day-to-day work are connected to those goals. Several interviewees described a disconnect between what was planned and executed during a PI and the broader direction of the organization. This sense of misalignment

appeared to negatively influenced motivation and made it harder for individuals to understand the value of their contributions. The findings suggest that when teams lack a clear connection to the organization’s long-term direction, it becomes harder to stay motivated and understand the broader purpose of their work.

These findings highlight the consequences of not fulfilling the conditions described in SF3 (organizational environment). According to the literature, alignment between an organization’s strategic direction and the day-to-day work of its employees is important for motivation and performance. The empirical data supports this by showing that when long-term goals were unclear or perceived as too distant, team members struggled to understand the purpose of their work, leading to reduced engagement and direction.

The importance of connecting long-term goals to daily work is not only emphasized in the literature on success factors, but also in the theory of SAFe. Alignment is one of SAFe’s four core values, explained in 2.2.2, and is defined as the principle that *“everyone in the organization, from teams to managers, is moving towards the same strategic goals”* (Scaled Agile Inc, 2021a). SAFe attempts to bridge the gap between strategy and execution through configurations that link portfolio-level planning with work at the ART level, including roles such as the Epic Owner and the breakdown of epics into features and stories (Scaled Agile Inc, 2021). However, from the interviews it suggest that this were either not visible or not effectively communicated to team members in the studied context. As a result, the strategic intent behind features or stories could be perceived as vague or disconnected.

This highlights why SF3 is a critical success factor to have in place. When teams are not clearly linked to the organization’s strategic objectives, it affects not only motivation, but also coordination, prioritization, and could in that way affect the ability to deliver effectively.

In contrast to the lack of clarity around long-term objectives, several interviewees expressed that they had a clear understanding of what was expected within the current and future PI. This suggests that short-term goals were well communicated and understood, a strength of the current approach. It also reflects SF18 (clear objectives and goals), which emphasizes the importance of clearly defined and shared objectives to support focus and coordination. Maintaining this clarity at the PI level is therefore something that is important to continue with, and possibly take inspiration for how long-term goals can be displayed.

Limited project visibility (EF27)

Another factor from the empirical findings that also aligns with theory is the factor EF27. This refers to the limited insight into how work flows between teams within the ART. Participants described uncertainty regarding how tasks were connected across teams and limited understanding of the overall process. This lack of visibility appeared to contribute to fragmentation in daily work and, in some cases, even to feelings of isolation between teams. Interviewees emphasized the need for a clearer

overall context and a shared understanding of how their work relates to that of others. If teams do not understand how work moves through the organization or what happens before and after their part, it becomes more difficult to prioritize and coordinate, which could affect the on-time delivery.

The consequences of EF27 confirm the importance of SF18 (project visibility), which highlights transparency and shared understanding as critical enablers for coordination and successful delivery. According to the literature, when key stakeholders and teams have insight into project status and dependencies, it improves communication, reduces misunderstandings, and supports effective collaboration. In particular, Shameem et al. (2017) emphasize that visibility should not be limited to individual teams, but must extend across the entire delivery system to ensure coherence and alignment. The findings of this study support that without a clear understanding of how one's work connects to others, collaboration becomes fragmented and the sense of shared purpose is weakened.

Customer involvement (EF28)

EF28 was only mentioned in one interview, where the interviewee described how their team had recently decided to hold regular demos with external customers at the end of each PI. This was done in order to strengthen the feedback loops and better align deliverables with customers' needs. This aligns with SF20 (customer involvement), which is one of the factors that has been mentioned the most in the literature. It is described that frequent collaboration with customers is said to manage expectation and prevent delays (Binboga & Gumussoy, 2024; Kula et al., 2021). Although only one interviewee raised this point, their reflections confirm the relevance of the factor and suggest that increased customer involvement may be an area for improvement in the studied ART. It also indicates that teams themselves recognize the value of involving customers more closely, particularly in a delivery context where feedback can influence both direction and motivation.

5.1.2 Empirical Findings Not Reflected in Literature

This section presents the empirical factors that have not been addressed in the reviewed literature, but which may have an impact on on-time delivery in agile contexts.

Agile way of working (EF4)

EF4 emerged in the empirical material as a factor that influenced delivery, but it is not directly addressed in the success factor literature. Specifically, several interviewees described challenges when collaborating with external parties who did not follow SAFe or similar agile frameworks. Differences in planning cycles, workflows, and delivery expectations were perceived as a source of friction. While not evident in the reviewed literature, the ability to work effectively in a non isolated SAFe context may be an important prerequisite for on-time delivery. At the very least,

teams may need to plan for and adapt to these external differences to maintain flow and delivery predictability.

Task ownership (EF9)

The interviews indicated that there were differences in how responsibilities for tasks were distributed within the teams. Where some teams structured themselves more on the basis of having areas of expertise, while others had a more shared task ownership. By organizing themselves on the basis of shared ownership, this affected the resilience and flexibility of teams in the event of absences, changing priorities, or handovers. Although this aspect is relevant in the studied context, it was not reflected in the success factors identified in the reviewed literature.

This raises the question whether shared ownership of tasks should be considered a success factor in itself. Although full replaceability is not always realistic, it can reduce risks and contribute to a more predictable delivery, by ensuring that several team members are knowledgeable in multiple areas. The empirical evidence suggests that how responsibilities are distributed within teams can have a significant impact on coordination and stability, which may warrant further attention in future research on agile success factors.

Team capacity (EF12) and resource constraints (EF13)

Another recurring theme in the interviews that appear to affect the ability to deliver work on time was EF12 and EF13. Through several interviews, participants described limited resources and that team members were required to cover multiple roles, which hinder their ability to execute planned work efficiently. Although these factors suggest a clear impact on delivery performance, they are not addressed in the literature. This may be because agile frameworks often assume well-defined roles and sufficient resources. However, the results indicates that when teams face resource constraints or role ambiguity, even structured planning can break down. Clear roles and balanced workloads, which may seem basic, are important preconditions for predictable delivery and may deserve more attention in future research.

Information flow (EF19)

The empirical data suggests that there are gaps in the flow of information (EF19). However, this factor has not been explicitly addressed in the reviewed literature on success factors, which primarily focuses on the aspect of communication. In this context, communication usually refers to the exchange of information, whereas information flow, as indicated by the interview data, can also include how information is documented, made available, and shared between different roles and teams. Although the literature does not distinguish between these two dimensions, the empirical results suggest that both aspects are relevant and that the broader concept of information flow should be explored further.

Human factor (EF20)

Another factor raised in one of the interviews was the human factor as a barrier to information sharing. This has not been discussed in the reviewed literature, but it is important to recognize that the human limitations, such as forgetfulness, can affect what information is shared or not. While this may be a natural and to some extent an unavoidable aspect, it still has implications for the effectiveness of information flow.

Side tasks (EF23)

Another factor in the empirical result that appear to directly affect on-time delivery is EF23. These tasks are not part of the initial planning, but are often urgent and cannot be ignored. Although this was described in several interviews as a recurring challenge, it is not reflected in the reviewed literature on success factors. The results indicates that side tasks not only disrupt planned workflows and force sudden re-prioritization, but also create inefficiency and frustration among team members. However, based on the empirical evidence, several interviewees described that this could be managed, by including buffer time in their PI planning to deal with such unexpected work. However, as side tasks are rarely documented, their effect on delivery remains invisible in many follow-ups. This highlights a potential blind spot in both theory and practice, because while agile literature emphasizes planning, visibility, and adaptability, it largely overlooks the role that emergent, undocumented work has in day-to-day delivery. Based on these findings, the ability to anticipate and manage side tasks should receive attention as a potential success factor.

Project manager role (EF24)

Another factor that was only raised in one interview, but not mentioned in the literature, is the lack of a role that is responsible for overseeing the delivery over time (EF24). In the studied ART, there was no formal project manager, which is also in line with the structure of SAFe. However, the interviewee expressed a desire for a central role that focuses specifically on ensuring that deliveries are made according to plan. According to this perspective, a project manager could help coordinate efforts, monitor progress, and take overall responsibility for the delivery. This idea is not reflected in the reviewed literature on success factors. Which could highlight a potential gap between the SAFe structure and practical delivery management, and raises the question of whether some roles that lie outside SAFe may still have relevance in scaled agile contexts.

Project milestones (EF26)

It was also mentioned in the interviews that the milestones (EF26) guiding their work were either too distant or not broken down enough to be actionable. As a result, in some cases, delays or postponed partial deliveries were not seen as problematic, as the milestones were considered to be so far in the future that they had limited impact. This suggests that the milestones might have lost their function as

motivational or guiding markers in daily work. Although the reviewed literature on success factors did not mention milestones as a success factor, it is supported by the Lean-Agile Principle 5, explained in Section 2.2.3, which emphasizes the importance of using milestones based on objective evaluation to ensure that work is progressing in the right direction (Scaled Agile Inc, 2021m). This indicates that project milestones are an important factor to have in place in order to be able to ensure that the project is being delivered on time. When the milestones felt absent, some teams solved this by creating their own milestones to make the work more concrete. While this shows initiative, it also points to a lack of top-down communication and common understanding. It also suggests that distant or abstract milestones can reduce engagement and make delivery less urgent. The results indicate that milestones are an important factor to have in place to ensure that the project is delivered on time, which also suggests that it may be an area worth exploring further.

5.1.3 Literature Findings Not Reflected in Empirical Findings

While many of the success factors identified in the literature were reflected in the empirical findings, a few were notably absent. This section discusses those factors, and reflects on why they may not have emerged in this particular context.

Organizational culture (SF4)

One interesting factor that was mentioned in literature, but lacking in the empirical findings, is cultural and social differences between team members, which can be a potential cause of friction in communication (Misra et al., 2009; Tam et al., 2020). These differences may contribute to misunderstandings, reduced openness, or variations in communication styles. Notably, the absence of this factor in the empirical findings may be attributed to the fact that most teams are co-located in Gothenburg and that the study was conducted on-site.

Personal characteristics (SF9)

SF9 is described in the literature as including traits such as communication skills, empathy, motivation, resilience, and honesty, qualities that support collaboration and commitment in agile teams (Dikert et al., 2016; Tam et al., 2020). These interpersonal attributes are considered essential for maintaining a constructive team environment and for embracing agile values in practice. Although this factor is highlighted in the literature, it did not emerge in the empirical findings. One possible explanation is that personal characteristics are difficult to identify and describe in interviews, especially when the focus is on thinking about factors that affect delivery performance. Another reason may be that such characteristics are seen more as general prerequisites for a positive working environment than as direct contributions to delivery performance.

However, it is important to consider that personal characteristics, particularly among individuals in key roles such as ScMs or POs, can have both positive and negative

influence. For example, if a person in a leadership role holds a skeptical view of certain SAFe activities, that attitude may unintentionally spread to the rest of the team and reduce engagement. This suggests that even though the factor was not raised explicitly, it may still play an indirect but important role in shaping team dynamics and delivery culture. It also highlights the importance of selecting individuals with not only the right technical skills but also constructive attitudes and leadership traits for roles with high team influence.

Training and coaching (SF11)

The literature highlights SF11 as a critical factor for building agile capabilities and ensuring correct implementation of agile practices (Dikert et al., 2016; Misra et al., 2009). However, this factor was not raised by any of the interviewees in this study. One possible explanation is that formal training is primarily offered during onboarding, making it less visible or top-of-mind for team members in their daily work. Another possibility is that, since SAFe has been established in the department since 2017, training and coaching have shifted toward informal, on-the-job learning rather than structured activities. Nevertheless, the absence of formal training does not make the factor less important. For instance, training on how to define and break down work, something several interviewees identified as a challenge, could potentially support better planning and improve delivery predictability. This suggests that even in mature SAFe contexts, continuous skill development remains a relevant area to consider.

5.2 Visualization of Factors Influencing On-Time Delivery

This study has identified factors that directly and indirectly appear to influence on-time delivery at Volvo GTT, visualized in Figure 5.2. The analysis of the empirical findings pointed to four areas that have a direct impact on timely delivery and these are: dependencies, planning, side tasks, and execution of work. Note that dependencies and side tasks are factors identified in the empirical data, whereas planning and execution of work are included in the illustration to demonstrate how certain aspects can indirectly influence timely delivery. Moreover, not all factors identified in the empirical data are included in the visualization, as they either are not confirmed to add any value or are factors that the teams cannot do anything about.

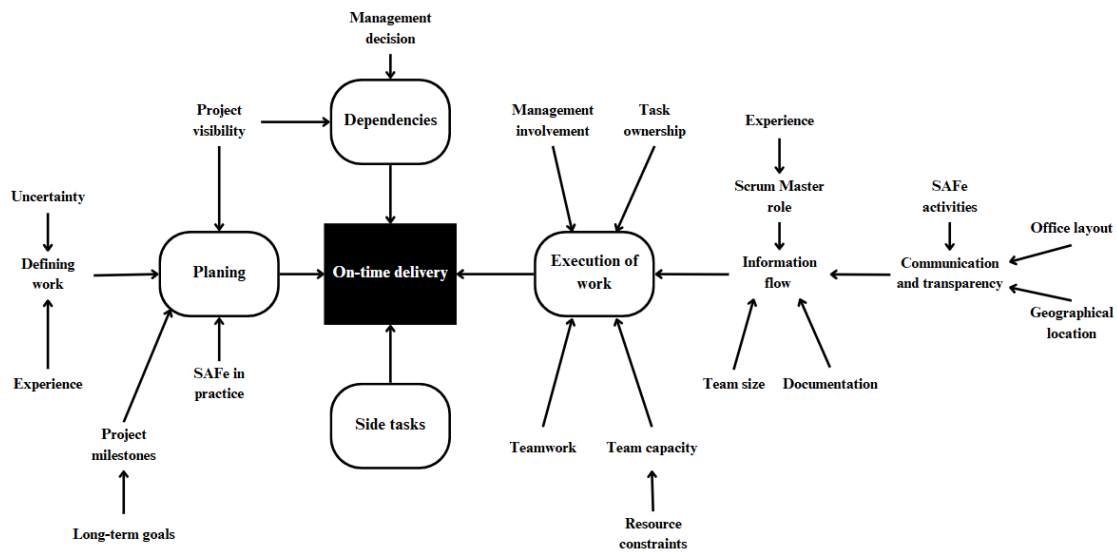


Figure 5.2: Visualization of factors influencing on-time delivery.

To validate the relevance of the visualization, it was presented to a representative from the department, who confirmed that it is valuable to support their future work.

5.2.1 Dependencies

Dependencies (EF1) are a main area that appear to have a direct impact on timely delivery of features and stories, disrupting the work of the team and creating bottlenecks. As described earlier in the report, there are different types of dependencies: within the ART, to other functions outside the ART, and to external parties. The dependencies on external parties appear to be beyond the control of the teams, making it harder to predict when a task might be completed. Another conclusion from the interviews is that the absence of decisions or constantly changing decisions from management (EF2) or other functions become a dependency, as illustrated in Figure 5.2. It prevents the teams that are dependent on these decisions to move forward and to complete work, affecting their ability to deliver work on time.

One factor found in the empirical data to affect the ability to manage dependencies is project visibility (EF27). When teams lack insight into what others are working on or how work are linked to each other, it becomes difficult to identify and coordinate dependencies effectively. Limited visibility makes it more difficult to understand how work flows across teams and time frames. In environments where different teams are working on different delivery horizons, this becomes particularly challenging. For example, one team may be working on a short-term release that is dependent on foundational work completed by another team several months earlier. Without a clear overview, such dependencies between different time periods can be missed or misunderstood. In this way, project visibility affects the ability to detect and coordinate dependencies, both immediate and long-term. When these linkages are unclear, it could increase the risk of misalignment and delivery delays.

5.2.2 Planning

Planning is another main area that appear to have a direct impact on timely delivery. This area has several indirect factors, as illustrated in Figure 5.2, which will be further described below.

The first factor to influence planing is the definition of work (EF21), which in turn is affected by both experience (EF8) and uncertainty (EF22), as seen in Figure 5.2. Experience contributes to the ability to define the work in a clear way. This includes knowing what typically needs to be included in the project, how much work is required, and how to articulate the work in a way that others can understand and act on. When work is not properly defined, it can lead to misunderstandings later in the process, which can make it harder for teams to break down features into understandable stories. In this way, experience strengthens both precision and common understanding, and therefore contributes to the definition of the work.

Uncertainty, which often arises due to unfamiliar areas or new types of projects, also limits teams' ability to define the work. When working on a project that has not been worked on before, it becomes difficult to know what to include, how long it will take, and what resources are needed, which in turn weakens the planning foundation. The ability to define work is therefore affected by both experience and uncertainty. Strong experience enables better definition of work and uncertainty weakens them. The quality of definitions in turn has a direct impact on the effectiveness of planning. Because when planning is based on weak or ambiguous definitions, teams are more likely to misjudge scope or time frames, hindering on-time delivery.

Another factor that also affects planning is project visibility (EF27). This refers to how well teams understand the broader delivery flow, and how their work relates to that of others. When visibility is limited, teams may lack clarity on how tasks are linked to each other, that is, what happens before and after their part in the workflow. This can lead to fragmented work, unclear priorities, and lack of coordination. Low visibility makes it difficult to make informed decisions during planning. If teams do not see the bigger picture, they may overcommit or miss important dependencies. In contrast, when teams have a shared understanding of the broader context, of what others are doing, and how priorities are set, it becomes easier to align plans and coordinate effectively.

An additional factor that influences planning are long-term goals (EF25). This means that the team's understanding of the current work links to the broader goals of the organization. When this view is clear, it helps teams make planning decisions that are in line with the strategic direction. It creates a sense of purpose, supports prioritization, and helps coordinate work across different time horizons. However, if the link to long-term goals is missing, planning risks becoming short-term or fragmented. This can lead to teams losing sight of the bigger picture, focusing on local goals rather than the big picture, and finding it harder to coordinate with others. As a result, they are less likely to deliver work on time.

One way to strengthen the understanding of the long-term goals is through the use of the factor project milestones (EF26). Milestones can act as concrete markers that link long-term goals to short-term execution. When they are clear, relevant, and well-communicated, they help translate abstract strategies into actionable progress points. This makes it easier for teams to understand where they are heading, why their work matters, and how it contributes to a bigger picture. In this way, project milestones support the creation of meaningful long-term goal understanding, which in turn improves planning. Without that bridge, planning can become disconnected from strategic intent, and efforts may lose focus over time.

The last factor to be presented to affect planning is the factor SAFE in practice (EF5). SAFE provides structure and alignment through its fixed PI cycles. While this can support coordination between different teams, the fixed timeframes of a PI do not always fit all types of work within the department. In other words, where information is emerging as it happens, or where lead times are long, the fixed structure can limit the accuracy and usefulness of the planning. These challenges point to the importance of adapting the framework to the context. Allowing greater flexibility in how commitments are made or how the scope is refined during the PI can improve planning opportunities in more uncertain or exploratory environments. In this way, the practical application of SAFE affects the quality of planning. When used with flexibility, the framework can support both structure and adaptability which creates better conditions for timely delivery.

5.2.3 Side Tasks

One factor that appear to directly affects on-time delivery is side tasks (EF23), i.e. unplanned but urgent work tasks that emerge during the PI. These tasks are not part of the initial plan, but require immediate attention and cannot be ignored, thus creating unpredictability in the delivery process. Even if teams had a clear direction and a realistic workload, suddenly emerging urgent issues force context switches and re-prioritization, slowing down the execution of the planned tasks and increasing the risk of delays. Some teams try to solve this by including buffer time in their PI planning to create space for side tasks. Although this is a practical solution, it also shows the need to manage side tasks. Because side tasks are rarely documented or tracked, their actual impact often goes unnoticed in delivery follow-ups, which makes them a hidden obstacle. By interrupting focus and diverting resources from planned work, side tasks have a direct negative impact on on-time delivery.

5.2.4 Execution of Work

There are several factors that appear to influence team performance and their ability to deliver work on time, as illustrated in Figure 5.2.

The interviews pointed to a desire for more active involvement from management (EF3), both supportive and directive. When management is engaged in the work of the teams, it leads to clearer priorities and increased support, which in turn im-

proves the execution of the work and increases project success.

How the tasks ownership (EF9) is structured within a team influences how work is carried out. When responsibilities are tied to specific individuals, it becomes more difficult to allocate tasks in a flexible way. If only one person can perform a particular task, the team becomes dependent on that person, increasing vulnerability to absences and work overload. In contrast, when multiple team members are familiar with the same tasks, execution becomes more resilient. Work that can be shared, reallocated, or handed over more easily, reduces the risk of bottlenecks and interruptions. In this way, task ownership influences how reliably the team can perform the work, and this reliability is important for on-time delivery. When execution runs smoothly and is not dependent on individual availability, the team could be in a better position to complete the work as planned.

Another factor that influences work execution is teamwork (EF11). When teams collaborate effectively and support each other, it enables smoother workflows and faster delivery. Strong teamwork also foster mutual support and motivation among team members, which in turn was highlighted to have a positive impact on the timeliness of the work being delivered.

Team capacity (EF12) was indicated to have an impact on the team's ability to deliver work on time. This capacity is, in turn, influenced by the available resources (EF13). As suggested by the results, there were resources constraints, including cases where individuals were assigned multiple roles. Such constraints hinder the ability of the teams and individuals to carry out the work effectively and meet deadlines. Resource constraints also affect how work is prioritized and what is actually completed.

Another factor is information flow (EF19). In order to execute work effectively, it is important that information about work is clear and understandable, enabling teams and team members to coordinate, set the right priorities, and adjust direction when needed. Team members receive information about their work through formal and informal channels, such as structured SAFe activities and quick face-to-face discussions. As discussed in Section 5.1, this can facilitate rapid interactions, but it can also create an uneven sharing of information that does not reach all parties involved, which in turn influences the performance of the work.

Figure 5.2 illustrate several factors that further appear to influence the flow of information. Firstly, ScMs (EF7) can be both an enabler and a bottleneck for the flow of information, as this role carries a lot of information that is shared with the rest of the team. Depending on the person's experience (EF8), it influences what kind of information is shared and filtered out, as illustrated in Figure 5.2. Secondly, the size of the team (EF17) and documentation (EF18) are noted to affect the flow of information. Larger teams can create a lack of information sharing as well as make meetings insufficient and time-consuming. Lack of documentation also creates information gaps and lack of traceability. Both these factors affect the flow of

information. Thirdly, communication (EF14) influences what information is shared and how. SAFe provides a structured way to enable transparent communication (EF6), but as noted from the interviews, this does not always work in practice. Communication is further influenced by both geographical distribution (EF16) and office layout (EF15). When team members are dispersed or there is a lack of office space, effective communication and coordination are reduced. This in turn affects how the teams operate and therefore influences on-time delivery.

6

Conclusion

The purpose of this study is to increase the understanding about factors influencing on-time delivery. To address this, empirical data have been collected through semi-structured interviews, non-participant observations, and literature, which has provided insights into the studied subject. This section provides a conclusion of the study and outlines the answers for the research questions, present limitations and future research.

6.1 Answering the Research Questions

RQ1: Which factors influence on-time delivery of work?

The study aims to answer and understand which factors influence on-time delivery. The empirical findings point to 28 factors, categorized into four different themes: organizational prerequisites, team prerequisites, communication and information sharing, and project prerequisites. Nineteen of the identified factors can be connected to findings from literature, 9 factors were found in the empirical data and not highlighted in literature, and 3 factors were not found in the empirical data but found in the literature.

RQ2: How are these factors related?

The second research question addresses how these factors are related. Based on the empirical findings, a visualization has been made (Figure 5.2) and discussed in Section 5.2. This illustrates four main areas that directly affect on-time delivery: dependencies; planning; side tasks; and execution of work. Twenty two factors appeared to indirectly influencing these four main areas. The visualization is intended to provide an overview of how these factors are perceived to be related, supporting a deeper understanding of their impact on on-time delivery.

6.2 Limitations

The results of this study contribute to an increased understanding of factors that influence on-time delivery within the context of Volvo GTT. However, certain limitations are acknowledged. Firstly, the authors recognize the potential for bias in the responses from the interviewees, which could cause a risk that some important factors may not be captured. Secondly, as this is a single case study, the findings

may not be applicable to other organizations using SAFe or operating in different industries.

6.3 Future Research

This study focused on identifying factors based on the success criterion of time. This may not capture the full picture, as project success can also be evaluated in terms of cost and quality. This opens up for future research to evaluate one or more success criteria in this setting. Furthermore, this study was based on a qualitative research strategy, and future research could complement the findings from this study by adopting a quantitative approach. Another suggestion for future research is to increase the understanding whether these factors can be applied to other companies and industries. Moreover, this study has focused on the essential configuration of SAFe, looking at ART and feature level. However, it would be of interest to see how this influences the bigger picture, suggesting a need for future research to focus on the full SAFe configuration and epic level.

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A

Interview Guide for Semi-structured Interviews

Provide information about the study and that the answers will be used as input for the thesis. Continue describing that the work will be published and publicly available, but anonymity will be applied.

General Questions:

1. What is your role?
2. What is your team responsible for?
3. How long have you worked at the company?
4. How long have you worked with agile methods?
5. Have you received any training or education in agile practices?

In-Depth Questions:

1. How would you describe what it is like to work in your team and according to your way of working (SAFe)?
2. What do you find most helpful in the way you work today - and what takes the most energy?
3. What factors do you feel affect your ability to deliver on time - positively or negatively?
4. How do you perceive the support from the organization and management in your work?
5. How does it work for you in terms of communication and getting the right information - do you have a clear picture of what is expected of you?
6. How do dependencies between different teams and external parties affect your ability to deliver on time?
7. How do you feel workload and team capacity affect your ability to deliver?
8. How do you perceive the way of working within SAFe and the activities involved? Are there parts that add particular value, and parts that feel less relevant?
9. If you could change one thing to ensure you deliver on time, what would it be?

Concluding Question:

- Is there anything from our conversation you would like to add or clarify?

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