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Challenges of Large-Scale Agile Transformation

A Case Study at a Manufacturing Firm

Master's thesis in Management and Economics of Innovation

IDA LINNAKALLIO

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENTREPRENEURSHIP AND STRATEGY

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Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Gothenburg
Telephone +46 31 772 1000

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Chalmers University of Technology

Abstract

This master's thesis explores the challenges associated with large-scale agile transformation within a manufacturing firm. Adopting a qualitative single-case study approach, the research draws on data from semi-structured interviews, internal documents, and field notes, focusing on a single platform within the organization to provide an in-depth understanding of the transformation process. Several key challenges were identified across multiple dimensions, which impacted the overall success and effectiveness of the agile transformation. These challenges, though varied stem from factors related to process, technology, organizational structure, and people. The discussion emphasizes the most significant challenges within each dimension, exploring their impact on the agile transformation and highlighting the complex nature of implementing agile at scale in a non-IT-centric environment.

The thesis presents a set of practical recommendations to address these challenges, including the need to improve communication and collaboration across teams, engage stakeholders more effectively, ensure strong leadership involvement, and promote organizational alignment throughout the transformation process. Additionally, the study highlights the importance of cultivating an agile mindset at all levels of the organization, addressing both cultural and psychological barriers to change. The research concludes that successful agile adoption goes beyond changing processes—it requires a fundamental shift in organizational culture and alignment at all levels, emphasizing the importance of leadership, collaboration, and continuous learning.

This study contributes to the body of knowledge on agile adoption in manufacturing and other non-IT-centric environments, offering insights into the unique challenges faced by organizations in these contexts. The findings also underscore the necessity of adaptive governance structures, integration strategies, and tailored approaches to agile transformation. The thesis provides managerial implications that can guide organizations through the complexities of agile adoption, focusing on the key aspects of leadership, engagement, and cultural transformation necessary for sustainable success.

Keywords: Agile transformation, Large-scale Agile, Challenges, Process, Technology, Structure, People

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Ida Linnakallio, Gothenburg, February 2025

List of Acronyms

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

BA	Business Analyst
CI	Continuous Integration
CD	Continuous Delivery
CI/CD	Continuous Integration and Continuous Delivery
IT	Information Technology
MVP	Minimum Viable Product
PO	Product Owner
SIT	System Integration Testing
TDD	Test-Driven Development
UAT	User Acceptance Testing
UX	User Experience

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1

Introduction

In today's rapidly evolving business environment, organizations must adapt quickly to technological advancements and shifting customer expectations to remain competitive (Eilers et al., 2020; Tallon et al., 2019). Digital transformation has fundamentally reshaped business models and customer demands (Favoretto et al., 2022; Verhoef et al., 2021), making it a strategic necessity for businesses to align technology, culture, leadership, and strategy (Kraus et al., 2021; Omol, 2024). Agile methodologies, originally developed for software development, have emerged as a key approach to help organizations respond swiftly to market shifts (Lee, 2019; Peselli, 2024). However, implementing Agile practices on a large scale in complex organizations presents challenges such as communication breakdowns, resistance to change, and coordination difficulties (Dikert et al., 2016; Sońta-Drażczkowska & Krogulec, 2024). Addressing these barriers is crucial for successful large-scale transformations (Orejuela et al., 2024). Accordingly, this thesis investigates the challenges companies face during large-scale Agile transformations. This introductory chapter outlines the background, purpose, research questions, and delimitations of the study.

1.1 Background

In today's dynamic business landscape, companies and industries face relentless pressure to adapt quickly. Rapid technological advancements, evolving customer expectations, and increased risks introduce layers of complexity and challenge that organizations must navigate to remain viable and profitable (Eilers et al., 2020; Tallon et al., 2019). The digital era has further intensified these demands, compelling businesses to rethink their strategies, redefine business models, and embrace innovation to maintain competitiveness in an increasingly digital environment (Garrido-Moreno et al., 2024).

As digital transformation accelerates, businesses must adopt greater flexibility in their operations to respond effectively to market shifts (Eilers et al., 2020). Traditional software development and deployment processes face mounting challenges, including the need for frequent updates with minimal disruption to end users (Chatterjee & Mittal, 2024). These dynamics have driven the widespread adoption of agility as a critical operational principle. Agility, defined as the capacity to respond swiftly to changing demands (Hossain et al., 2021), has become essential for organizations striving to remain competitive in today's volatile markets. Agile methodologies, initially rooted in software development, have grown in popularity

across various sectors, with large companies increasingly prioritizing agility not just at the team level but across entire organizations (Dikert et al., 2016; Lee, 2019; Peselli, 2024). While the Agile Manifesto was formally introduced by Beck et al. (2001), the foundational principles and practices of agility can be traced as far back as the 1930s (Whiteley et al., 2021).

Initially developed for small teams working on individual projects, Agile practices have since been adapted for use across a wide array of industries, including manufacturing, finance, and healthcare (Lee, 2019). However, scaling Agile practices beyond their original context introduces significant challenges. As noted by Dikert et al., 2016, applying Agile methodologies in larger organizational contexts often gives rise to issues such as communication breakdowns, reduced flexibility, and coordination challenges. One of the most persistent challenges lies in balancing the empowerment of individual teams with the overarching need for organizational coordination and control (Sońta-Drączkowska & Krogulec, 2024). Agile principles emphasize autonomy and decision-making at the team level, but in large-scale settings, this autonomy can lead to misalignment and inefficiencies if not carefully managed (Sońta-Drączkowska & Krogulec, 2024).

In addition, organizational inertia presents a significant barrier. Resistance to change is particularly prevalent in non-development functions—such as sales, marketing, and human resources—complicating the alignment necessary for a full Agile transition (Dikert et al., 2016). Without integration across these functions, the benefits of Agile cannot be fully realized. Theobald and Diebold (2018) highlight synchronization issues between Agile and non-Agile business units, where mismatches in communication needs often result in bottlenecks for Agile teams. This misalignment, combined with the rigidity of established processes and cultural resistance, hinders the ability of organizations to fully embrace Agile principles (Theobald & Diebold, 2018).

In summary, while many large organizations grapple with the complexities of digital and Agile transformations, further research is needed to address these challenges comprehensively. Dikert et al. (2016) underscore the importance of examining how non-development functions can better support Agile adoption. Similarly, Sońta-Drączkowska and Krogulec (2024) call attention to the need for integrative research on scaling Agile practices and resolving tensions between development and business functions. Additionally, Orejuela et al. (2024) highlight the importance of investigating large-scale Agile transformation efforts within manufacturing companies to contribute to the existing body of knowledge. Addressing these research gaps is critical for organizations striving to navigate their transformation journeys effectively.

1.2 Purpose and Objectives

The purpose of this research is to investigate the challenges hindering large-scale Agile transformation at a large manufacturing company, focusing on the interplay between methodological, technological, organizational, cultural, and motivational

factors. To investigate the challenges encountered by a traditional manufacturing company in its transition to an agile way of working. The research will aim to identify the most critical barriers to Agile adoption, understand their underlying causes, and propose actionable recommendations for overcoming them and facilitating a successful transition to an Agile way of working.

Given this context, the purpose of this study is to investigate *the challenges a large manufacturing firm face in a large-scale agile transformation*.

1.3 Delimitations

This research will focus on the large-scale Agile transformation within a single platform at the case company, specifically examining the perspectives of team members directly involved in this transformation effort. The scope is deliberately narrowed to this platform to provide a detailed and nuanced understanding of the challenges faced in a specific context, rather than a broad or generalized view across the entire organization.

The study will concentrate exclusively on the challenges associated with Agile transformation, excluding other related but distinct aspects such as general organizational performance metrics, financial outcomes, or comparisons with non-Agile methodologies. Furthermore, the research will not encompass Agile practices in other platforms or divisions within the company, nor will it include external stakeholders such as suppliers or customers.

This delimitation ensures the research remains focused on the core objective of identifying and addressing barriers to Agile adoption as experienced by the team members within the specified platform. It also enables a more in-depth analysis of the methodological, technological, organizational, cultural, and motivational factors specific to this context. Broader implications or comparisons with other companies or industries are outside the scope of this study.

2

Theoretical Background

This section presents key theories related to agile transformation, with a focus on the challenges faced during large-scale agile implementations. To better understand these challenges, the section will explore four key dimensions presented by Fuchs and Hess (2018) that influence large-scale agile transformations: *Process*, *Technology*, *Organization*, and *People*.

2.1 Agile Transformation

With the rise of digital transformation, the demand for flexibility has increased, prompting businesses to adapt their operations to remain responsive to market shifts (Eilers et al., 2020). Traditional software development and deployment processes face challenges due to the growing need for frequent updates with minimal disruption to end users (Chatterjee & Mittal, 2024). This rapid technological evolution, coupled with the increasing complexity of markets, has driven the widespread adoption of Agile methodologies. Agile, defined as the ability to quickly respond to changing demands (Hossain et al., 2021), has become essential for organizations navigating today's dynamic environment. Consequently, Agile practices have gained popularity across various sectors, with large companies prioritizing agility not only within individual teams but also at the organizational level (Dikert et al., 2016; Lee, 2019; Peselli, 2024).

Unlike traditional methods, Agile emphasizes informal collaboration, coordination, and learning over upfront planning and strict control (Dybå et al., 2014). Dybå et al. (2014) identify four key principles of Agile project management: minimizing specifications, enabling team autonomy, fostering cross-functional skill sets, and integrating feedback and learning into project execution and its interaction with the environment. Additionally, Rajakumari, Hemalatha, et al. (2024) highlight critical aspects of the Agile approach, including collaboration, flexibility, adaptability, empowered teams, continuous improvement, customer involvement, and iterative development. Agile development also emphasizes frequent access to business insights, which Siakas and Siakas (2007) identify as a cornerstone of Agile processes. By relying on iterative cycles, Agile methodologies break tasks into smaller, manageable units, enabling teams to reflect and optimize their processes after each cycle (Rajakumari, Hemalatha, et al., 2024).

Various Agile methodologies are employed across industries. For instance, Scrum fo-

cuses on iterative and incremental delivery through short development cycles called sprints (Rajakumari, Hemalatha, et al., 2024). Kanban emphasizes visualizing workflows and limiting work in progress to ensure continuous delivery. Extreme Programming (XP) centers on engineering practices such as pair programming and test-driven development to enhance software quality (Herdika & Budiardjo, 2020). Common Agile practices include sprints, continuous integration, incremental releases, and a focus on value-driven requirements (Hossain et al., 2021).

2.2 Challenges with Large-Scale Agile Transformations

The transition from traditional, process-driven workflows to Agile methodologies poses significant challenges for organizations, requiring substantial effort and time (Nerur et al., 2005; Sońta-Drączkowska & Krogulec, 2024). These challenges become even more pronounced when scaling Agile across multiple teams, departments, and functions (Dikert et al., 2016), with the complexities increasing as the organization grows larger (Dybå & Dingsøy, 2008). In the literature, this process of adopting agile practices is commonly referred to as "agile transformation" or "agile transition" (Sońta-Drączkowska & Krogulec, 2024). Sońta-Drączkowska and Krogulec (2024) emphasizes that this organizational change impacts all aspects of an organization, not only project and development management. While agile methodologies have demonstrated effectiveness in smaller teams or projects, large-scale implementation introduces unique challenges arising from variations in organizational structure, culture, and operational processes (Dikert et al., 2016; Lindskog & Netz, 2021; Nerur et al., 2005).

The foundation of the challenges organizations face lies in the contrasting philosophies of traditional and agile methodologies (Lindskog & Netz, 2021; Nerur et al., 2005). Traditional approaches emphasize stability, predictability, and control, relying on extensive upfront planning, hierarchical management, and standardized processes (Nerur et al., 2005). In contrast, agile methodologies prioritize flexibility, adaptability, collaboration, and responsiveness to change (Lindskog & Netz, 2021). This fundamental clash between rigid, process-driven systems and iterative, feedback-oriented workflows demands a significant cultural and structural shift, rethinking how teams collaborate, how decisions are made, and how work is structured (Nerur et al., 2005). Chandra Misra et al. (2010) emphasize that successfully transitioning to agile requires managing changes in culture, leadership styles, knowledge-management strategies, and development processes, with each of these areas being equally critical to address. Additionally, Chandra Misra et al. (2010) suggest that addressing shifts in personal characteristics, customer attitudes, and education or training is vital to effectively adopt agile principles.

One critical challenge in agile adoption is integrating agile practices into existing standards and business processes (Begel & Nagappan, 2007), a difficulty that grows

with the size and complexity of the organization (Dikert et al., 2016). Larger organizations face heightened obstacles due to their scale, structure, organizational inertia, and deeply entrenched traditional processes, which slow the transition to agile (Dikert et al., 2016; Paasivaara et al., 2018; Sońta-Drączkowska & Krogulec, 2024). To successfully navigate this transition, large organizations must tailor both their project management methodologies and agile transformation processes to better align with their specific needs and capabilities (Paterek, 2017).

There are many frameworks and models that describe challenges in large-scale agile transformation. However, common themes in the literature are captured by Fuchs and Hess (2018), who identifies four key dimensions: Process, Technology, Structure, and People. These categories provide a comprehensive framework for understanding the challenges organizations face when scaling agile. The following sections will explore each dimension in detail, highlighting specific obstacles and offering insights into how large organizations can navigate their agile transformation successfully.

2.2.1 Process Challenges

Challenges in large scale agile transformation often occur due to an inadequate implementation of agile methodologies, where the practices may be misapplied or not customized properly according to the organizational needs (Fuchs & Hess, 2018). Several studies highlight that adapting agile methods to an organization's specific needs and context is critical, where Dikert et al. (2016) highlight that strictly following prescribed methods may not be feasible, leading to the adoption of only selected practices while neglecting the broader agile principles, hindering widespread organizational change (Dikert et al., 2016). Späth and Westner (2024) further stresses that agile transformations are individual to each company, and existing agile process models should only be used as guidance. Berntzen et al. (2022) adds that, given the complexity of large-scale software development, there is no one-size-fits-all approach to system design and implementation. However, as noted by (Edison et al., 2021), this adaptation is often very challenging.

At the project level, the expansion of team-specific practices, such as sprint planning and retrospectives, requiring cross-team oversight to align backlogs and deliveries presents a significant challenge in large-scale agile settings (Edison et al., 2021). As the number of teams increases, managing dependencies and coordinating task become more complex (Edison et al., 2021; Paasivaara et al., 2018; Van Waardenburg & Van Vliet, 2013). Poor inter-team planning, coupled with a lack of technical understanding, can lead to misalignment, delays, and inefficiencies (Edison et al., 2021; Sekitoleko et al., 2014). In a large-scale agile environment, the primary objective of sprint planning is to ensure that all teams are aligned on a common product plan (Bajpai, 2020), with effective management of cross-team dependencies being central to achieving this (Uludağ et al., 2019). However, this process is complicated by the inherent uncertainty in software development (Edison et al., 2021; Sekitoleko et al., 2014). Furthermore, a lack of technical expertise among managers can result in poor planning and unresolved dependencies (Edison et al., 2021; Sekitoleko et al., 2014).

To mitigate these challenges, fostering knowledge sharing and ensuring that planners possess a strong technical understanding is essential (Sekitoleko et al., 2014). Uludağ et al. (2019) also recommends utilizing tools like the Iteration Dependency Matrix to enhance the management of cross-team dependencies.

Another critical challenge in large-scale agile development is quality assurance, with testing being a key part in this (Dikert et al., 2016). Saeeda et al. (2023) highlights several testing-related issues, including insufficient system testing due to the complexity of large projects and a lack of a holistic view across teams. Additionally, the absence of acceptance testing, mainly caused by limited user involvement, poses further challenges. Regression testing is often neglected because of the complexity of the project and difficulties in tracking updates across multiple teams. Moreover, Saeeda et al. (2023) points to insufficient integration testing, as teams struggle to test the system as a whole, primarily due to tight deadlines, limited testing skills, and high pressure on teams. Dikert et al. (2016) also underscores the importance of coordinating testing efforts across teams to address these challenges effectively.

Agile implementation can face challenges when it is not effectively applied across all areas of the organization, particularly when feedback loops and collaboration practices struggle to integrate with operational processes (Fuchs & Hess, 2018; Van Waardenburg & Van Vliet, 2013). Limited participation from business stakeholders often leads to insufficient customer feedback during development, causing misalignment between the development work and business needs (Balasubramaniyam, 2024; Van Waardenburg & Van Vliet, 2013). Without regular feedback, teams find it difficult to assess whether development aligns with the original requirements (Hoda et al., 2011). Delays in receiving feedback further complicate the process, as developers may need to revisit old user stories, wasting time and resources (Hoda et al., 2011). According to Dugbartey and Kehinde (2025), continuous feedback loops play a crucial role in sustaining both agility and development velocity within agile frameworks.

Similarly, the refinement of requirements can be inefficient when customer-facing units are not fully engaged in the process. This makes it challenging to break down requirements into manageable tasks for a sprint, as these units are crucial for defining and clarifying the initial requirements (Edison et al., 2021; Kasauli et al., 2021; Van Waardenburg & Van Vliet, 2013). Hoda et al. (2011) emphasizes the importance of customer representatives in prioritizing requirements to ensure alignment with business value. Without clear requirements, teams are forced to make assumptions that lead to misalignment with customer needs and result in rework (Van Waardenburg & Van Vliet, 2013). A key challenge in this is ensuring that business stakeholders understand the system's dependencies, which is essential for making informed decisions about the product's functionality (Van Waardenburg & Van Vliet, 2013). Van Waardenburg and Van Vliet (2013) further highlights delays and productivity losses as a result of unclear requirements. Business involvement is key to aligning development with organizational goals, and when stakeholders are unavailable or disengaged, the PO must step in to effectively communicate the requirements to the agile teams (Balasubramaniyam, 2024; Van Waardenburg & Van Vliet, 2013). En-

asuring effective business-level knowledge and requirement alignment can further be facilitated through collaborative demos, which allow stakeholders to see how features interact and depend on one another (Van Waardenburg & Van Vliet, 2013). These demos not only improve the understanding of the system as a whole but also provide a foundation for making more informed decisions about functionality (Van Waardenburg & Van Vliet, 2013). Additionally, regular stakeholder workshops involving all business representatives help ensure continuous feedback and reflection, fostering stronger collaboration and keeping the business side aligned with the ongoing development (Van Waardenburg & Van Vliet, 2013).

2.2.2 Technological Challenges

Technology-related challenges in large-scale agile projects stem from the infrastructural features of firms and the supporting structures of technological tools within organizations (Fuchs & Hess, 2018). These challenges include inappropriate technological equipment and inadequate IT infrastructure, which can hinder effective agile implementation and transformation (Dikert et al., 2016; Fuchs & Hess, 2018).

One of the key technology-related challenges in large-scale agile projects is the complexity of technical dependencies across teams (Berntzen et al., 2022; Stray et al., 2019; Van Waardenburg & Van Vliet, 2013). Large-scale agile initiatives often involve multiple parallel development streams, increasing dependencies and complicating their management (Berntzen et al., 2022; Stray et al., 2019; Van Waardenburg & Van Vliet, 2013). Technical dependencies often manifest in software artifacts, such as code, where complications can arise when developing larger features (Kula et al., 2021; Sekitoleko et al., 2014). Coupled architectures and cross-team dependencies create significant obstacles for continuous delivery, limiting teams' ability to develop, evolve, and deploy independently (Shahin et al., 2017). An overemphasis on individual teams' agile practices can result in fragile system architectures, inconsistent coding styles, and a lack of trust between teams (Dikert et al., 2016; Shahin et al., 2017). Frequent changes and merges between teams working on the same codebase can result in conflicts, instability, and issues in testing, ultimately impacting product quality (Kula et al., 2021; Shahin et al., 2017; Søvik & Forfang, 2010; Van Waardenburg & Van Vliet, 2013).

As the scale of development increases, the tracking and management of dependencies becomes more difficult (Avuthu, 2022; Søvik & Forfang, 2010). Close coordination between teams to avoid disruptions caused by inter-team dependencies since even minor issues can have a widespread impact in the system (Avuthu, 2022; Shahin et al., 2017; Søvik & Forfang, 2010). Effective coordination requires strong version control, clear ownership, automated rollbacks, a thorough understanding of dependencies before starting the design phase, and well-defined coding standards to improve predictability in deliveries (Avuthu, 2022; Daneva et al., 2013; Kula et al., 2021). Furthermore, Shahin et al. (2017) notes that breaking down larger, more complex requirements into smaller, more manageable tasks is an effective strategy for dealing with technical dependencies and minimizing complexity. By decompos-

ing large tasks, the risk of impacting other teams is reduced, as smaller components are less likely to cause disruptions across the broader system. Additionally, one technique Shahin et al. (2017) recommends is the use of the "dead code" practice, where certain pieces of code remain inactive until all their dependencies are fully met. This ensures that the code is only tested when all necessary components are in place and functional, helping to prevent complications during testing and integration.

Another significant challenge is inadequate technological equipment within the organization (Fuchs & Hess, 2018; Nerur et al., 2005). Firms often lack the proper IT infrastructure and tools to support agile practices, including iterative development, automated testing, and continuous integration (Fuchs & Hess, 2018; Nerur et al., 2005). The absence of suitable or efficient tools to enable automation hinders the effectiveness of agile practices such as CI/CD, leading to increased manual efforts and delays in identifying defects (Shahin et al., 2017). In particular, the lack of investment in the right tools may reduce efficiency in automated processes such as testing, builds, deployments, and monitoring (Avuthu, 2022). This inadequacy often results in slower development cycles, delays in feedback, and a bottleneck in the deployment pipeline (Shahin et al., 2017). Moreover, fragmented tools across teams, where different teams use incompatible or poorly integrated systems, create additional barriers and increase the likelihood of errors, further complicating the agile transformation process (Avuthu, 2022; Shahin et al., 2017). The lack of a unified, effective technological framework across teams reduces the predictability of deliveries and hampers coordination, ultimately affecting the quality and speed of development (Kula et al., 2021).

According to Dugbartey and Kehinde (2025), automation is a key factor in Agile software development as it improves efficiency and reduces errors. Tools like Jenkins and Azure DevOps support CI/CD pipelines, which automatically handle the processes of building, testing, and deploying code. This reduces manual intervention, minimizing the risk of human error, and speeds up the development cycle. Additionally, test-driven development (TDD) emphasizes writing tests before code implementation, ensuring that quality is maintained throughout the process. The combination of CI/CD and TDD allows for faster delivery while ensuring that the final product meets high-quality standards. Lack of automation in testing is further highlighted by several studies posing obstacles to agile software development (Dikert et al., 2016; Shahin et al., 2017), where Dikert et al. (2016) highlighted consequences such as excess testing work and late discovery of defects.

However Altuwaijri and Ferrario (2022) suggest that technological factors are less impactful than human factors such as customer involvement and cultural aspects of the agile adoption. Many other researchers also highlight the need for coordination and careful management to effectively mitigate issues stemming from technical dependencies (Avuthu, 2022; Berntzen et al., 2022; Sekitoleko et al., 2014; Shahin et al., 2017; Van Waardenburg & Van Vliet, 2013)

2.2.3 Structure Challenges

A large-scale agile transformation spans multiple teams and organizational units, making it crucial for all stakeholders to be aligned and actively involved, participating in the change process Dikert et al. (2016) and Edison et al. (2021). This alignment is essential to ensure that the transformation is effectively rolled out and gains traction across the organization (Carreño, 2024).

Carreño (2024) argue that a clear, shared vision is essential during an organizational transformation to unite teams and departments around the organization's long-term goals, underscoring the need to align strategic objectives with execution. This alignment fosters collaboration, enhances unity, and mitigates inefficiencies caused by fragmented efforts (Carreño, 2024). Aligning goals and establishing a clear direction require unifying values, definitions, and ways of working across the organization (Kalenda et al., 2018). A common vision ensures alignment and clarity while reducing resistance to change (Edison et al., 2021). The absence of a clearly defined and collaboratively developed vision poses significant challenges in large-scale agile adoption (Balasubramaniam, 2024; Uludag et al., 2018). Furthermore, Dugbartey and Kehinde (2025) emphasizes that such a vision must not only be clear but also actionable at the team level, ensuring alignment between the organizational-level vision and team-level goals.

In addition to a shared vision, to succeed with an organizational change such as a large-scale agile transformation, it is crucial to engage all stakeholders who will be impacted (Dikert et al., 2016; Edison et al., 2021). Agile transformations often originate in IT or development teams, but friction arises when other functions, such as finance or customer-facing roles, resist adopting an agile mindset, leading to slower progress and hindering transformation efforts (Chukwunweike & Aro, 2024; Dikert et al., 2016; Mako, 2019; Van Waardenburg & Van Vliet, 2013). Engaging all impacted stakeholders is necessary to secure their acceptance and active participation, which is key to ensuring that the transformation is successfully rolled out across the organization (Dikert et al., 2016; Edison et al., 2021; Pinton & Torres Junior, 2020). This is further highlighted by Dikert et al. (2016) and Kalenda et al. (2018), stating that when employees are actively engaged in shaping transformations they are also more likely to support them. Edison et al. (2021) also highlights how both internal and external stakeholders needs to be understood with the reason for change as well as potential impacts on their work and role. Edison et al. (2021) emphasizes that a lack of this engagement could lead to resistance to the change.

Top management engagement is further noted to be a critical factor in successful large-scale agile transformations (Dikert et al., 2016; Fuchs & Hess, 2018; Kalenda et al., 2018). Strong, visible, executive sponsorship ensures resource allocation, supports cultural change, and drives organizational alignment (Edison et al., 2021; Fuchs & Hess, 2018; Kalenda et al., 2018). Further, managers with the help of their authority and power can remove obstacles such as employees advocating for agile practices not being suitable for them, or providing time and resources needed for adopting the practices (Dikert et al., 2016; Edison et al., 2021). Pinton and Tor-

res Junior (2020) highlights that senior management plays a key role in obtaining buy-in from all employees, noting the importance of transition goals and benefits being advocated for by management. Edison et al. (2021) aligns with this perspective, noting that employees are more likely to adopt agile practices—even when they initially fail to see their value—if management is visibly addressing the challenges associated with the adoption process. Dikert et al. (2016) highlighted that visible management support motivates and encourages employees to commit to the change and put in effort to adapt to the new agile processes. Without it, agile transformations may face resistance at various levels of the organization (Dikert et al., 2016). Edison et al. (2021) further highlights other benefits of management participation in training, being that it demonstrates their commitment which builds trust among employees towards the transformation.

However, while strong leadership direction and support are crucial, leaders should not act as sole decision-makers. Instead, they should set the direction and facilitate collaboration to effectively guide the transformation (Beretta & Smith, 2023; Edison et al., 2021). Striking a balance between providing clear direction and fostering collaborative decision-making is essential for achieving alignment across teams and the organization (Beretta & Smith, 2023). This critical leadership role also underscores the need for a mindset shift among leaders, requiring a more adaptive and flexible approach to successfully drive organizational change (Mako, 2019).

Furthermore, siloed structures within organizations often pose significant challenges to agile transformations by impeding communication, collaboration, and alignment between teams and departments (Fuchs & Hess, 2018; Uludag et al., 2018). Agile thrives on open communication, trust, and collaboration, but rigid social structures and silos can obstruct these principles, creating barriers to information flow and knowledge sharing (Cunha, 2020; Dikert et al., 2016; Nerur et al., 2005; Pinton & Torres Junior, 2020). When teams or departments work in isolation with conflicting priorities or agendas, collaboration becomes difficult, posing a significant barrier to adopting agile practices at scale (Dikert et al., 2016). Silos, where teams and departments hoard information and insights, complicate efforts to scale agile practices by leading to duplicated efforts, poor decision-making, and missed opportunities, ultimately slowing progress (Chukwunweike & Aro, 2024; Dikert et al., 2016; Jeleel-Ojuade, 2024). Breaking down these silos requires active measures, such as encouraging job rotations, both on management and team level, and creating platforms that promote cross-team knowledge sharing (Berntzen et al., 2021; Bömelburg & Gassmann, 2024).

Managing multi-team settings is a significant challenge due to the complexity of coordination and dependencies that arise between teams (Dikert et al., 2016; Edison et al., 2021; Uludag et al., 2018). The interdependence between teams is a key issue, as the progress of one team may rely on the completion of tasks by another, creating bottlenecks and slowing down the overall progress (Dikert et al., 2016; Vlietland & van Vliet, 2015), (Berntzen et al., 2021). When teams work in isolation, these dependencies are overlooked, leading to delays and coordination breakdowns

(Shahin et al., 2017). An overemphasis on autonomy within teams can result in teams working in isolation causing misalignment and delays (Bick et al., 2017; Edison et al., 2021; Shahin et al., 2017; Vlietland & van Vliet, 2015). Further, Edison et al. (2021) highlight the risk of local optimizations within teams harming the performance of the overall system. This issue is particularly problematic when different teams work for separate clients (Dikert et al., 2016). Additionally, a lack of shared knowledge and visibility into other teams' work creates obstacles to adopting continuous practices, often leading to misunderstandings, merge conflicts, and delivery delays (Shahin et al., 2017).

To address these challenges, balancing autonomy with alignment and consistent performance is crucial (Berntzen et al., 2021; Edison et al., 2021). While teams should maintain autonomy in their processes, defining shared goals, a common "definition of done," and standardized practices is essential to ensure consistency across teams (Berntzen et al., 2021; Vlietland & van Vliet, 2015). Further, transparency must be improved across teams (Edison et al., 2021). Transparency fosters collaboration and knowledge-sharing, both of which are critical for successfully implementing continuous delivery (Edison et al., 2021; Shahin et al., 2017). Providing clear visibility into each team's progress, goals, and dependencies helps align efforts and ensures teams work towards shared objectives (Berntzen et al., 2021; Vlietland & van Vliet, 2015). Additionally, shared documentation, communication tools, and regular synchronization meetings play a vital role in maintaining an overview of work across teams and improving overall coordination (Berntzen et al., 2021).

Taking a higher perspective, Dikert et al. (2016) highlights the difficulties of integrating non-development functions as a challenge in an large-scale agile transformation due to the increasing need to interface with functions distanced from development. Organizational divisions can hinder agile adoption, particularly when stakeholders from different departments lack a full understanding of agile (Dikert et al., 2016; Niva, 2022). For instance, centralized IT departments may create a disconnect between business and IT (Niva, 2022), especially when IT management assigns the PO role to IT employees resulting in limited business input (Van Waardenburg & Van Vliet, 2013). With budget control resting with senior IT management rather than business stakeholders, business involvement is further negatively impacted (Van Waardenburg & Van Vliet, 2013). This structural divide may cause business stakeholders to feel less urgency and responsibility for IT project outcomes, as failures do not directly affect them (Van Waardenburg & Van Vliet, 2013). Further, this misalignment often fosters a "we-them" mindset that undermines progress, making a cultural shift across all organizational levels essential for successful agile adoption (Neumann et al., 2024; Van Waardenburg & Van Vliet, 2013). It also creates difficulties in agile processes, as businesses are frequently less involved than necessary, leading to several challenges, especially in requirement engineering and feedback processes (Edison et al., 2021; Van Waardenburg & Van Vliet, 2013). This structural divide is particularly challenging for organizations with long-standing relationships with clients and customers, where long-term roadmaps and extensive planning are typically required. To address this, education for key stakeholders are necessary

(Dikert et al., 2016). Addressing these silos requires involving continuous business engagement in user stories, feature prioritization, and feedback (Van Waardenburg & Van Vliet, 2013).

2.2.4 People Challenges

Adapting the company culture to align with Agile values is seen as key in an agile transformation by several studies (Kaul & Nand, 2022; Mordi & Schoop, 2021). Mordi and Schoop (2021) emphasizes that in large-scale agile transformations, the agile mindset is one of the most critical factors. They stress the importance of not only individuals adopting an agile mindset but also ensuring that it permeates the entire organizational culture. At the organizational level, an agile mindset signifies an agile culture that consists of four key elements: *autonomy of people and teams, enabling environment, continuous improvement, and managing uncertainty* (Mordi & Schoop, 2021). At the individual level, it is characterized by *trust, openness and willingness to adapt and grow, willingness to learn, responsibility and ownership, specific personal attributes* (Mordi & Schoop, 2021).

Similarly, Kaul and Nand (2022) underscores the importance of fostering a culture of continuous improvement and learning in an agile transformation. Edison et al. (2021) further argue that shifting people’s mindsets is the first step in aligning and integrating the broader organizational culture. However, achieving this shift to an agile mindset is highly complex and challenging (Kaul & Nand, 2022; Mordi & Schoop, 2021).

Organizations that fail to cultivate an agile mindset often struggle with their agile transformation (Kaul & Nand, 2022; Mordi & Schoop, 2021), highlighting that the agile mindset relates to several challenges and success factors spanning across all dimensions of agile transformation outlined in this study. Studies further indicate that without an agile mindset, individuals may find agile’s iterative and flexible nature difficult to navigate, leading to misunderstandings, resistance to collaboration, and overall inefficiencies (Eilers et al., 2022; Späth & Westner, 2024).

Späth and Westner (2024) argue that simply practicing agile methodologies is insufficient unless agility is internalized as a mindset (Edison et al., 2021). Likewise, Mordi and Schoop (2021) emphasize that to fully realize the benefits of agile, organizations must adopt a dual perspective, focusing on both being agile and doing agile to effectively scale agility across the organization.

A successful agile transition relies on equipping employees with the right skills to effectively adopt agile practices (Chukwunweike & Aro, 2024). A major challenge in agile adoption is a lack of knowledge about agile methodologies (Chandra Misra et al., 2010; Fuchs & Hess, 2018). Developers with more experience are typically better equipped to understand and apply these practices (Chan & Thong, 2009), and without the necessary knowledge or willingness to learn, the success of the project can be compromised (Chandra Misra et al., 2010). One recurring issue is the difficulty

in refining requirements and creating user stories (Dikert et al., 2016). High-level requirements often lack the detail needed for agile teams, making it challenging to break them down into manageable stories (Dikert et al., 2016; Ekasari et al., 2021). This often results in inefficiencies, as large, undivided requirements take up excessive time to refine (Dikert et al., 2016).

Moreover, a significant skills gap in areas like test and deployment automation, as well as coordination and communication, can hinder the implementation of continuous practices, further complicating the transition (Shahin et al., 2017). Agile transformation brings changes across roles, processes, and teams, requiring everyone in the organization to adapt (Gandomani et al., 2015). However, without comprehensive training, these changes are difficult to implement effectively (Gandomani et al., 2015). Many organizations fail to provide the necessary training, creating major obstacles in the agile transition (Chukwunweike & Aro, 2024). Knowledge transfer can also be impeded by heavy workloads, leaving employees with little time to learn or participate in knowledge-sharing activities (Dikert et al., 2016).

For a successful transition, organizations must invest in thorough training to equip employees with the essential knowledge and skills to adopt agile practices (Chukwunweike & Aro, 2024). This training is critical for both product management and development teams (Dikert et al., 2016). Without it, agile techniques may be misused, leading to confusion and a lack of trust in the methodologies (Chukwunweike & Aro, 2024). Further, staffing teams with individuals who have prior agile experience can greatly benefit an organization's agile transformation (Dikert et al., 2016; Nerur et al., 2005; Obrutsky & Erturk, 2017). These experienced team members can share their knowledge and help train others, reducing the overall training costs and accelerating the adoption of agile methodologies (Dikert et al., 2016; Nerur et al., 2005; Obrutsky & Erturk, 2017). To address these challenges, organizations need to plan effective training programs, allocate sufficient resources, and ensure that management provides the necessary support and funding (Obrutsky & Erturk, 2017).

Resistance to change is another major obstacle, arising from factors such as insufficient agile knowledge, ineffective training, comfort with existing routines, and changes in roles and management responsibilities (Brynildsen, 2021; Pinton & Torres Junior, 2020). It is also influenced by challenges like lack of trust, openness, adaptability, and willingness to learn and grow (Mordi & Schoop, 2021). Employees in traditional, plan-driven organizations often resist agile methods due to skepticism and fear of the unknown (Brynildsen, 2021; Dikert et al., 2016; Pinton & Torres Junior, 2020). Resistance increases when individuals are not provided with clear, understandable reasons for the change or do not perceive the process as manageable (Dikert et al., 2016). The lack of knowledge about agile principles further diminishes support and willingness to adopt new practices, making securing buy-in challenging and potentially leading to lost time and productivity (Dikert et al., 2016).

Misconceptions also fuel skepticism and distrust in agile practices, with beliefs that agile is unsuitable for complex products, must be strictly followed, or that frequent

meetings cause excessive overhead (Dikert et al., 2016). Additionally, a lack of understanding about why agile methods are adopted and how they impact roles and responsibilities can lead to resistance and hinder the change process (Edison et al., 2021). Resistance is particularly strong in managerial and non-technical departments, which often view agile as being primarily for technical teams like IT (Brynildsen, 2021). This, coupled with insufficient knowledge, results in diminished support for the agile transformation (Brynildsen, 2021).

Fear of consequences, such as job insecurity, skill obsolescence, or negative performance evaluations, also contributes to resistance (Pinton & Torres Junior, 2020). Employees accustomed to traditional methods may find agile principles, such as self-organization, challenging and perceive them as lacking structure or guidance (Kalenda et al., 2018; Pinton & Torres Junior, 2020). Transitioning from a well-defined and structured environment to something new and unfamiliar often exacerbates resistance to the agile transformation (Brynildsen, 2021). This fear, compounded by misunderstanding of collaboration and agile values, further hinders the adoption process (Pinton & Torres Junior, 2020). Related to this, self-efficacy is an important ability highlighted by Chan and Thong (2009), referring to an individual's belief in their capacity to successfully perform tasks and overcome challenges. This sense of confidence is crucial for employees to embrace new challenges, as it empowers them to adopt new practices more easily and effectively (Chan & Thong, 2009).

3

Methodology

This section outlines methodology used in the study. First, the research approach is described, detailing the use of a qualitative single-case study and an idiographic approach to explore the unique characteristics of the case. Next, the data collection process is explained, which involved internal documents, semi-structured interviews, and field notes. Then, the data analysis approach is presented, where thematic analysis was used to identify patterns, guided by a framework on large-scale Agile transformations. Finally, the case is described, providing context for the research and insights into the company's Agile transformation challenges.

3.1 Research Approach

A qualitative single-case study was conducted using an idiographic approach to focus on the unique aspects of the selected case (Bell et al., 2022). This approach provided a detailed exploration of the specific context and complexities, offering insights that quantitative methods might miss (Starman, 2013). By focusing on the case details, the study aimed to uncover patterns, motivations, and dynamics to better understand the phenomenon (Starman, 2013). The chosen company was undergoing an agile transformation with the goal of achieving Continuous Integration and Continuous Delivery (CI/CD). This transformation, set in a manufacturing company navigating digitalization while shifting to agile practices, presented a valuable opportunity to explore a common challenge in today's business world. The learning aspect was key in selecting this company (Bell et al., 2022).

Additionally, the study used an abductive approach, continuously engaging with both the literature and the empirical data to refine explanations. The research began with observations and data collection to identify patterns and potential explanations. As new insights emerged, the process remained flexible, allowing the researcher to adjust questions and ideas. This ongoing interaction with the data prompted a re-examination of the literature to ensure new patterns were understood within relevant theories. The abductive approach is beneficial because it provides flexibility and adaptability, enabling researchers to adjust explanations as new insights arise (Bell et al., 2022). It fosters a dynamic link between empirical data and existing literature, ensuring that the research stays grounded in both real-world observations and established theories (Dubois & Gadde, 2002). This approach is particularly valuable in complex situations where initial hypotheses might not fully capture the nuances of the phenomenon (Bell et al., 2022).

3.2 Data Collection

Data was collected using multiple methods, including internal documents, semi-structured interviews, and field notes from visits and activities with the case company. This approach, known as triangulation, involves using different methods or data sources in qualitative research to gain a deeper understanding of a phenomenon (Patton, 1999).

Semi-structured interviews were selected to provide flexibility and facilitate a deeper exploration of the topic, while ensuring that the discussions remained focused on the research objectives (Bell et al., 2022). The process began with pre-interviews conducted with the supervisor at the case company, aiming to develop an initial understanding of the organization and its current situation. Subsequently, interviews were conducted with individuals identified by the supervisor as relevant to the study, furthering the exploration of the topic. Following these interviews, snowball sampling was employed, where interviewees were asked to recommend other individuals who could offer additional insights. This approach enabled the identification of key participants and contributed to a more comprehensive understanding of the organizational dynamics and the relationships between individuals within the company (Bell et al., 2022). The interviewees are presented in Table 3.1. Interviewees are referred to by numbers, and their identification is kept at the team and organizational unit level to maintain anonymity, without revealing specific roles that could compromise their identity. To enable full engagement in the discussions, the interviews were recorded with the participants' consent for transcription purposes. These recordings were later transcribed and deleted. This approach allowed the researchers to review and analyze the responses in detail, as noted by Bell et al. (2022). The initial interviews with the case company supervisor were not recorded; instead, detailed notes were taken.

Field notes and internal documents both contributed to the triangulation of data in the study. Field notes were carefully recorded during the researcher's participation in meetings and a two-day workshop with a cross-functional team at the case company. These notes documented key observations, such as team dynamics, discussions on processes, decision-making, and challenges faced in daily work. The insights from these notes provided valuable context, deepening the understanding of the organization's Agile transformation and its challenges. Additionally, internal documents, including project plans, reports, team role descriptions, and Agile process guidelines, were analyzed to validate and triangulate the data gathered from interviews and observations. By examining these materials, the researcher cross-checked the consistency of findings, identified discrepancies, and gained further insights into the organizational context and practices. This process strengthened the construct validity of the study by ensuring that the findings were supported by multiple sources of evidence (Yin, 2009).

Table 3.1: Overview of Participating Interviewees

Interviewee	Team/Function	Organizational Unit	Date	Duration
Interviewee 1	Common Function	Central IT Organization	2024-09-24	60 minutes
Interviewee 2	Common Function	Central IT Organization	2024-09-24	63 minutes
Interviewee 3	Common Function	Consultant (Divisional IT)	2024-09-24	55 minutes
Interviewee 4	Platform Team A	Divisional IT Organization	2024-09-25	48 minutes
Interviewee 5	Platform Team A	Divisional IT Organization	2024-09-25	49 minutes
Interviewee 6	Platform Team B	Business Organization	2024-09-26	56 minutes
Interviewee 7	Common Function	Divisional IT Organization	2024-09-25	57 minutes
Interviewee 8	Common Function	Divisional IT Organization	2024-10-02	53 minutes
Interviewee 9	Platform Team F	Business Organization	2024-10-04	52 minutes
Interviewee 10	Platform Team B	Divisional IT Organization	2024-10-14	60 minutes
Interviewee 11	Platform Team C	Divisional IT Organization	2024-10-18	55 minutes
Interviewee 12	Platform Team F	Consultant (Divisional IT)	2024-10-24	55 minutes
Interviewee 13	Platform Team B & C	Consultant (Divisional IT)	2024-11-05	56 minutes
Interviewee 14	Platform Team D	Business Organization	2024-11-06	45 minutes
Interviewee 15	Platform Team C	Consultant (Divisional IT)	2024-11-07	58 minutes
Interviewee 16	Platform Team H	Consultant (Divisional IT)	2024-11-08	69 minutes
Interviewee 17	Platform Team D & E	Consultant (Divisional IT)	2024-11-08	58 minutes
Interviewee 18	Platform Team G	Divisional IT Organization	2024-11-12	51 minutes

3.3 Data Analysis

Thematic analysis was used to identify key features in the collected data and organize them into themes that reflected the observations made during the research.

This approach was chosen for its flexibility and ability to adapt to various research situations (Braun & Clarke, 2006). Thematic analysis is particularly useful in exploratory studies, where the focus may evolve as new insights arise (Bell et al., 2022). First, the researcher familiarized themselves with the data by transcribing, reading and re-reading interview transcripts and observational notes while noting down initial thoughts and potential patterns. This immersion in the data allows for an in-depth understanding of its content (Braun & Clarke, 2006). When familiarized with the data, Fuchs and Hess (2018)'s categorization of challenges in large-scale Agile transformations was adopted as the theoretical lens for data analysis, serving as a robust foundation for identifying key themes within the data. This framework was selected due to its holistic perspective on the challenges organizations may encounter during large-scale Agile transformations. Its comprehensive approach is particularly valuable for capturing the multifaceted nature of these challenges, which is critical given the complexity of Agile adoption at scale. Moreover, the data collected, and initial themes detected aligned closely with the categories proposed by Fuchs and Hess (2018), reinforcing the relevance of this framework for the study. Utilizing an established theory allows researchers to situate their findings within a broader context, facilitating deeper understanding and interpretation (Grant & Osanloo, 2014). This theoretical grounding also bridges the specific findings of this study to existing knowledge in the field, enhancing its academic and practical contributions (Grant & Osanloo, 2014).

Initial codes were then created based on the theoretical categories, which helped focus the analysis on aspects of the data that align with the theoretical lens. Data segments relevant to the predefined codes were identified and categorized. This process still allows for the emergence of data-driven codes but prioritizes those consistent with the theoretical framework. Themes were then constructed by synthesizing coded data in alignment with the theoretical framework. The researcher examined how the data supports, contradicts, or extends the theoretical concepts. The themes were then interpreted and discussed within the context of the theoretical lens. While using the theoretical lens, the researcher remained open to new insights or contradictions that did not align with the framework, to avoid forcing data to match the theory (Braun & Clarke, 2006). The use of a theoretical lens enables researchers to situate their findings within a broader scholarly context, enhancing the study's contribution to the field (Braun & Clarke, 2006). To illustrate the categorization, Table 3.2 shows the categorization applied in this study. The categorization in this table serves as a clear representation of how the challenges were organized and analyzed during the data analysis process.

At a later stage, the interviewees who referred to each challenge within its respective category were mapped to assess its significance. The findings from the data analysis were then evaluated based on the frequency of mentions, enabling a more focused discussion. Challenges identified by more than half of the interviewees were considered prominent and analyzed in greater depth, as shown in Table 5.1. Recommendations were subsequently aligned with these key challenges, drawing from both the literature and the study's findings, which are presented in Table 5.2.

Table 3.2: Categorization of Challenges from Thematic Analysis

Process Challenges	Insufficient and Delayed Feedback Loop
	Insufficient Cross-Team Dependency Planning
	Overlapping Development and Release Cycles
	Release Process Bottlenecks
	Inefficient Requirement Refinement
	Inefficient Use of User Acceptance Testing
	Lack of Data-Driven Decision-Making and Metrics
Technology Challenges	Technical Complexity and Dependencies in development
	Deployment Tool Effectiveness and Adoption Issues
	Insufficient Automation
Structure Challenges	Conflicting Priorities Across Teams
	Disconnect between Business and IT
	Siloed Team Dynamics
	Leadership Deficiencies for Change Initiative
	Resistance Among Product Owners
	Lack of Business-Driven Justification for Change
	Communication Gaps Regarding Change Initiative
	High Workload in Daily Work
	Structural Communication Deficiencies
People Challenges	Fears regarding change initiative
	Skepticism About the Effectiveness and Impact of Change
	Digital Immaturity in the Industry
	Lack of agile mindset
	Difficulties in Decomposition of User Stories
	Gaps in Skill Development

3.4 Ethical Considerations

Ethical considerations were carefully addressed throughout the research. All participants were informed about the purpose of the study, their voluntary participation, and their right to withdraw at any time without any consequences. Interviews were conducted with the informed consent of the participants, ensuring they understood the scope and nature of the research. Participants also gave consent for the recording of the interviews.

3.5 Case Description

The case company in this study is a leading manufacturer of construction equipment, headquartered in Sweden. With a strong market presence, the company is actively pursuing digital transformation to enhance customer engagement and maintain its competitive edge. A key initiative in this effort is a digital services platform launched in 2018, designed to connect directly with end customers and expand service offerings. The platform consists of ten interconnected applications, each managed by dedicated product teams that must coordinate closely to ensure smooth development and deployment. To manage interdependencies, teams have

synchronized their development activities, allowing for simultaneous testing and updates.

Historically, the company followed a traditional release cycle of three updates per year, which resulted in complex code that was difficult to test and deploy. To improve efficiency, the organization transitioned to a four-week release cycle, consisting of a three-week development sprint followed by a two-and-a-half-week release period. However, as teams became more efficient, new challenges emerged. There was a drive to address internal inefficiencies, particularly those related to release size, complexity, and quality. In response, a proposal to further shorten the sprint cycle to three weeks was introduced. The motivation for moving to three-week cycles also stemmed from a desire to increase release frequency and deliver value to the business and customers more quickly. However, the initiative met resistance due to concerns about organizational readiness and was ultimately halted.

Despite these challenges, management remains committed to advancing the company's agile transformation, with a long-term goal of implementing Continuous Integration and Continuous Deployment (CI/CD). This research explores the company's ongoing agile transformation, focusing on the complexities of scaling agile principles across multiple organizations, teams and interdependent applications.

3.5.1 Platform Teams Setup

The platform is supported by ten cross-functional teams, with nine dedicated to developing and maintaining distinct applications within Salesforce, and one focused on managing integrations with other internal systems. While each of the application teams is responsible for its own specific application, they also share key objects and components across the platform. The integration team's role is facilitating communication between Salesforce and the company's broader internal systems. They manage the integration layer, overseeing the flow of data between Salesforce and systems such as the Master Data Management system. Each of the application and integration teams operates as its own scrum team, with varying internal structures but typically including roles such as Product Owners (POs), Scrum Masters (SMs), Business Analysts (BAs), Developers, and Testers.

3.5.2 Current Sprint and Release Setup

During the Development Phase, each team spends the first three weeks focused on building and testing their features. They work within their own Salesforce sandboxes—isolated environments where they can develop independently. Once development is complete, teams integrate their changes into a shared staging environment for further testing and refinement. Code is continuously deployed to the System Integration Testing (SIT) environment after being validated in the Quality Assurance (QA) environment. The last two days of the third week are reserved for a "code freeze" in the SIT environment, meaning no new code is deployed. This allows the testing team to focus on validating the code already in the environment. Product

teams can deploy to SIT without involving the DevOps team.

The Release Phase begins in the fourth week when the code is deployed to the User Acceptance Testing (UAT) environment. This deployment takes two days due to the large amount of code from different teams. The UAT testing period lasts for five days, during which bugs are fixed. The release group holds daily meetings throughout the release period to monitor progress and address any issues. The last three days of the UAT period are reserved for testing, with no new deployments made. After the UAT phase, the code is deployed to production. Go/no-go meetings are held at different stages to confirm readiness to progress to the next environment, ensuring the stability and quality of the release. Notably, the release phase overlaps with the start of the next sprint.

Given this background, this case is well-suited for investigating the challenges of a large-scale agile transformation due to its complex structure, interdependent teams, and ongoing efforts to scale agile principles across multiple applications. The company's shift from traditional release cycles to shorter sprints, along with its goal of implementing Continuous Integration and CI/CD, presents an opportunity to explore challenges in coordination, dependencies, and process optimization. Additionally, the resistance to change, particularly regarding the sprint cycle reduction, highlights key cultural and psychological factors to investigate in agile adoption.

4

Findings

The data analysis revealed a range of challenges encountered during the agile transformation. These challenges were categorized into four key dimensions: *Process*, *Technology*, *Structure*, and *People*. Each category represents a different aspect of the transformation and highlights specific barriers that organizations face when scaling agile practices. The findings for each dimension are presented below.

4.1 Process Challenges

Challenges related to Process focus on how agile frameworks are implemented and managed. The challenges found in this dimension is outlined in this section.

4.1.1 Insufficient and Delayed Feedback Loop

A significant challenge frequently highlighted by interviewees is the lack of timely and effective feedback from both end-users and the business. Limited engagement from the business makes it challenging for teams to verify if the product sufficiently meets business needs, while the lack of end-user involvement is noted to create a misalignment between development and actual end-user requirements. Several interviewees pointed out delays in identifying usability issues and aligning with business and end-user needs, mainly due to insufficient feedback during development.

Currently, UAT is conducted by POs and BAs, who also convert business requirements into technical specifications. This dual responsibility is noted by interviewees to limit their ability to provide an unbiased, user-centered perspective. As internal stakeholders are already familiar with the product's intended functionality, they lack the real-world context that direct end-user involvement would offer. Consequently, I6 highlight that the feedback provided tends to offer limited insight into the product's user-friendliness or whether the requirements truly reflect actual user needs. Meaningful user feedback typically only emerges after the product has been deployed to production—often weeks after development is complete. At this point, addressing misaligned requirements or usability issues becomes more difficult, delaying the realization of a solution that fully meets user expectations.

Compounding these challenges is the absence of robust feedback mechanisms, further limiting the collection of accurate and actionable insights. Several interviewees also highlighted limited access to users, with some attributing this to the early phase

of the product. Others pointed out that the unique relationship with dealers—who act as intermediaries between the business and end-users—often restricts direct access to users, further complicating the feedback process.

I13 highlights this issue by sharing an example where developments approved by internal stakeholders during UAT ultimately failed to meet user needs upon delivery:

"The tests were conducted by people who were familiar with the product, so they knew how it should behave and how to check some flows. But once this product was used by end users, it turned out that not everything is that user-friendly and that we need to change a couple of things [...] this could be already spotted if someone else not from the product team would tested it in UAT phase."

I17 explained the issue as a result of the application having a relatively small user base, making it difficult to receive sufficient feedback:

"One of the big challenges to that is at the moment [our product] don't have many users so the access to [end-users] is quite low, meaning the source of our feedback is limited so having more feedback would help us considerably"

4.1.2 Insufficient Cross-Team Dependency Planning

A recurring issue mentioned by interviewees was the ineffective management of dependencies, which results from a disconnect between high-level planning and low-level execution. Teams often struggle with dependency planning, as high-level plans do not adequately account for the detailed technical work required to identify and manage dependencies. As a result, dependencies often emerge late in the development process—during cross-testing or even in production—disrupting sprints and delaying delivery. This late discovery of dependencies creates blockages during sprints. Interviewees highlight that development often begins without a clear understanding of dependencies on other teams, leading to misalignment in sprint goals and capacities. I15 highlight how this lack of joint planning forces teams to disrupt others mid-sprint, causing delays as they wait for these dependencies to be addressed. Furthermore, interviewees highlight that may result in errors during cross-testing or deployment, when the dependencies are not identified or managed earlier in the process.

In addition, interviewees pointed out that existing dependency planning meetings are insufficient as they do not include the right people to address the technical specifics. Instead, I18 describes that these meetings often serve as high-level knowledge-sharing sessions, which do not allow discussions on implementation details or the impacts of dependencies. As a result, teams are unable to identify and address the technical dependencies requiring collaboration.

I12 raises concerns regarding not addressing dependencies at an early stage:

"I'll give you an example be it number of similar issues in place where we discover dependencies in production [...] we don't want to find it in production, we don't even want to find it in testing, we don't want to find it in development. We want to find it in design, and that design as I mentioned to you has not yet been configured"

I18 express concerns regarding the current planning meetings:

"I think there's a big issue with our dependency planning meeting. It's more about sharing what we're working on rather than proper dependency planning. You really need to get down into the details, and the right people aren't there for that."

4.1.3 Overlapping Development and Release Cycles

Several interviewees highlighted the issue of overlapping release processes and the development of the next sprint, which creates conflicting priorities for developers and complicates sprint planning. Due to the sprint structure, where the release process extends beyond the development sprint, the UAT phase often ends up outside and parallel to the next sprint. This misalignment disrupts the workflow and prevents teams from maintaining a clear focus on either the release or the next sprint's progress.

I4 highlights how this overlap pressures developers to address bugs discovered during the release process while simultaneously working on new features, leading to frequent context switching and uncertainty about prioritization. Interviewees highlight how this dynamic also complicates sprint planning, as teams cannot accurately predict what defects may emerge during the release process, resulting in capacity planning challenges and inaccurate sprint forecasts. I17 notes that these challenges increase stress to meet deadlines, impact productivity, and can lead to a decline in product quality. This overlap and the pressure to meet deadlines are viewed as significant obstacles to implementing more frequent releases. Interviewees expressed concerns that reducing sprint sizes would only exacerbate the overlap between UAT and the subsequent sprint, making it even harder to meet deadlines and maintain quality.

I4 describes the difficulties in maintaining focus due to the sprints overlapping:

"It becomes a bit like a Catch-22. As a developer, you have to switch contexts a lot. You're working on your user story, but then you might find a bug in UAT or perhaps in SIT that needs fixing. [...] This delays or shifts your focus away from what you should be working on"

I17 illustrates the issue of defect leakage due to this overlap:

"And so we get a lot of defect leakage because there's a lot of pressure to meet the timeline for the code freeze while we're trying to fix bugs from the previous sprint"

4.1.4 Release Process Bottlenecks

The release process is hindered by large, complex release packages that make deployments time-consuming and difficult to manage. This results in a rigid process that significantly limits the agility of development teams. As the number of applications grows, so does the volume of user stories being released simultaneously, requiring complex cross-testing and close coordination. The process is time-consuming, with each release requiring numerous meetings for complex coordination across multiple development teams. The rigid release structure, which includes defined stage gates and a mandatory code freeze at the end of each sprint, is seen as a constraint. Interviewees express that the structure limits the time available for active development, as teams have only a narrow window to finalize their work before the freeze, leaving little room for flexibility to address emerging issues. I17 explains how the pressure to meet deadlines often results in defects being carried over from previous sprints, as teams focus on fixing bugs under tight time constraints rather than fully developing new features.

Furthermore, the release cycle itself, tied to a fixed schedule, creates a bottleneck. Interviewees highlight that missing a deployment window forces teams to wait for up to four weeks until the next cycle, hindering the ability to quickly respond to issues or release new features. The strict adherence to this timeline and the need for all teams to deploy simultaneously due to shared dependencies adds to the complexity, requiring significant administrative work and coordination across multiple development teams.

I17 notes how the current release process hinders agility:

"I think having code freezes and the strict stage gate structure for environments, rather than flexible standards, is preventing the teams from truly being agile and responding quickly"

I15 illustrates the consequence of having code freezes:

"So if we end up deploying something like, [...] and it goes for testing in SIT and we find an issue. A blocking issue. Then we have two options, option 1: not release it further, and fix it in the next Sprint. or option 2: Go with that to UAT and provide the fix later, which we shouldn't do but very often it happens"

4.1.5 Inefficient Requirement Refinement

The teams face significant challenges in applying agile practices to the discovery process and backlog refinement, particularly in understanding and breaking down requirements. Delays in capturing business requirements, combined with a lengthy process of refining them, lead to long lead times before they can be implemented in a sprint. The lack of clarity or detail from the business side, along with the large size of requirements provided further exacerbates the issue. Several interviewees highlight how these inefficiencies create bottlenecks that hinder the team's ability to respond to evolving needs and deliver value on time.

Some interviewees identify these delays as a more pressing issue than release frequency. I12 emphasized how simply reducing sprint durations or increasing release cadence will not resolve the problem, as the refinement process remains separate from development and release. Other interviewees echoed this concern, pointing out that unless the refinement process is improved, the lead time before requirements reach development will remain long, regardless of release frequency. I11 further stressed that accelerating delivery relies on improving the refinement process.

I17 illustrates this challenge

"I think the refinement process is where the team is most significantly lacking in agile ways of working. The length that it takes us to capture requirements and refine them into user stories that the team can take into a sprint is longer than it should be."

4.1.6 Inefficient Use of User Acceptance Testing

The testing process, particularly UAT, faces inefficiencies and limitations. The UAT environment, which according to some interviewees should primarily focus on acceptance testing, is often used for additional tasks such as functional testing and defect fixes. This blurs the lines between testing phases and leads to UAT often being overly time-consuming. As a consequence, the excessive testing carried out during UAT creates resistance to shortening its duration.

Late-stage testing is another challenge, as bugs are frequently discovered late in the release cycle, making it difficult for teams to respond quickly. Additionally, tight timelines for writing and executing test cases at the end of sprints further constrain teams, leaving little room to address last-minute issues.

This issue is illustrated by I10:

"We have been testing too much in UAT, we must test more in the lower environments. It should be done already when it comes to UAT, since UAT is only for short verifications, but we haven't really worked that way"

4.1.7 Lack of Data-Driven Decision-Making and Metrics

Another challenge identified by interviewees is the absence of data-driven decision-making and measurable metrics, both in evaluating change initiatives and in daily operations. The lack of standardized metrics across teams creates a fragmented approach to tracking progress, making it difficult to align efforts or assess the success of initiatives. Without clear, data-driven evidence of the benefits, progress becomes difficult to measure, leaving stakeholders uncertain about the impact of the transformation. The lack of standardized metrics and a proactive risk assessment approach leads to a fragmented view of progress, creating misalignment between teams and decision-makers. Additionally, the absence of a consistent method for tracking and analyzing outcomes diminishes the ability to communicate tangible results, making it harder to justify the change initiative and align it with business goals.

Furthermore, the lack of standardized metrics across teams exacerbates this issue, creating a fragmented approach to tracking progress. I9 highlights how teams often do not measure their capacity or align their key metrics. Without a centralized system for data-driven insights, it becomes challenging to evaluate the impact of changes or make informed decisions.

I15 illustrates the importance of comparable metrics when driving change:

I think that we should be, make sure that the change we do is driven by some measurable method. That we can actually compare number to number and like apples to apples before and after. Right now, I don't feel we have this measure or it was or I haven't heard how we can do.

I12 describe the need for metrics:

you can not ever reach optimization of any kind until and unless you measure, so metrics are first and foremost, and just to be absolutely frank there are teams within our platform that don't have any metrics, that are now just discussing the very basic metrics.

I17 further describes how a lack of data-driven grounds for decisions causes conflicts:

"one team has full freedom to decide that something is or isn't a priority for them, even if it's a major priority for another team. And so it becomes an opinion based decision [...] rather than the value based decision or based on some objective measure that all of the teams can align to"

4.2 Technology Challenges

The Technology category addresses obstacles related to the tools and systems supporting agile ways of working. The challenges found in this dimension is outlined in this section.

4.2.1 Technical Complexity and Dependencies in Development

One significant challenge highlighted by several interviewees is the technical dependencies within the application, between teams and with external platforms, all of which significantly complicate development and deployment. They explain that the system's large scale and intricate structure make it difficult to break features into smaller deliverables without compromising functionality and testability, which leads to the need for longer sprints and deliberate release cycles. While interviewees see the benefits of faster releases for smaller updates, they stress that larger features require more time and coordination to ensure quality and stability.

Interviewees also emphasize that cross-team dependencies are a significant obstacle. They note that changes in one part of the system can unintentionally affect others. This increases the risk of merge conflicts, production issues, and unexpected failures, creating a need for thorough testing and coordination. Some interviewees express hesitation to make changes due to a limited understanding of the dependencies as they can lead to unforeseen impacts and unintended consequences. Interviewees point out that approaches such as shorter sprints and iterative delivery get impractical due to the complexity of the system and the need for coordination and testing driven by dependencies.

I12 interviewees suggest that tools like feature toggles, phased rollouts, and controlled deployment processes could help manage this challenge, enabling more gradual and stable releases. However, the organization struggles to manage system complexity and cross-team dependencies. Some interviewees mention that CI/CD could reduce dependencies and complexities, but others believe that it is not feasible until better coordination is achieved.

I9 illustrates the uncertainties caused by technical dependencies:

"The different dependencies scare me a bit too, if we tweak something over here, what happens over there? We are so intertwined. It's like having a big knot in a huge plate of spaghetti. If I pull here, what happens there? That scares me a bit, especially with CI/CD, because it can become unmanageable due to the size"

I12 illustrates the challenge of having a large, complex system:

"it's not about slicing to enable a single requirement being released in a single sprint—that's a noble idea [...] but within a complex environment such as Salesforce platform [...] That's not a pragmatic, realistic situation on the ground. Realistically, you have got features that cannot be rolled out to users until they are completed end to end, for example, and now to do that you need to have tools in place to do that across a number of sprints."

4.2.2 Deployment Tool Effectiveness and Adoption Issues

The challenge with the deployment tool lies in its slow performance and the associated learning curve. The interviewees highlighted the inefficiency of the current release and deployment tool, particularly its prolonged deployment times. This issue is recognized across teams as a bottleneck, impacting delivery speed. Deployments, even for relatively small amounts of code, are described as taking an entire day or longer, which is seen as highly inefficient and misaligned with agile principles of fast and frequent releases. I1 highlights that the tool not only takes a long time to deploy but also generates false negatives, leading to errors and manual rework. Furthermore, its complexity and difficult learning curve hinder effective adoption, creating frustration among users. These issues slow down the overall deployment process.

As I7 noted the ineffective deployments:

"Deploying takes a lot of time, takes a full day deploying max 3 weeks of development. We don't have that much code, but it still takes a lot of time"

4.2.3 Insufficient Automation

Interviewees also pointed out the inefficiencies in the release process, particularly the highly manual nature of both testing and deployment activities where they see a lot of opportunities for automation. The lack of automation in testing was described as an obstacle to becoming more agile. Interviewees highlight how manual regression testing consumes a significant amount of time, slowing down development and release cycles. Without sufficient test automation, teams struggle to quickly and efficiently validate new code, leading to slower feedback and a higher risk of defects. Similarly, the absence of automation in the deployment process hinders the ability to release software rapidly and consistently.

I4 expressed a need for more automated tests:

"We need to catch up with automating all our test scripts. Running regression tests manually takes a lot of time, so that's something we absolutely need to address"

4.3 Structure Challenges

This *Structure* category highlights structural and strategic challenges of the organization that impact the success of an agile transformation. The challenges found in this dimension is outlined in this section.

4.3.1 Conflicting Priorities Across Teams

The challenge of conflicting priorities and value definitions arises from the lack of a unified framework to guide prioritization across teams and business units. Interviewees highlighted the absence of a common backlog, roadmap, or objective measures of value to ensure alignment. Without a shared backlog or roadmap, there is confusion about what should be prioritized and developed, leaving teams to rely on subjective decisions, individual agendas, or the demands of specific stakeholders. As a result, teams often prioritize the needs of individual business units over broader platform goals, leading to misalignment both among teams and with the platform's overarching objectives.

A critical factor underlying this challenge is the disconnect between overarching vision—set at a higher strategic level to benefit the platform as a whole—and the individual priorities of fragmented business units aligned to individual teams. I18 note that while individual business units push their own priorities onto their respective teams, these may not align with the overarching strategic goals or deliver the most value to the platform. This misalignment is exacerbated by a lack of clarity and preparedness in the overarching priorities, where several interviewees note that high-level objectives are often being too abstract or disconnected from day-to-day operations. This gap leaves teams struggling to align their work with the broader vision, making coordination difficult and results in fragmented efforts. Additionally, I10 notes that a lack of shared understanding and discussions of what constitutes business value across the organization further complicates efforts to align priorities across teams.

I17 illustrates the alignment to different business units causing conflicts:

"A lot of stakeholders are aligned to specifically one team, and that means that pushing their priorities to that team results in some teams prioritizing things that are of lower value to [the platform] as a whole. [...] because the teams [...] are being incentivized to meet the demands of a particular set of stakeholders rather than the demands of the wider platform"

I1 further describes the conflicting priorities between the teams due to a lack of a concrete roadmap:

"[there is] a vision for [the platform], but at the same time, a product team [...] is supposed to make this their priority one. However, it's not priority one for other streams they depend on, which creates tensions and potential mismatches. Having just a vision isn't enough; it needs to be more concrete with a roadmap decided at a higher level"

4.3.2 Disconnect between Business and IT

A key challenge identified is the disconnect between business and IT teams, which impedes effective collaboration and alignment during the agile transformation. I10 describes how both organizations often operate independently, each with distinct agendas and priorities, leading to communication breakdowns and a lack of shared understanding. Interviewees highlight that business stakeholders have limited visibility into IT processes, development timelines, and priorities, while IT teams struggle to align their work with business needs. I10 further highlights that business discussions often occur in isolation, lacking transparency, which makes it challenging for IT teams to ensure their solutions are both usable and valuable. This disconnect slows collaboration, particularly as development teams lack access to key business insights. I14 described that not all teams have direct interaction with business users, and missing this vital input can hinder progress. The lack of engagement further exacerbates the difficulty in aligning IT and business objectives.

This separation also manifests in limited involvement of business stakeholders in key agile initiatives. Interviewees express that while IT teams push forward with changes such as faster release cycles, business stakeholders are often left out of the conversation. Efforts to implement practices such as more frequent releases were described by I11 as being primarily kept within the IT organization, with little to no communication or engagement with business teams. Some interviewees also stress the importance of actively engaging business users in agile initiatives, cautioning that without their involvement, change efforts risk becoming superficial and ineffective. Business stakeholders are noted to remain unaware of ongoing change initiatives, which makes it difficult for them to provide feedback or adapt to new ways of working. Moreover, the lack of engagement and training for the business side further complicates efforts to align IT and business objectives, undermining the success of the agile transformation.

I10 interviewee noted the division between Business and IT,

"Business is its own separate organization [...] It's more like two separate groups with different interests"

I10 continued by describing how it affects their collaboration:

"We've started working agile, pushing things out, and [business] are left there like 'uhhh' trying to keep up. But they haven't received proper training either, which I think everyone should have to a certain degree so they can understand the overall approach"

I11 illustrated the disconnect regarding the change initiative:

"I don't think that [business] are very involved [in the change initiative], or that awareness is even very high, I think this discussion has been staying very much within IT"

4.3.3 Siloed Team Dynamics

A primary challenge identified is the siloed mentality between teams, limiting cross-team visibility, alignment, and effective collaboration. Teams are noted to work independently, unaware of each other's developments and operations, resulting in fragmented efforts across the platform. By focusing on their internal goals, teams tend to overlook broader platform objectives, making coordination on shared features difficult. I18 highlight that this leads to inefficiencies, duplicated work, and delays, as crucial updates or changes are not communicated in time for teams to prepare or adjust their work accordingly.

I17 describes how the high degree of autonomy within teams, while enabling quick decision-making, also contributes to decisions being made in isolation. Interviewees note that this lack of alignment on overarching goals creates a disjointed approach, where teams may pursue objectives that conflict with each other, further impeding progress and creating bottlenecks when cross-team collaboration is necessary. Furthermore, there is an unwillingness to align across teams on broader change initiatives, with misaligned priorities making it difficult to establish a unified direction. I3 describes how in discussions regarding change initiatives, focus is frequently redirected to other issues, complicating progress toward a cohesive solution. While some teams prioritize frequent releases, others resist due to unresolved dependencies, stalling progress. This misalignment extends to leadership, where I18 highlights that SMs struggle with alignment among themselves, which compounds the challenges at the team level. Several interviewees note that this unwillingness to align among teams hampers strategic change initiatives.

I16 illustrates the siloed dynamics:

"So there's still a lot of silo thinking. People tend to talk in their bubble [...] the mindset of the organization, and I'm not talking about entire [company], of course, just the area I have an overview and this is [the platform], we have to open our minds and start thinking little bit more [...] outside the silos"

I12 describes the misalignment hampering a previous change initiative:

"From what I can remember the pressing issue was misalignment across different groups and different streams on [...] what is important and why [...] there is a lot of misalignment across maybe 200 people, and no one really seeks the alignment and that is even more pressing."

4.3.4 Leadership Deficiencies for Change Initiative

A recurring challenge expressed by the interviewees was the lack of senior management commitment and clear leadership in driving the change initiative. While some acknowledged that there was recognition at higher levels of the need for change, they noted that senior leadership failed to actively champion the initiative. This lack of active involvement led to misalignment and a lack of clear direction across teams. I12 noted that this absence of leadership not only caused significant delays but also hindered progress, as no one was taking decisive action or ensuring consistent follow-through. Without active involvement and ownership from senior management, employees struggled to see the value of the change and felt uncertain about its long-term importance. In addition, I11 emphasized the need for senior management to acknowledge employee concerns, noting that such acknowledgment would secure their buy-in for the initiative.

Furthermore, interviewees emphasized the need for change leaders to provide decisive direction and expressed frustration over the lack of decision-making. They highlighted how decisions regarding the previous change initiative were revisited repeatedly, even after receiving initial approval. This indecisiveness led to confusion and last-minute rejections of changes, creating uncertainty and significantly slowing progress. While inclusive approaches, such as open dialogue, were appreciated to some extent, interviewees felt these methods were ineffective without clear leadership to guide and support the process. Additionally, the initiative lacked clear goals and accountability beyond specific release activities. For instance, I11 noted that while ownership existed for the release plan, other critical activities impacted by the change were neglected. This imbalance was noted to risk derailing the success of the transformation.

I12 illustrated this challenge of lacking senior management advocacy:

"there is no senior management actually stepping in and putting their weight in to say 'please commit' and driving that change through. [...] and as a result we actually missed out on a lot of time and actually hurt ourselves in the process [...] There is just no leadership in place"

I11 further described a lack of ownership for impacted processes outside of the release:

"And of course i see that the platform team mainly owns the part that is about the release plan, but nobody else owns the rest that I mentioned so that is a risk that i see, that we will only change the release frequency and nothing else will change on the side or not enough"

4.3.5 Resistance Among Product Owners

Interviewees highlight that a key challenge in driving change lies in the role and influence of POs. As the primary link between business and IT, POs hold significant

decision-making power and influence over the development teams. Some interviewees state that POs act as gatekeepers, resisting more frequent releases because they do not perceive a pressing need for them. I16 suggests that this reluctance is rooted in a risk-averse mindset and highlight that POs' strong sense of accountability for their respective areas makes them hesitant to adopt changes that might introduce uncertainty. Other interviewees further suggest that the resistance stems from a lack of awareness about the benefits of shorter release cycles and agile practices. While leadership appears to support agility, some POs lack formal training or hands-on experience with agile methodologies, making it difficult to align them with transformation efforts.

Additionally, interviewees express frustration regarding POs' authority allows them to block changes, even when teams are prepared to move forward. Some state that a few vocal POs influence others, amplifying resistance and delaying progress. Others point out that last-minute objections from POs derailed the previous transformation effort, despite prior agreements to proceed. Ultimately, while many teams are willing to adapt, the resistance from POs—who hold a central role in decision-making—is expressed to have been a significant barrier to change.

I10 highlights that vocal POs have the power to shape team decisions, often influencing others to resist change:

"It wasn't the teams that said no—it was the Product Owners. Not all, but those who are the most visible and vocal tend to bring others along"

I16 emphasizes that many POs lack an agile mindset and formal training, yet their authority significantly impacts team ways of working:

"But we have a few POs who don't have any agile mindset today. [...] that's actually a big problem. And I'm not sure if they've ever had any education or educational contact with agility and the POs, they have a lot of power. Not that they want it, but they have it, so I think that's a historical or a structural thing. [...] if a DPM says no, it inflicts very much the team and their ways of working"

4.3.6 Lack of Business-Driven Justification for Change

Another challenge in implementing the proposed change initiative is the absence of a clear, business-driven justification for it. Some interviewees struggle to see the need for change because there is no strong push from the business side. Other interviewees note that it has been stated that the business does not want more frequent releases but have doubts about what this assumption is based on. I1 expresses uncertainty about whether this reluctance is grounded in concrete feedback from business users or if it is merely a perception held by some stakeholders. Interviewees who suggest a lack of business need primarily indicate that the business has not actively asked for more frequent releases, rather than explicitly rejecting them. This passive

stance creates a situation where IT teams are hesitant to invest time and resources into modifying workflows, as they do not see a compelling reason to do so. Some interviewees also noted that a past successful change, which involved significantly reducing release cycles, was met with clear business support, whereas the current proposal appears to lack the same level of urgency or necessity from a business perspective. Without clear evidence of business demand, teams question the necessity of the initiative, and the lack of alignment between the platform and business priorities leads to resistance. As a result, progress stalls, as teams are unwilling to engage in a transformation that does not appear to be solving a recognized problem.

I1 highlights the uncertainty surrounding whether the business has genuinely expressed a need for more frequent releases:

"they said that the business don't want more frequent releases, but i dont know if [...] is it true or not if you understand what i mean. Is there interviews done with that? Is it some dealer who has said it or is it just a feeling?"

I13 emphasizes that the business has not provided any explicit feedback or expressed demand for more frequent releases

"we didn't receive any feedback like this, that someone would have would like to have those releases more frequently, right? So there's no business need to do it"

4.3.7 Communication Gaps Regarding Change Initiative

This challenge centers on communication breakdowns related to the ongoing change initiative, which have led to misunderstandings and misaligned expectations. Interviewees highlight that discussions about the initiative have often been broad and unfocused, with multiple changes being addressed without clearly defining the scope or desired outcomes. As a result, people agreed to proceed without fully understanding the changes, leading to superficial agreement. This lack of clarity has led to confusion about what the changes will actually involve and how they will impact individuals, making it difficult for teams to fully engage and align with the initiative. Additionally, interviewees point out that key aspects of the change, such as adjustments to the UAT process and the planning week, were not communicated accurately, leading to misunderstandings and conflicting expectations across teams. This, in turn, resulted in last-minute resistance when trying to implement the change. The overall lack of clarity has hindered effective engagement and alignment.

I12 illustrates the confusion during discussions around the change initiative:

"I remember that at that time we were talking about [change initiative] [...] literally within the same meeting literally with the same people as you were discussing splitting teams, agile transformation, we were talking

about injecting scrum masters into existing fully functioning teams and we were also implementing one rhythm. [...], so when someone asks do you feel like this is safe enough to try, people were so confused about what we were actually talking about that they just ended up nodding and said ok let's go with it"

4.3.8 High Workload in Daily Work

The high workload across teams is a significant barrier to agile transformation. With overloaded backlogs and competing priorities, teams are unable to focus on essential activities such as training, process improvements, and cross-team collaboration. This constant pressure makes it difficult to achieve meaningful change, as the focus is primarily on immediate tasks rather than long-term strategic goals. Moreover, the heavy workload severely limits the opportunity for upskilling. Although training sessions are available, employees struggle to prioritize them due to pressing operational demands. I9 found it difficult to balance these commitments with their daily tasks, and explained how they dropped out of training when the time commitment became too much. Additionally, I16 highlight how the focus on immediate deliverables leaves little time for alignment on broader organizational goals, further impeding transformation efforts.

Ultimately, the high workload creates a barrier to engaging with key aspects of the transformation, including training, change management, and alignment on common goals. As I16 interviewee noted,

"You know the situation is today, that we have a lot of workload, a lot of tensed working situations, people have full calendars. And the result is that we ended up having no time left to have decent exchanges on topics, everything is in a rush, and this is very bad if you need to consider improvements"

4.3.9 Structural Communication Deficiencies

Coordination between teams is a significant challenge, particularly when dealing with interdependencies between systems and platforms. This issue stems from structural communication deficiencies, which create barriers to effective collaboration. Interviewees point out that communication channels are not well-aligned, forcing teams to rely on informal methods to coordinate their work. I15 described how teams end up working in parallel without a formalized communication structure to keep everyone aligned. I12 describes how this leads to communication that is inconsistent and reactive, making it difficult to track and synchronize efforts across teams. Furthermore, I18 notes that each team communicates with its internal stakeholders in its own way. Additionally, interviewees note how some teams, such as consultants in the BA role, are excluded from key forums, limiting their access to important updates and shared learning opportunities. I18 also noted that without a

scrum master, they lacked representation in the scrum master forum, causing them to miss out on crucial information. These structural communication gaps prevent teams from aligning their efforts, resulting in inefficiencies and slowing down overall progress.

I18 emphasizes the misaligned communication structures:

"I don't think we have an aligned way to communicate to our internal people, which is why I'm trying to work on that part at least. But I don't. I think we communicate to people all over the place. So it becomes difficult to track"

4.4 People Challenges

The *People* dimension focuses on the human aspect of agile transformations, including opinions, attitudes and capabilities of participants in the transformation. The challenges found in this dimension is outlined in this section.

4.4.1 Fears Regarding Change Initiative

Interviewees express that one of the main obstacles to adopting new processes is a fear of change among employees. This manifests in various concerns, particularly around a potential shift towards CI/CD. Some interviewees members express concerns about the complexities and risks associated with continuous integration and delivery. These fears include concerns about defect leakage when bypassing existing quality gates and the potential risks of deploying without these safeguards. Additionally, I7 notes that there is fear of losing control over key decisions, especially in UAT and deployment processes, where stakeholders are accustomed to having full authority.

Furthermore, interviewees express concerns about the adequacy of time and resources, particularly with shortening sprints. Some interviewees fear that reducing the time allocated for development or UAT could lead to insufficient time thorough testing, potentially compromising the quality of deliverables. Others highlight that more frequent releases would result in more UAT, which might take time away from supporting the business. Furthermore, interviewees highlight the issue that shorter sprints provide less flexibility to accommodate delays from other teams. I9 further mention that more frequent releases would increase workload, suggesting that this could lead to burnout or reduce the team's capacity to meet demands. There is also concern that frequent releases could disturb or overwhelm customers, who may struggle to keep up with constant changes. Furthermore, interviewees fear the potential impact on delivery output, expressing that these changes could reduce the value delivered to the business. Several interviewees express concerns that contribute to a broader resistance to change, as well as anxiety about the unknowns and perceived risks associated with altering well-established processes. This resistance is not solely about specific processes like UAT or deployment but is a more general unease with

any shift from the status quo.

I7 describes the fear of CI/CD

"One major problem is people's mindsets, they are freaked out by the thought of CI/CD"

I15 expresses a fear of insufficient development time in the new sprint structure

"We have four weeks of Sprint but only two weeks, two weeks and two days is the time where we can develop [...] If we cut it by another week, we'll end up with eight days of development. And yes, the question is if that's enough for the team to actually deliver something valuable"

4.4.2 Skepticism About the Effectiveness and Impact of Change

Another significant challenge is the skepticism surrounding the effectiveness and overall impact of the proposed changes. Even among those open to change, there is skepticism about whether the proposed adjustments will deliver meaningful improvements. Many interviewees state that reducing sprint sizes or increasing release frequency will not address the underlying internal issues they are currently facing, such as long lead times, complex deployment processes, or broader structural challenges. Without a more comprehensive approach that includes improving feedback loops, user engagement, and operational efficiency, simply increasing release frequency is viewed as an isolated change that fails to address deeper inefficiencies in the development and deployment process. Additionally, some interviewees express that the primary beneficiaries of the change would be DevOps, rather than the broader organization, leading to further doubts about its overall impact.

Additionally, there is hesitation about whether the effort required to implement these changes is justified by the potential benefits. The proposed change from four-week to three-week sprints is often seen as too incremental to justify the effort required for implementation. Many interviewees believe that other, more pressing priorities should take precedence. I11 argue that prioritizing release cycles is misguided, and that focusing on process efficiency and backlog management might be a more impactful approach. Without clear evidence of significant gains, I15 suggest the proposed adjustments seem like a disruption rather than an improvement. This misalignment between the perceived benefits and the actual needs of different teams further fuels resistance, as some interviewees remain unconvinced that the benefits outweigh the costs.

I9 highlights the need for other improvements beyond simply decreasing release sizes:

"You are decreasing the release size, making adjustments, and still, you want to go faster. It doesn't really square in my head. Instead of improving efficiency, we are just decreasing the release sizes, which doesn't

make sense because my backlog is still long."

I11 points out the disconnect between the limited impact and the costs of reducing release cycles:

"Now moving from four weeks to three weeks many of us don't really see how it will be a game changer [...] the scale benefits versus cost is maybe not strong enough in this case"

4.4.3 Lack of Agile Mindset

A critical challenge is the lack of an agile mindset within the organization, which hinders the effective adoption of agile methods. Although teams acknowledge the need for change and are familiar with agile frameworks, there is a recognized gap between theory and practice. The organization still relies on traditional methods, with teams resisting change, often due to the comfort of established work practices and a fear or uncertainty.

Another key issue is that, while agile concepts are often discussed, their practical application is lacking. There's a tendency to focus heavily on planning and talking about agile, but little effort is made to embody its principles in practice. I10 highlight that the focus remains on grand, complicated processes, rather than taking small, manageable steps to learn and adapt incrementally. This disconnect between talking about agility and actually being agile leads to frustration among some interviewees, as teams get caught up in the discussion rather than embracing the action needed to make meaningful progress.

Additionally, these discussions sometimes fall short, as some interviewees point to a reluctance to engage in collaborative decision-making. I16 highlights that some still prefer top-down directives, while others describe that there is a tendency for the strongest or most authoritative voice to direct the way forward, instead of fostering collective problem-solving.

The lack of an agile mindset is rooted in organizational members' unwillingness to change and accept risks, their attachment to predefined plans, and the absence of a culture of experimentation and collaboration. I18 states that until there is a shift towards embracing uncertainty, prioritizing adaptability, and fostering team-oriented decision-making, the full potential of agile methodology will remain untapped.

I16 describes the unwillingness to change:

"even though they are aware of, OK, that's not ideal or even they're aware of no, that's really, really bad. But at least this bad situation is something, I somehow can handle. But if you try to tell them, but hey, you know what we could do this and that change most of the people react 'Oh, no, no, no, no'"

I10 further notes the importance of an agile mindset:

"I keep insisting in the Scrum Master forum that we need to work on the agile mindset and start from the basics. We focused a lot on tools and processes [...] But it only gets you so far [...] you'll never get further if you don't have the right mindset. [...] We're still stuck in the mindset where the loudest voice gets what they want, and that's not really the right approach"

4.4.4 Digital Immaturity in the Industry

The company is committed to maintaining strong customer relationships and ensuring a seamless user experience. However, it faces the challenge of addressing varying levels of digital maturity across its customer base, which affects the adoption of new functionalities and technologies. Some interviewees note that many customers operate in traditional, less digitally advanced environments, where processes rely heavily on stability and familiarity. In these contexts, the interviewees state that even well-intentioned updates risk disrupting established workflows, leading to resistance to change and a steep learning curve.

On the other hand, I6 notes that customers with higher digital maturity expect faster innovation and are more receptive to adopting new tools. Interviewees also highlight that the growing user base and increasing stakeholder demands are pushing for more frequent releases. Interviewees further note that a mismatch arises as many customers, eager for frequent releases, may not fully understand that agile updates are typically incremental, which adds complexity to managing customer expectations and aligning them with the company's release strategies.

This digital divide is further compounded by the need for effective change management to guide less digitally mature customers through the transition. Several interviewees note that without clear communication and education, these customers may struggle to see the value of updates or resist changes altogether. Ensuring customers understand and adapt to new tools while minimizing disruption to their operations is a critical challenge, requiring consistent efforts in messaging, relationship management, and long-term support to foster trust and gradual acceptance.

I8 illustrates the focus on customer relations:

"We are different from other software companies because software companies they want to deliver value to any cost because that's how they survive and get business. They don't want to ruin their reputation not delivering in time. Here, we don't have any accountability partner, here the end customers are end users we want a good name among the customers"

I9 further describes the digital maturity of their customers:

"We have users in an environment and a reality that isn't very digital. We sell machines for digging holes, building houses, working in mines, and so on. So, it's not a fast-moving technology-first approach. These are big, heavy machines, not fast-moving devices"

4.4.5 Difficulties in Decomposition of User Stories

Interviewees emphasize the challenge of breaking down large and complex user stories into smaller, manageable tasks that fit within sprint time frames. Many user stories are described as too broad, unclear, or intricate, making it difficult to complete them within a single sprint. This leads to inefficiencies and delays, as teams struggle to start and finish tasks as planned.

A key factor contributing to this challenge is the lack of experience in decomposing user stories. I17 notes that many team members are unfamiliar with structuring stories for shorter sprints, often perceiving the process as challenging or even unfeasible. Several interviewees further highlight the need to develop competencies in this area to ensure that user stories are clear, actionable, and effectively managed within sprint cycles.

I16 illustrates the common feedback from teams regarding the difficulty in breaking down user stories:

"we asked every team some months ago [...] what improvement candidate would bring you the most benefit. Most of the teams said, All in all, we had a prio one topic. This was [user story] slicing"

I4 further explains the importance of breaking down user stories to ensure they are concrete and achievable within a sprint:

"User stories need to become much smaller, more concrete, and we need to minimize all the theoretical work around them. This is crucial because we need to be able to pick up user stories, start them, and finish them"

4.4.6 Gaps in Skill Development

Interviewees emphasize the need for consistent and comprehensive training across teams, particularly in deployment processes, Agile practices, and tool usage. They identify knowledge gaps in these areas and stress the importance of additional training to ensure agile processes are handled effectively. I18 further noted issues with limited knowledge sharing regarding new tools, expressing a desire for more training. Strengthening the understanding of Agile practices, such as the Definition of Ready and user story writing, is also essential, as teams frequently encounter challenges in

these areas.

Conversely, some interviewees highlight challenges in engaging employees with available training opportunities. Despite identified needs, such as improving breaking down user stories and tool adoption, participation in related training sessions has been low. For instance, I16 mentioned that although platform teams acknowledged the importance of improving skills in breaking down user stories as the top priority, only a few members attended the relevant training sessions.

I17 illustrates the importance of training:

"Training, I think the team would need to be upskilled [...] So it is a new process of deploying, if teams don't understand the rules around that, then there may be a risk of them deploying things that shouldn't have been deployed"

I18 emphasizes a desire for broader dissemination of training on new tools:

"I think [they] have done some work with trying some automation tools, but I don't think that information has been disseminated and we have large scale training on it. I'd like to know more"

5

Discussion

This discussion will be based on the quantification outlined in the methodology, as shown in Table 5.1, which presents the frequency of the 25 challenges identified during the study. These challenges were initially categorized into four key areas: *Process*, *Technology*, *Structure*, and *People*. Challenges mentioned by more than half of the interviewees were considered prominent and are the primary focus of this discussion, explored based on their frequency and impact. Following this, recommendations to address these challenges will be provided, with Table 5.2 summarizing the proposed solutions. These recommendations are derived from an analysis of the data, synthesis of the findings, and insights from the existing literature.

Table 5.1: Visualization of the frequency of mentions for challenges

		Interviewees highlighting the challenge																	Sum	
Challenges		I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16	I17	I18	
Process	Insufficient and Delayed Feedback Loop		X		X	X	X		X		X	X	X	X		X		X		11
	Insufficient Cross-Team Dependency Planning		X		X		X	X			X	X	X	X		X		X	X	11
	Overlapping Development and Release Cycles				X					X	X					X	X	X	X	7
	Release Process Bottlenecks		X		X		X					X	X			X				7
	Inefficient Requirement Refinement				X		X		X		X	X	X						X	7
	Inefficient Use of User Acceptance Testing		X	X	X		X				X									5
	Lack of Data-Driven Decision-Making and Metrics									X		X	X			X		X		5
Technology	Technical Complexity and Dependencies in development	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X		15
	Deployment Tool Effectiveness and Adoption Issues	X	X	X				X			X	X				X				7
	Insufficient Automation			X	X						X							X	X	5
Structure	Conflicting Priorities Across Teams	X		X		X		X		X		X	X		X	X		X	X	10
	Disconnect between Business and IT		X			X				X	X		X	X	X	X	X	X	X	10
	Siloed Team Dynamics			X					X	X		X	X		X	X	X	X	X	9
	Leadership Deficiencies for Change Initiative	X		X		X			X	X	X	X				X		X	X	9
	Resistance Among Product Owners	X	X	X							X				X		X	X	X	8
	Lack of Business-Driven Justification for Change	X		X		X	X					X		X		X				7
	Communication Gaps Regarding Change Initiative	X	X			X			X				X							6
	High Workload in Daily Work					X		X	X	X				X			X			6
Structural Communication Deficiencies										X		X		X	X			X	5	
People	Fears regarding change initiative	X	X			X	X		X		X	X	X	X	X	X		X	X	12
	Skepticism About the Effectiveness and Impact of Change	X			X	X			X	X	X	X	X	X	X	X				10
	Digital Immaturity in the Industry				X	X	X	X	X		X			X				X	X	9
	Lack of agile mindset	X		X		X		X			X		X				X	X	X	9
	Difficulties in Decomposition of User Stories			X	X	X	X						X				X	X		7
	Gaps in Skill Development	X		X							X						X	X	X	6

Table 5.2: Recommendations for the prominent challenges of large-scale agile transformation

Dimension	Challenge	Recommendation
Process	Insufficient and Delayed Feedback Loop	<ul style="list-style-type: none"> • Educate stakeholders on agile principles and practices to encourage stakeholder engagement and alignment • Engage top management in Agile advocacy to encourage stakeholder participation • Involve end-users in validation sessions
	Insufficient Cross-team Dependency Planning	<ul style="list-style-type: none"> • Ensure Planners Have Strong Technical Expertise • Leverage Tools like Iteration Dependency Matrix to improve visibility into cross-team dependencies
Technology	Technical Complexity and Dependencies in Development	<ul style="list-style-type: none"> • Improve Cross-Team Communication and Coordination • Break Down Complex Requirements into Smaller User Stories • Utilize "Dead Code" Practices
Structure	Conflicting Priorities Across Teams	<ul style="list-style-type: none"> • Establish a Common Backlog and Prioritization Framework • Ensure Alignment at the Program Level and Across Business Units • Create an Actionable Vision Tied to Day-to-Day Work
	Disconnect Between Business and IT	<ul style="list-style-type: none"> • Create a Shared Vision Integrating Business and IT Objectives • Secure Active Support from Top Management to strengthen cross-functional alignment and commitment to agile adoption. • Involve Business Stakeholders Early in the Transformation • Improve Communication Through Stakeholder Workshops
	Siloed Mentality Between Teams	<ul style="list-style-type: none"> • Create and Communicate a Clear Vision actionable at team-level • Promote Transparency and Regular Communication • Maintain team autonomy while setting shared goals, a common definition of done, and standardized practices to align efforts • Organize Regular Stakeholder Workshops and Synchronization Meetings • Secure Leadership Support for Alignment and Collaboration
	Leadership Deficiencies for Change Initiative	<ul style="list-style-type: none"> • Senior Management Should Actively Champion the Transformation • Address Employee Concerns to Foster Engagement • Train Management in Agile Principles • Balance Clear Direction with Collaborative Decision-Making • Involve Change Leaders from Different Areas or External Coaches
People	Fears Regarding Change Initiative	<ul style="list-style-type: none"> • Foster an Environment of Trust and Collaboration • Promote Transparent Communication • Provide Ongoing Coaching During Agile Implementation
	Skepticism About the Effectiveness and Impact of Change	<ul style="list-style-type: none"> • Engage Teams in Shaping the Transformation • Communicate the Reasons for Change Clearly • Demonstrate Visible Leadership Commitment • Build and Communicate Evidence of Change Impact • Address stakeholder concerns and ensure their ongoing support throughout the transformation process
	Lack of Agile Mindset	<ul style="list-style-type: none"> • Align Organizational Culture with Agile Values • Encourage Iterative Development and Adaptation • Focus on Mindset Shift in Training • Promote Collaborative Decision-Making • Leaders Should Model Agile Behaviors
	Digital Immaturity in the Industry	<ul style="list-style-type: none"> • Engage Customers in the Change Initiative • Offer Customers Targeted Training on Agile Practices • Implement Partial Releases • Communicate Effectively with Customers

5.1 Process Challenges

This section provides an analysis of the significance and impact of the challenges in the Process dimension, followed by recommendations for addressing the most frequently mentioned issues: *Insufficient and Delayed Feedback Loop* and *Insufficient Cross-team Dependency Planning*, as shown in Table 5.1.

5.1.1 Analysis of Prominent Process Challenges

Insufficient Cross-Team Dependency Planning emerges as one of the most frequently cited challenges, likely due to its direct impact on multiple teams that rely on one another throughout development. Edison et al. (2021) emphasizes that poor dependency management leads to workflow disruptions, inefficiencies, and delays, reinforcing the argument that inadequate cross-team planning poses significant system-wide challenges when their development is interconnected. The frequency of its mention underscores that this issue is a persistent concern for many teams, impacting their day-to-day operations. Furthermore, its frequent discussion in the literature, by authors such as Edison et al. (2021), Sekitoleko et al. (2014), Shahin et al. (2017), Uludağ et al. (2019), and Van Waardenburg and Van Vliet (2013), suggests that insufficient dependency planning is a widespread issue in agile transformations in general, indicating that more focus and attention may be needed to manage dependencies effectively when scaling agile.

By contrast, *Insufficient and Delayed Feedback Loop*, primarily caused by limited engagement from business stakeholders and end-users during development, do not necessarily impact all teams equally, as the study found that teams are aligned with distinct business units. However, the frequent occurrence of this issue suggests that it may pose a challenge for many teams, potentially indicating a broader organizational misalignment. This limited involvement in agile processes aligns with Edison et al. (2021) and Van Waardenburg and Van Vliet (2013), who note that in large-scale agile implementations, business stakeholders often remain less engaged than necessary, ultimately affecting key agile practices such as requirements engineering and feedback processes. Furthermore, Fuchs and Hess (2018) and Van Waardenburg and Van Vliet (2013) highlight the importance of effectively integrating agile across the organization, as failure to do so can disrupt feedback processes and misalign development with business needs—an issue also raised by interviewees in this study. Additionally, the literature consistently cites customer collaboration, continuous feedback, and frequent access to business insights as essential to agility and responsiveness to changing demands (Hossain et al., 2021; Lindskog & Netz, 2021; Rajakumari, Hemalatha, et al., 2024; Siakas & Siakas, 2007; Van Waardenburg & Van Vliet, 2013), further underscoring the significance of this challenge observed in the study.

While challenges such as dependency management and feedback loops were widely cited, other process-related issues were mentioned less frequently. This may suggest that teams encounter different obstacles based on their workflows, structures, and

varying understandings of agile. As noted by Eilers et al. (2020) and Späth and Westner (2024), the way agile is understood plays a critical role in the efficiency of processes. However, the fact that some challenges were raised by only a subset of teams may also point to inconsistencies in agile adoption, where specific processes hinder agility in certain contexts. This aligns with Berntzen et al. (2022), who emphasize that large-scale agile software development is complex, and there is no one-size-fits-all approach. Additionally, Edison et al. (2021) highlight that adapting agile methods to suit different team needs is inherently challenging. Although these challenges are less frequently mentioned, they may still deserve attention, as Fuchs and Hess (2018) point out that misapplied or poorly customized practices can create significant barriers in large-scale agile transformations.

5.1.2 Recommendations to Address Prominent Process Challenges

Common strategies to address the challenges of *Insufficient and Delayed Feedback Loops* and *Insufficient Cross-team Dependency Planning* include improving communication, fostering active engagement, and enhancing collaboration across teams. The following sections will describe the specific mitigations for each challenge in more detail.

To address the challenge of *Insufficient and Delayed Feedback Loop*, Van Waardenburg and Van Vliet (2013) emphasizes the need to shift business stakeholders' mindsets to encourage deeper involvement in agile processes. Educating stakeholders on agile principles and their role in feedback cycles can enhance their engagement, leading to more timely and constructive input (Carroll et al., 2023; Edison et al., 2021; Van Waardenburg & Van Vliet, 2013). A stronger understanding of agile practices fosters alignment with development efforts and gives stakeholders a greater sense of control, which increases their enthusiasm for the process (Van Waardenburg & Van Vliet, 2013). Additionally, top management plays a crucial role in driving this engagement, as strong advocacy for agile principles can help shift business stakeholders' perspectives (Van Waardenburg & Van Vliet, 2013). Moreover, the organization could benefit from actively involving end-users in validation sessions, as their involvement is suggested to enhance feedback relevance by capturing real-world insights early in the development process, reducing the risk of misalignment between product functionality and user expectations (Pinton & Torres Junior, 2020; Shahin et al., 2017).

To mitigate *Insufficient Cross-team Dependency Planning*, ensuring that planners possess strong technical expertise can improve the accuracy of dependency identification during cross-team planning, as highlighted in the study. Theory further suggests that technical knowledge enables planners to better integrate technical considerations into joint planning efforts (Edison et al., 2021; Sekitoleko et al., 2014). Strengthening this perspective can help teams detect dependencies earlier, reducing misalignment between high-level planning and execution. Furthermore, leveraging tools such as the Iteration Dependency Matrix can improve visibility into cross-team

dependencies, enabling teams to track and manage potential risks more effectively (Uludağ et al., 2019). These combined approaches may contribute to more effective dependency management and smoother development cycles.

5.2 Technology Challenges

This section provides an analysis of the significance and impact of the challenges in the Technology dimension, followed by recommendations for addressing the most frequently mentioned issue: *Technical Complexity and Dependencies in Development*, as shown in Table 5.1.

5.2.1 Analysis of Prominent Technology Challenges

Technical Complexity and Dependencies in Development was the most frequently mentioned challenge in this study, as seen in Table 5.1, and is also widely discussed in the literature on scaling agile. This challenge often arises from the complexities of multiple teams working with tightly coupled architectures, which becomes increasingly problematic as teams strive for greater autonomy in development and deployment (Berntzen et al., 2022; Shahin et al., 2017; Stray et al., 2019; Van Waardenburg & Van Vliet, 2013). This aligns with the study’s findings, where uncertainties in development are largely attributed to dependencies across the platform.

Interviewees in this study also emphasized that the system’s overall complexity can hinder the effective implementation of agile practices, such as breaking down tasks or user stories to fit within sprint goals. Shahin et al. (2017) highlights the difficulty of determining the right size for user stories to effectively manage dependencies while maintaining their value, a challenge echoed by participants in this study. While Paasivaara et al. (2018) found that difficulties in breaking down user stories were present, they considered it less of a critical challenge compared to other issues in their study. Despite this, the frequent mention of this issue in the findings of this study suggests that it remains an important challenge to address.

Overall, the literature consistently frames dependency-related challenges as a central issue tied to the complexity of coordinating multiple teams. This is particularly important in large-scale agile transformations, where managing dependencies across teams is essential to maintaining agility and preventing disruptions in the development process (Dikert et al., 2016; Van Waardenburg & Van Vliet, 2013). This further supports the finding of this study that technical dependencies represent a critical challenge to address in order to successfully scale agile practices.

The challenges of *Deployment Tool Effectiveness and Adoption Issues* and *Insufficient Automation* were mentioned less frequently in this study, as represented in Table 5.1, which might suggest that they are viewed as secondary or less urgent concerns for some agile teams. In the literature, these challenges are primarily discussed in the context of CI/CD (Avuthu, 2022; Dugbartey & Kehinde, 2025; Shahin et al., 2017), suggesting that they may become more significant when organizations start

adopting CI/CD practices. However, other challenges, particularly those related to team processes and dependencies, may take priority in the earlier stages of an agile transformation, meaning that deployment-related issues might not be as pressing initially.

5.2.2 Recommendations to Address Prominent Technology Challenges

To address the prominent Technology challenge, the recommendations emphasize improving cross-team communication, simplifying requirements, and implementing strategic practices to mitigate risks. The following section outlines these strategies.

To address the challenge of *Technical Complexity and Dependencies in Development*, improving cross-team communication and coordination is essential to ensure all teams are aware of component changes and their potential impact on others (Edison et al., 2021; Shahin et al., 2017; Van Waardenburg & Van Vliet, 2013). Regular, open communication between teams can help identify and address dependencies early, reducing the risk of unforeseen issues during development and deployment. Additionally, breaking down complex requirements into smaller, more manageable user stories can help reduce dependencies, allowing teams to focus on delivering smaller, well-defined pieces of functionality (Edison et al., 2021; Shahin et al., 2017). This approach can make it easier to handle larger features and integrate them gradually, without compromising the stability of the system. Finally, for complex environments, utilizing "dead code" practices where code is kept inactive until all dependencies are resolved, could provide further control over the development process, ensuring that changes do not introduce unforeseen risks (Shahin et al., 2017). These strategies, when combined, could help manage the complexity of technical dependencies and support smoother, more stable releases.

5.3 Structure Challenges

This section provides an analysis of the significance and impact of the challenges in the Structure dimension, followed by recommendations for addressing the most frequently mentioned issues: *Conflicting Priorities Across Teams*, *Disconnect between Business and IT*, *Siloed Mentality between Teams*, and *Leadership Deficiencies for Change Initiatives*, as shown in Table 5.1.

5.3.1 Analysis of Prominent Structure Challenges

Conflicting Priorities Across Teams pose a significant challenge to Agile transformations by undermining coordination and alignment, which are essential for success (Dikert et al., 2016; Edison et al., 2021). In this study, it is noted that the lack of a unified framework for prioritization—such as a common backlog or roadmap—leads to teams making subjective decisions based on individual agendas, rather than the platform's strategic objectives. This misalignment results in fragmented efforts and inefficiencies, as teams prioritize individual business unit needs over broader platform

goals. As Beretta and Smith (2023) points out, these conflicts hinder the organization's ability to adapt quickly, while Carreño (2024) highlights their disruption of cross-functional collaboration in agile. Furthermore, the gap between the high-level vision and business unit priorities exacerbates this misalignment, also highlighted by Dugbartey and Kehinde (2025), who argues that a vision must be actionable at the team level. Ultimately, addressing conflicting priorities is essential for both daily execution and long-term strategic agility. Without a structured approach to prioritization, organizations struggle to coordinate efforts, leading to inefficiencies, slower decision-making, and reduced adaptability in a fast-paced business environment.

The *Disconnect between Business and IT* is a major barrier to achieving strategic alignment, as findings from the study suggest it may have a widespread impact, contributing to multiple other challenges. The literature supports this, noting that a lack of integration between these functions can foster a "we-them" mentality, reducing the cohesion necessary for Agile practices to effectively permeate the organization (Van Waardenburg & Van Vliet, 2013). The study highlights that low business engagement hinders feedback loops and the refinement of requirements, two key challenges in the process dimension, making it difficult to align development efforts. This is echoed in the literature, where Van Waardenburg and Van Vliet (2013) emphasizes that inadequate stakeholder involvement weakens collaboration between Business and IT, impacting these processes. Additionally, the findings indicate that this misalignment may fuel conflicting priorities across teams, as business stakeholders—lacking a comprehensive understanding of the platform—may push their own agendas, leading teams in different directions. Van Waardenburg and Van Vliet (2013) similarly highlights that a key challenge is ensuring business stakeholders understand system dependencies to make informed decisions. Furthermore, Uludag et al. (2018) and Van Waardenburg and Van Vliet (2013) note that aligning priorities is particularly difficult when stakeholders are not actively engaged in development. Based on these findings, it can be interpreted that a lack of understanding, driven by this disconnect, may lead to the prioritization of suboptimal demands, further exacerbating the challenge of conflicting priorities across platform teams. This interpretation aligns with Dikert et al. (2016), who argue that coordination becomes increasingly difficult when teams serve different customers with separate priorities.

Furthermore, according to Dikert et al. (2016), the transformation's success depends on both business and IT departments being engaged and aligned with shared goals. Although the study does not explicitly report resistance from the business side, it identifies the absence of active support as a factor hindering Agile implementation. This lack of support may stem from two interrelated factors. First, the study suggests that a structural divide within the organization reduces the perceived urgency of IT initiatives among business stakeholders. This aligns with Van Waardenburg and Van Vliet (2013), who argue that such divides cause business stakeholders to prioritize immediate or more familiar concerns, leaving IT initiatives lower on the agenda. Second, the study finds that many business stakeholders are unaware of the Agile initiative, limiting their ability to either engage or reject it. Literature supports this concern, as Dikert et al. (2016) and Edison et al. (2021) emphasize

that successful Agile implementation requires the active involvement of all impacted stakeholders. Based on these findings, it can be inferred that without awareness, business stakeholders are unable to provide support or engage in the initiative, further reducing the likelihood of successful implementation.

The study findings align with literature suggesting that the misalignment between Business and IT slows down transformation efforts and reduces an organization's ability to respond to evolving market demands (Edison et al., 2021). Given these combined insights, addressing this disconnect is critical for ensuring a more seamless Agile adoption and improving overall organizational agility.

Siloed Team Dynamics may hinder agile transformations by impeding communication, knowledge sharing, and collaboration, all of which are critical for agile success (Fuchs & Hess, 2018; Uludag et al., 2018). In this study, the siloed mentality between teams is noted to limit cross-team visibility and alignment, leading to fragmented efforts across the platform. Teams working independently, often unaware of each other's developments, struggle to coordinate their work, which results in inefficiencies, duplicated efforts, and delays. This becomes particularly problematic, as the teams are deeply interconnected in their development, creating a significant need for effective coordination. Dikert et al. (2016) highlights how such isolation can impede understanding and coordination of dependencies, exacerbating delays in delivering value. The study further reflects Uludag et al. (2018)'s finding that siloed structures create barriers to transparency, making it harder for teams to collaborate and align on shared goals. Additionally, while autonomy within teams facilitates quick decision-making, it can also lead to isolated decisions, resulting in conflicting priorities between teams and hindering broader change initiatives. This lack of alignment, as noted in the study, complicates strategic efforts and slows progress when cross-team collaboration is necessary. Ultimately, the impact of this misalignment appears to affect both operations and broader change initiatives, making it a significant challenge to address.

Leadership Deficiencies for Change Initiative, as observed in this study, may significantly hinder the success of large-scale agile transformations. While senior leadership acknowledged the need for change, their lack of active involvement resulted in misalignment and unclear direction across teams. This aligns with Dikert et al. (2016) and Edison et al. (2021), who emphasize that leadership is crucial for driving and sustaining agile initiatives. Without visible commitment, employees struggled to see the initiative's value, leading to disengagement and uncertainty.

Furthermore, as Fuchs and Hess (2018) highlights, strong leadership is essential for removing obstacles and maintaining momentum. However, interviewees expressed frustration over indecisiveness, with previously approved decisions being revisited, causing confusion and delays. While this indecisiveness was not always attributed to senior management, it reflected a lack of decision-making among change drivers. This may suggest that insufficient management support left change drivers without the authority needed to resolve conflicting opinions and push the transformation

forward. As Dikert et al. (2016), Edison et al. (2021), and Pinton and Torres Junior (2020) note, managers play a critical role in overcoming resistance, as their authority helps counter skepticism and secure employee buy-in for agile transformations. Additionally, this indecisiveness could also point to difficulties in balancing the need for clear direction with fostering collaborative decision-making, a challenge highlighted by Beretta and Smith (2023), which is essential for organizational alignment. Ultimately, as Kalenda et al. (2018) emphasizes, leadership deficiencies can undermine the effectiveness of the transformation and risk its success.

The challenges of *Resistance Among Product Owners*, *Lack of Business-Driven Justification for Change*, *Communication Gaps Regarding Change Initiative*, *High Workload in Daily Work*, and *Structural Communication Deficiencies* are mentioned less frequently as seen in Table 5.1. The relative infrequency of these challenges may suggest that they are perceived as secondary to the more systemic and foundational issues that typically shape the success or failure of large-scale agile transformations.

For instance, while *Resistance Among Product Owners* could undoubtedly affect the transformation, as noted by Dikert et al. (2016) and Sarangee et al. (2022) and observed in this study, it may be indicative of deeper structural and cultural issues. These include a lack of engagement from top management or insufficient agile knowledge, which can contribute to resistance at multiple levels (Dikert et al., 2016; Edison et al., 2021). Similarly, the *Lack of Business-Driven Justification for Change* may reflect broader concerns such as misalignment between business and IT, as discussed earlier.

Communication gaps and high workloads are undeniably important but may be considered as part of the larger challenges involving *Siloed Team Dynamics* that limit communication or *Leadership Deficiencies for Change Initiative*, as management is needed to allocate time and resources needed for change according to Edison et al. (2021), Fuchs and Hess (2018), and Kalenda et al. (2018). Structural communication deficiencies may not be seen as critical if they arise from the lack of alignment or shared understanding between teams, which are broader issues.

Overall, the most frequently cited challenges can be seen as foundational barriers that significantly hinder large-scale agile transformations. These issues disrupt alignment, collaboration, and strategic execution, making them critical areas for organizations to address. Less prominent challenges, while still relevant and offering nuanced insights, may stem from deeper structural and leadership shortcomings. Addressing the core challenges can help mitigate these secondary issues, while the secondary challenges may also offer guidance on how to tackle the foundational ones.

5.3.2 Recommendations to Address Prominent Structure Challenges

To address the prominent organizational challenges, the recommendations focus on fostering alignment across the organization and increasing engagement across team

and organizational boundaries. Ensuring coordination and alignment is critical for overcoming obstacles such as *Conflicting Priorities Across Teams*, *Disconnect between Business and IT*, *Siloed Mentality between Teams* and *Leadership Deficiencies for Change Initiative*. The following section will provide detailed recommendations for addressing these challenges.

To address the challenge of *Conflicting Priorities Across Teams*, a few practical steps can help guide the organization toward better alignment. First, it could be beneficial to establish a common backlog and prioritization framework. By creating a shared backlog, teams would have a clearer understanding of what needs to be prioritized, reducing the impact of subjective decisions and individual agendas. This approach, supported by Kalenda et al. (2018) and Paasivaara et al. (2018), emphasizes the importance of objective criteria to guide prioritization and provide clarity across the organization. Another helpful step could be ensuring alignment at the program level and across business units. This might involve creating a governance structure that encourages collaboration across teams, as well as organizing joint workshops and demos with representatives from all business units. These sessions would help business units better understand each other's priorities and goals. As suggested by Edison et al. (2021) and Van Waardenburg and Van Vliet (2013), these efforts can create a shared sense of purpose and help align teams more effectively. Lastly, creating an actionable vision connected to day-to-day work could help everyone stay focused. Ensuring that the vision is practical and tied to daily tasks is crucial for making sure that strategic goals are understood at the team level. As highlighted by Carreño (2024) and Kalenda et al. (2018), this can foster alignment and keep teams grounded in the bigger picture. These recommendations aim to simplify coordination, enhance clarity, and help teams work more cohesively towards shared objectives.

To mitigate the *Disconnect between Business and IT*, strategic alignment is essential. One key step is creating a shared vision that integrates both business and IT objectives, fostering collaboration and a unified purpose, which can ease the transformation process (Carreño, 2024). Additionally, securing active support from top management is crucial, as it strengthens cross-functional alignment and commitment to agile adoption (Dikert et al., 2016; Edison et al., 2021; Fuchs & Hess, 2018; Kalenda et al., 2018). Business stakeholders should also be actively involved in agile initiatives. Engaging all impacted stakeholders early in the transformation is crucial to securing their active participation and reducing resistance (Dikert et al., 2016; Edison et al., 2021; Pinton & Torres Junior, 2020). Actively involving business units, such as through structured agile events and feedback sessions, ensures they understand the change and its impact, fostering a sense of ownership and support for the transformation (Dikert et al., 2016; Edison et al., 2021; Kalenda et al., 2018). Finally, improved communication through regular stakeholder workshops, bringing together IT and business representatives, can further promote collaboration and ensure continuous alignment throughout development efforts (Uludag et al., 2018; Van Waardenburg & Van Vliet, 2013).

Regarding the *Siloed Mentality between Teams*, several strategies could be beneficial to enforce strategic alignment across teams. First, a vision which is clearly communicated down to the teams and actionable at team-level is important. Second, promoting transparency and regular communication between teams is crucial to breaking down barriers and fostering alignment (Edison et al., 2021; Shahin et al., 2017). Transparency can be increased by encouraging job rotations at both the management and team levels, as well as creating platforms that facilitate cross-team knowledge sharing (Berntzen et al., 2021; Bömelburg & Gassmann, 2024). This could help address the issue of fragmented efforts by ensuring that teams are aware of each other's goals and progress (Dikert et al., 2016; Nerur et al., 2005). Additionally, balancing autonomy with alignment is critical. While teams should maintain their autonomy, setting shared goals, a common definition of done, and standardized practices across teams would ensure that efforts are aligned with the broader organizational objectives (Berntzen et al., 2021; Vlietland & van Vliet, 2015). Furthermore, regular stakeholder workshops and synchronization meetings could improve coordination and help establish a unified direction, particularly in cross-team collaboration and change initiatives (Uludag et al., 2018; Van Waardenburg & Van Vliet, 2013). This approach could facilitate alignment between the separate stakeholders to whom the teams align, making it easier for that alignment to be integrated into the teams. Finally, securing leadership support to encourage alignment and collaboration across teams is crucial in overcoming siloed structures and fostering a culture of cooperation (Dikert et al., 2016; Kalenda et al., 2018).

Finally, to address the challenge of *Leadership Deficiencies for Change Initiative*, several strategies could be implemented. First, it is suggested that senior management take a more active and visible role in championing the transformation. As Kalenda et al. (2018) and Dikert et al. (2016) highlight, strong, visible executive sponsorship is critical to securing buy-in, ensuring resource allocation, and driving alignment across teams. Leadership should not only endorse the initiative but also provide consistent guidance, remove obstacles, and resolve conflicting opinions that may hinder progress (Dikert et al., 2016; Edison et al., 2021). Additionally, management should acknowledge and address employee concerns to foster engagement and buy-in, as Dikert et al. (2016) suggests that this acknowledgment is crucial for securing their commitment. Managers should also be trained in agile principles to ensure they understand the transformation process and its benefits, helping them lead by example and reduce misunderstandings (Dikert et al., 2016; Edison et al., 2021). Furthermore, leadership should balance providing clear direction with promoting collaborative decision-making. While it is important for leaders to set the vision and ensure alignment, they should also create opportunities for collaboration and input from various stakeholders to foster a sense of shared ownership and commitment to the transformation (Beretta & Smith, 2023; Edison et al., 2021). Lastly, involving change leaders from different organizational areas or bringing in external coaches may help navigate resistance and provide additional support for the transformation process (Dikert et al., 2016). By ensuring senior management's active involvement and leadership, the transformation process may be better positioned for success.

5.4 People Challenges

This section provides an analysis of the significance and impact of the challenges in the People dimension, followed by recommendations for addressing the most frequently mentioned issues: *Fears Regarding Change Initiative*, *Skepticism About the Effectiveness and Impact of Change*, *Lack of Agile Mindset*, and *Digital Immaturity in the Industry*, as shown in Table 5.1.

5.4.1 Analysis of Prominent People Challenges

The people dimension presents significant challenges in large-scale agile transformations, underscoring its critical role in success. This aligns with Altuwaijri and Ferrario (2022), who argue that human and cultural factors have a greater impact on transformation outcomes than technological concerns. The frequent mention of these challenges suggests that cultural and psychological barriers play a central role in agile adoption. Research supports this, emphasizing that adapting company culture and fostering an agile mindset are crucial to transformation success (Kaul & Nand, 2022; Mordi & Schoop, 2021). Without this shift, individuals may struggle to internalize agile values, leading to uncertainty, resistance, and inefficiencies in practice.

The *Fears Regarding Change Initiative* observed in the study is often linked to concerns about losing quality in CI/CD, having less time for development with the proposed new sprint structure causing reduced output, or disturbing customers. These concerns may reflect a broader issue identified in the literature: employees accustomed to traditional methods may struggle with agile's iterative and flexible nature, perceiving it as lacking structure or increasing workload (Brynildsen, 2021; Pinton & Torres Junior, 2020). Research also suggests that fear of consequences—such as job insecurity or skill obsolescence—can contribute to resistance (Pinton & Torres Junior, 2020). If employees are not provided with clear explanations and support, these fears can lead to hesitation and reluctance to engage fully in the transformation.

Skepticism About the Effectiveness and Impact of Change, as observed in the findings, manifests in doubts about the initiative's value, concerns that the transformation is misguided, beliefs that other priorities should take precedence, or a perceived lack of evidence to justify the change. This aligns with research suggesting that resistance increases when individuals do not fully understand the rationale for change or view the process as unmanageable (Dikert et al., 2016; Edison et al., 2021). Misconceptions—such as the belief that agile is only suitable for certain projects or that frequent meetings create unnecessary overhead—further contribute to skepticism (Dikert et al., 2016).

While previous studies indicate that skepticism is strongest in managerial and non-technical departments, where agile is often seen as IT-centric (Brynildsen, 2021), the findings reveal that fear and skepticism are widespread within the IT organiza-

tion as well. This suggests that even those directly involved in implementation may struggle with doubts about its value, feasibility, or priority. Such skepticism could stem from unclear communication about the transformation's goals, skills gaps, or a lack of concrete evidence demonstrating agile's benefits in their specific context. Theoretical perspectives highlight that misconceptions, a lack of understanding, or perceptions of change as unmanageable can all contribute to resistance (Dikert et al., 2016; Edison et al., 2021). However, the findings also suggest that the fear and skepticism may not always stem from resistance to change itself. Some participants expressed openness to transformation but questioned the effectiveness of the current initiative. This may indicate a lack of inclusion in the initiative, as research emphasizes that a lack of involvement in shaping the transformation can lead to disengagement and resistance (Kalenda et al., 2018).

Moreover, the *Lack of Agile Mindset* is a critical challenge highlighted by several employees, as seen in Table 5.1, suggesting that while agile frameworks are discussed, their practical adoption remains limited. Many teams still rely on existing methods, resisting change due to comfort with established routines and fear of uncertainty. This aligns with research emphasizing that an agile transformation requires not just process changes but also a cultural shift, fostering autonomy, adaptability, and continuous improvement (Kaul & Nand, 2022; Mordi & Schoop, 2021). A key frustration among interviewees is the gap between talking about agility and actively practicing it. Teams often focus on extensive planning rather than taking incremental steps to learn and adapt. Research suggests that without an internalized agile mindset, organizations struggle with flexibility and collaboration, leading to inefficiencies and resistance (Eilers et al., 2022; Späth & Westner, 2024).

The widespread mention of this issue in the findings indicates that the agile mindset challenge is deeply embedded in both individual and organizational behaviors. Theory suggests that without a cultural shift towards trust, openness, and willingness to adapt, agile transformations remain superficial and fail to deliver their full potential (Edison et al., 2021; Mordi & Schoop, 2021). Addressing this requires more than just training—it necessitates fostering an environment where adaptability and shared ownership are genuinely encouraged.

The challenge of *Digital Immaturity in the Industry* is significant, as highlighted by several employees. While some customers expect rapid innovation, others rely on stability and resist frequent updates. This mismatch complicates the agile transformation, as teams must balance the need for continuous delivery with minimizing disruption. Research underscores that successful transformations require engaging all impacted stakeholders, ensuring they understand the change and its benefits (Dikert et al., 2016; Edison et al., 2021). Without this, resistance can emerge, slowing adoption and reducing effectiveness (Brynildsen, 2021; Pinton & Torres Junior, 2020).

Interviewees emphasize the importance of clear communication and education to help less digitally mature customers adapt. Theory supports this, noting that a lack

of engagement and understanding can lead to skepticism and resistance (Edison et al., 2021; Kalenda et al., 2018). Additionally, misconceptions about agile—such as the assumption that frequent releases mean large-scale changes—can create misalignment in expectations (Dikert et al., 2016). The findings suggest that addressing these challenges requires proactive change management, consistent communication, and collaboration with customers to bridge the gap between innovation and usability—indicating that these efforts may currently be insufficient.

Ultimately, the prominence of these challenges highlights that technical and structural changes alone are insufficient. Addressing fears, fostering confidence, and creating a culture that supports continuous learning and agile values are essential steps in overcoming resistance and ensuring a successful transformation (Chan & Thong, 2009; Kaul & Nand, 2022; Mordi & Schoop, 2021).

The less frequent mention of *Difficulties in Decomposition of User Stories* and *Gaps in Skill Development* may suggest that these challenges are not experienced by all teams equally. Research indicates that different teams may struggle with different aspects of agile adoption depending on their background, experience, and role in the organization (Chukwunweike & Aro, 2024; Dikert et al., 2016). Another possible explanation for their lower frequency in the findings is that these challenges might be viewed as more practical hurdles, which can be addressed over time through training and support. This aligns with theory that suggests deeper challenges such as *Resistance to Change* and *Lack of Agile Mindset* are more deeply ingrained in organizational culture and require broader, systemic efforts to address (Kaul & Nand, 2022; Mordi & Schoop, 2021).

5.4.2 Recommendations to Address Prominent People Challenges

The prominent challenges within the people dimension of change initiatives often center around resistance to change, skepticism, and varying levels of readiness, all of which can hinder successful transformation. To address these challenges, several common mitigation strategies are recommended, including transparent communication, stakeholder engagement, ongoing coaching and training, incremental implementation, and visible leadership commitment. The following section will delve into how these strategies specifically address the challenges related to *Fears Regarding Change Initiative*, *Skepticism About the Effectiveness and Impact of Change*, *Lack of Agile Mindset*, and *Digital Immaturity in the Industry*, offering practical solutions for each.

To mitigate the *Fears Regarding Change Initiative* leaders are recommended to foster an environment of trust and collaboration by encouraging open feedback and supporting experimentation. Promoting constructive dialogue where concerns can be raised and addressed may help alleviate anxiety and empower employees to express their worries in a safe, supportive environment (Avuthu, 2022; Neumann et al., 2024). Additionally, transparent communication about how agile practices will

impact roles and responsibilities can help team members understand how their functions will evolve and how the new processes will benefit them (Carreño, 2024; Neumann et al., 2024; Pinton & Torres Junior, 2020). By clearly explaining how these changes will enhance the quality of deliverables and support business goals, leaders can reduce fears related to quality risks and workload increase. Furthermore, providing ongoing coaching throughout the agile implementation process could be beneficial for reinforcing training and helping teams navigate practical challenges as they arise. This continuous support is noted to build confidence, allowing teams to gradually adjust to the new processes and feel more in control of the transition (Dikert et al., 2016; Paasivaara et al., 2018; Pinton & Torres Junior, 2020). By focusing on transparency, communication, and sustained coaching, leaders can help mitigate resistance to change and create a more resilient and confident team during the transition.

Regarding *Skepticism About the Effectiveness and Impact of Change*, it is suggested to engage teams in actively shaping the transformation process. By involving them in decision-making and soliciting their input, organizations can foster ownership and deeper engagement, which may help mitigate resistance and build trust in the change process (Dikert et al., 2016; Edison et al., 2021; Kalenda et al., 2018). Transparent communication about the reasons for the change is also considered to be a critical factor to ensure alignment and commitment across teams, clearly outlining how the proposed adjustments will address underlying inefficiencies (Carroll et al., 2023; Dikert et al., 2016; Edison et al., 2021). A key part of this is clearly distinguishing the proposed agile methods from existing processes to ensure that employees understand how the changes will differ from current practices and how they will benefit the organization as a whole (Carroll et al., 2023). Additionally, leadership is recommended to demonstrate visible and strong commitment to the changes, as this can reduce skepticism and ensure that all stakeholders understand the importance of the transformation (Dikert et al., 2016; Edison et al., 2021; Kalenda et al., 2018; Pinton & Torres Junior, 2020). To further support the transition, organizations can strengthen their approach by gathering both qualitative and quantitative evidence to showcase the impact of the changes. This can help build momentum and reduce doubts about the effectiveness of the transformation (Carroll et al., 2023). Lastly, securing buy-in from all stakeholders by addressing their concerns and ensuring their ongoing support is considered essential for ensuring the success of the change (Chukwunweike & Aro, 2024; Dikert et al., 2016; Edison et al., 2021; Mako, 2019).

To mitigate the challenge of a *Lack of Agile Mindset*, organizations can foster a cultural shift by actively promoting agile values and principles, as emphasized by Kaul and Nand (2022) and Mordi and Schoop (2021). This includes fostering autonomy, an enabling environment, and continuous improvement while managing uncertainty. Mordi and Schoop (2021) also highlights that the agile mindset must permeate the entire organization, not just individuals, for it to be effective. To support this shift, organizations are recommended to encourage iterative development and adaptation, focusing on small steps rather than rigid plans, as Kaul and Nand (2022) suggests. Training programs are suggested to go beyond methodologies to emphasize the mind-

set shift, encouraging attributes like openness, responsibility, and ownership (Eilers et al., 2022; Späth & Westner, 2024). Further, it may be beneficial to consider the importance of collaborative decision-making, shifting from top-down directives to a more team-empowered approach, as suggested by Mordi and Schoop (2021) and Späth and Westner (2024). Leaders can play a valuable role by modeling agile behaviors such as embracing feedback and experimentation, as suggested by Edison et al. (2021), to help reinforce agile values across the organization. By encouraging trust and collaboration, organizations may be better positioned to address resistance and gradually develop a more agile, adaptive culture.

Finally, to address the challenge of *Digital Immaturity in the Industry*, the company could consider engaging customers in the change initiative by enabling them to actively collaborate and communicate as integral team members in the transformation process (Dikert et al., 2016; Edison et al., 2021; Pinton & Torres Junior, 2020). This can help bridge the digital divide by fostering trust and a sense of ownership among customers, particularly those with lower digital maturity. Additionally, offering targeted training on agile values and processes may empower customers to better understand and engage with the development approach, reducing resistance to updates and facilitating smoother adoption of new functionalities (Pinton & Torres Junior, 2020). To better meet the needs of different customer segments, the company might consider implementing partial releases, starting with a smaller user group and gradually deploying software, while potentially disabling or hiding new features as required. This approach allows for managing customer expectations and minimizing disruption, as well as providing a quick rollback to a stable state if any issues arise (Shahin et al., 2017). Finally, effective and consistent communication could play a key role in helping customers better understand the value of updates. As noted by the interviewees, customers who expect frequent releases might not always appreciate the incremental nature of agile updates. By thoughtfully guiding customers through the transition and managing their expectations, the company may be able to build long-term trust and acceptance, allowing customers to adapt to new tools with minimal disruption to their operations.

6

Conclusion

To conclude, this master's thesis has examined the challenges faced during large-scale agile transformations within a manufacturing firm, particularly focusing on the complexities involved in adopting agile methodologies in a traditional context. The research explored the dimensions of process, technology, structure, and people, providing a thorough understanding of the various obstacles encountered throughout the transformation. Utilizing a qualitative single-case study approach, supported by internal documents, semi-structured interviews, and field notes, the study uncovered a broad range of challenges across these four dimensions.

The significance of the challenges identified are reflected upon in the study and recommendations are provided for addressing them. It highlights how these challenges impact the success of large-scale agile transformations, emphasizing the importance of all dimensions. The recommendations offered focus on key areas such as improving communication and collaboration across teams, enhancing stakeholder engagement, ensuring strong leadership involvement, and implementing strategic practices to manage risks effectively. By considering these aspects, the discussion underscores the necessity of addressing both technical and human factors in the transformation process, suggesting that a successful agile adoption goes beyond merely changing processes—it requires a fundamental shift in organizational culture and alignment at all levels.

6.1 Theoretical Implications

This research contributes to the existing body of knowledge on Agile transformation by advancing the understanding of Agile adoption in non-IT-centric environments, particularly within the manufacturing sector. The study provides valuable theoretical insights into the complexities of large-scale agile transformations, confirming key challenges identified in the literature across the dimensions of Process, Technology, Structure, and People (Fuchs & Hess, 2018), while also offering detailed insights into these dimensions and mapping them to recommendations from existing theory.

The study reaffirms previous research that emphasizes the centrality of cultural and psychological factors in successful Agile transformations (Altuwaijri & Ferrario, 2022; Avuthu, 2022; Mordi & Schoop, 2021), underscoring that these aspects often outweigh purely methodological or technological concerns. The study further elaborates on the necessity of active leadership, as emphasized by Rajakumari,

Hemalatha, et al. (2024), and the importance of fostering communication and collaboration across teams, echoing Hossain et al. (2021). These findings enhance the theoretical understanding of agile adoption by highlighting that leadership and organizational alignment are just as crucial as process changes.

Moreover, the study supports the theory that scaling agile in large organizations is complicated by entrenched processes and organizational structure (Dikert et al., 2016; Sońta-Drączkowska & Krogulec, 2024). It suggests that a hybrid approach, blending agile with traditional frameworks, is necessary to address these challenges, enriching the literature on tailoring agile practices to larger organizations (Paasi-vaara et al., 2018; Paterek, 2017).

Finally, the study contributes to the ongoing discourse on Agile scalability, emphasizing the need for adaptive governance structures and tailored integration strategies that address the complexities of large-scale organizations (Dikert et al., 2016; Fuchs & Hess, 2018; Späth & Westner, 2024). These findings bridge theoretical frameworks with real-world challenges, enhancing the dialogue on the contextual application of Agile methodologies beyond traditional software development environments.

6.2 Managerial Implications

This thesis has provided valuable insights into key challenges in Agile transformations, offering practical recommendations for managers, executives, and Agile practitioners to enhance alignment, collaboration, and adaptability. The proposed solutions focus on four dimensions—Process, Technology, Structure, and People—and emphasize leadership commitment, stakeholder engagement, cross-team collaboration, cultural transformation, and continuous learning.

Among the most critical recommendations, proactive leadership commitment is essential. Senior management must actively advocate for Agile principles, align business units, and foster collaboration while securing buy-in and addressing employee concerns. Without strong leadership, Agile adoption risks stagnation due to resistance and misalignment.

Stakeholder engagement and transparent communication are also crucial. Early and active involvement of business stakeholders, end-users, and IT teams strengthens feedback loops, reduces skepticism, and enhances alignment with organizational goals. Regular stakeholder workshops, synchronization meetings, and validation sessions minimize misunderstandings and ensure effective decision-making.

Cross-team collaboration and dependency management help streamline Agile adoption. Shared backlogs, structured prioritization frameworks, and tools like the Iteration Dependency Matrix improve visibility into dependencies, reducing bottlenecks and conflicting priorities.

Shifting organizational culture and fostering an Agile mindset is essential for long-term success. Beyond Agile training, organizations must instill values such as openness, accountability, and iterative learning. Encouraging team autonomy while maintaining alignment promotes psychological safety and continuous improvement. Additionally, this cultural shift strengthens the Process dimension by enabling continuous refinement and adaptation of Agile practices as the organization and its employees evolve.

Finally, continuous learning and capability building reinforce Agile principles and ease adoption. Ongoing coaching, leadership training, and structured learning opportunities help teams adapt, while educating external stakeholders, such as customers, can reduce resistance to iterative releases and improve collaboration.

By prioritizing leadership, engagement, collaboration, cultural transformation, and learning, organizations can overcome Agile adoption barriers and create a resilient, adaptive, and efficient work environment, ensuring long-term success in an evolving market.

6.3 Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, the research focused on a single case company, which limits the generalizability of the results to other organizations. While the study provides valuable insights into the challenges of agile transformation within a specific context, these challenges and their underlying causes may differ significantly in organizations of different sizes, industries, organizational structures, and cultural dynamics.

Second, the study employed a qualitative approach, primarily relying on semi-structured interviews, observations, and document analysis. While this method allowed for an in-depth exploration of the case company's experiences, it may introduce subjective biases in data interpretation. Additionally, the reliance on self-reported data from interviewees may be influenced by social desirability bias or other forms of bias.

Third, the research mainly focused on identifying the challenges hindering agile transformation. While understanding these challenges is essential, the study did not provide a comprehensive view of the strategies and practices that have been successful in facilitating agile adoption. Future research could explore successful strategies to offer a more balanced perspective on agile transformation. The study also had a limited timeframe, capturing a snapshot of the organization's agile transformation journey at a specific point in time. As the transformation progresses, the challenges and dynamics observed may evolve. Longitudinal research would provide a more comprehensive understanding of the long-term impacts and adaptations during the transformation process.

Lastly, the study focused on agile transformation within the context of digital trans-

formation and the development of a digital services platform. The challenges and findings may not be fully applicable to organizations implementing agile in other contexts, such as software development for internal use, or organizations operating in industries with varying levels of digital maturity.

The findings of this study lay the groundwork for further investigation into agile transformations in different organizational contexts. Future research could explore:

Developing Strategies for Addressing Interconnected Challenges: Future studies could focus on identifying and developing practical strategies and tools for addressing the interconnected challenges highlighted in this study.

Tailoring Agile Practices Across Industries: Research could explore how agile practices can be adapted to suit the specific needs of different industries and organizational contexts, considering variables such as organizational size, culture, and industry requirements.

The Role of Leadership Development in Agile Transformation: Investigating the role of leadership development and coaching in fostering an agile mindset among decision-makers would provide valuable insights into how leaders can better support and guide agile transformations.

Impact of External Stakeholder Engagement on Agile Transformation: Examining the role of external stakeholders, such as customers and partners, in agile transformations could yield insights into how their engagement and buy-in can influence transformation outcomes.

By addressing these areas, future research can contribute to a deeper understanding of large-scale agile transformations, providing organizations with the knowledge and tools to navigate the complexities of these processes more effectively.

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A

Appendix 1

A.1 Interview Guide

Background and Context

Can you describe your current position and the journey that led you here?

How does your role connect with the business and/or development teams?

What experience do you have with agile methodologies, including practices like Scrum and CI/CD?

How does Agile relate to your responsibilities and projects?

Current practices

What agile practices are currently being used in your team?

What are the benefits of those practices?

What are the challenges?

How does your team collaborate with other product teams?

What challenges do you face in this collaboration?

Current Initiative

What is your understanding of the current initiative regarding increasing the release frequency?

How was the initiative communicated to you? What feedback did you provide?

What benefits and challenges do you anticipate with the initiative?

Comparing to previous initiative

How did you experience the previous shift from releases three times a year to every month?

What were the key challenges during this transition?

Why do you think the monthly release strategy was initiated, while the effort to reduce sprints in DRM3 was put on hold?

What could have been done differently to make it more successful?

CI/CD

How do you see agile practices such as CI/CD contribute to your team's goals and the broader business objectives?

How do you assess your team's readiness to adopt CI/CD practices?

What specific indicators or signs do you observe that suggest this readiness? What is missing?

Closing thoughts

Is there anything else you would like to add that I haven't asked about?

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