EXPLORING THE EFFECTS OF AGILE TRANSFORMATIONS ON LEADERSHIP

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M.Sc. Mareike Weidlich

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Wuppertal

Referent*in: Prof. Dr. Christoph Rosenkranz

Korreferent*in: Prof. Dr. Matthias Heinz

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The dissertation is composed in a cumulative style.

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ACKNOWLEDGEMENTS

After six years, my Ph.D. journey comes to an end – and it has certainly been a journey. I have learned a lot about both my research interests and about myself, challenged myself and stepped outside of my comfort zone, and experienced both huge relief and complete frustration. I have often struggled with balancing my Ph.D. and my full-time job and, at the end, my time at the University of Cologne has lasted much longer than I had originally anticipated. Nevertheless, I believe that my research has helped me become better at navigating my own professional role in an agile transformation, and my practical experience has in turn made me aware of the uncertainty and constant change that such transformations entail.

I would like to thank my supervisor Christoph Rosenkranz for your continuous support in every phase of this project, for motivating me to keep going time and time again, for your flexibility, and your guidance and valuable input. I appreciate that you have always made time for me and been a great sparring partner over the past years.

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ABSTRACT

Over the past three decades agile software development (ASD) methodologies have continuously gained popularity and effectively reshaped the way that organizations approach software development. Organizations embraced those principles and practices to become more adaptable and enable prompt responses to changing circumstances and requirements. While ASD methodologies had initially been targeted at small, innovative, high-performing software development teams, they have long reached a multitude of organizations across all sectors and are often applied across departments and business functions. One fundamental mechanism of ASD is the creation of empowered teams to solve problems, self-organize, and continuously improve. As organizations with established hierarchies and siloed department structures increasingly adopt ASD methodologies, they often notice a clash between the old world and the new world. To mitigate those challenges, organizations engage in so-called agile transformations. One major aspect of this transformation is the adaption of leadership structures and processes to enable ASD teams to be empowered. Empowerment implies that many responsibilities that were formerly assumed by managers now rest with team members, which fundamentally changes the role of those managers. Until now, we have little insight into how to adapt leadership structures and processes in agile transformations.

This dissertation is composed in a cumulative style comprising three independent but interrelated studies that each contribute a part to answering the overarching research question: *how do agile transformations shape leadership structures and processes in organizations*? The three research projects (1) explore and measure employees' preferences and perceptions of agile transformations, (2) summarize the current body of knowledge and introduce agile leadership as a dual concept combining both team-internal and -external perspectives, and (3) observe, analyze, and conceptualize team-external management, contextual factors, and the effects on team empowerment.

In sum, this dissertation offers insights into an agile transformation and its effects on how organizations implement leadership in and around ASD teams. It thereby brings us a step closer to understanding the complex interplay of ASD teams and managers which remains one of the major challenges of agile transformations.

LIST OF ABBREVIATIONS

ASD	Agile software development
IS	Information systems
ISD	Information systems development
IT	Information technology
PCPM	Pairwise comparison-based preference measurement
SLR	Structured literature review
TEM	Team-external manager

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1. DISSERTATION OVERVIEW

1.1 INTRODUCTION

Since its inception over two decades ago, the Agile Manifesto has reshaped the software engineering landscape (Beck et al., 2001). In the early 2000s the new methodology to develop software has revolutionized the industry and became the de facto standard in IT departments around the globe, increasingly replacing the traditional waterfall methodology (Digital.ai, 2023). A myriad of approaches, processes, tools, and practices have since been developed to aid organizations in implementing *agile software development* (ASD).

The reasoning behind shifting to ASD approaches lies in the necessity of organizations to achieve *agility* – the ability to "rapidly or inherently create change, proactively or reactively embrace change, and learn from change" (Conboy, 2009, p. 340) in a world that is increasingly shaped by uncertainty and volatility. Traditional software development has strived to create certainty through extensive up-front analysis, design, and planning. Instead, ASD embraces the new realities of ever-changing demands and circumstances, in which competitive advantages result from nimbleness and adaptability (Conboy, 2009; Highsmith & Cockburn, 2001). Initially, this new approach to software development has done exceptionally well (Serrador & Pinto, 2015). In an attempt to replicate those successes, ASD has long transcended the organizational borders of IT departments and found its way into a variety of sectors, industries, and domains – but prior research has found mixed results on the success of those attempts to implement ASD methodologies (Niederman et al., 2018).

While the Agile Manifesto does not necessarily exclude certain types of organizations or applications, the focal areas of application have been innovative, small, fast, high-performing IT teams (Beck et al., 2001; Highsmith & Cockburn, 2001). As more and more adoptions of ASD take place in (very) large organizations with established structures, processes, and hierarchies (e.g., Birkinshaw, 2018; Laanti et al., 2011), those contexts and characteristics often clash with the basic principles of agility (Boehm & Turner, 2005; Nerur et al., 2005).

Establishing working conditions for agile teams in a context that is not set up for cross-functionality, self-organization, and adaptability often requires extensive changes to processes, structures, and generally held beliefs in organizations. We call initiatives to implement such changes *agile transformations*. Agile transformations can vary vastly across organizations depending on, for example, the starting conditions, the levels of investment, commitment, and ambition from both management and the work force (Chow & Cao, 2008; Dikert et al., 2016; Kalenda et al., 2018). Some of those transformations are considered successful, while others are not – why is that? Prior research has found

indications and contributing factors, and each of those factors can amount to major adjustments and necessary cultural changes (Chow & Cao, 2008; Dikert et al., 2016; Kalenda et al., 2018).

In this dissertation, I explore how agile transformations change fundamentals of team and work organization and zoom in on one of the major points of contention: a new understanding of *management* or *leadership* that ASD entails (Dikert et al., 2016; Kalenda et al., 2018). Agility emerges from self-organization and autonomy, shifting decision-making power to teams, reducing dependencies outside of teams, eliminating bottlenecks, and relying on teams to self-correct and optimize their work processes (Beck et al., 2001; Cockburn & Highsmith, 2001). Those characteristics are preconditions for the successful implementation of ASD (Moe, Dingsøyr, & Dybå, 2009; Werder & Maedche, 2018).

1.2 PROBLEMATIZATION AND RESEARCH QUESTION

Rearranging management and leadership mechanisms in an organization is a process that heavily influences both teams and individual team members on the one hand and managers, supervisors, and executives on the other hand. In this dissertation, I use the concept of team empowerment to describe the desired attributes of ASD teams: team empowerment comprises the ability of teams to self-manage and have discretion over decision, the feeling of self-sufficiency, usefulness, and importance for an organization (Kirkman & Rosen, 1999). Over the past two decades, the team-internal processes of how team members distribute or share leadership and self-manage have been intensively studied and are relatively well understood (e.g., Hoda et al., 2010; Moe et al., 2010; Moe, Dingsøyr, & Øyvind, 2009; Stray et al., 2018; Werder & Maedche, 2018). However, transferring managerial tasks onto teams and team members drastically changes the roles and responsibilities of management and leadership personnel who previously performed those exact tasks.

We know that managers still exist in organizations that pursue agile transformations and their commitment and support for ASD is vital to a transformation's success (Dikert et al., 2016). We understand that there is a need for a general shift of management from a team-directive to a team-supportive approach (McAvoy & Butler, 2009) and prior research has formulated management roles and guiding principles in ASD contexts (e.g., Parker et al., 2015; Shastri et al., 2017), but those recommendations remain vague and rather define general directions and a new mindset instead of concrete, quantifiable behaviors and actions. Further, the interplay between teams and managers to put new leadership and management mechanisms as required by ASD teams into practice is not well understood and we currently lack the instruments to measure those dynamics.

This dissertation therefore pursues answering the following research question:

How do agile transformations shape leadership structures and processes in organizations?

In the following chapter, I lay out how the studies included in this dissertation build upon each other and contribute to the overarching goal of this research project.

1.3 STRUCTURE

This dissertation is composed in a cumulative style, consisting of three studies that have been published by or submitted to academic conferences or journals. The manuscripts included in this dissertation have been reformatted, but otherwise do not differ from the published or submitted versions of the papers. Table 1-1 provides an overview of the papers included in this dissertation. Previously published versions of the three studies are specified as applicable. This introductory paper precedes the three studies included in my dissertation. It summarizes the overarching research endeavor, introduces core concepts that my research builds upon, outlines the individual studies' research approaches and methods, and explains how all three studies are linked to each other and how they contribute to answering the research question that I answer in this dissertation.

No.	Title	Current Status
1	"You Can't Always Get What You Want": Examining Employees' Preferences and Job Satisfaction in Agile Transformations	Presented at the European Conference on Information Systems 2023.
2	How Agile Software Development Teams are Led and Lead Themselves – A Literature Review on the Duality of Agile Leadership	Submitted to Hawaii International Conference on System Sciences 2025.
3	"No One Can Do It All": The (Changing) Role of External Managers for Team Empowerment in Agile Teams	Presented at the European Conference on Information Systems 2023, preparing for journal submission in late 2024. Previous versions were presented at the International Conference on Information Systems 2020 and the International Research Workshop on IT Project Management 2019.

Table 1-1. Study overview.

The three consecutive papers of this dissertation move from a broader perspective of agile transformations to a focus on agile leadership as one specific aspect of agile transformations which warrants a closer look. While all three studies are generally independent research projects, they motivate and build upon each other. Study 2 is a single-author paper, while the other two studies have been

conducted in collaboration with other researchers. In the following, I will thus us the plural form ‘we’ when referring to Studies 1 and 3 while using ‘I’ for Study 2. Table 1-2 summarizes the contributions of the individual research team members per study.

Title	**"You Can't Always Get What You Want": Examining Employees' Preferences and Job Satisfaction in Agile Transformations**	**How Agile Software Development Teams are Led and Lead Them-selves – A Literature Review on the Duality of Agile Leadership**	**“No One Can Do It All”: The (Changing) Role of External Managers for Team Empowerment in Agile Teams**
Research Team	Weidlich, Heinz, Schlereth, Rosenkranz	Weidlich	Weidlich, Rosenkranz
Research Design	Weidlich, Heinz	Weidlich	Weidlich
Data Collection	Weidlich, Schlereth	Weidlich	Weidlich
Data Analysis	Weidlich, Rosenkranz	Weidlich	Weidlich, Rosenkranz
Theorizing	Weidlich, Heinz, Schlereth, Rosenkranz	Weidlich	Weidlich, Rosenkranz
Write Up	Weidlich, Heinz, Schlereth, Rosenkranz	Weidlich	Weidlich, Rosenkranz

Table 1-2. Research team overview per study.

Study 1 introduces the topic of agile transformations as the research context of this dissertation. The empirical study takes on a dimension-based view of agile transformations and evaluates employees’ preferences for agile, hybrid, or traditional forms of team and work organization using pair-wise comparison-based preference measurement (PCPM). Further, we evaluated how those preferences and the importance of those preferences differ across the dimensions of team and work organization (such as team composition or requirements engineering). The findings of this study indicate that employees attach particular importance to self-organization and the (new or changing) role of managers in agile transformations.

Thus, *Study 2* seeks to shed light on the current state of research regarding leadership and management in agile transformations by means of a structured literature review (SLR). I summarize the current body of knowledge on the topic and introduce *agile leadership* as a two-fold concept comprising both team-internal and team-external characteristics. The study's findings demonstrate the need for a more in-depth understanding of team-external agile leadership and the interplay with team-internal processes.

Therefore, we take a deep dive into team-external leadership in *Study 3*. We performed a case study to explore interactions between ASD teams and team-external managers to broaden our understanding on how team empowerment as a desired characteristic for ASD teams is influenced by behaviors and actions of the teams' respective managers. We developed a model of team-external management and a set of hypotheses on the relationship between team-external management and team empowerment.

The remainder of this introductory paper is structured as follows. In Chapter 2, I will introduce the current body of knowledge on ASD and agile transformations, team empowerment, and the role of management and leadership within and around ASD teams. Next, I present the overall design of my research project and then explain the chosen research methods for each of the three studies in detail in Chapter 3. Chapter 4 provides a summary of the three respective studies and Chapter 5 includes a discussion of the studies' contributions to both research and practitioners as well as a summary of this dissertation's limitations and potential future research directions. Chapter 6 includes a brief conclusion, before the three studies of this dissertation are presented in Chapters 7 to 9.

2. RELATED WORK

2.1 AGILE SOFTWARE DEVELOPMENT

Agile is an umbrella term for a set of methodologies, practices, and principles to organize teams and tasks in software development. ASD offers an *incremental* or *lightweight* alternative to traditional *sequential* or *heavyweight* approaches and, as such, seeks to counteract the challenges that traditional software development has regularly faced (Beck et al., 2001; Cockburn & Highsmith, 2001; Highsmith & Cockburn, 2001). Leading practitioners have created the first iterative approaches to software development since the 1950s (Larman & Basili, 2003) and they have since continuously gained popularity (Digital.ai, 2023). For example, Scrum – the most-used ASD methodology today – has been introduced in 1986 (Schwaber & Beedle, 2002), other approaches emerged in the coming years. The undeniable similarities of those new approaches to software development led to the now infamous meeting of 17 software development thought leaders at a ski resort in 2001. They identified the commonalities among the methodologies used at the time, resulting in four values and twelve principles (see Table 2-1. Values and principles of the Agile Manifesto , which summarize the fundamentals of ASD in a so-called Agile Manifesto (Beck et al., 2001).

The four values form pairs of two aspects that play a role in software development. According to the authors of the Agile Manifesto, all of those aspects are important, but the items on the left should be preferred to the items on the right when necessary (Beck et al., 2001). For example, adequate documentation should be created for any software but, ultimately, it is working software that provides value to paying customers which should thus be valued higher than documentation.

The twelve principles of ASD provide more details on the underlying beliefs and guidelines for working in an agile manner. Some of those principles explicitly diverge from sequential practices in traditional software development such as the waterfall methodology: ASD instead promotes incremental approaches with short feedback cycles and an anticipation of changing requirements to best meet customer requirements (see principle 1, 2, 3, and 7). Stage-based SD approaches imply a division of tasks and responsibilities between teams in the development process and team-external approval processes. ASD instead relies on making problems small, so that cross-functional, co-located, and self-organizing teams can solve those problems without external dependencies (see principle 4, 5, 6, and 11). The remaining principles do not necessarily contradict traditional approaches to SD, but ASD strongly encourages that teams seek to deliver high-quality software with minimal waste (see principles 9 and 10) and continuously improve while maintaining a sustainable work effort (see principle 8 and 12).

Four Values
• Individuals and interactions over processes and tools • Working software over comprehensive documentation • Customer collaboration over contract negotiation • Responding to change over following a plan
Twelve Principles
1. Customer satisfaction by early and continuous delivery of valuable software. 2. Welcome changing requirements, even in late development. 3. Deliver working software frequently (weeks rather than months). 4. Close, daily cooperation between business people and developers. 5. Projects are built around motivated individuals, who should be trusted. 6. Face-to-face conversation is the best form of communication (co-location). 7. Working software is the primary measure of progress. 8. Sustainable development, able to maintain a constant pace. 9. Continuous attention to technical excellence and good design.

10. Simplicity – the art of maximizing the amount of work not done – is essential.
11. Best architectures, requirements, and designs emerge from self-organizing teams.
12. Regularly, the team reflects on how to become more effective, and adjusts accordingly.

Table 2-1. Values and principles of the Agile Manifesto.

Initially, agile methods have been developed for small teams and organizations designing new and innovative products. Prior research has shown the positive effect of using ASD practices on project success (Olszewska et al., 2016; Serrador & Pinto, 2015). Over the past two decades, ASD evolved to be the de-facto standard for SD practices and is now prevalent in some form in a majority of IT departments (Digital.ai, 2023). Over time – and due its success in this domain – agile moved far beyond software development and digital product development (Baskerville et al., 2011). Thus, the scale on which ASD is implemented in organizations is continuously growing – both in terms of the number of organizations overall and the number of teams within one organization that use ASD practices (Kalenda et al., 2018; Moe et al., 2019). As products become too large to be developed by a single team, the need for effective communication and coordination between teams that work on different parts of one (or connected) system(s) arises (Bick et al., 2018; Dingsøyr et al., 2018). As soon as the number of teams or people involved passes a certain threshold, the new operating model is called *large-scale* or *scaled agile* (Dingsøyr et al., 2012). Over the years, frameworks to implement large-scale agile have emerged in practice, e.g. Scaled Agile Framework (SAFe), Large Scale Scrum (LeSS), Spotify, Nexus, or Scrum at Scale (Conboy & Carroll, 2019; Gerster, Dremel, Kelker, et al., 2018; Paasivaara, 2017).

2.2 AGILE TRANSFORMATIONS

Implementing ASD methodologies and practices often turns out to be a major challenge for large organizations, having established processes, hierarchies, knowledge silos, and complex IT infrastructures (Gerster, Dremel, & Kelker, 2018). Large-scale implementations of agile practices require organizations to change in several dimensions of team and work organization. For example, roles, processes, structures, tools, and technologies need to evolve to support agile teams (Jovanoví et al., 2017; Kalenda et al., 2018; Uludag et al., 2018). Organizations often engage in organizational transformation efforts to put those changes into practice. We call these *agile transformations*.

Ultimately, the goal of agile transformations is achieving agility, which describes the "continual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment" (Conboy, 2009, p. 340).

Agile transformations are – in the broadest sense – a type of digital transformation as well as an extensive cultural transformation (Dikert et al., 2016). The duration, content and process for an agile transformation is heavily customized since the starting point and level of ambition vary for any organization. Differences between organizations may arise from a variety of cultural or industry-specific factors (Olszewska et al., 2016). Prior research has identified a variety of factors that either facilitate or hinder agile transformations over the past decade (Chow & Cao, 2008; Dikert et al., 2016; Kalenda et al., 2018). For instance, some of the major challenges include a resistance to change, the integration of non-agile business functions, coordination in multi-team environments, rigid hierarchical management and organizational boundaries, quality assurance concerns, and lack of investments. Successful agile transformations are hence supported by both management and employee support, piloting and adapting ASD approaches, extensive training, communication, and transparency, a company culture that fosters team autonomy and change, and leadership commitment (Chow & Cao, 2008; Dikert et al., 2016; Kalenda et al., 2018).

2.3 TEAM EMPOWERMENT

Team empowerment is a phenomenon that has been observed in practice already in the 1950s (Trist & Bamforth, 1951). It is thus a concept that precedes the advent of ASD methodologies by nearly 50 years, but the attributes of empowered teams match those of ASD teams remarkably well. The Agile Manifesto defines an ASD team as self-organizing, cross-functional, and capable to sustainably and constantly creating value for customers. Similarly, team empowerment is defined by the following four patterns: (1) *potency* (the team feels effective), (2) *meaningfulness* (the team beliefs in the importance and value of its tasks), (3) *autonomy* (the team can act freely, independent and at its own discretion), and (4) *impact* (the team's work is significant and important) (Kirkman & Rosen, 1999).

Prior research on ASD teams has often only focused on a subset of those characteristics, particularly autonomy – often synonymously referred to as *self-organizing* or *self-managing* (e.g., Hoda et al., 2010; Moe et al., 2008; Srivastava & Jain, 2017; Stray et al., 2018). In this research project, I define ASD teams as a sub-category of empowered teams rather than autonomous or self-organizing teams to reflect the importance of self-sufficiency and continuous value creation for ASD teams.

Prior research has found a positive influence of team empowerment on, for example, task and team performance, productivity, job satisfaction, organizational commitment, and team commitment as well as a negative influence on turnover intention and employee strain (Cheong et al., 2016; Kirkman & Rosen, 1997; Mathieu et al., 2006; Maynard et al., 2007, 2012; Moe et al., 2008; Moe, Dingsøyr, & Dybå, 2009; Parker et al., 2015; Seibert et al., 2011). However, organizations need to exercise caution when implementing empowerment initiatives as those can overwhelm employees and increase job-induced tensions (Cheong et al., 2016). Further, limitations to empowerment through structures or

processes can be detrimental to the emergence of team empowerment and, at worst, create cynicism (Brown & Cregan, 2008).

Team empowerment is closely linked to the concept of psychological empowerment. Nevertheless, by definition it does not represent the collective psychological empowerment of each individual team member but rather represents a feature of the team as a unit. Still, both the antecedents and outcomes of team empowerment and psychological empowerment are nearly indistinguishable (Seibert et al., 2011).

2.4 AGILE LEADERSHIP

2.4.1 MANAGEMENT AND LEADERSHIP THEORY

Leadership has long been a extensively studied phenomenon and a multitude of theories on leadership have emerged over time (Derue et al., 2011). Initial research on leadership focused on *traits* – you are either born a leader or you are not. Those traits could be related to, for example, demographics, competences, or interpersonal attributes. Critics of those trait-based approaches to leadership have since argued that leadership is rather learned than inherited and expressed through leaders' behaviors and actions. *Behavioral leadership* theory resulted in a number of *leadership styles* that combined and categorized different sets of behaviors (Johns & Moser, 1989). Contingency theory emerged from this behavioral approach to leadership, which basically introduced the assumption that effective leadership results from adapting leadership styles as specific situations or contexts require (Fiedler, 1978). One of the most popular theories of leadership, the full-range leadership model, builds upon and refines the situational approach to leadership, comprising three forms of leadership depending on the degree of leadership engagement: laissez-faire leadership (often considered the absence of leadership), transactional leadership (ensuring subordinate compliance through a system of rewards and punishments), and transformational leadership (characterized by the so-called 4 I's of leadership: idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation) (B. J. Avolio, 2010; B. J. Avolio et al., 1991). From there, a huge number of new leadership approaches has emerged, such as authentic leadership, servant leadership, charismatic leadership, ethical leadership, and many others, often building on transformational leadership (B. Avolio et al., 2009; Bass, 1999; Dinh et al., 2014). However, critics often argue that leadership theory lacks theoretical integration (Derue et al., 2011) and many newer forms of leadership heavily overlap and provide additional value only in very specific contexts and research projects (Hoch et al., 2018)

While the terms *management* and *leadership* are often used interchangeably nowadays, leadership has originally been used to describe a sub-category of managerial tasks (Mintzberg, 1971) or later framed as a separate concept (Kotter, 1990). The concepts are hard to separate strictly, but in general, management is associated with more operational tasks such as planning, organizing, or budgeting, while

leadership often refers to more change-oriented behaviors such as setting strategic objectives, motivating and developing subordinates, or fostering innovation (Hunt, 2004; Zaleznik, 2004). For this dissertation, understanding the difference between both terms is essential to grasp how tasks originally carried out by managers (and leaders) are often more dispersed in the ASD context. Nevertheless, I do not strictly distinguish between both terms in the following. For example, the term "managerial tasks" will include any responsibilities routinely associated with management personnel and thus span both aspects of management and leadership.

2.4.2 THE ROLE OF MANAGERS IN AGILE TRANSFORMATIONS

Traditional approaches to leadership can only partially be used in the context of ASD teams. In general, the belief system of positive leadership theories such as authentic leadership, transformational leadership, or servant leadership matches the basic premise of ASD that employees are "motivated individuals, who should be trusted" (Beck et al., 2001). Nevertheless, ASD is heavily based on the concept of cross-functional teams instead of individuals and the requirements for leading teams are not necessarily congruent with the management of individuals. Only a relatively modest number of leadership studies and theories explicitly engage with teamwork to ask what is required from leadership to motivate effective team process and performance (Knippenberg, 2017).

The two concepts of *empowering leadership* and *shared leadership* are more promising approaches to help explain the dynamics and process of transferring leadership from designated individuals to teams and team members (Knippenberg, 2017). In ASD contexts, management and leadership tasks are much more widely dispersed across people (Moe et al., 2010). Empowering leadership and shared leadership assume that there is not only one leader or a very limited number of appointed leaders, but rather everyone shares those responsibilities and leadership emerges within teams (Amundsen & Martinsen, 2014; Carson et al., 2007). The dynamics of shared leadership and self-organizing ASD team have been extensively studied over the past decades as ASD has continuously gained popularity (Hoda et al., 2013; Moe, Dingsøyr, & Dybå, 2009; Moe, Dingsøyr, & Øyvind, 2009; Stray et al., 2018).

In this dissertation, I explicitly focus on the role of managers who do not assume defined roles with inherent leadership responsibilities within teams such as, for example, product owners or Scrum masters in Scrum teams. Instead, there often remain managers in the vicinity of ASD teams in agile transformations without explicit directions on how to interact with the respective teams. Following, I will refer to those as team-external managers. Prior research has identified general guidelines on how managers in those capacities should act: for example, they shall act as "mentors", "coordinators", "negotiators", or "process adapters" (Shastri et al., 2017), or follow simple rules such as "setting the direction", "establishing the simple, generative rules of the system", or "encouraging constant feedback, adaptation, and collaboration" (Parker et al., 2015). Nevertheless, we do not yet fully understand how

these recommendations translate into practice and how they influence ASD teams and the teams' success.

2.5 WORKING DEFINITIONS

Table 2-2 summarizes the definitions for key terms and concepts that this dissertation is based on.

Concept	**Definition**	**Reference(s)**
Agile software development	Approaches to software development that follow the values and principles defined by the Agile Manifesto	Beck et al., (2001) Highsmith & Cockburn (2001)
Agile transformation	Organizational initiatives to adapt structures, processes, roles, tools, or strategic priorities while implementing ASD approaches	Dikert et al. (2016) Laanti et al. (2011) Olszewska et al. (2016)
(Information Systems Development) Agility	ISD agility as the "continual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment."	Conboy (2009)
Team empowerment	Work teams that experience high degrees of potency, meaningfulness, autonomy, and impact	Kirkman & Rosen (1997)

Table 2-2. Definitions of key terms.

3. RESEARCH DESIGN

3.1 RESEARCH APPROACHES AND OVERARCHING STRATEGY

This dissertation is composed of three studies that progressively zoom into agile leadership and team empowerment as two of the pressing concerns of agile transformations. Each study builds upon the findings of the previous studies as described hereafter, thereby answering the dissertation's overarching research question as described in Chapter 1.

The three studies address the following research questions:

- **RQ1-1:** Which characteristics of an agile team and work organization do employees perceive as important? *(Study 1, Chapter 7)*
- **RQ1-2:** How do agile transformations affect employee satisfaction? *(Study 1, Chapter 7)*
- **RQ2:** How have aspects of agile leadership been defined in prior research? *(Study 2, Chapter 8)*
- **RQ3-1:** How do team-external managers influence team empowerment of agile software development teams? *(Study 3, Chapter 9)*
- **RQ3-2:** How do contextual factors shape the interactions between team-external managers and agile software development teams? *(Study 3, Chapter 9)*

Providing answers to these questions required utilizing a variety of different research methods and designs throughout the research projects of this dissertation. In Study 1, we used a quantitative survey and employed pairwise-comparison-based preference measurement (PCPM), a self-explicated stated preference method originating from marketing research (Schlereth et al., 2014; Scholz et al., 2010), and tested our hypotheses using linear regressions. In Study 2, I performed an SLR following the guidelines of Webster & Watson (2002) and vom Brocke et al. (2015) and used coding techniques and constant comparison analysis (Belgrave & Seide, 2019; Williams & Moser, 2019) for concept development. Study 3 is a qualitative study: we performed an exploratory multiple-case study (Dubé & Paré, 2003; Yin, 2011) gathering data from semi-structured interviews, internal documentation and observations. We analyzed our data using multiple coding rounds followed by a within-case and cross-case analysis. Details on the research designs per study can be found in Chapter 4 and in the full-text versions of each study.

The three studies of this dissertation are generally independent research projects and the data collection and analysis for each study has been carried out independently. Nevertheless, the studies build upon each other as each project's motivation and research design is based on the findings and research implications of the preceding studies.

Figure 3-1 summarizes the dependencies and links between the three studies of this dissertation. Following, I will explain those relationships in detail.

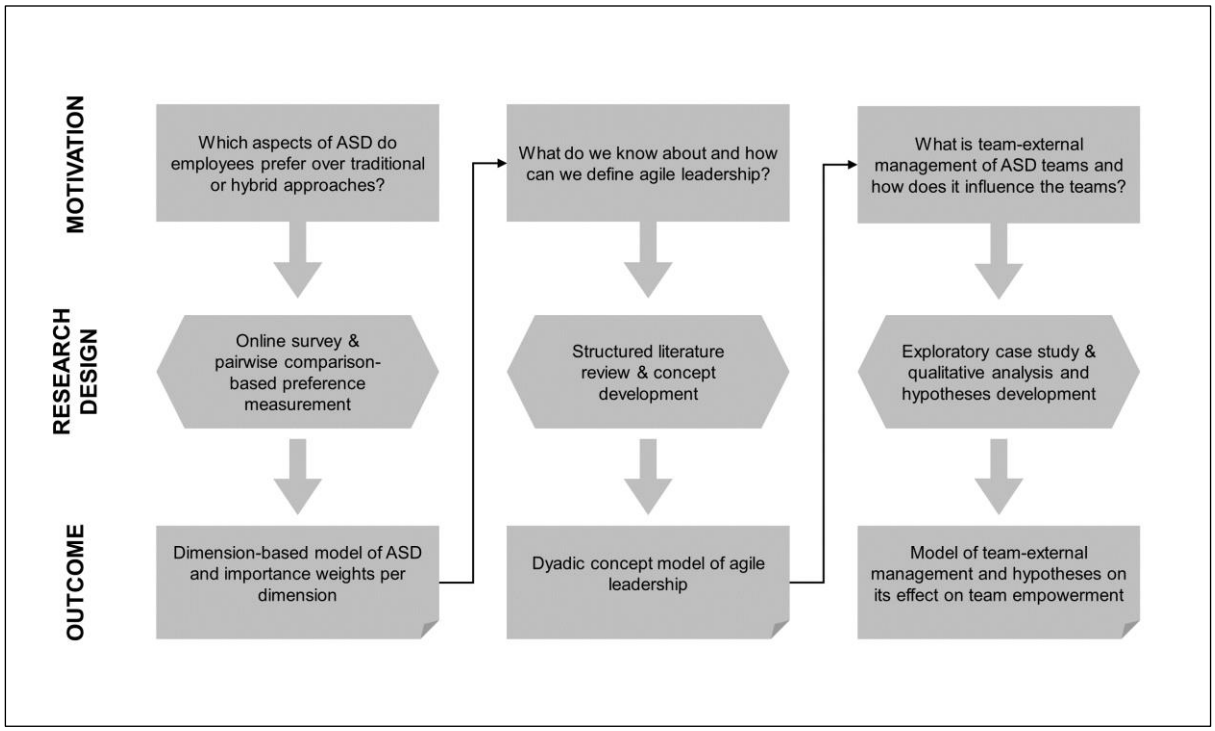


Figure 3-1. Overview of dependencies and links between research projects.

In Study 1, we set out to identify characteristics of team and work organization in traditional, hybrid, and agile settings that employees attach importance to and perceive as currently not matching their preferred ways of working. Two dimensions stood out: team organization and requirements engineering. Team organization – the degree to which teams self-organize as opposed to being organized by either a supervisor or project manager – has been rated as being significantly more important than any other dimension. For requirements engineering – the degree to which teams prioritize requirements based on either internal stakeholders' or customers' demands – the mismatch between employees' preferences and the perceived status quo is especially large. Preferences for agile forms of working in both dimensions are closely linked to the shift of typical management tasks to teams and team members in agile transformations. We thus use our findings from Study 1 as motivation for Study 2.

In Study 2, I provide an overview of the current body of knowledge on agile leadership as a topic of interest uncovered in Study 1. The SLR and subsequent analysis of prior research indicates that agile leadership thus far has been used as a term to describe both team-internal and team-external processes in ASD teams. On the one hand, it refers to self-organization and shared leadership among team member – a phenomenon that has been the subject of a variety of studies in the past years and is relatively well

understood. On the other hand, agile leadership sometimes describes the way in which managers and leaders are supposed to interact with teams in ASD contexts. In contrast to team-internal aspects, there is considerably less consent on how to define the team-external leadership dynamics. We have compared and integrated those aspects of team-external leadership that prior research has commonly identified as relevant, but the resulting indicators remain vague, do not reflect the particularities of ASD contexts, and there is no instrument to reliably measure team-external leadership aspects as of now.

Study 3 addresses the gaps identified by Study 2 and zooms in on team-external agile leadership. We performed an exploratory multiple-case study focusing on so-called team-external managers (TEM): supervisors or managers who work outside of ASD teams but have either disciplinary or functional links to the teams or individual team members. We gathered data from semi-structured interviews, internal data, and observations and extracted a set of actions and behaviors of TEM and contextual factors that influence how TEM engage in those actions and behaviors. Further, we identified patterns how TEM thereby influence team empowerment (as a desired characteristic of ASD teams). We developed a model of team-external management on this basis and assorted a set of testable hypotheses on the relationship between team-external management and team empowerment.

3.2 DATA COLLECTION APPROACHES

3.2.1 OVERVIEW OF DATA COLLECTION APPROACHES

In this dissertation, both qualitative and quantitative data collection approaches have been used to answer the studies' research questions. Table 3-1 provides an overview of the data collection approaches that have been utilized per study.

Study	**Data collection approach(es)**	**References**
"You Can't Always Get What You Want": Examining Employees' Preferences and Job Satisfaction in Agile Transformations	- Survey data obtained from participants working in (or very closely with) ASD teams in our case organization between November and December 2021 (n = 176) - Usage of Dynamic Intelligent Survey Engine (DISE) as an online survey tool - Preference measurement by means of PCPM as an instrument that minimizes the number of systematically chosen paired comparisons and thereby reduces survey fatigue to assess employee preferences for dimensions of team and work organizations in agile transformations - Additional assessment of perceptions of status quo of team and work organization, job	Schlereth et al. (2014); Schlereth & Skiera (2012)

	satisfaction and turnover intention (as outcome variables), and demographic information - Inclusion of two validation tasks to ensure the validity of participants' preference measurement results	
How Agile Software Development Teams are Led and Lead Themselves – A Literature Review on the Duality of Agile Leadership	- SLR for agile leadership using a keyword search string in the title, keywords, and the abstract of publications - Search was carried out by means of the meta-search tool Litsonar in 109 outlets of the AIS top list and the top conferences in the information systems domain using the following databases: EBSCOhost, IEEEXplore, Science Direct, ProQuest, ACM Digital Library, and AISeL - Search was restricted to peer-reviewed research articles between 2000 and 2024 - Initial search string resulted in a total of 359 articles and the following process of applying exclusion criteria and a forward and backward search resulted in a total of 18 article that were considered for further analysis - Exclusion criteria included the following: articles in any languages other than English, not available via common databases, no focus on or no definition of agile leadership	Levy & Ellis (2006); vom Brocke et al. (2015); Webster & Watson (2002)
"No One Can Do It All": The (Changing) Role of External Managers for Team Empowerment in Agile Teams	- Exploratory multiple-case study in one organization with ASD teams as the unit of analysis over the course of two years (2019-2021) - Data sources comprised internal data (e.g., training materials, documentation, and internal presentations), observations, and semi-structured interviews in five teams - Team selection followed a literal and theoretical replication logic to ensure a broad representation of different team characteristics - In total, 45 interviews were conducted with teams, individual team members and team-external managers lasting between 45-70 minutes	Dubé & Paré (2003); Yin (2009); Yin (2011)

Table 3-1. Overview of data collection approaches.

3.2.2 CASE ORGANIZATION

One case organization served as the main source of data for both Study 1 and Study 3. We decided to rely on one organization and investigate a variety of teams within this organization because of two reasons. First, we had exceptionally broad access to internal data and ASD teams and were thus able to

delve into the nuances and details of our focal issues. Second, we could control for factors specific to our case organization and the sector that it operates in while exploring differences across teams. The case organization is a critical case that warrants an in-depth analysis. The organization is the national subsidiary of an international insurance company that has embarked on an agile transformation in 2016 and since continuously adjusted the usage of agile methodologies and practices, planning and budgeting processes, structures, roles and responsibilities, team setups, and supporting HR mechanisms. The transformation has started in the IT department in individual teams as a bottom-up effort. While initially only a small number of teams employed mostly Scrum, XP, or Kanban practices, the number of ASD teams has steadily increased and today around 900 employees are organized in cross-functional tribe structures similar to the Spotify model.

3.2.3 STRUCTURED LITERATURE REVIEW

SLRs are a central part of most scientific studies and "serve as foundations and frameworks for research projects because they help to develop an understanding of a domain and explain the topic under study" (vom Brocke et al., 2015, p. 206). This justification for using SLRs directly corresponds to the motivation for Study 2: employees attach great importance to changing leadership structures and processes in ASD contexts, but the research domain is still characterized by uncertainty, ambiguity, and vagueness concerning leadership actors, roles, and responsibilities. I thus followed established guidelines on performing an SLR (Levy & Ellis, 2006; vom Brocke et al., 2015; Webster & Watson, 2002). As a first step, I developed a search string that appropriately delimits results while not being overly restrictive. Furthermore, inclusion and exclusion criteria (e.g., outlet, year of publication, quality, thematic focus, or language) were used to sort through the initial results and select the most fitting publications for deeper analyses. This process includes a forward and backward search based on the resulting set of publications to identify relevant studies on the topic of agile leadership outside of the selected journals or keywords. Following these steps, I identified a total of 18 publications that were taken into consideration in the following data analysis process.

3.2.4 SURVEY RESEARCH

In Study 1, we used an online survey for two purposes: first, we employed a preference measurement instrument to gain knowledge on employee preferences on agile transformations and corresponding changes to team and work organization. Second, we used the results of the preference measurement to test our hypotheses on the relationship between the forms of organizing in agile transformations and job satisfaction. The online survey was conducted in our case organization and sent out to all employees working in or very closely with ASD teams in the last months of 2021. We integrated validation tasks for participants to ensure the survey's validity and took advantage of strategically chosen pairwise comparisons in our preference measurement exercise to reduce the total number of questions in the

survey and minimize survey fatigue. To allow for follow-up surveys or longitudinal studies, we created a unique, reproducible identifier per participant that ensures that we can link participants responses across several surveys.

3.2.5 EXPLORATORY CASE STUDY RESEARCH

In general, case study research is performed to observe and describe phenomena as they appear in a real-world setting (Yin, 2009, 2011). An exploratory case study approach in particular is a suitable research method for contexts in which we cannot rely on established theory but instead use data-centric, inductive reasoning to build theory (Sarker et al., 2018). We used this research approach in Study 3 due to our limited understanding of team-external management in ASD team contexts. Defining ASD teams as the unit of analysis, we performed a multiple-case study in a single organization, thereby controlling for potential organization-specific and industry-specific factors (Lee, 1989). The case selection is a crucial process in case study research as we want to ensure that replication logics match the stated research goal. In our case, we aimed to cover a broad range of team setups and characteristics while simultaneously ensuring a duplication of similar cases. We thus followed both theoretical and literal replication logics (Dubé & Paré, 2003). Our case data was collected from a variety of data sources, comprising 45 semi-structured interviews, internal documents such as presentations, planning and budgeting spreadsheets, and training material, and observations from shadowing teams in team-internal rituals and meetings.

3.3 DATA ANALYSIS APPROACHES

3.3.1 OVERVIEW OF DATA ANALYSIS APPROACHES

Table 3-1 summarizes how the data that has been collected as described before was then analyzed to answer each study's research questions.

Study	**Data analysis approach(es)**	**References**
"You Can't Always Get What You Want": Examining Employees' Preferences and Job Satisfaction in Agile Transformations	- By means of PCPM, importance weights were calculated that represented employees' preferences for agile, hybrid, or traditional forms of team and work organization for five dimensions of ASD using analytical hierarchy process, respectively eigenvector technique - Performed t-tests to check for systematic variances based on demographics (e.g., age or job title) - Manual calculation of two variables for usage in further analyses: (a) *BestMean* (referring to the overall preference for one form of team and work organization across all dimensions of ASD) and (b)	Schlereth et al. (2014); Schlereth & Skiera (2012); Scholz et al. (2010)

	DistanceMean (referring to the mismatch between preference and perceived status quo on a scale between 0 as the lowest and 1 as the highest distance, meaning that the status quo equals the least preferred form of organizing) - Performed linear regressions to test hypotheses and assess relationships between *BestMean* or *DistanceMean* and job satisfaction	
How Agile Software Development Teams are Led and Lead Themselves – A Literature Review on the Duality of Agile Leadership	- Analysis of research method, identity or role of individuals representing "agile leaders", and corresponding leadership theories - Extraction of definitions of agile leadership and three-step coding process (open, axial, and selective coding) to identify patterns, iteratively refine codes and categories, resulting in a three-level concept - Creation of an intensional and extensional definition to further specify and delimit the applicability of the concept - Definition of logical relationship (AND, OR) between sub-categories of agile leadership characteristics	Belgrave & Seide (2019); Williams & Moser (2019)
"No One Can Do It All": The (Changing) Role of External Managers for Team Empowerment in Agile Teams	- Analysis of qualitative data in the form of transcribed interviews, case write-ups, team setup visualizations, and internal presentations by means of triangulation - Three-level coding approach (using open, axial, and selective coding) was used for (1) team-external management and (2) contextual factors to first identify patterns in the data, develop categories among similar patterns and iteratively refine code categories into higher-level structures and logics - Usage of a priori construct on team empowerment to mark instances of team-external management influences (positive, neutral, or negative) - Case comparison by a two-step process comprising a within-case analysis to understand each case in-depth followed by a cross-case analysis to identify similarities and differences, potentially identifying relevant contextual factors - Manual identification of links between team-external management and team empowerment and subsequent hypotheses development based on simultaneous appearances of both code categories for text passages and/or themes	Dubé & Paré (2003); Yin (2009); Yin (2011)

Table 3-2. Overview of data analysis approaches.

3.3.2 PAIRWISE COMPARISON-BASED PREFERENCE MEASUREMENT

In Study 1, we introduced pairwise comparison-based preference measurement as a means to understand employees' preferences in agile transformations (Schlereth et al., 2014; Schlereth & Skiera, 2012; Scholz et al., 2010). Therefore, we differentiated between dimensions of team and work organizations as individual characteristics, considering that employees can prefer traditional or hybrid forms of organizing for one dimension, but the agile form for another. We thus equated the choice between forms of team and work organization to the choice between complex products such as, for example, smartphones. Smartphones have a set of relevant characteristics such as the operating system, the price, storage capacity, size, and others, and when choosing a smartphone, we as buyers attach different importances to different characteristics. The same is true for the choice between forms of organizing: employees attach different importance to the individual dimensions of team and work organization. We used PCPM to present survey participants with a set of strategically chosen comparisons between two alternatives to then calculate importance weights using an analytical hierarchy process, respectively eigenvector technique. We then used this set of importance weights in subsequent analyses to deepen our understanding of how employees perceive agile transformations.

3.3.3 CODING TECHNIQUES

For both Study 2 and 3, we applied a three-step coding technique consisting of open, axial, and selective coding (Belgrave & Seide, 2019; Williams & Moser, 2019). *Open coding* as the first level of coding creates a first set of distinct, definable categories and includes the identification of patterns within the collected data and a process of constant comparison against existing and similar codes. In the second step, *axial coding*, the existing set of codes is further refined by identifying links and similarities among existing codes and aggregating, dropping, or extending them as necessary. The third level of coding – *selective coding* – includes a sensemaking process of the set of codes that emerged from the axial coding phase. In this step, the researcher seeks to create high-level categories and sub-categories of codes, with the goal of creating meaningful order among the set of codes.

For Study 2, this coding process was used to categorize and differentiate the definitions of agile leadership that resulted from the SLR. The initial set of codes concentrated on individual characteristics of agile leadership. In the second and third step of the coding process, those characteristics (represented by the initial set of codes) were continuously compared and refined. At this point, a potential categorization into team-internal and team-external aspects became apparent and was thus realized, ultimately resulting in the three-level structure of the concept of agile leadership.

For Study 3, the coding techniques were applied for both the behaviors and actions of TEM and the contextual factors that we identified as potentially affecting team-external management. Due to the high

number of interviews and identified patterns, this process was performed in several iterations while constantly comparing existing codes to emerging patterns. The resulting set of codes was then aggregated into higher-level categories by combining similar codes into more generalist themes. Those were then again compared and summarized into main categories (e.g., for team-external management this resulted int the three main forms: *managing individuals*, *managing within teams*, and *managing beyond teams*).

We also used another form of coding for Study 3 to identify instances of team empowerment processes in our data. In this case, we utilized the established definition of team empowerment (Kirkman & Rosen, 1997) as an a priori construct and marked references to the four dimensions of team empowerment in this way. The process to identify links between TEM and team empowerment was a manual task that comprised the identification of the presence of both (1) a code that represented one (or more) forms of team-external management and (2) a code for one of the dimensions of team empowerment for the same corresponding text passage. If interviewees referred to the same story or situation again or if other team members referenced the same story or situation, we manually linked those instances. As patterns of simultaneously present codes emerged, we iteratively developed hypotheses on the relationship of the concepts of team-external management and team empowerment.

4. PAPER SUMMARY

4.1 SUMMARY OF STUDY ONE

The first study of this dissertation has a two-fold goal and therefore answers the following two research questions:

- *Which characteristics of an agile team and work organization do employees perceive as important?*
- *How do agile transformations affect employee satisfaction?*

The study thereby helps to shed light on employee preferences on team and work organizations in an agile transformation. As an organization gradually introduces ASD practices and methodologies, employees experience the differences between SD approaches regarding job characteristics in terms of team and work organization first-hand. Job characteristics – and the degree to which those characteristics align with personal preferences – affect job satisfaction (James & Jones, 1980). A high level of job satisfaction is crucial for successfully implementing ASD methods as prior research has identified employees' support – or lowered resistance – as one of the major success factors of agile transformations (Dikert et al., 2016; Kalenda et al., 2018). However, assessing how satisfied employees

are with changing job characteristics in agile transformations is not a trivial task as ASD influences those characteristics in a variety of dimensions (e.g., team composition or requirements engineering).

To answer our first research questions, this study hence reframes the different approaches to SD as complex alternatives that differ in attributes (i.e., agile, hybrid, or traditional forms of work organization) across dimensions (i.e., team composition or requirements engineering). This dimension-based view of SD approaches provides a more nuanced understanding of agile, traditional, or hybrid working modes and forms the basis for a preference measurement in a complex choice. As a research instrument, we applied pairwise comparison-based preference measurement – an instrument originating from marketing research which provides a tool to assess overall preferences for complex products such as, for example, vacations or smartphones (Schlereth et al., 2014; Scholz et al., 2010). Table 4-1 shows the proposed dimensions and forms of team and work organization of ASD that forms the basis for the preference measurement.

	Traditional	**Hybrid**	**Agile**
Team organization	Organized by the supervisor or project manager, no involvement of the team	Organized by the supervisor or project manager, with the involvement of the team	Organized by the team itself, with no involvement of supervisor or project manager
Task planning	Long-term planning, no changes anticipated	Long-term planning, changes anticipated	Short-term planning, changes anticipated
Division of tasks	Strictly separated tasks	Often shared responsibility for tasks	Always shared responsibility for tasks
Requirements engineering	Mainly from internal stakeholders	From both internal stakeholders and customer feedback	Mainly from customer feedback
Team composition	All team members with similar functional background	Mainly team members with similar functional background, some exceptions	Team members with very different functional backgrounds

Table 4-1. Dimensions and forms of team and work organization.

To answer our second research question, we developed and tested two hypotheses on the effect of employees' preferences on job satisfaction as the dependent variable. First, we hypothesized that the distance between employees' preferred forms of team and work organization and the status quo in their work environment negatively influences job satisfaction. Second, we proposed that employees who prefer agile forms of team and work organization have higher job satisfaction.

We collected data from our focal case organization in the fifth year since it started its agile transformation. Therefore, we sent out an online survey to employees which have started to work with ASD methods over the course of the transformation and assessed (a) employees' preferences on team and work organization, (b) their perception of the status quo in their work environment, (c) job satisfaction and turnover intention, and (d) demographics of the participants.

We collected and analyzed a total of 176 responses from participants. The results indicate that 'team organization' – the degree to which a team organizes itself as opposed to being organized by a supervisor or project manager – is considered by far the most important dimension of team and work organization, followed by the form of 'requirements engineering' and 'task planning'. Overall, while traditional forms of team and work organization were not preferred in any dimension, there is no overwhelming preference for agile forms as well: participants preferred agile over hybrid forms of teams and work organization only in two dimensions, namely 'team organization' and 'team composition'. For most dimensions, participants indicated that they perceived the status quo in their work environment as a hybrid form except for 'requirements engineering'. For this dimension, most participants described the status quo as a traditional approach resulting in a noticeable mismatch to employees' preferences on average. Further, the results of our regression indicate a significant negative relationship between the distance of employee preferences and perceptions of the status quo and job satisfaction while our second hypothesis is only weakly supported.

In summary, the findings of this study highlight the importance of understanding ASD as a multi-dimensional concept. While we found supporting evidence that hybrid or agile forms of team and work organization are generally preferred, we determined that employees attach varying importance to the respective dimensions, particularly team organization (referring to the involvement of managers or supervisors in team-internal decision-making). Further, a mismatch between employee preferences and perceptions of the status quo negatively influences job satisfaction. For practitioners, our study can thus support organizations in increasing the impact of their transformation efforts: we suggest that organizations should prioritize optimizing the dimensions of team and work organization that employees consider both important and currently not matching their preferences.

4.2 SUMMARY OF STUDY TWO

The second study aims to answer the following research question:

- *How have aspects of agile leadership been defined in prior research?*

Introducing ASD methodologies in an organization that previously followed a traditional SD approach challenges existing management and leadership structures as agile teams self-organize and require autonomy (Cockburn & Highsmith, 2001). Among practitioners, the desired outcome of this

transformation is often referred to as *agile leadership*. The term has increasingly been used in research over the past years as well, but there is no consensus on a clear, distinct definition, much less an established instrument to measure the presence of agile leadership (Digital.ai, 2023; P. Xu & Shen, 2015). Thus, this study seeks to integrate existing research on agile leadership into one comprehensive construct.

To answer this study's research question, I performed an SLR following the recommendations of Webster & Watson (2002) and vom Brocke et al. (2015) resulting in a total of 18 papers after excluding any studies that only partially covered the topic of agile leadership and did not provide a definition of the term. I extracted these definitions and – if specified – the group of persons that the studies specified as taking on agile leadership roles and responsibilities, and the leadership concepts that the studies used as a theoretical lens or a basis for their research. I then compared and integrated the definitions and specified an intensional and extensional definition of the concept, resulting in one comprehensive three-level model of agile leadership (see Figure 4-1).

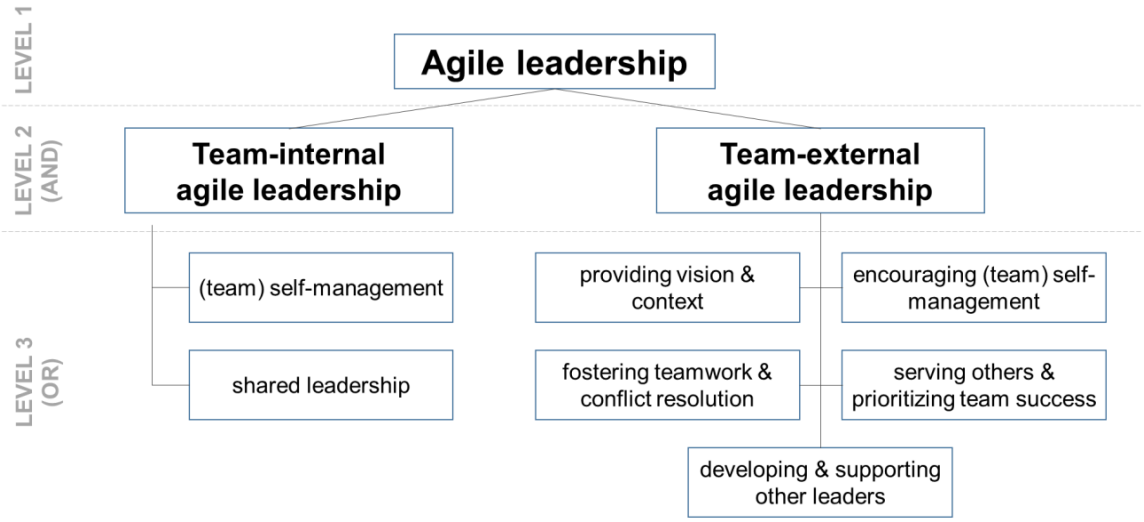


Figure 4-1. Concept model of agile leadership.

In short, this study's findings suggest that agile leadership is both a team-internal and team-external phenomenon and both dimensions should co-exist for agile leadership to be effective for both teams and organizations as a whole. While prior research has often focused on only one of these two dimensions, the two sub-forms of agile leadership are two sides of the same coin and arguably reinforce each other. Team-internal agile leadership consists of (a) team self-management and (b) shared leadership (e.g., Gren & Ralph, 2022; Moe et al., 2015; Moe, Dingsøyr, & Øyvind, 2009; Przybilla et al., 2020; Spiegler et al., 2019). Both sub-concepts have been extensively studied – also outside of the literature on ASD. Thus, there are established instruments to measure team-internal agile leadership.

Team-external agile leadership on the other hand is less well understood. There is a set of five characteristics that are commonly associated with agile leadership through managers, supervisors, or subject matter experts operating outside of teams, namely (1) providing vision and context, (2) encouraging (team) self-management, (3) fostering team work and conflict resolution, (4) serving others and prioritizing team success, and (5) developing and supporting other leaders (e.g., Andrias et al., 2018; Augustine et al., 2005; Geffers et al., 2024; Gren & Ralph, 2022). These characteristics are based on the concept of empowering leadership. In contrast to generic leadership styles – for example, transformational leadership or servant leadership – empowering leadership is one of the few team-specific leadership styles that have been used to explain team-external agile leadership and focuses on shifting decision-making power and team-specific responsibilities from appointed team-external leaders to team members themselves (Ahearne et al., 2005; Chen et al., 2007). The desired outcome of empowering leadership is empowerment (Ahearne et al., 2005), which is one of the central premises of ASD (Beck et al., 2001; Cockburn & Highsmith, 2001). Currently, there is no established scale to measure the dimensions of team-external leadership, but an instrument to measure empowering leadership (Zhang & Bartol, 2010) can be adapted to fit the roles and responsibilities of team-external leaders specific to the context of ASD.

This study defines agile leadership as a dual concept and thereby serves as a starting point to develop a valid and reliable scale to measure agile leadership. While team-internal agile leadership is generally well understood, we lack insights into how team-external agile leaders can position themselves and act in concrete ways that supports ASD teams in being effective and efficient. Further, the interplay between shared leadership and empowering leadership is a promising future research direction that can ultimately help us understand how and why some ASD teams and agile organizations are successful and others are not.

4.3 SUMMARY OF STUDY THREE

The third study zooms in on the topic of team-external leadership and thereby answers the two following research question:

- *How do team-external managers influence team empowerment of agile software development teams?*
- *How do contextual factors shape the interactions between team-external managers and agile software development teams?*

As ASD methodologies and practices have become the de-facto standard for developing software over the past two decades (Digital.ai, 2023), organizations have increasingly come to the realization that agile teams can only flourish and achieve the desired results if processes, tools, roles, and standards

change accordingly (Dikert et al., 2016; Kalenda et al., 2018). ASD teams rely on a high degree of team empowerment (Tessem, 2014). Yet, autonomous decision-making and self-organization are at odds with traditional command-and-control management (Moe, Dingsøyr, & Dybå, 2009). As more and more organizations adopt agile methods at a large scale and embark on agile transformations, managers can be either a burden or a facilitator in the endeavor to achieve agility as several studies on the challenges and success factors of agile transformations have shown (Chow & Cao, 2008; Dikert et al., 2016; Kalenda et al., 2018). Prior research has studied the internal processes of agile teams, but our understanding of the role of team-external managers is limited to the basics: managers should act as facilitators rather than decision-makers, empower teams and support their efforts to self-organize, act as coaches and mentors, set strategic objectives, and design systems in which ASD teams can work effectively (Moe et al., 2019; Parker et al., 2015; Vidgen & Wang, 2009). Nevertheless, we do not yet understand in depth which concrete actions and behaviors managers take on, how those affect ASD teams, and how organizational and individual characteristics shape this interplay. In this study, we explicitly focus on functional managers, who are connected to ASD teams, but are not involved in their day-to-day inner workings, and refer to them as team-external managers (TEM). We used team empowerment as a theoretical lens since its four dimensions aligns well with the desired characteristics of an ASD team (Highsmith & Cockburn, 2001): potency, meaningfulness, autonomy, and impact (Kirkman & Rosen, 1997).

In this study, we conducted an exploratory multiple-case study in five teams in our case organization currently undergoing an agile transformation. The teams served as the unit of analysis in a single organization to control for organization-specific factors. We selected the teams based on a set of characteristics to allow for both literal and theoretical replication (Dubé & Paré, 2003), e.g. the number of team members and team-external managers, the degree of cross-functionality or the usage of different agile practices. We collected data through internal documents and intranet data, observations from attending team events and shadowing the team, and semi-structured interviews. Overall, 45 interviews were conducted with both team members and TEMs connected to those teams. In our data analysis, we used open coding to identify (1) TEMs' managerial roles and responsibilities, (2) contextual factors that were named as potentially affecting those roles and responsibilities and (3) the effects – both positive and negative – on team empowerment dimensions. Both the interview guidelines and the coding schemes for all three topics were continuously refined throughout the interview and analysis process. Following, we performed a within-case analysis and a cross-case analysis to first understand the processes and inner workings for individual teams in depth and then identify commonalities and differences across cases. As applicable, we reviewed differences in contextual factors to find explanations for varying patterns across teams.

Based on our analysis, we developed a theoretical model of team-external management and its effects on team empowerment. Figure 4-2 integrates our findings into a model of team-external management in ASD teams. We categorized the ways in which TEM interact with ASD teams in three types: (1) *managing individuals*, (2) *managing within teams*, and (3) *managing beyond teams.* We identified contextual factors concerning (1) managers and (b) teams, which influence the degree to which managers apply the different forms of team-external management.

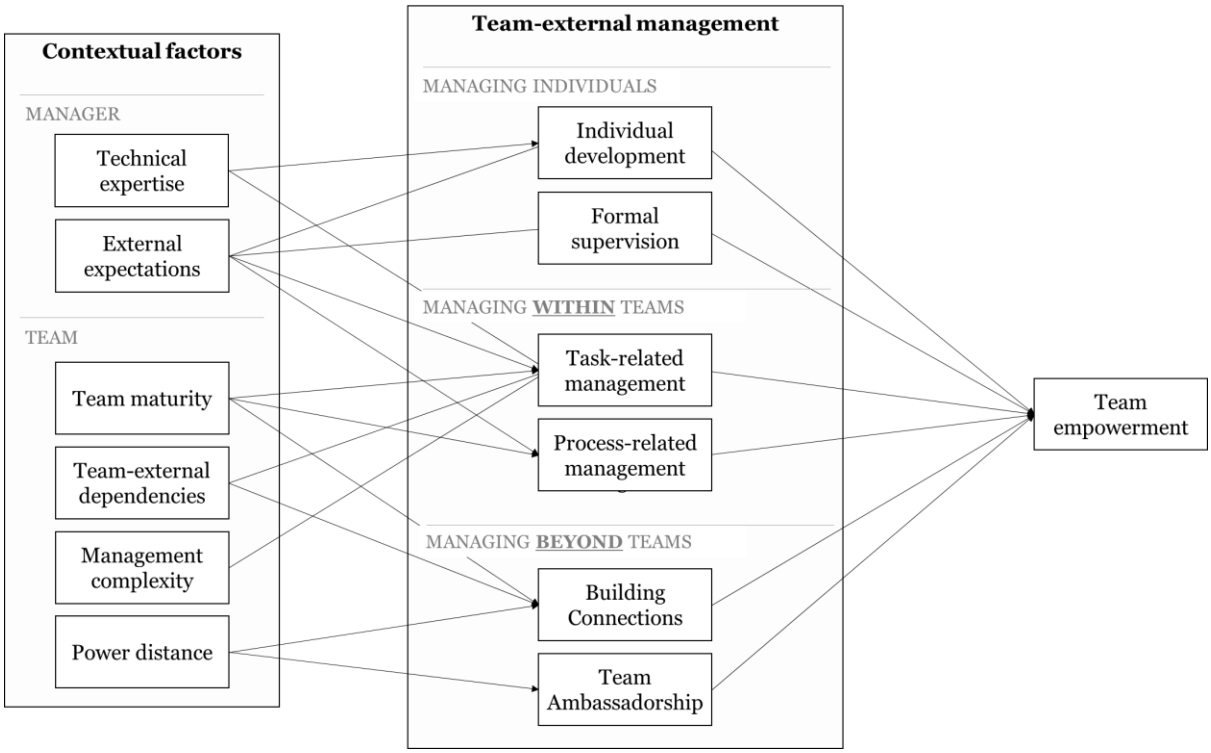


Figure 4-2. Model of team-external management of ASD teams.

Further, we evaluated how the actions and behaviors of TEMs influence team empowerment. Table 4-2 details the potential relationship that we have identified.

	Managing Individuals		**Managing within Teams**		**Managing beyond Teams**	
	Formal Supervision	Individual Development	Task-related Management	Process-related Management	Building Connections	Team Ambassadorship
Potency	o	+	--	--	+	++
Meaning-fulness	o	+	+	o	+	++
Autonomy	-	-	--	--	o	o
Impact	o	o	o	o	+	+
Legend: ++ strong positive influence; + positive influence; o no influence; - negative influence; -- strong negative influence						

Table 4-2. Potential relationships of team-external management and team empowerment.

We have found supporting evidence that forms of team-external management influence team empowerment, which is in line with previous research on team empowerment (Mathieu et al 2006). Nevertheless, TEMs interactions with ASD teams appear to influence the separate dimensions of team empowerment differently. For example, we argue that an emphasis on task-related management has a negative effect on potency and autonomy as team members do not feel trusted and capable of completing their tasks on their own, but very low efforts on task-related management could also signal to the team that their work is not that important to warrant a TEM's involvement.

Based on our findings, we derived a set of hypotheses regarding the interplay between the types of team-external management and the dimensions of team empowerment for empirical testing in future studies. In addition, we summarized the implications of our research for practitioners: we particularly raise awareness that the pursuit to empower ASD teams requires TEMs to scrutinize their own learned behaviors and actions and analyze the influence they have on teams and team members. Further, contextual factors may prompt TEMs to engage in undesirable behaviors or prevent them from doing what might be best for their teams. Systemic changes on an organizational level are required to counteract those patterns.

5. DISCUSSION

5.1 SYNOPSIS OF CONTRIBUTIONS

This dissertation set out to provide answers to the following overarching research question: "*How do agile transformations shape leadership structures and processes in organizations?".* I will now summarize how the three studies of this dissertation contribute to the research project as a whole and how each study adds to the current body of knowledge in different ways.

The goal of Study 1 was to explore employees' perceptions of ASD approaches as employee support has regularly been identified as a central success factor in agile transformations (Dikert et al., 2016; Kalenda et al., 2018). First, to measure the degree to which teams in our case organization prefer an agile, hybrid, or traditional approach to software development, we utilized an instrument from marketing research and equated software development approaches to complex products. Complex products have a variety of features and a combination of a subset of those features make product A more desirable to a customer than product B. PCPM as our instrument of choice is designed to assess how changes to individual aspects of these products change customer preferences to ultimately identify the most important features. We translated this approach to the software development domain: agile, hybrid, and traditional approaches combine a certain subset of characteristics of team and work organization (such as team composition or distribution of tasks), and our goal is to understand which features actually drive employees' preferences for one approach over another. We hereby introduce a more nuanced,

dimension-based understanding of ASD as opposed to, for example, measuring ASD by assessing the usage of specific agile practices (e.g., Maruping et al., 2009; Tripp & Armstrong, 2016). While the focus on ASD practices is appropriate for some research projects, we argue that our instrument that explicitly includes alternative hybrid or traditional approaches to software development allows for more in-depth analyses in the context of agile transformations where practices are shifting from one form to another. Second, we used the data that we collected in our case organization to explore the relationship between preferences on team and work organization and job satisfaction. We found supporting evidence that a mismatch between preferences and perception of the status quo negatively influences job satisfaction. This is in line with prior research (Tripp & Armstrong, 2016) and generally to be expected as agile transformations heavily influence job characteristics which are long known to have an influence on job satisfaction (James & Jones, 1980), but the relationship has not been explicitly tested in the context of agile transformations before.

In regard to the overarching research question of this dissertation, Study 1 introduces the context of agile transformations and identifies leadership processes and structures as important aspects of ASD that employees prefer over hybrid or traditional approaches on average. Further, the distance between the perceived status quo at our case organization and preferences of the employees is particularly large concerning the involvement of managers in requirements engineering, which warrants a more in-depth analysis of how managers and ASD teams interact in practice and their respective influence on teams.

I build upon those results in Study 2 and take a close look into prior research on leadership in the context of ASD. I consolidated the findings of existing studies in an SLR and extracted information on the roles and functions of different actors assuming leadership and management tasks (e.g., team members, Agile coaches, or project managers) as well as associated theories of leadership in the respective studies (e.g., shared leadership, self-management, or empowering leadership). Based on the results of the SLR, I used coding and constant comparison techniques to conceptualize agile leadership – a term, which has regularly been used especially in grey literature to describe changing leadership dynamics in ASD contexts. In particular, I outline the duality of leadership dynamics in ASD that became apparent in the analysis of prior research: on the one hand, team-internal processes change as leadership responsibilities increasingly move down the hierarchy and are shared between team members. On the other hand, team-external leadership processes change as the responsibilities of traditional managers and supervisors evolve due to the shift to more team-internal leadership. The vagueness and ambiguousness of a definition as well as the lack of an established instrument to measure team-external leadership necessitate further research to better understand the processes and structures of leadership outside of ASD teams.

In sum, Study 2 contributes to answering the overarching research question by broadening this dissertation's focus beyond the case organization, thereby summarizing the current state of research on agile leadership and structuring the current research gap: while the team-internal aspect of agile leadership is generally well-understood, we have little insight into the team-external dynamics of agile leadership and do not yet fully understand how team-external managers actions and behaviors influence ASD teams.

In Study 3, we address this gap and explore team-external management of ASD teams at our case organization in detail. We chose a set of teams that are characterized by their usage of different agile methodologies, types of team composition, team size, and others to represent the diversity of team setups and thus potentially influencing factors in the case organization. An in-depth analysis of the interactions between TEMs and ASD teams allowed us to identify patterns of behaviors that appear to influence the degree to which a team gains empowerment as a desired characteristic of ASD teams (Cockburn & Highsmith, 2001). Hence, we introduce a definition for the concept of team-external leadership as a formerly often neglected or glanced over aspect that has major influence on the success of transformations as prior research has often summarized under management commitment (Dikert et al., 2016; Kalenda et al., 2018). Our model of team-external management in ASD includes facets of TEMs' behaviors and actions as observed in practice as well as contextual factors which influence when and how TEMs display those behaviors. Furthermore, we have analyzed the interplay between those behaviors and their influence on ASD teams and derived a set of testable hypotheses on the influence of team-external management on team empowerment as the outcome variable.

Study 3 contributes to my overarching research question by zooming into the concept of team-external leadership which emerged in the course of an agile transformation. Team-external leadership results from the implementation of ASD teams, which are by definition empowered teams and thereby assume roles and responsibilities that have formerly been taken on by designated managers, impacting leadership structures and processes. We define potential actions and behaviors that TEMs engage in to varying degrees, and identify relationships between those respective TEM behaviors and team empowerment. Thereby, we shed light on the interplay between team-internal and external dynamics that is crucial for the process of moving leadership roles and responsibilities from designated leaders to teams and team members.

5.2 IMPLICATIONS FOR PRACTICE

This dissertation provides answers to a research question that is directly motivated by the challenges that organizations regularly face when engaging in agile transformations: ASD changes fundamental principles of organizational structures and processes, and organizations need to be both mindful and well-informed when managing such transformations. In my three research projects, I provide insights

and instruments that can help guide this transformation – particularly regarding leadership structures and processes – and thereby offer the following implications for practice.

First, Study 1 introduces an instrument to gain insights into employees' perceptions of an agile transformation. The preference measurement tool can help organizations to shape their transformation journey and identify the most pressing concerns. It can reveal the aspects of the transformation that are in line with employees' expectations or, alternatively, uncover glaring mismatches between their preferences and the status quo. Also, organizations can form sub-groups of participants (e.g., depending on organizational departments, roles, agile methodologies, types of IS or technologies, or others) which may experience both their work environments and the influence of the agile transformation in very different ways. Using the instrument on a regular basis provides a data basis that organizations can use to make informed and context-specific decisions and observe how interventions change employee perceptions over time.

Second, the findings of Study 1 highlight the importance of employee engagement in an agile transformation as we found supporting evidence that a mismatch between employees' preferences and the perceived status quo in the organizations negatively influences job satisfaction. Organizations should thus strive to either implement changes to move the perceived status quo on team and work organization aspects closer to employees' preferences, or – if possible and reasonable in the specific circumstances – influence employees' preferences through discussions, trainings, organizational changes, or change management efforts.

Third, the analysis of prior research on the topic of agile leadership in Study 2 reveals the ambiguousness, uncertainty and broadness that is associated with leadership processes and structures in agile transformations. In practice, organizations struggle with the same challenges that the scientific community faces: we know the basic principles of how ASD teams and managers share and distribute managerial roles within teams while managers take on a more supporting than controlling or directing role. The role of managers operating outside of ASD teams is still too often neglected, although the potential impact of those managers' support for an agile transformation is extensive (Dikert et al., 2016; Kalenda et al., 2018). This dissertation sheds light on the importance, potential antecedents and effects of leadership in an agile transformation. Providing training, coaching, and change management initiatives to both team members and TEM to communicate which behaviors and actions are expected from each actor is essential for a successful transformation. The model of team-external management presented in Study 3 can serve as a starting point to understand, prioritize, and set those expectations. In particular, the studies' findings highlight the balancing act for TEMs to engage in certain behaviors and actions more while not neglecting others. Further, organizations need to be mindful of contextual factors that influence TEMs' behaviors and actions and can thus act as either roadblocks or accelerators.

5.3 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This dissertation opens up a number of potential follow-up studies, partly based on the limitations of this research project. These future research directions will be summarized in the following.

First, in Study 1 we use PCPM as an established instrument from marketing research, but we have derived a new set team and work organization dimensions in agile, hybrid, and traditional forms from prior research. Those dimensions have considerably changed in the pilot study based on feedback from both practitioners and researchers. Thus, these dimensions as well as the definitions of an agile, hybrid, and traditional form for each dimension need to be tested extensively to ensure their validity and reliability.

Second, in Study 2 I identified team-external agile leadership as a concept that requires further analyses to create a comprehensive definition and ultimately make team-external agile leadership measurable. In Study 3, we performed the first steps to arrive at a more detailed definition based on our observations in practice. Nevertheless, an instrument to measure agile leadership needs to be developed in a follow-up study to allow future research to test our hypotheses on the influence of team-external management on team empowerment. This instrument should build upon existing measurement methods for, for example, empowering leadership, but adjustments to the specific context of ASD and the fact that managers explicitly exist outside of those teams are necessary.

Third, two of the three studies in this dissertation relied on empirical data from a single organization. This represents the deliberate choice to concentrate on a critical case and emphasize the depth of analysis rather than its breadth. Nevertheless, the analysis of a critical case can only be the first step to create new theory as it cannot ensure generalizability. One of the major avenues for future research is to test whether our insights hold true for other contexts. These different contexts comprise, for example, the duration, direction, and setup of the agile transformation, organizational culture, or simply the size and sector of the focal organization. This is particularly important since the case organization operates in a heavily regulated sector that, for example, requires official approval processes, detailed documentation, or strict requirements for governance mechanisms. Managers often have a double role, officially being responsible for operations, without actually being involved in the development phase and the continuous support and maintenance processes. As a result, both our preference measurement instrument and the team-external management model need to be tested in future research in a variety of contexts and organizations.

Fourth, our data collection in both Studies 1 and 3 represent only a snapshot of one point in time in an ever-changing context. Agile transformations are a process in which transformation initiatives constantly change underlying conditions in the form of structures, processes, and roles. Thus,

longitudinal studies are crucial in this context to understand the changing environment and the impact of individual transformation initiatives. In Study 3, we have started to collect data in the ASD teams at multiple points in time, but there have been further considerable changes to leadership roles at our case organization since the data collection phase has ended. In Study 1, we have made arrangements to allow for future research: participants have created an individual ID based on personal information that ensure both anonymity and matching participants' responses across different surveys. As a result, we can monitor how individual participants' opinions, preferences, and perceptions change as the agile transformation progresses.

6. CONCLUSION

How does the adoption of agile software development approaches change organizations? How does the necessity to empower teams affect traditional management and leadership structures? And what can managers do to support these empowered teams and thereby help to make an agile transformation successful? This dissertation delves deeply into the agile transformation of an organization that represents a critical case as the organization's size, structures, sector, and respective regulatory constraints provide a challenging environment for ASD teams. In three consecutive studies, this research projects ask (1) *which characteristics of an agile team and work organization do employees perceive as important*, (2) *how do agile transformations affect employee satisfaction*, (3) *how have aspects of agile leadership been defined in prior research*, (4) *how do team-external managers influence team empowerment of agile software development teams*, and (5) *how do contextual factors shape the interactions between team-external managers and agile software development teams*?

Therefore, this dissertation explores how employees experience agile transformations and lays out the need to zoom in on specific aspects of those transformations that are of significance, particularly the distribution of leadership responsibilities and the role of managers and supervisors. Further, it provides insights into the current body of knowledge on leadership in ASD contexts and conceptualizes agile leadership as an interplay between teams and managers and offers a model of team-external leadership to explain one side of the equation.

In sum, this dissertation provides extensive insights into how an agile transformation plays out in practice and affects existing structures, processes, and essentially fundamental beliefs. This research project can only be a starting point in the endeavor to understand leadership in agile contexts in detail and deduce best practices for the interplay between managers and teams to make agile transformations successful.

7. STUDY ONE

Title	"You Can't Always Get What You Want": Examining Employees' Preferences and Job Satisfaction in Agile Transformations
Author(s)	Mareike Fischer, University of Cologne, Germany, mareike.fischer@wiso.uni-koeln.de. Matthias Heinz, University of Cologne, Germany, heinz@wiso.uni-koeln.de. Christian Schlereth, WHU – Otto Beisheim School of Management, Germany, christian.schlereth@whu.edu. Christoph Rosenkranz, University of Cologne, Germany, rosenkranz@wiso.uni-koeln.de.
Abstract	Agile transformations cause fundamental changes to work designs. To better understand resistance to transformations, we shed light on employee preferences and the consequences of team and work organization changes for job satisfaction. Using the stated preference method "pairwise comparison-based preference measurement", we examine our hypothesis on job satisfaction in agile vs. traditional team and work organization. Furthermore, we relate job satisfaction to the gap between perceived and preferred forms of such organizations. In summary, we identified team organization as the most important dimension in agile transformations. For requirements engineering, the distance between employee preferences and the perceived status quo was particularly large. Further, we found evidence that a larger distance between team and work organization preferences and perceptions negatively influenced job satisfaction.
Keywords	Agile software development, Hybrid software development, Agile transformation, Job satisfaction.
Publication status	Presented at the European Conference on Information Systems 2023.

7.1 INTRODUCTION

Agile software development (ASD), which emphasizes intense collaboration and fast, continuous iterations of working software (Beck et al., 2001), has been implemented across all sorts of organizations and continuously gained popularity since its advent in the 1990s (Dybå & Dingsøyr, 2009; West et al., 2010). Today, it is the de-facto standard for software development (Digital.ai, 2021). When agile methodologies are implemented in organizations and enterprises in so-called *agile transformations* – usually large-scale change programs introducing new tools, routines, and practices of working – essential characteristics of team and work organization are fundamentally changed in comparison to traditional software development practices (Dybå & Dingsøyr, 2008; Nerur & Balijepally, 2007; Tripp & Armstrong, 2016).

Previous research suggests that employees overall see agile transformations in a positive light due to perceived benefits such as increased effectiveness, quality, transparency, and satisfaction (Laanti et al., 2011). Nevertheless, several studies have indicated that *resistance* from the work force is one of the major challenges for agile transformations (Kalenda et al., 2018; Nerur et al., 2005; Mueller & Benlian, 2022). Thus, winning over employees to participate and support an agile transformation is one of its major success factors (Dikert et al., 2016).

Until now, we lack a clear understanding of how employees perceive agile transformations, which exact changes to more traditional forms of organizing employees resist, and why they do so. Partly, this is due to an imprecise and ambiguous definition of ASD that has regularly been named as an obstacle for ASD adoption by practitioners (VersionOne, 2021). Similarly, organizations struggle to identify those aspects of agile transformations that are most controversial among employees; we do not really know employees' *preferences*.

Understanding how changes to team and work organization impact and are perceived by the work force is crucial to allow organizations to follow the agile principle of inspecting and adapting to improve iteratively (Cockburn & Highsmith, 2001). Continuously integrating employee feedback into designing work processes and structures is fundamental to maintaining high employee involvement in the transformation and ultimately supporting its success (Dikert et al., 2016).

It is well-known that changing the work environment in organizational transformations influences job characteristics, and thereby employees' job satisfaction. As job satisfaction is one major predictor for turnover intention (Tett & Meyer, 1993) and job performance (Judge et al., 2001), it is imperative for organizations to maintain a high level of job satisfaction in the process of transforming team and work organization during agile transformations. Thus, we pose the two following research questions to gain

an in-depth understanding of specific changes in agile transformations, employees' preferences, and the consequences of such transformations:

RQ1: *Which characteristics of an agile team and work organization do employees perceive as important?*

RQ2: *How do agile transformations affect employee satisfaction?*

To study our two research questions, we employed pairwise comparison-based preference measurement (PCPM; Schlereth et al., 2014; Scholz et al., 2010) to determine both (a) the importance that employees attach to certain dimensions of team and work organization that change in agile transformations and (b) the preference for traditional, hybrid, or agile forms of organization per dimension. Existing quantitative research mainly focuses on the effects of the use of agile practices on job satisfaction or fatigue (e.g., Tripp et al., 2016; Mueller & Benlian, 2022), but does not consider the preferences of employees. To the best of our knowledge, we are the first to measure the preferences of the employees and their willingness to work with agile methods. Thus, we depart from previous research, which mostly either focuses on the advantages of an organization and thereby neglects the employee perspective or investigates the negative effects without considering employees' preferences.

The remainder of the paper is structured as follows. First, we summarize prior research on ASD, agile transformations, and job satisfaction. We then describe our research design and model. Next, we present the findings of our analysis. Finally, we discuss our findings in terms of their relevance for both research and practice and point out the limitations of our work and future research directions.

7.2 RELATED WORK

7.2.1 AGILE SOFTWARE DEVELOPMENT AND AGILE TRANSFORMATIONS

ASD is an umbrella term for a set of iterative software development approaches such as Scrum (Schwaber & Beedle, 2002) or eXtreme Programming (Mangalaraj et al., 2009) that have emerged over the past three decades. Initially, the methods have been developed to counteract the shortcomings of traditional, plan-driven software development, presenting an alternative to rigid up-front planning and top-down project management practices (Beck et al., 2001; Highsmith & Cockburn, 2001). Instead, ASD promotes light-weight processes and an ability to respond to changing requirements (Cohen et al., 2004).

ASD approaches are generally built around cross-functional, self-organizing, and autonomous teams (Cockburn & Highsmith, 2001). As such, they were initially introduced primarily in smaller organizations, often in single teams working on innovative projects (Boehm & Turner, 2003).

Nowadays, ASD is regularly practiced in large organizations and in several teams (VersionOne, 2021) and is not limited to the software development domain (Niederman et al., 2018).

However, while agile approaches share principles and values (Beck et al., 2001), organizations implement ASD differently, drawing on many practices, techniques, and tools to varying degrees (Cao et al., 2009). This practice is also well-known as process or method "tailoring" – the change and adaptation of software development processes and methods to address the unique needs of the development context (Avison & Fitzgerald, 2003; Fitzgerald et al., 2006). As a result, the degree to which traditional ways of team and work organization are adjusted to a more agile way of working differs substantially between organizations. Often, the approach of combining traditional and agile aspects is called *hybrid*. Similar to agile approaches, there is no single hybrid approach to software development but numerous variations: organizations are free to choose which underlying assumptions, methods, practices, or roles they adopt from either traditional or agile concepts (Bick et al., 2018).

The adoption of ASD by a high number of individuals or teams is termed *large-scale agile* (Conboy & Carroll, 2019; Dikert et al., 2016). The exact definitions differ, but as an example, Dikert et al. (2016) have specified that the notion of large-scale applies to "software development organizations with 50 or more people or at least six teams". When organizations engage in large-scale agile, leaving the pilot stage of implementing agile approaches behind and having a considerable number of teams adopting ASD practices, often tensions arise between the needs of agile teams and traditional organizational processes such as budgeting, resource allocation or certain HR practices (Conboy & Carroll, 2019; Dikert et al., 2016; Uludag et al., 2018). To reduce friction and enable agile teams to work effectively, organizations thus often engage in *agile transformations*, which are initiatives in which processes, structures, and roles can change considerably to implement ASD practices.

We know little about how employees perceive these transformation initiatives. We need a deeper understanding of the relationship between agile transformation and effects such as job satisfaction if we want to understand how organizations can successfully manage agile transformations.

7.2.2 JOB SATISFACTION AND TURNOVER INTENTION

The concept of *job satisfaction* always has received considerable scholarly interest. Prior research on job satisfaction has differentiated between global job satisfaction (an employee's overall satisfaction with their job as a whole) and facet job satisfaction (an employee's satisfaction with a number of aspects of their job) (Dolbier et al., 2005). As one of the earliest studies on job satisfaction, Hoppock (1935) described the concept as a combination of psychological, physiological, and environmental circumstances influencing an employees internal feeling of being content with her or his work. Similarly, Spector (1985) has identified nine facets that determine the degree to which an employee

feels satisfied with her or his occupation. Those aspects include, for example, supervision, benefits, operating procedures, co-workers, or the nature of work. This fundamental definition of job satisfaction as a multifaceted concept has not substantially changed in contemporary research, but there is little consensus on the optimal way to measure job satisfaction – researcher debate both the advantages of measuring global or facet job satisfaction and using single- or multi-item measurements (e.g., Dolbier et al., 2005; Nagy, 2002).

Prior research has identified several antecedents and outcomes of job satisfaction. For example, scholars have shown that job satisfaction is a strong predictor of an employee's turnover intention (Tett & Meyer, 1993) and quits (Lévy-Garboua et al., 2007). Further, a meta-analysis concluded that job satisfaction significantly influences job performance (Judge et al., 2001).

Regarding agile approaches, it has been shown that ASD positively influences work attributes such as psychological safety (Hennel & Rosenkranz, 2021), psychological empowerment (Koch & Schermuly, 2021) or team effectiveness (Lee & Xia, 2010; Recker et al., 2017). First existing studies also have found a positive relationship between agile project-management and software-development practices and employees' perceptions of job characteristics and job satisfaction (Tripp et al., 2016). Recent studies also have shown that agile practices can have adverse, resource-draining effects (Mueller & Benlian, 2022). However, to our knowledge, no study has investigated employees' preferences for ASD practices regarding agile transformations and their direct effect on job satisfaction.

7.2.3 HYPOTHESIS DEVELOPMENT

Agile transformations impact job characteristics that heavily change how employees experience their day-to-day work environment (Tripp et al., 2016; Mueller & Benlian, 2022). For example, ASD approaches emphasize cross-functional teams; thus, introducing ASD often influences team composition and, by that, the specific colleagues that employees cooperate and communicate with daily. Moreover, as self-organizing teams, ASD teams have substantially more responsibility for team success compared to traditional approaches where planning and steering are mostly run by and the responsibility of project managers or team leaders (Moe et al., 2008). Those changes can be fundamental and change an employee's job characteristics to a considerable degree. Accordingly, job characteristics differ for the three forms of organizing – traditional, hybrid, and agile.

Prior research has found that perceived job characteristics influence job satisfaction (James & Jones, 1980). If agile transformations substantially change team and work organization characteristics, this should impact job satisfaction. Simultaneously, every employee has individual preferences for team and work organization that ranges from traditional over hybrid to agile forms of organizing. These preferences are not necessarily in line with the form of organizing that employees experience in their

work environment. Prior research in the field of person-job fit theory indicates that matching employee preferences to work environments influence job satisfaction (Kristof-Brown et al., 2005). We build upon this insight and argue that the degree to which job characteristics do not fit preferences is crucial; that means that the negative influence on job satisfaction is higher if the status quo represents the least-preferred form of organizing (as opposed to the second-best alternative). Thus, we hypothesize:

H1: *Job satisfaction is negatively related to the distance between employee preferences on team and work organization and the perceived status quo.*

7.3 METHODOLOGY

7.3.1 STUDY DESIGN AND SAMPLE

We employed the self-explicated stated preference method PCPM (Schlereth et al., 2014; Scholz et al., 2010), which stands for pairwise comparison-based preference measurement, to investigate our two research questions. This method has the advantage over other self-stated preference methods, such as discrete choice experiments (e.g., Keller et al., 2021), that it enables the analysis of preferences for each participant separately. It also requires only a few decisions per participant and thus is cognitively easy to administer because of its static cyclic design, as described in Scholz et al. (2010). In line with discrete choice experiments, all decisions are trade-off based, i.e., they exhibit a high level of discrimination.

We have conducted our study in a German organization in the financial services industry currently undergoing an agile transformation. The agile transformation started around 2016 when pilot teams first started using ASD methods in the IT department. While teams participated voluntarily first and drove the transformation bottom-up, management became more interested over time and assumed a central role in determining the course of change initiatives. At the start of 2019, adopting ASD methods was mandatory and entailed extensive changes to organizational structures and processes beyond the IT department. The data collection took place in 2021 while the organization was in the process of establishing ASD methods in cross-functional teams across the entirety of product development units. Starting in 2018, the organization issued an annual agile acceptance survey in which they captured employees' perceptions of the current state of the transformation.

The participants were generally members of agile teams or worked close to agile teams in the focal organization. The web-based questionnaire was sent out to 498 employees, and a reminder was issued two weeks after the initial invitation. Participation was anonymous. In total, 176 participants completed the questionnaire, corresponding to a response rate of 35.7%.

7.3.2 DATA COLLECTION

Our questionnaire consisted of three major parts: in the first part, we assessed participants' preferences for team and work organization using PCPM (Schlereth et al., 2014; Scholz et al., 2010) as an instrument

from marketing research to evaluate complex products. PCPM builds on systematically chosen paired comparisons to evaluate complex products or services. The appeal of this method is that it uses analytic hierarchy process techniques to infer the decision in paired comparisons that a participant has not evaluated. Thus, this method enables individual participants' preference analysis without exhausting the survey. We have chosen PCPM as an instrument to measure preferences in our study, as the multitude of characteristics makes the decision between complex products similar to a decision between traditional, hybrid, or agile work organization. Further, it allows us to gain insights into how different factors or dimensions of work organization influence employee preferences.

We measure five dimensions of team and work organization: team organization (the manner in which teams and managers share responsibilities for team-internal processes), task planning (the timeframe and flexibility of planned work items), division of tasks (the manner in which team members share responsibilities for individual work items), requirements engineering (the entity that represents the customer and influences prioritization) and team composition (the degree to which teams are cross-functional). For each dimension, participants could choose between three forms – a traditional, hybrid, or agile form of organizing. The dimensions were defined as follows: first, characterizations of ASD from both practitioners (e.g., Beck et al., 2001; Digital.ai, 2021) and scientific studies (e.g., Cockburn & Highsmith, 2001; Dybå & Dingsøyr, 2008; Nerur & Balijepally, 2007) were gathered and sorted by themes. The themes were refined and reorganized until we could form a set of dimensions and their three forms. The dimensions and forms were then validated by scholars well-versed in research on ASD and a group of practitioners. We integrated their feedback into a final version of the dimensions and forms. We paid close attention to the wording of the forms in this step: our goal was to describe the forms in as few words as possible to avoid a high dropout rate in the PCPM part of our survey. In this process, we eliminated a sixth dimension focusing on documentation practices from the final set because it was discussed controversially. Table 7-1 summarizes the resulting five dimensions and forms.

	Traditional	Hybrid	Agile
Team organization	Organized by the supervisor or project manager, no involvement of the team	Organized by the supervisor or project manager, with the involvement of the team	Organized by the team itself, with no involvement of supervisor or project manager
Task planning	Long-term planning, no changes anticipated	Long-term planning, changes anticipated	Short-term planning, changes anticipated
Division of tasks	Strictly separated tasks	Often shared responsibility for tasks	Always shared responsibility for tasks
Requirements engineering	Mainly from internal stakeholders	From both internal stakeholders and customer feedback	Mainly from customer feedback
Team composition	All team members with similar functional background	Mainly team members with similar functional background, some exceptions	Team members with very different functional backgrounds

Table 7-1. Dimensions and forms of team and work organization.

The preference measurement proceeded as follows: the participants performed an initial rating per dimension on a 11-point rating scale: they chose their most and least preferred alternative form (traditional, hybrid or agile), which were then assigned the highest and lowest rating. They then rated the remaining form relative to the most and least preferred form. In a second step, participants were provided with ten pairwise comparisons: for each comparison, participants were asked to imagine a scenario in which they could choose between two projects. The project characteristics differed in one aspect: for each dimension in the pair, the most preferred form was chosen instead of the least preferred form. Following Scholz et al. (2010), participants had to decide on a 7-point scale, in which dimension the change from the least to the most preferred form was more important. Thereby, we reduced the number of pairwise comparisons by using the two static cyclic approaches, as proposed in Scholz et al. (2010). We also asked participants for their perception of the status quo: for each dimension, participants were asked to indicate which form of organizing was currently practiced in their work environment. We assessed the status quo for each of the five dimensions separately – as opposed to a single-item question on the work mode of the participant's team – to account for differing modes of organizing per dimension since a team is seldomly fully practicing agile, hybrid, or traditional forms of organizing.

In the second part of our survey, we assessed participants job satisfaction and turnover intention. For job satisfaction, we chose a single-item measure ("How satisfied are you in your current job?") rated on a 7-point Likert scale. Prior research has concluded that a single-item measure provides adequate reliability and validity while avoiding survey fatigue and high dropout rates (Dolbier et al., 2005).

Similarly, we used single "yes-no" questions to assess both internal and external turnover intention. Participants were allowed to provide no answer to the two questions.

In the third part of the survey, participants provided their age, gender, education level, employment form, organizational unit, and job title. We implemented and executed the questionnaire using the online survey platform DISE (Schlereth and Skiera 2012).

7.3.3 DATA ANALYSIS

We calculated the preferences and importance weights for the five dimensions of work and team organization, using the analytical hierarchy process, respectively eigenvector technique as described in Scholz et al. (2010). Then, we tested whether the importance weights per dimension differed depending on participants' age and job titles using t-tests.

Further, we used the detailed PCPM results to calculate two variables manually: First, we analyzed which form of organizing was chosen as the most preferred alternative on average. Therefore, we coded the traditional form as 1, hybrid as 2, and agile as 3. We calculated the mean of the most preferred form across dimensions, resulting in a value between 1 and 3. We refer to this variable hereafter as *BestMean*. Then, we assessed how the most preferred form of team and work organization (traditional, hybrid, or agile) compares to the perceived status quo across all dimensions. We, therefore, calculated the distance (*DistanceMean*) between preference and status quo as a value between 0 (no distance; most preferred form is status quo) and 1 (highest distance; least preferred form is status quo).

We used these variables to answer our second research question and test our hypothesis. Specifically, we performed linear regressions to evaluate how the degree to which preferences and perceptions match (DistanceMean) relates to employees' job satisfaction.

7.4 FINDINGS

7.4.1 PARTICIPANT DESCRIPTIVES

In the following, we present demographic statistics on our participants. Of all 176 participants, a majority is male (63.6 percent), 33.5 percent indicated that they are female, and 2.8 percent chose the option "other". Most participants were between 45 and 54 years old (46 percent), 23.3 percent between 35 and 44, 10.8 percent were 34 or younger, and 19.9 percent were 55 years old or older. Most participants were employed full-time (89.8 percent). Over two-thirds of the participants (70.5 percent) worked in the IT department, while all other business units ranged between 0.6 and 8 percent. Most participants (84.1 percent) are team members (software engineers, specialists, business analysts, and Scrum-specific roles). In comparison, 7 percent worked in some form of management role and 8.5 percent of participants chose the option "other".

7.4.2 PREFERENCES ON TEAM AND WORK ORGANIZATION

The survey included two tasks to assess the validity of participants' preference measurement results. For the first task, we asked participants to pick one of four graphs depicting importance weight distributions between the five dimensions of team and work organization. While one of the graphs was based on the actual results of the PCPM, three other graphs were generated randomly. Overall, 62.5 percent of the participants chose the correct graph. Overall, this is in line with the hit rates of prior studies using PCPM and outperforms several alternative self-explicated approaches for preference measurement (Schlereth et al., 2014). For the second validation task, we presented the correct graph and participants were asked to indicate on a 7-point scale how well the graph reflected the importance they attach to each of the five dimensions. On average, participants rated the quality of the importance rates as comparatively high (mean: 5.03). The results of the second validation task also indicate that the importance weights are valid and very similar to validation task success in prior PCPM studies (Schlereth et al., 2014).

Table 7-2 presents the importance weights of the five dimensions of team and work organization as determined by PCPM. The importance weight values add up to 1 and can thus be interpreted as percentages. Overall, participants considered team organization to be by far the most important dimension (0.268), followed by requirements engineering (0.199). The two least important dimensions are the way tasks are divided between team members (0.176) and the degree to which teams are cross-functional (0.175).

Dimension	**Mean**	**Std.**
Team organization	0.268	0.136
Task planning	0.182	0.110
Division of tasks	0.176	0.102
Requirements engineering	0.199	0.136
Team composition	0.175	0.101

Table 7-2. Dimension importance weights.

Table 7-3 summarizes the participants' preferences on the form in which team and work organization are implemented. The mean ratings range from 0 to 10, with 10 being the highest possible value.

Dimension	Mean rating per form		
	Traditional	**Hybrid**	**Agile**
Team organization	1.26	8.09	**8.72**
Task planning	3.35	**8.52**	6.56
Division of tasks	5.15	**7.84**	5.08
Requirements engineering	2.65	**9.81**	6.49
Team composition	3.51	6.97	**7.48**

Table 7-3. Preferences for the form of team and work organization.

Overall, there is no dimension in which a traditional form of organizing is preferred. Nevertheless, the other side of the spectrum – an agile form of organization – is only preferred in two dimensions: team organization (i.e., a team organizes itself, with no involvement of supervisors or project managers) and team composition (i.e., cross-functional teams). Participants, on average, preferred a hybrid approach for task planning, the division of tasks, and requirements engineering. Interestingly, a traditional form of dividing tasks (i.e., strictly separated tasks) is preferred over an agile approach (i.e., shared responsibilities), while the opposite is true for all other dimensions. For all dimensions besides the division of tasks, the distance between the rating for the most preferred and the second-most preferred form – in all four cases a hybrid and an agile form – is much smaller than the distance to the least preferred alternative (traditional form).

In Table 7-4, we present participants' perception of the status quo form of organizing that is currently practiced in their work environment. Overall, the preferences and perceptions of the status quo match for two dimensions: a hybrid approach is preferred and currently perceived as practiced for task planning and the division of tasks. Most participants indicated that their work environment is organized in a hybrid form for both team organization and team composition, while an agile approach is preferred on average. Nevertheless, the mismatch between the preferences and the perceived status quo is relatively small as only a very small percentage of participants indicated that their work environment currently follows a traditional approach as the least preferred form (6.3 and 13.1 percent). Concerning the dimension of requirements engineering, the mismatch is most profound. Most participants indicated that they currently practice a traditional approach (60.2), which had an overall low preference rating. This mismatch is especially noteworthy since requirements engineering had the second-highest importance weight across the five dimensions (see Table 7-2).

Dimension	Perception of status quo (in percent)		
	Traditional	**Hybrid**	**Agile**
Team organization	6.3	**59.1**	34.7
Task planning	11.9	**55.1**	33.0
Division of tasks	26.1	**67.0**	6.8
Requirements engineering	**60.2**	38.1	1.7
Team composition	13.1	**48.3**	38.6

Table 7-4. Perceptions of the status quo.

7.4.3 HYPOTHESIS TESTING FOR EFFECTS OF PREFERENCES ON JOB SATISFACTION

We created and inspected a scatterplot to ensure that a linear relationship between our dependent and independent variables exists. We then tested our hypothesis for the second research question with linear regression. We assessed the influence of our independent variable (DistanceMean) on job satisfaction. Since our sample size is large (n = 176), we do not need to test for normality. Table 7-5 summarizes the results of our analysis.

Overall, the regression was statistically significant ($R2 = 0.02$, $F(2, 175) = 4.31$, $p = 0.04$). We found a significant negative relationship between DistanceMean and job satisfaction ($\beta = -0.98$, $p = 0.039$). The results indicate that a larger distance between the preferred and perceived characteristics of team and work organization leads to lower job satisfaction. Thus, H1 is supported.

Variable	Unstand.	Stand.	Std.
Constant	5.74***		
DistanceMean	-0.98*	-0.155*	0.215
R^2	0.024		
Corrected R^2	0.019		
F (df=2, 175)	4.31*		
*p < 0.05; **p < 0.01; ***p < 0.001			

Table 7-5. Influence on job satisfaction.

7.5 DISCUSSION

Our objective in this study has been to shed light on changing team and work characteristics in agile transformations, employees' perception of these changes, and their influence on job satisfaction. Using

PCPM as a well-established instrument for evaluating complex products helped us make the concept of agile transformations more tangible by explicitly formulating five dimensions related to agile approaches' impact on work design. The research process resulted in both importance weights for our five dimensions of team and work organization and average preferences for traditional, hybrid, or agile forms of organizing.

Concerning our first research question, we identified team organization as the most important dimension. Combined with the high preference rating for both a hybrid and an agile form of team organization, we conclude that employees attach great importance to attaining a degree of self-organization and a greater say in planning the team's work. For the dimension of team composition, we find a similar picture. Nevertheless, while employees generally prefer a cross-functional team, this aspect is less relevant. In the remaining three dimensions – task planning, division of work, and requirements engineering – the agile form of organizing is overall rated lower than the hybrid model. Thus, we note that an agile transformation may be more popular among employees if some compromises between traditional and agile forms of organizing – hybrid approaches – are implemented regarding these three dimensions. Hybrid approaches appear to be the least controversial options as they are always rated as the best or (close) second-best option. As such, organizations could start their agile transformations by adopting hybrid approaches first and adapting as they see fit, because the choice of a hybrid form of organizing, initially at least, would put off employees less that prefer either an agile or a traditional approach.

Concerning our second research question, we could find supporting evidence that a higher distance between employee preferences and perceptions of team and work organization leads to lower levels of job satisfaction. This finding particularly serves as a reminder for organizations that they may want to take their employees feedback on team and work organization into consideration and adjusting the forms of organizing according to the work force's preferences. In this way, organizations can increase job satisfaction and respective related positive outcomes such as a reduced turnover rate or higher performance.

In this paper, we have analyzed employees' preferences for team and work organization in agile transformations and their effect on job satisfaction. This study represents the first part of a larger research projects. Moving on from here, we intend to shed light on the relationship between a general preference for agile, hybrid, or traditional forms of organizing and job satisfaction for organizations in the midst of an agile transformation. Our analysis of the status quo suggests that the focal organization does not exclusively use agile forms of organizing yet. This could be a sign that the organizational change is not progressing as fast or rigorously as proponents of agile forms of organizing might prefer. We found further evidence on this claim in the comments that participants could enter at the end of the

survey. Some comments stated that while participants generally preferred agile forms of organizing, they did not like the form of ASD that is practiced in their organization. Further research into this dynamic may provide new insights on how to engage especially those employees that support agile transformation and may thus act as drivers for change.

Currently, our study is limited by the fact that we only have data on employee preferences at a single point in time. Our analysis would benefit greatly from a longitudinal study that assesses how preferences and perceptions of the status quo change over time. Additionally, our data source is a single organization. While this allows us to control for organization-specific factors such as the industry, business model, or market segment, our hypothesis and PCPM results must be tested in additional contexts.

Further, a qualitative research approach could enrich our findings and help us understand, on the one hand, why and in which time frame the focal organization did change the form of organizing, and on the other hand, why employees perceive and prefer the forms of organizing as they do.

7.6 CONCLUSION

This study ought to deepen our understanding of how agile transformations influence an organization's workforce. Notably, we wanted to generate a more fine-granular view of the introduction of ASD methodologies and the importance that employees attach to certain aspects of working agile. We did so by successfully adopting an instrument from marketing research and translating it for our context – not the evaluation of products or services, but of team and work organization and its dimensions. Thereby, we answered our first research question and created an early warning system for organizations that currently undergo an agile transformation: our tool can be used to sense employee resistance and skepticism early on so that organizations can react in a timely and targeted manner. In a second step, we built upon the PCPM results to evaluate how perceptions and preferences of team and work organization in agile transformations influences job satisfaction. Further research is necessary to enrich our findings and test our hypothesis in different contexts.

8. STUDY TWO

Title	How Agile Software Development Teams are Led and Lead Themselves – A Literature Review on the Duality of Agile Leadership
Author(s)	Mareike Fischer, University of Cologne, Germany, mareike.fischer@wiso.uni-koeln.de.
Abstract	Agile software development (ASD) methods are widely applied today as organizations expect to gain flexibility and foster innovation. Since one of the basic problem-solving mechanisms of ASD is a cross-functional, self-organizing, and empowered team at its core, the shift from traditional to ASD approaches requires fundamental changes to management and governance processes and structures. Especially among practitioners, the term "agile leadership" is popular to describe the new demands for formal and informal leaders in an agile environment. In research, the concept is increasingly prevalent and connected to a variety of established leadership theories, but it is not yet consistently conceptualized. This study seeks to integrate existing definitions into a comprehensive model that comprises both a team-internal and team-external perspective of agile leadership. Therefore, a systematic literature review is performed to gather and assess prior literature on how agile leadership materializes in practice. A first iteration of the concept is developed, and future research directions are summarized.
Keywords	Agile software development, Leadership, Agile leadership, Agile management, Literature review.
Publication status	Presented at the Hawaii International Conference on System Sciences 2025.

8.1 INTRODUCTION

The advent of agile software development (ASD) methodologies in the 1990s has fundamentally changed the organization of team and work processes in various companies over the last three decades. Mostly starting in IT departments around the globe, ASD introduced a customer-centric, feedback-driven software development process based on frequent iterations, openness to changes, and continuous delivery of working software (Highsmith & Cockburn, 2001). This approach has helped organizations adjust to rapidly changing market conditions and customer demands (Dybå & Dingsøyr, 2008; Laanti et al., 2011). A crucial precondition to achieving these desired outcomes is that organizations build cross-functional, self-organizing ASD teams (Cockburn & Highsmith, 2001).

Establishing ASD teams requires a fundamental change to the way in which work is organized (Moe, Dingsøyr, & Dybå, 2009): the subjects of management and leadership are no longer individual employees but teams that function as a unit. These teams are expected to manage themselves, make decisions, and require a high degree of empowerment in doing so (Cockburn & Highsmith, 2001). As a result, management responsibilities no longer necessarily rest with designated people but are shared across hierarchy levels and functions (Moe et al., 2010).

The requirements to manage agile teams are often summarized under the notion of agile leadership (e.g., Andrias et al., 2018; Modi & Strode, 2020). Among practitioners, the term is well-known and widely used – for example, popular ASD methodologies such as SAFe (Scaled Agile Framework) use the term agile leadership in their official handbook (Scaled Agile Inc, 2023) and a variety of consultancies offer trainings and certifications on how to become an agile leader. Nevertheless, the concept is neither consistently defined in practice nor has it yet been formally conceptualized and explored in research. Two recent literature reviews on agile leadership (Modi & Strode, 2020; Theobald et al., 2020), stress the importance of establishing a strong theoretical foundation of the concept. Furthermore, they highlight that a myriad of terms and constructs are strongly connected to agile leadership but are neither used in a consistent manner nor integrated into one comprehensive, parsimonious model. Thus, this study seeks to answer the following research question:

RQ: "How have aspects of agile leadership been defined in prior research?"

In the first step, a systematic literature review was performed to identify relevant studies that have covered aspects of the phenomenon of agile leadership. In the second step, the respective definitions of agile leadership have been extracted and analyzed in terms of common characteristics and discrepancies between the applied concepts. This formed the basis for a subsequent aggregation of the relevant components into an initial construct of agile leadership, which incorporates both team-internal and

team-external leadership aspects. Lastly, promising directions for future research endeavors have been identified.

The remainder of this paper is structured as follows. In Section 2, the foundations of ASD and team leadership opposed to traditional leadership theories are recapitulated. Section 3 summarizes how the literature review was performed to answer the research question. In Section 4, concepts that have been associated with agile leadership in prior research are introduced and integrated. Finally, Sections 5 and 6 discuss how the results of the literature review can be used to build an initial comprehensive construct of agile leadership and subsequently refine it.

8.2 THEORETICAL BACKGROUND

8.2.1 CHARACTERISTICS OF AGILE SOFTWARE DEVELOPMENT

The shortcomings of traditional software development (SD) motivated a group of professionals in the 1990s to implement new, more lightweight approaches to developing software. In 2001, they established the term agile to describe the commonalities of these methods and summarized their fundamental beliefs in the Agile Manifesto, consisting of associated values and practices (Beck et al., 2001). As a common theme, the frameworks and practices that were developed aimed to counteract the inflexibility, heaviness, and late availability of finished work that is commonly associated with sequential approaches (Mahadevan et al., 2015). Thus, in ASD (1) individuals and interactions are more important than processes and tools, (2) working software matters more than comprehensive documentation, (3) customer collaboration should be preferred over contract negotiation, and (4) responding to change over following a plan (Beck et al., 2001).

The ultimate goal of ASD is to achieve agility in SD processes. Conboy (2009) defines agility as a team's ability to "rapidly or inherently create change, proactively or reactively embrace change, and learn from change" (p. 340). ASD methods constitute a means to facilitate agility by providing practices to work in short iterations and receive and implement feedback frequently to establish a constant process of improving the team's product and internal processes (Beck et al., 2001). One of the central preconditions of most ASD methods to establish agility is the introduction of cross-functional teams that comprise all skills that are required to deliver functioning products to customers (Cockburn & Highsmith, 2001). To do so in a timely fashion, the teams require empowerment to define their own working methods, make informed decisions, and proactively drive their product's development (Highsmith & Cockburn, 2001).

Today, the most popular agile methods – such as Scrum , Kanban, or eXtreme Programming (XP) (e.g., Martin, 1991; Poppendieck & Poppendieck, 2003; Schwaber & Beedle, 2002) – are widely popular in industry and nowadays often the default approach in IT departments and SD projects (Digital.ai, 2023).

In addition, ASD approaches are now often applied on a larger scale instead of single, isolated teams. The implementation of ASD teams in large numbers and with many team members while still adhering to the fundamental principles of agility is challenging and promising at the same time (Gerster, Dremel, Kelker, et al., 2018; Kalenda et al., 2018).

8.2.2 AGILE SOFTWARE DEVELOPMENT AND TEAM LEADERSHIP

Traditionally, the concept of leadership describes the roles and responsibilities that a formally appointed manager takes on in an organization (Hunt, 2004). Although the term is often used synonymously with the notion of management, leadership is commonly associated with activities such as "initiating change", "giving directions" and "motivating employees" while management is more about the operational aspects of "planning", "organizing" and "controlling" (Hunt, 2004). One of the most dominant concepts of leadership – transformational leadership – stems from the work of Bass (1999) and Avolio (2010) and is part of the full range leadership model, differentiating transformational leadership from its presumed counterparts, transactional and laissez-faire leadership. While laissez-faire describes the absence of leadership and transactional leadership builds on the premise that compliance is achieved through a system of punishments and rewards (B. J. Avolio, 2010), transformational leadership is characterized by the so-called "four I's": idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation (B. J. Avolio et al., 1991).

These traditional or generic theories of leadership have long dominated the discussion on guidance and influence in the organizational context. Nevertheless, over the past two decades, a variety of new leadership theories have been proposed to cover aspects of leadership that could not be explained using the traditional models, for example authentic, ethical, servant, or pragmatic leadership (Anderson & Sun, 2017). Besides the discussion on how much variance these new leadership theories explain beyond transformational leadership (Hoch et al., 2018), the generic leadership theories have limited potential to help us understand leadership in ASD teams because none of them explicitly cover team-related aspects of leadership (Knippenberg, 2017). This focus on leading individuals instead of teams is represented in the existing body of knowledge on leadership as reported by DeChurch et al. (2010).

ASD teams rely on a system in which "decentralized independent individuals interact in self-organizing ways" (Highsmith & Cockburn, 2001), which is at odds with the traditional view of leadership with designated leaders. Newer, team-specific approaches to leadership concepts emerged over time that seem more applicable to ASD teams as self-organizing, autonomous units. In his seminal work on team leadership, Knippenberg (2017) highlights the promising approaches of empowering leadership and shared leadership and their advantages in explaining how leaders not only strengthen and encourage team members, but actively turn over decision-making power and responsibilities to teams.

8.3 METHODOLOGY

8.3.1 DATA COLLECTION

To gather relevant leadership concepts that have been analyzed in connection with ASD teams, a systematic literature review based on the recommendations of Webster & Watson (2002) and vom Brocke et al. (2015) was performed. Accordingly, the selected search scope and time frame, the keywords and resulting search string, as well as inclusion and exclusion criteria were specified as follows. The search was carried out assisted by the meta-search tool Litsonar (http://litsonar.com). The tool supports the selection of keywords, databases, and publications and subsequently creates search strings that can be entered in the advanced search field of the selected scientific databases.

The challenge of a literature review on agile leadership lies in the inconsistent wording and breadth of potentially relevant publications. Thus, the search was limited to studies that had a clear focus on ASD teams (instead of cross-functional, empowered, or self-organizing teams in general) and were published in the field of information systems (instead of general business or management research).

As a publication filter, the 109 journals of the AIS top list were selected in the first step. In addition, the most important conferences in the information systems field (ICIS, ECIS, AMCIS, PACIS, HICSS) were added manually since research on agile leadership is relatively new and relevant studies are often presented at those conferences before they are published in the selected journals. To cover all selected publications, the following databases were searched via the generated search strings: EBSCOhost, IEEEXplore, Science Direct, ProQuest, ACM Digital Library, and AISeL. In addition, manual searches for non-covered publications were carried out in several cases. Further, the search results were limited to peer-reviewed studies published between 2000 and 2024.

The search string was iteratively refined to best represent the topic of agile leadership. As the research focus on this topic is often relatively new and scarce, the initial pilot search consisted of the terms agil* and leader*. Scanning the results of this search led to an addition of ASD methods to the search string as some studies used the term of the specific practices that were analyzed instead of the general term “agile”. Management as an alternative term to leadership was not selected as the search delivered far too many results because of the prevalence of the term “agile project management”. This resulting search string was used in the process:

> *(agil* OR scrum OR “scaled agile” OR Kanban OR xp OR extreme programming) AND leader**

The search resulted in a total of 359 papers. After screening the abstracts of the papers, 87 papers remained that were further evaluated in the next step. Any remaining papers were downloaded and scanned to evaluate their relevance for defining the term of agile leadership. Many studies only

considered leadership as a partial topic of their research and did not specify a definition of how agile leadership is applied in practice. After excluding those studies, only 11 papers remained. In the following, a backward and forward search was performed that led to a total of 18 papers that were analyzed in detail.

8.3.2 DATA ANALYSIS

For the data analysis process, the papers were read in full by the main author and information on the following questions was extracted: author, year of publication, title, outlet, research question, method, findings, and relevant theories from leadership research that had been applied. During the analysis, it was noticeable that one part of the studies interpreted the phenomenon of agile leadership as a process that solely happens within the ASD teams, while other either took management personnel outside of the team into consideration as well, or solely analyzed team-external management of ASD teams. This categorization seemed especially interesting since it reflects a new view on leadership as a team-internal process, where team members take on leadership roles. At the same time, studies that took team-external processes into consideration acknowledged that the reality in which ASD teams operate in an organization seldomly provides a fully autonomous standing regardless of the optimal conditions that should or could exist. Thus, the categorization of team-internal and team-external agile leadership was added to the study overview. In addition, most papers specified the individuals or roles that they considered for potential leaders, such as team members, Scrum Masters, Product Owners, managers, or coaches.

Next, the definitions or concepts that the studies used to describe or analyze agile leadership were gathered and compared in terms of common themes and remaining discrepancies. An initial concept model for agile leadership was developed based the findings of the literature review.

8.4 FINDINGS

8.4.1 OVERVIEW OF AGILE LEADERSHIP CONCEPT

Figure 8-1 depicts the leadership relationships that potentially exist within an ASD team and its environment. This understanding of agile leadership does not position the ASD team outside of or autonomous from an organization but embedded in existing structures and hierarchies. Not only do team members influence and guide each other, but they are also possibly subjects to leadership from managers of different hierarchy levels – individually or the team as a collective.

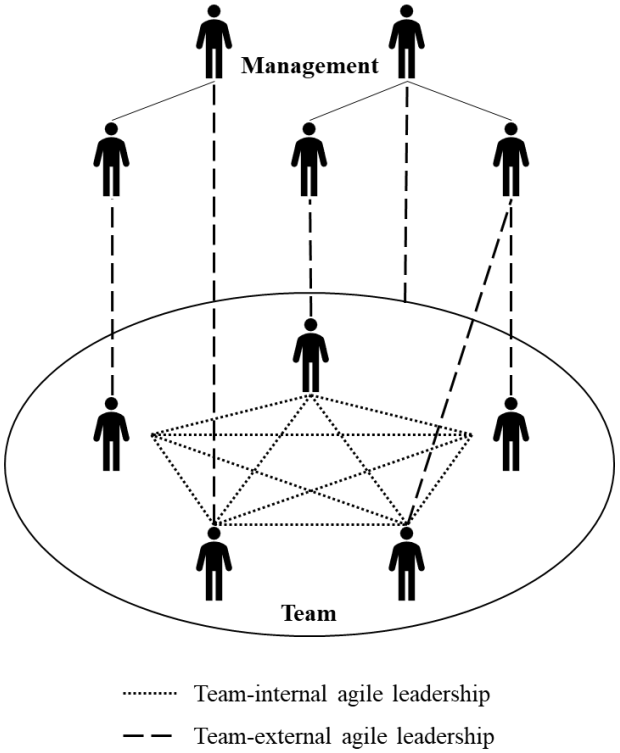


Figure 8-1. Team-internal and team-external perspective of agile leadership.

Likewise, the term agile leadership is not explicitly defined in prior research, but instead it is often associated with a variety of established management and leadership concepts. The concepts can be divided into two main categories or dimensions:

- theories on the manner in which a team organizes itself, makes decisions, allocates work and responsibilities, and
- theories on how a team is externally guided, controlled, staffed, and supported by functional and disciplinary managers.

In the following, the two categories will be referred to as team-internal and team-external perspectives of agile leadership.

Table 8-1 summarizes the results of the literature review. Overall, five studies exclusively look at team-external agile leadership, eight studies focus on only team-internal agile leadership and five studies analyze both aspects. 12 papers build upon an existing leadership theory, most often self-management (or organization) and shared leadership.

Table 8-1. Definitions of agile leadership in prior research.

Source	Team-internal	Team-external	Specified Leaders	Relevant Leadership Concepts
Hoda et al. (2013)	x	(x)	Team members Coach	Self-organization
Moe et al. (2015)	x	(x)	Coach (Team Leader) Team members	Self-management Shared leadership
Andrias et al. (2018)	x	x	Team members Managers	-
Dubinsky & Hazzan (2010)	x	x	Change leader (Team members or managers)	Ad-hoc leadership
Gren & Ralph (2022)	x	x	Scrum Master Coach Managers	Self-management Shared leadership
Augustine et al. (2005)		x	Managers	Adaptive leadership
Bäcklander (2019)		x	Coach	Enabling leadership
Bonner (2010)		x	Project managers	-
Geffers et al. (2024)		x	Managers	-
Yang et al. (2009)		x	Project managers	Full range leadership model
Moe, Dingsøyr, & Dybå (2009)	x		Scrum Master Team members	Self-management
Moe et al. (2010)	x		Scrum Master Team members	Self-management Team leadership
Moe, Dingsøyr, & Øyvind (2009)	x		Scrum Master Product Owner Team members	Shared leadership
Przybilla et al. (2020)	x		Team members	Self-organization Emergent leadership
Spiegler et al. (2019)	x		Scrum Master Team members	-
Srivastava & Jain (2017)	x		Scrum Master Team members	Situational leadership Rotational leadership Shared leadership Expert leadership Super leadership
Spiegler et al. (2020)	x		Scrum Master Team members	-
Xu & Shen (2018)	x		Scrum Master Product Owner Team members	-

Research that examined the role of specific roles defined in ASD frameworks, in particular Scrum Masters and Product Owners, counts towards team-internal agile leadership in this study. This is

because employees in these roles work with the other members of the team daily, are usually assigned to a single team, and have very clearly defined responsibilities. Their skill set and capabilities are essential in achieving the cross-functionality of an ASD team that is required to deliver value. Another role that is assessed in several studies is the agile coach. The categorization of those studies is less clear: while many coaches often work very closely with a team, they are mostly in a more advisory capacity, are not responsible for operational tasks, and are sometimes employed by external firms.

8.4.2 TEAM-INTERNAL AGILE LEADERSHIP

Research on leading and managing agile teams has focused on team-internal processes for a long time as ASD methodologies by definition highlight the necessity of self-organization and self-leadership (Beck et al., 2001). In addition, ASD practices were particularly applied in small, innovative, and IT-related new product development projects first, often in start-ups or specialized, autonomous subunits before they have become increasingly popular in IT departments of larger, more traditional organizations and even beyond the IT context (BitkomResearch, 2018; Digital.ai, 2023).

The literature review on team-internal agile leadership resulted in three main perspectives: shared (or rotating) leadership, self-management (i.e., team autonomy or empowerment) and newer concepts such as adaptive or emergent leadership.

Shared leadership is defined by three characteristics: (1) lateral influence among peers, (2) the occurrence as an emergent team phenomenon, and (3) the dispersion of leadership roles and influences across team members (Zhu et al., 2018). The concept is strongly related to the fundamental characteristics of ASD teams as cross-functional, autonomous units (Cockburn & Highsmith, 2001). A team's desire to plan and manage its own work makes it necessary that traditional management responsibilities lay with team members. Due to the variety of team member skills, functional leadership is organically assigned to the person with the most knowledge in one distinct field.

Shared leadership and self-management – the second theme of team-internal agile leadership – are not mutually exclusive but rather build on one another. Leadership cannot be shared or distributed within a team if the team is not allowed or does not have the ability to do so. Nevertheless, self-management does not necessarily result in shared leadership and vice versa since other factors such as the internal and external team environment shape team processes and norms as well (Carson et al., 2007). Another concept that is often referenced in connection with self-management is team empowerment (Kirkman & Rosen, 1999). Team empowerment is also linked to shared leadership (as well as self-management), but it is rather a motivational concept than a leadership theory that explains how high levels of a team's perception of its meaningfulness, impact, potency, and autonomy influence task motivation (Carson et al., 2007).

Other concepts such as emergent or adaptive leadership are the third theme of team-internal agile leadership (e.g., Augustine et al., 2005). These theories help to explain how a state of shared leadership is reached, but they only cover certain parts of the characteristics of shared leadership (Carson et al., 2007). For example, emergent leadership theory is about the transition of a few (mostly one or two) individuals on a team into an unofficial leadership role. Thus, the individuals have lateral influence among peers, but the theory is rather an individualistic concept than a team-based concept and only few, not many, share influence and leadership (Zhu et al., 2018). Consequently, this study argues that including shared leadership in the concept of agile leadership sufficiently covers the team processes and states that newer concepts such as emergent and adaptive leadership would explain.

8.4.3 TEAM-EXTERNAL AGILE LEADERSHIP

As ASD methodologies gained popularity over the last three decades and following the introduction of scaled agile practices, there are more and more ASD teams in a variety of organizations and functional departments today (Digital.ai, 2023). As a result, those teams are increasingly intertwined with team-external managers and leaders. Since ASD methodologies and frameworks typically focus on team-internal processes and structures, there is no blueprint for how external managers fit into and support the ASD team. To gain a better understanding of team-external agile leadership, research has started to focus on the roles and responsibilities of functional and disciplinary managers in relation to ASD teams over the past years. The analysis of prior research an agile leadership has resulted in a set of five clusters of behaviors regularly associated with team-external agile leadership: (1) providing vision and context, (2) encouraging (team) self-management, (3) fostering team work and conflict resolution, (4) serving others and prioritizing team success, and (5) developing and supporting other leaders (e.g., Andrias et al., 2018; Augustine et al., 2005; Geffers et al., 2024; Gren & Ralph, 2022). While some of those roles and responsibilities are in line with generic leadership approaches such as transformational leadership (e.g., “providing vision and context”, or “developing and supporting other leaders”) others build upon the notion of team leadership (Knippenberg, 2017) and explicitly go beyond the notion of one or more formal appointed leaders as entities that hold power and may or may not decide to share it – rather, teams are expected to self-manage and leaders support them in developing the capabilities to do so. The distinction between generic leadership approaches and team-specific leadership approaches is essential to understanding the way in which agile leadership differs from more traditional leadership models.

Transformational leadership and servant leadership are two examples of generic leadership approaches that have been considered in prior research on agile leadership. For example, Yang et al. (2009) have found that a transformational leadership approach is connected to ASD teams’ success. Similarly, servant leadership appears to moderately correlate with team effectiveness, especially for formally appointed leaders in ASD teams (Holtzhausen & de Klerk, 2018). These generic leadership approaches

– especially positive leadership approaches, such as transformational, ethical, or authentic leadership – have dominated the debate on leadership over the past decades. These approaches have regularly been connected to a variety of positive outcomes (e.g., increased employee trust, motivation, satisfaction, and performance) (Hoch et al., 2018). Nevertheless, while generic approaches have the advantage of being applicable to leading both individuals and teams, they cannot address the specific requirements of team leadership (Knippenberg, 2017). That is especially relevant for self-organizing or empowered teams (such as ASD teams), because many tasks that are traditionally carried out by formal managers are now part of the responsibilities of a team (Cooney, 2004).

This is where team-specific leadership approaches come into play. Empowering leadership is one of the central team-specific approaches, focusing on giving team members the skills, opportunities and knowledge to take on leadership responsibilities themselves (Ahearne et al., 2005; Chen et al., 2007). As opposed to positive leadership approaches, empowering leadership seeks to actively shift power away from a designated leader and encourage teams to take on these powers instead (Knippenberg, 2017). In line with team empowerment, which is the intended outcome of empowering leadership, the approach comprises measures to (a) enhance the meaningfulness of work, (b) foster participation in decision-making, (c) express confidence in a team's high performance, and (d) provide autonomy from bureaucratic constraints (Ahearne et al., 2005). The concept is strongly linked to agile leadership at first glance as ASD teams are described as empowered teams since the advent of ASD methodologies (Beck et al., 2001) and prior research has yet discussed the concept of empowering leadership in connection with ASD (Xu & Shen, 2015, 2016).

In his prior work on team leadership, Knippenberg (2017) has called for further research on the link between and interplay of shared leadership (as a team-internal process) and empowering leadership (as a team-external process). The context of organizations that apply ASD methodologies on the team levels lends itself to a detailed analysis particularly through the lens of shared and empowering leadership which is why the first version of an agile leadership concept will be heavily influenced by the two aforementioned concepts.

8.5 DISCUSSION

8.5.1 CONTRIBUTIONS TO RESEARCH

Figure 8-2 summarizes the concept model that emerges from this study's literature review. Agile leadership is defined as a three-level concept. The first level is named "agile leadership", and the second level comprises the two sub-dimensions of agile leadership, namely "team-internal agile leadership" and "team-external agile leadership". Both team-internal and team-external aspects are required to establish agile leadership simultaneously. ASD teams cannot self-organize and share leadership internally if external management does not actively encourage team-internal organization and decision-

making and give up management powers and responsibilities themselves at the same time. Thus, the dimensions are logically combined with an AND-logic. The third level includes indicators for both sub-dimensions. For both team-internal and team-external agile leadership, the set of indicators can vary between samples. As a result, the indicator level is logically combined with an OR-logic.

For team-internal agile leadership, two indicators are included that need to be established for a high level of team-internal agile leadership: (1) "self-management" and (2) "shared leadership". For team-external agile leadership, five indicators have been developed based on empowering leadership. The dimensions have been extended and concretized to better reflect the context of ASD teams and incorporate additional team-external leadership theories that have been linked to agile leadership. For example, 'providing vision and context' is a way of increasing an ASD teams' perception of its meaningfulness by better understanding the organizational environment and its own contribution to the organization's success.

An intensional and an extensional definition of agile leadership has been developed to concretize and limit the understanding of the concept:

- **Intensional definition**: Agile leadership describes how managerial roles and functions are prioritized and distributed in the context of agile software development teams. Agile leadership covers both team-internal and team-external characteristics.
- **Extensional definition**: The concept of agile leadership only relates to work groups - not individuals - that apply work methods in line with the values and practices specified in the agile manifesto as well as external managers that are functionally or disciplinarily linked to the team.

The concept of agile leadership as described above has not yet been measured in prior research in its entirety. Still, the concept builds upon and combines established instruments, which have been tested for their reliability and validity extensively. In future research endeavors, the measurement instrument should be developed and tested to operationalize agile leadership. This process builds upon existing research as several relevant instruments could be integrated to assess a dual, comprehensive view of agile leadership as a both team-internal and team-external process at the same time.

For team-internal agile leadership, the defined dimensions can be operationalized as follows. First, shared leadership is usually measured via network analysis approaches. For example, network density is often calculated by asking every team member whether they perceive another team member as an individual they rely on for leadership (Carson et al., 2007). This approach is still subject to potential improvements as Zhu et al. (2018) argue that shared leadership relies on both leadership density and decentralization and a suitable operationalization should assess both perspectives. Second, there are established scales to measure self-management in surveys using Likert scales.

For example, Campion et al. (1993) have developed a three-item instrument that is very commonly used and both reliability and validity have been established. The level of team-internal agile leadership should be calculated using a sum score. For team-external agile leadership, the creation of a measurement instrument is more complex. Since existing constructs neither span all necessary dimensions to evaluate team-external agile leadership nor are specific enough for the ASD team context, a revised instrument should be developed. In addition, the instrument's reliability and validity need to be established using established scale development processes. The 12-item instrument by Zhang & Bartol (2010) to measure empowering leadership can serve as a starting point for a more refined version that can be assessed in a survey using a Likert scale. The level of team-external agile leadership should be calculated using a sum score.

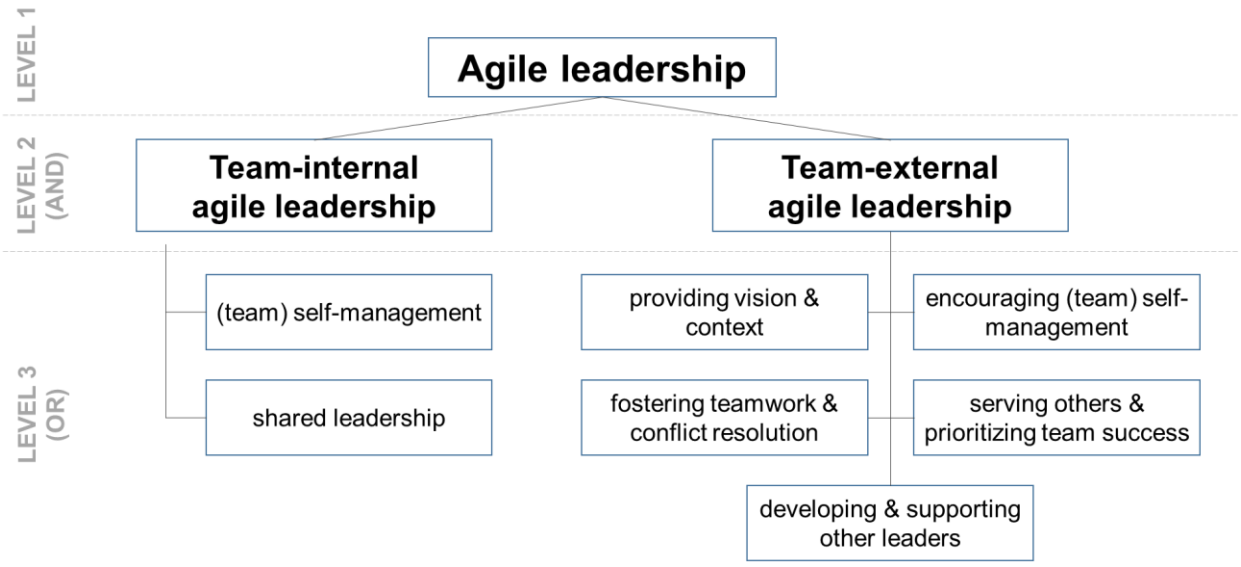


Figure 8-2. Concept model of agile leadership.

8.5.2 CONTRIBUTIONS TO PRACTICE

For organizations that are currently in the process of implementing ASD methods or have done so in the past, this study primarily serves as a reminder that agile leadership is a set of attitudes and behaviors that is relevant for both team-internal processes and traditional management positions. A good understanding of how teamwork processes as well as management support contribute to the success of ASD teams is essential for organizations to master a transformation. As stated before, the notion of agile leadership often refers to how managers need to adapt their style of leadership when working with agile teams. Nonetheless, this study has concluded that agile leadership needs to be practiced both internally and externally for ASD teams. Especially in training resources and curriculums, this finding needs to be translated into practice. It is not only required to teach managers an empowering, hands-off leadership approach, but simultaneously, teams need to be explicitly told that self-management is required from them, and they need training to be able to implement those requirements into their work

processes. Further, supporting organizational processes – e.g., planning, budgeting, or HR-related functions such as performance management – often require changes to facilitate the new approaches to decision-making and distribution of power that implementing agile leadership entails.

In addition, this study is a first step in designing a measurement instrument to assess agile leadership on a team level. Once this instrument is refined and tested, organizations can use it to identify strengths and weaknesses in their approach to introduce ASD teams and shape the environments they are working in.

8.5.3 LIMITATIONS

This study has certain limitations. First, since the literature review has strictly focused on publications that have a clear focus on information systems, it does not incorporate the extensive body of knowledge on empowering leadership in other contexts. While empowered teams do not share all characteristics of ASD teams, they certainly overlap to a large degree. Future research should analyze the findings of studies on empowering leadership and team empowerment in general in more detail so that research on ASD teams can benefit from those insights. Empowering leadership has been covered in the course of this study, but only as it was used in existing research on ASD teams.

Second, as especially team-internal leadership is often only a small part of studies on ASD teams in general, those findings may have not been considered during this literature review.

Third, there are currently several unfinished research-in-progress papers from conferences over the last years that are not yet published as completed research. Those studies should be considered for the concept of agile leadership as well when published.

8.6 CONCLUSION

Our understanding of the concept of leadership specific to teams that use ASD methods is still very limited. As ASD methods are more and more prevalent in a variety of contexts today, the need to understand how such teams can profit from effective leadership is continuously increasing. As a first step in this process, this study was performed to aggregate findings from a growing body of research on ASD teams in how those team are led and lead themselves in practice. A two-fold model of agile leadership was developed based on those insights, which conceptualizes agile leadership as a combination of both team-internal and team-external perspectives. In a next step, research on related topics from other disciplines could be integrated if possible and a measurement instrument to assess agile leadership should be developed.

9. STUDY THREE

Title	"No One Can Do it All": The (Changing) Role of External Managers for Team Empowerment in Agile Software Development Teams
Author(s)	Mareike Fischer, University of Cologne, Germany, mareike.fischer@wiso.uni-koeln.de. Christoph Rosenkranz, University of Cologne, Germany, rosenkranz@wiso.uni-koeln.de.
Abstract	Agile software development teams need a high degree of team empowerment. Yet, autonomous decision-making and self-organization are at odds with traditional command-and-control management. As more and more organizations adopt agile methods at a large scale, managers can be either a burden or a facilitator in the endeavor to achieve agility. Prior research has studied the internal processes of agile teams, but our understanding of the role of team-external managers is limited. In this research, we conducted a case study in five teams in a large organization currently undergoing an agile transformation. We developed a theoretical model of team-external management, contextual factors, and potential effects on team empowerment. We provide recommendations for practitioners and a set of hypotheses for empirical testing in future studies.
Keywords	Agile software development; Team-external management; Team empowerment.
Publication status	Presented at the European Conference on Information Systems 2023, preparing for journal submission in late 2024. Previous versions were presented at the International Conference on Information Systems 2020 and the International Research Workshop on IT Project Management 2019.

9.1 INTRODUCTION

It has been precisely two decades since the seminal work of Beck et al. (2001), which yielded the inception of the 'Agile Manifesto.' This pioneering document enunciated a set of guiding principles for software development teams, fundamentally reshaping the software engineering landscape (Beck et al., 2001). Over this epoch, *agile methodologies* such as Scrum, eXtreme Programming (XP), and the Spotify model have firmly entrenched themselves as the prevailing norm for software development practices (Baskerville et al., 2011; Digital.ai, 2023). Organizations, motivated by the imperative to harness more nimble, adaptable, and iterative approaches, have wholeheartedly embraced these agile techniques. This strategic shift is driven by the pursuit of heightened responsiveness to evolving market dynamics and customer exigencies.

The successful assimilation of agile practices has not been confined to the domain of software development alone; it has reverberated throughout a multitude of domains across all sectors (Niederman et al., 2018). The efficacious implementation of agile methodologies has fostered a multifaceted evolution, transcending the confines of individual teams and diffusing across the broader organization, encompassing all areas of work and business (Dikert et al., 2016). This transformative phenomenon has precipitated the adoption of agile styles of working on an extensive scale, inaugurating a wave of organizational "*agile transformations*" (Laanti et al., 2011; Paasivaara et al., 2018). Consequently, agile methodologies have transcended their initial confinement within software development teams, supposedly ushering in a new era of holistic organizational agility.

ASD teams require *empowerment*, comprising both autonomy and self-organization (Cockburn & Highsmith, 2001). This challenges traditional organizational structures and processes: teams make autonomous decisions and self-organize their efforts to a significant extent; the project manager's role fundamentally changes from team-directive to team-supportive (McAvoy & Butler, 2009; Remus et al,. 2019). *Team autonomy* provides individual team members and groups the power to self-organize (Hoda et al., 2013; Moe et al., 2019) and the discretion of self-direction (Dikert et al., 2016; Moe et al., 2019). In studies of teamwork, increased team autonomy has been mostly identified as positive for team performance and related factors such as job satisfaction or well-being of team members (Cordery et al., 1991; Stewart, 2006; Wall et al., 1986), especially in uncertain contexts (Cordery et al., 2010; Langfred, 2004). In sum, previous research has highlighted that the desired flexibility and adaptiveness in agile teams are reflected in higher degrees of team autonomy (Larman, 2003; Lee & Xia, 2010), self-organization (Chow & Cao, 2008; Highsmith et al., 2001; Hoda et al., 2013), self-management (Sharp & Robinson, 2004), and team empowerment (Larman, 2003; Maruping & Magni, 2012).

Even though these studies show the importance of empowerment for teams working with agile methods, they often focus on the team and team-internal processes. However, managers still exist in organizations

that adopt agile methods, and recent studies highlight the continued significance of managers in the context of empowered teams (e.g., Garvin et al., 2013; Remus et al., 2019). Nevertheless, limited guidance exists on the role of managers operating explicitly outside of teams and their control (Cram et al., 2016; Dreesen et al., 2020). Thus, the managers' role is often overlooked in research on agile transformations, although we know that management support is vital as especially middle management can either hinder or drive change and agility (Dikert et al., 2016).

Our objective with this study is to understand the role of *team-external managers* and their impact on the work of agile teams, specifically concerning team empowerment. Furthermore, in the same way that agile teams are impacted by the work of team-external managers, managers themselves operate not on a green field, but within an organizational context that encourages or confounds their actions. Consequently, we ask the following research questions: *"How do team-external managers influence team empowerment of agile software development teams (RQ1), and how do contextual factors shape the interactions between team-external managers and agile software development teams (RQ2)?"*

To answer our research questions, we use an exploratory, embedded multiple-case study design (Eisenhardt, 2011; Lee, 1989; Sarker et al., 2018). The focal cases reflect five agile teams in one case organization. We add to the body of knowledge on agile software development teams by introducing the concepts of team-external managers (TEM) and team-external management to the context of agile teams and by developing a theoretical model to explain how team-external management affects a team's empowerment. Furthermore, we identify factors in the organizational environment of a team that help us explain why TEMs choose to engage in certain sets of activities.

The remainder of the paper is structured as follows. First, we provide an overview of related work on agile teams, team empowerment, and team leadership. Next, we describe our research design. Subsequently, we present the results of our analysis. Finally, we discuss our results, implications, and limitations.

9.2 RELATED WORK

9.2.1 AGILE SOFTWARE DEVELOPMENT

Agile software development (ASD) is an umbrella term for a variety of distinct methods, such as Scrum, eXtreme Programming (XP), or Crystal (e.g., Martin, 1991; Poppendieck and Poppendieck, 2003; Schwaber, 1995; Stavru, 2014). Collectively, these approaches emphasize an iterative development model, close collaboration between stakeholders, and a lightweight approach to project documentation (Cohen et al., 2004). *Agile methods* have essentially been developed to counteract the shortcomings of traditional software development (Beck et al., 2001; Highsmith & Cockburn, 2001) such as limited opportunities to adjust to changes and to integrate feedback (Mahadevan et al., 2015). The concept of

"agility" in terms of business or organizational agility had been explored by management research earlier (Overby et al., 2006), but the term became widely known when leading software development practitioners formed the Agile Alliance (Beck et al., 2001) and established agile concepts in the software development domain. The members of the alliance espoused their ideas in an "Agile Manifesto", summarizing the foundations of agility as a more light-weighted approach (Beck et al., 2001). Accordingly, in ASD (1) individuals and interactions are more important than processes and tools, (2) working software matters more than comprehensive documentation, (3) customer collaboration should be preferred over contract negotiation, and (4) responding to change surpasses following a plan (Beck et al., 2001). Building on this, information systems research understands agility as the continual readiness of an ASD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment (Conboy, 2009).

The basic mechanism for solving problem-solving in agile methods is a *cross-functional team* that comprises all skills necessary to deliver value to the customer. Those teams, ideally suggested to be made up of intrinsically motivated teams of equals, work in short iterations, get feedback as soon and often as possible, and use this feedback to continuously improve both the product and their team processes (Beck et al., 2001). Thus, the emphasis is on significant flexibility and autonomy for teams that the ASD method provides (Hoda et al., 2013; Wood et al., 2013). In agile teams, the overall development process is not planned and scheduled upfront by an all-powerful project manager; rather, progress is made in short iterative phases, with decisions made collectively by the team as solutions evolve (Cockburn et al., 2001; Highsmith et al., 2001). One crucial aspect of ASD teams is therefore the necessity of *empowering* an ASD team, providing both autonomy and purpose (Cockburn & Highsmith, 2001).

9.2.2 TEAM EMPOWERMENT

Empowered teams have been around long before agile methods became popular, starting in the 1950s when Trist and Bamforth (1951) published their research on self-organizing coal miners. Specifically, empowered teams demonstrate four characteristics: (1) *potency* (the collective belief of a team that it can be effective), (2) *meaningfulness* (the team's belief that its tasks are important and valuable), (3) *autonomy* (the degree to which team members experience freedom, independence and discretion), and (4) *impact* (the team's work is significant and important for an organization) (Kirkman & Rosen, 1999).

While some scholars use the terms *empowered teams*, *self-organizing teams*, or *autonomous teams* synonymously (e.g., Moe et al., 2008), empowered teams are not only managing themselves. The concept of empowerment goes even further: teams need to know the purpose and implications of their work to feel a sense of empowerment (Kirkman & Rosen, 1997). We argue that this broader definition

of empowerment reflects the ideal ASD team better than concepts such as self-organization or team autonomy (Hoda et al., 2012; Werder & Maedche, 2018). According to the Agile Manifesto (Beck et al., 2001), not only do "[t]he best architectures, requirements, and designs emerge from self-organizing teams", but teams also need to know that they contribute to the "highest priority [of an organization, which] is to satisfy the customer", which gives a team purpose and, consequently, noticeable impact. Thus, we consider ASD teams a sub-category of empowered teams.

Prior research has shown that team empowerment is positively related to a variety of desirable outcomes concerning team performance such as productivity, proactivity, customer satisfaction, job satisfaction, organizational commitment, and team commitment (Cheong et al., 2016; Kirkman & Rosen, 1997; Mathieu et al., 2006; Maynard et al., 2007, 2012; Moe et al., 2008; Moe, Dingsøyr, & Dybå, 2009; Parker et al., 2015). Only when the team has decision-making authority for problems within its domain, the team can be as responsive and adaptive as needed while taking on responsibility for the problem itself (Moe et al., 2009, 2010, 2019).

Structural, processual, and cultural factors can facilitate or hinder the emergence of empowered teams. For example, high specialization and the resulting division of labor are a major challenge, especially if the specialization leads to highly siloed organizational structures (Moe et al., 2008). Also, high specialization often supports high individual autonomy, which is again potentially problematic for empowered teams: while team autonomy is an important characteristic of an empowered team, it decreases individual autonomy because the team makes most of the decisions instead of the individual (Moe et al., 2009). Moreover, empowerment also can have negative effects if empowerment initiatives overwhelm employees. For example, specific empowering leadership behaviors can increase job-induced tensions (Cheong et al., 2016). Especially if team empowerment is illusory, or heavily limited by existing organizational processes and structures, empowerment initiatives can also enhance cynicism (Brown & Cregan, 2008). That is not to say that empowering teams is a non-beneficial endeavor in itself, but that organizations need to be very careful in the process because changing power dynamics can easily create tensions and produce unintended outcomes of empowerment initiatives (Baarle et al., 2019).

9.2.3 TEAM-EXTERNAL MANAGEMENT OF ASD TEAMS

One of the central factors of successfully developing team empowerment is team management. The breadth of roles and responsibilities that management personnel take on in an organization is defined in well-established theories of *leadership* and *management*. While some researchers view leadership and management as one and the same (Zaleznik, 2004), others argue that leadership is one aspect or sub-category of management (Mintzberg, 1973), or even an entirely separate concept (Kotter, 1990). While activities such as "initiating change", "giving directions", and "motivating team members" are related

to the notion of leadership, the operational implementation – meaning "planning", "organizing", and "controlling" – is often more narrowly defined as management. The two concepts are hard to define strictly or separately from each other (Hunt, 2004) but the differentiation is important to understand the shift of responsibilities in empowered teams. As Highsmith & Cockburn (2001) have stated, ASD relies on "a world view that organizations are complex adaptive systems […], in which decentralized, independent individuals interact in self-organizing ways,". Concepts such as *shared leadership* – which is closely intertwined with ASD teams (Dombrowski & Mielke, 2013; Parker et al., 2015) – describe the shift from "traditional managerial hierarchies […] to 'thick networks of relationships'" (Hunt, 2004, p. 27). Leadership and management responsibilities do not need to be filled by one person, traditionally a project or team lead, but specialized knowledge in a particular issue allocates leadership (Moe et al., 2009). Accordingly, team members share decision-making authority while acknowledging that their influence on a specific decision is dependent on their experience and knowledge in the domain of the problem (Hoegl & Parboteeah, 2006).

Those characteristics are at odds with traditional command-and-control management in large enterprises, where structures and processes have grown for decades, and hierarchies and administrative bureaucracy have been established (Uhl-Bien & Marion, 2009). This is where *team-external managers* (TEM) come into play. We define TEM as *functional managers who are connected to ASD teams but not involved in the team's day-to-day inner workings*. While TEMs exist on different levels of an organization, spanning from team leads to executive management, our study explicitly investigates the role of direct supervisors. We suggest that over time, the role of TEMs in agile environments will change, and the number of managers will likely decrease, but there is still "management" and "managers". The managers' responsibility is to design constraints and create conditions for empowered teams to work effectively, self-organize, and continuously improve. Also, managers have a role in providing alignment and coordination with other teams and the overall organizational strategy (Moe et al., 2019; Vidgen & Wang, 2009).

For empowered teams, TEMs are expected to "generally refrain from interfering in team-internal operational decisions" (Hoegl & Parboteeah, 2006), and prior research suggests that TEMs' behavior can become a major barrier to team empowerment if they provide low external autonomy – the degree to which external leaders refrain from influencing the team's activities (Moe et al., 2008). Prior research has identified governance mechanisms that managers still can use in an agile setting and has called for further research on how these findings apply in different contexts (Lappi et al., 2018). Others have defined management roles in broad terms as, for example, "mentors", "coordinators", "negotiators", or "process adapters" (Shastri et al., 2017), or have formulated guiding principles of agile leadership such

as “setting the direction”, “establishing the simple, generative rules of the system”, or “encouraging constant feedback, adaptation, and collaboration” (Parker et al., 2015).

It remains unclear, however, how these roles and principles translate to organizational structures, routines, practices, or management levels. In addition, recent studies indicate that not only the management style but also the manager’s prior role and relationship with the team could influence their ability to positively influence team empowerment. For example, team coaches – facilitating the team’s work without being involved in the actual execution and often having no prior relationship to the teams – seem to be in a better position to positively influence team empowerment than disciplinary managers (Mathieu et al., 2006; Rapp et al., 2016).

9.3 RESEARCH DESIGN

9.3.1 RESEARCH MODEL

Given limited theory on the role of both antecedents and outcomes on the role of TEMs for ASD teams, we chose an exploratory multiple-case study approach (Sarker et al., 2018) as a data-centric approach involving inductive reasoning for building theory. This allows us to collect rich data on the phenomenon in a real-world context to arrive at new insights on the interplay between organizational environments, TEMs, and ASD teams. We focus on five teams as the unit of analysis within one single case organization. The organization (hereafter referred to as INSUR) is a large national subsidiary of an international insurance company, which is currently undergoing an organizational transformation and adopts ASD methods on a large scale for this purpose. This presents a unique opportunity to investigate our research questions in a critical case, with extensive access to internal data and teams, as well as the possibility to collect longitudinal data. For this study, data was collected from several teams, which all operate within the case organization. In this way, variations that result from external (e.g., environment or market influences) or internal factors (e.g., overall organizational structure, processes, or culture) can be controlled for (Lee, 1989). The selection of teams followed a combination of literal (conditions of the cases lead to predicting the same results) and theoretical (conditions of the cases lead to predicting contrasting results) replication logics (Dubé & Paré, 2003).

9.3.2 DATA COLLECTION

Overall, five teams were identified to ensure coverage of differing team characteristics. The following characteristics were considered:

- *Number of team members*. There is no required minimum or maximum number of team members at INSUR. Thus, the selected cases cover large parts of the typical team sizes, ranging from four to eight team members.

- *Number of TEMs*. Depending on the organizational setup, the number and role of TEMs differs across teams. We sampled teams with two TEMs and others with up to three.
- *Degree of cross-functionality*. While agile teams are generally supposed to comprise all skills necessary to successfully achieve a team's goals, the actual cross-functionality of a team setup differs widely at INSUR. On the one side of this spectrum there are fully IT-internal teams that develop tools or platforms for other teams to use in their SD processes. On the other side of the scale, fully cross-functional teams are made up of employees from a wide range of functions beyond IT, for example, product management, customer service, finance, or marketing. Both of these types of team setups do exist at INSUR, but the majority of the teams are mostly IT-internal, often with one team member (typically the product owner) from a business unit or department. The selection of cases comprises all three team setup scenarios (IT-internal; IT-internal with product owner from business unit; cross-functional).
- *Time since and cause for ASD methodology adoption*. There are three major waves of ASD adoption at INSUR: (1) pilot teams that started around or before 2017, (2) teams that voluntarily adopted ASD from 2018-2019, and (3) teams that started using ASD under a mandate by executive management in or after 2020. All three waves of ASD adoption are represented in the resulting case selection.
- *Choice of agile methodology*. The case organization does not strictly specify which agile methodology a team should adopt, although it favors the introduction of Scrum and Kanban (e.g., through an agreement between the organization and its workers' council or training offers on these two methodologies). Many teams have refined their working mode based on one of the two methodologies, but the teams are also able to use other agile approaches such as eXtreme Programming. Thus, a lot of tailoring is happening. The selection process ensures that all mentioned approaches are covered in the resulting set of teams.

Table 9-1 provides an overview of the selected teams.

Team	Product/Project Description	No. of Team Members	No. of TEMs	Degree of Cross-functionality	Point in Time of Adoption	Agile Methodologies and Practices Used
TEAM1	New product development for external application	5	3 (1 IT, 2 business)	fully cross-functional	2018 (voluntarily)	Combination of Scrum, Kanban, and XP practices
TEAM2	New product development for internal application	6	2 (2 IT)	fully IT-internal	2018 (voluntarily)	XP
TEAM3	Operations and feature development for internal application	8	2 (1 IT, 1 business)	IT-internal with one business representative	2017 (pilot team)	Combination of Scrum and Kanban practices
TEAM4	Operations and feature development for internal application	7	3 (2 IT, 1 business)	IT-internal with one business representative	2020 (mandated)	Kanban
TEAM5	New product development for internal application	8	3 (2 IT, 1 business)	IT-internal with one business representative	2017 (pilot team)	Scrum

Table 9-1. Overview of selected teams.

For each team, different sources of evidence were collected to serve as converging lines of inquiry, allowing for triangulation of the different perspectives on the question how TEMs influence agile teams at INSUR (Yin, 2009). These sources include (1) internal documents and intranet data, (2) observations from attending team events shadowing the team, and (3) semi-structured interviews. The latter included (a) group interviews with all team members to establish a common understanding of the project team setup, goal and work processes as well as an overview of management personnel who interact with the team, and (b) semi-structured individual interviews. The individual interview participants were team members and their respective disciplinary supervisors as well as other stakeholders of the team (e.g., senior managers). The interviews covered interactions between a team member and their peers, stakeholders, and functional supervisors. Overall, we conducted 45 interviews across the five teams over the course of 26 months. The interviews lasted from 45-70 minutes and were recorded and transcribed after the interviews in one team had concluded. In total, five group interviews and 40 individual interviews were performed. Out of the 40 individual interviews, 11 participants were managers, and 29 participants were team members (including product owners and agile coaches, who are official team members at INSUR). For one of the teams, follow-up interviews took place about a year after the initial round of interviews concluded and the organizational setup of this team fundamentally changed.

The interview guidelines for the three forms of interviews can be found in Appendix A, the participant overview in Appendix B.

9.3.3 DATA ANALYSIS

The data analysis started in parallel to the data collection phase. After the first round of interviews in TEAM1 concluded, the interviews were transcribed and thoroughly read. We noticed that the interviewees mentioned responsibilities of TEMs that we had not anticipated. The interview guidelines were adjusted accordingly for the following teams. We started to analyze our data using open coding: we identified managerial roles, contextual factors, and effects on team empowerment dimensions – both positive and negative – in the interview transcripts.

We did not limit or predefine our coding scheme regarding team-external management and contextual factors. The coding scheme was continually adjusted by comparing existing codes in one team with both the other teams and data from observations and internal documents. For example, internal role descriptions and training documents were compared to the set of management roles that both TEMs and team members mentioned in the interviews. In a next step, the resulting coding scheme was refined after several iterations: some codes were combined (e.g., the contextual factors "high involvement in organization-wide planning" and "team-external dependencies" were integrated), others dropped, and new ones emerged. Table 9-2 provides an overview of first- and second-level codes as well as exemplary quotes for team-external management and for contextual factors.

Exemplary Quotes	**First-Level Code**	**Second-Level Code**
Team-External Management		
"[The role of our manager], it's a disciplinary one, because the three of us are all part of her business unit. Sure, she does all the stuff like jour fixes, goal-setting, typical HR or organizational topics." (PART1-2) "My boss told me that I could come up with goals and we could talk about it at the end of the quarter and that's it. You just notice that this goal setting process is useless. At the end, we all know where we're going and that's it." (TEM5-2) "Well, she is my supervisor after all, so she does all these formal things. Although, we're doing some stuff ourselves. We have started to approve vacation requests for each other for example." (PART5-2)	**Formal Supervision**	**Managing Individuals**
"I certainly don't see her as a mentor. If I need a sparring partner or something, I would talk to [her boss] in the IT unit or upper management on the business side." (PART1-2) "I was organizing a group for anyone interested in [topic] and she has supported me in that from the beginning. We discussed our ideas for how to set this up and she pushed me to advertise it more, invited me to her management meeting and so on. It definitely helped." (PART1-3) "I mean, I have something like five years left until I retire. I don't want to climb the ladder and I don't need coaching or anything. [...] That might be different for the younger ones, but we as the "dinosaurs", we're done." (PART5-4)	**Individual Development**	

“Overall, working at INSUR has definitely changed. Before, when [former manager] was our team lead, he has often asked for our opinion, but now we are just doing it ourselves and so far it’s working fine.” (PART3-1) "Upper management has noticed that if they go on with this agile transformation, all power resides in the product owner. No one would need them anymore. And I think they are scared of that and try to backpedal now." (PART5-5) “We have massive technical debt that we need to tackle. At the moment, we must migrate to the cloud, like yesterday. And [our manager] is talking to all our stakeholders and saying ‘No, we can’t do your stuff right now’. She knows that we need a good, stable basis first.” (PART4-3) “The downside [of the quarterly planning process] is that the top managers, the department managers, make the final decision. My boss acts like the senior product owner. We need to tell it like it is.” (TEM5-3)	**Task-Related Management**	**Managing Within Teams**
“We were one of the pilot teams and we just figured it out ourselves. It’s not like we’re doing Scrum by the book today. We just choose whatever works for us. And I know that some people think that we’re difficult, but I think it’s good. But we certainly have some kind of reputation. ” (PART2-3) “Right now we are deadlocked. We know that he prefers Scrum but it just makes no sense for us. […] At the end, we are the team and we need to work with it. If he accepts it or not.” (PART3-2) "We are completely free to decide which practices we want to use. At the beginning we had workshops and an external coach to learn what's there, what we could do. But after that, it was completely up to us." (PART-5-6)	**Process-Related Management**	
“It’s not like someone makes her do that, it’s just her personality. She’s really good at networking. And it’s not like our project would fail without her, but she makes stuff easier for us. […] She has opened a lot of doors.” (PART1-3) “She organizes those department meetings, like once a month. And I like those a lot, because she is very structured and speaks briefly, comes to the point. […] She always summarizes the highlights of what goes on at INSUR, like the big picture.” (PART1-4) "We know our stakeholders and I just talk to them myself. [My boss] has been at INSUR for a lot less time than myself, I don't think he could help us here. And it's certainly not as if he forces himself on us." (PART3-5)	**Building Connections**	**Managing Beyond Teams**
“[In the quarterly planning] there’s a management review and for a long time, we as product owners were not allowed to be there. And at the end all the managers were like ‘Look at what we achieved’. But actually, we, the teams, did that. […] [My manager] criticized that like a thousand times. And now, finally, we can attend the review, we’re part of the decision.” (PART4-2) "We approached her so that she could bring the issue up to management. To choose the right language, have them understand our issue. She is some kind of communication channel to INSUR for us." (PART2-4) "I do that with all my teams, if they have achieved something and they are up for it, I always invite the product owners to our management meeting. I don't want to reap the benefits, get the recognition myself." (TEM5-1)	**Team Ambassadorship**	
Contextual Factors		
"If there's someone who knows more about your topics, I always worry that they could try to meddle much more. I feel like it's not too bad to have a manager who's just there for the formal, individual parts. Because then the team can just work it out by itself." (PART5-1) "I've been a developer myself for close to 15 years, but they work with such specialized tools that I wouldn't be able to help them anyway. And I know I shouldn't. I have some ideas, big picture stuff. And if they ask, I discuss them with the team, but at the end they know better than me." (TEM2-1)	**Technical Expertise**	**Manager-Related Factors**
"If [my boss] comes to me and wants to know the status, I won't say "Don't ask me", you just don't do that. So, I need to be in the loop at least." (TEM4-2) "He sometimes just expects me to make it work. But it's not my job to tell the team what do to. We don't have a lot of conflicts about that, but it certainly happens." (TEM5-3)	**External Expectations**	

"We have worked together as a team in some form for over 20 years now. We know what we are doing, we don't need anymore to tell us what to do." (PART3-2) "It's different for my teams. The one that you interviewed, TEAM4, they are much more experienced, and I can just let them do their thing. For other teams, newer teams, I am much more present." (TEM4-1)	**Team Maturity**	**Team-Related Factors**
"We are very autonomous. Sure, they give us a business case and budget and everything, but that's everything. We are lucky that we can work outside of all those processes, because our product is completely disconnected." (PART1-5) "We are one of the central systems at INSUR and that's the issue. We have like a million requests in the quarterly planning. There are so many discussions beforehand and I really don't mind if [TEM5-1] supports us here. It makes my job a lot easier, but you need a lot of trust and communication." (PART5-7)	**Team-External Dependencies**	
"I'm not involved at all. I know that there's another manager from IT and I think she is a little closer, but I don't think I could help them in any way. Too many cooks spoil the broth, you know." (TEM1-2) "It's not always easy between [TEM3-1] and [TEM3-2]. They have their conflicts, they just look at it from two completely different perspectives. But as long as they keep it between themselves, it's actually not too bad for us. At least we don't have to discuss this stuff with upper management." (PART3-4)	**Management Complexity**	
"I don't see her in a position to handle escalations. I would just talk to senior or executive management directly. […] At the end of the day, she would need to pass the issue on to upper management anyway." (PART1-2) "I don't think [our executive manager] would even recognize me. I don't talk to him regularly, no. I wouldn't even know about what." (PART5-4)	**Power Distance**	

Table 9-2. Exemplary quotes, second- and first-level codes.

For team empowerment, we used an a priori construct based on its four characteristics (Kirkman & Rosen, 1999; see Section 2). In addition, we used codes – (strongly) positive to (strongly) negative – to mark how participants assessed the effect of TEMs' behaviors on team empowerment. For example, a participant described how a TEM tried to influence the team's prioritizing process but failed due to strong resistance as team members felt that the TEM imposed on the team's decision-making authority. We registered this instance as task-related management having a strongly negative influence on autonomy.

Subsequently, we started the within-case analysis: for each team, we prepared a case write-up that summarized our understanding of a product or project description, the organizational environment, team processes, management involvement, team-internal and -external contexts, and the perceived state of team empowerment. We created a visualization of organizational structures per team, comprising all management layers beyond the team context, and matched team-external management roles to the individuals that engage in these roles for each team. Appendix C gives an example.

In the cross-case analysis, we compared our findings per teams and identified similarities and differences between the teams. We analyzed how team-external management configurations influence team empowerment dimensions across teams and extracted patterns. If we could find similar patterns across more than one team, we registered a potential relationship between team-external management and team empowerment. If we found different outcomes per team, we analyzed contextual factors in

detail to find explanations for how team-external management and resulting team empowerment configurations differ across teams.

9.4 FINDINGS

9.4.1 AGILE SOFTWARE DEVELOPMENT AT INSUR

INSUR is a German insurance company with approximately 10,000 employees, which belongs to a multinational insurance enterprise operating worldwide. INSUR has an internal national IT department that is responsible for software development and operations. In addition, an international IT subsidiary oversees providing and operating a partially standardized, global IT infrastructure. The adoption of ASD methods at INSUR has progressed in two phases, while a third phase is currently being prepared.

In phase 1, before 2019, the adoption was primarily driven by bottom-up efforts from within IT teams. The first teams started experimenting with Scrum around 2015. Over the years, ASD became more prevalent, and the company has started to officially introduce agile methods in pilot teams – namely Scrum (Schwaber & Beedle, 2002) as well as Kanban and XP practices. INSUR has a strong workers' council that was involved in the efforts to introduce ASD from the beginning and negotiated a work agreement on how to transition from a traditional SD approach early on. After that, teams could voluntarily start to use ASD practices and several teams chose to do so.

In phase 2, senior IT executives issued a mandate for the remaining SD teams in the IT department to adopt ASD methods at the beginning of 2019. The voluntary movement to adopt ASD methods had lost its momentum and the IT department struggled with managing the duality of traditional and agile SD approaches and their inherent contradictions. Simultaneously, two organizational changes were implemented: first, the responsibilities of traditional functional managers in the IT department were revised and, partially, these management positions were reassigned. Specifically, these managers were encouraged to refrain from business decisions concerning the teams and instead invest more time in coaching and developing individual employees. On average, the manager-to-staff ratio was between 1:15 and 1:25. Second, a new quarterly planning cadence was implemented to manage inter-team dependencies. Beyond the inter-team quarterly planning, INSUR has explicitly refrained from imposing standardized team-internal processes. Instead, the organization has given individual teams discretion to combine agile methods or practices in their specific working contexts as they see fit. This has resulted in a wide variety of working models across teams, ranging from textbook examples of the Scrum process to fully tailored approaches.

A third phase of the agile transformation at INSUR is currently undergoing. Based on the Spotify model, INSUR sets up a new organizational structure that groups teams – so-called tribes – that work on one overarching line of business or platform. In this phase, disciplinary management will be restructured

again. Chapter leads will be introduced as a new role that invest roughly half of their time in managing a team of 5-10 people and working in the same function as their subordinates in a team themselves.

9.4.2 MODEL OF TEAM-EXTERNAL MANAGEMENT OF ASD TEAMS

Figure 9-1 summarizes our main findings and proposes a model of team-external management of ASD teams. In sum, our data suggests that the way in which TEMs interact with ASD teams can differ vastly, even within a single organization. Despite common management guidelines and standardized training, TEMs invest their time to varying degrees in different activities related to management, which we categorized into three main types: (1) managing individuals, (2) managing within teams, and (3) managing beyond teams. We found supporting evidence that the form of team-external management (i.e., the categories of team-external management those individual managers prioritize in managing a team) considerably influences team empowerment. Further, we have identified contextual factors regarding (1) managers and (2) teams that we suggest have an influence on why and how managers engage in the different categories of team-external management activities.

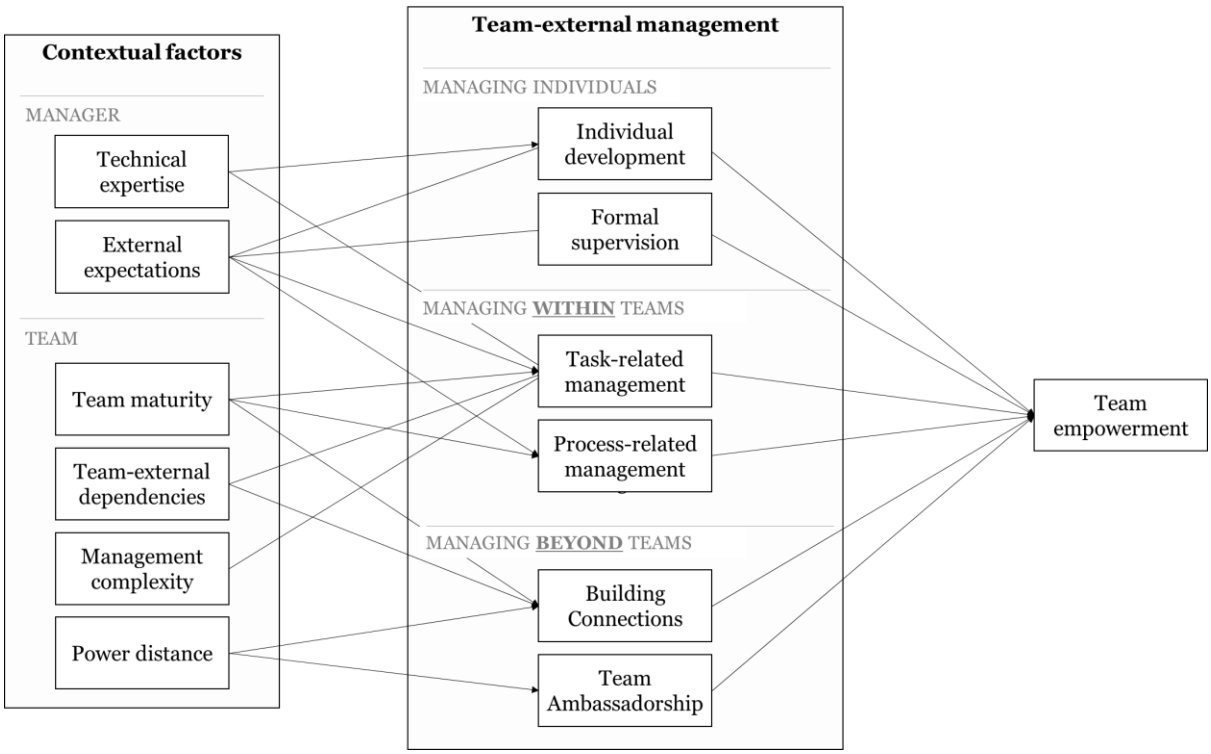


Figure 9-1. Model of team-external management of ASD teams.

9.4.3 MANAGING INDIVIDUALS

The first group of tasks that all TEMs at INSUR regularly took on (but each to varying degrees) is managing individuals through (a) formal supervision and (b) individual development. For example, formal supervision includes the handling of staffing, overtime, requests for time off, compensation, or feedback and performance management. Individual development refers to managers encouraging or

initiating personal development, giving career advice, organizing and approving training, and individual coaching or mentoring. In all cases, this type of management is directed at the team members as individual employees. These tasks are explicitly part of a manager's responsibilities according to INSUR's policies, especially the encouragement of personal development.

Formal supervision if often considered the most basic managerial responsibility, and several interviewees first named some or all those tasks when asked which responsibilities their direct managers regularly took on:

> *"[The role of our manager], it's a disciplinary one, because the three of us are all part of her business unit. Sure, she does all the stuff like jour fixes, goal-setting, typical HR or organizational topics." (PART1-2)*

Neither employees nor team-external managers stated that much time is spend on such tasks. Furthermore, while formal supervision is often the first aspect of management that comes to mind and one that is seen as essential or inevitable, it is seldomly considered a prestigious part of management that managers take pride in:

> *"Sure, I'm doing all the disciplinary stuff. But that's not why I wanted to become a manager; I enjoy working on the topics. People notice well-done projects, not well-written performance reviews or something." (TEM2-1)*

Increasingly, some parts of formal supervision are transferred to the team directly. This change is often informal at first: regarding requests for time off, all the teams stated that the role of direct managers is a formal one at best while the team members discussed the vacation schedule among themselves in the first place. Still, the direct manager must officially approve time off in most cases. Partly, this responsibility was also officially transferred. For example, one team reported that requests for time off are no longer officially approved by a manager but by the team members themselves. Similarly, the role of TEMs for staffing is partially transferred to the team: at the very least, team members are included in job interviews across all interviewed teams today, in some cases the teams are also in involved in creating job postings.

Considerable differences between managers and teams can be observed for the performance management process. Over the past years, INSUR has established quarterly to biannual feedback meetings (instead of annual feedback) between individual employees and their direct supervisors in which a performance evaluation and the definition of objectives for the next three to six months take place. The official evaluation influences variable salary components for a very small part of employees, but it has no direct consequences for most team members. Accordingly, most interviewees indicated that they do not benefit from or attach importance to the performance management process:

"My boss told me that I could come up with goals and we could talk about it at the end of the quarter and that's it. You just notice that this goal setting process is useless. At the end, we all know where we're going and that's it." (TEM5-2)

Increasingly, the defined objectives are team goals instead of individual goals. None of the interviewees disagreed with this practice as it simplified the process and reduced the time that team members needed to invest.

The degree to which managers engage in activities concerning individual development varies greatly for each employee. For most employees, managers initiate, organize, and approve training or conference attendances if the development of the individual benefits the team (i.e., if an employee acquires a skill that is necessary or relevant to the team). Less often, managers act as coaches, mentors, or sparring partners concerning individual development. The individual's career aspirations and, often correspondingly, their age appear to influence the desire or need to include a manager in discussions around trainings or career advancement. Several interviewees strongly rejected the assumption that their manager functions as a mentor or coach altogether:

"I certainly don't see her as a mentor. If I need a sparring partner or something, I would talk to [her boss] in the IT unit or upper management on the business side." (PART1-2)

Overall, managers' estimates on the time that they invest in individual development are much higher than employees'. Potentially, this mismatch results from the fact that managers often invest a lot of time in developing a select few employees that actively seek advice and counselling.

9.4.4 MANAGING WITHIN TEAMS

The second category of team-external management activities refers to the management of or within teams, namely through (a) task-related management and (b) process-related management. Task-related management describes the way managers influence requirements by prioritizing work items or posing tasks themselves. Process-related management includes a manager's interference with the inner workings of a team, specifically the way in which requirements are gathered and organized, work is planned and distributed, team members communicate, or stakeholders are managed. For both task-related and process-related management, the managed entity is not the individual employee, but the team.

Before ASD methods were introduced, both task-related and process-related management were a major part of the daily work and standard responsibilities of managers at INSUR. Many interviewees noted that "in the old world" managers had at least veto power for functional decisions, oftentimes they took planning or process organization into their own hands and consulted with the teams in case of uncertainties. Following our data, this dynamic has changed considerably in both theory and practice at

INSUR: for task-related management tasks, the product owner (or, in one case, the product owner and the project manager) is officially in charge; for process-related tasks, the responsibility lies with the team itself. While the degree to which TEMs follow these official guidelines differs, a large majority of interviewees agreed that the involvement of the team (including product owners and agile coaches) in formerly managerial tasks has notably increased over the last four years:

> *"Overall, working at INSUR has definitely changed. Before, when [former manager] was our team lead, he has often asked for our opinion, but now we are just doing it ourselves and so far it's working fine." (PART3-1)*

For task-related management, TEMs are often faced with a dilemma: while the ASD teams officially organize and prioritize tasks themselves, the managers officially and practically often remain the point of contact for senior management or other teams. Some managers explicitly mention that such requests should be directed to the team (or to the product owner), but this process remains difficult to enforce due to conflicting standards and structures across departments and – sometimes – resistance from upper management. As a result, TEMs are often expected to ensure that certain tasks get done, at times disregarding existing priorities and product road maps.

Conflicts typically arise in two cases: first, INSUR is currently undergoing a major digital transformation including the decommissioning of legacy systems and a large-scale move from self-hosting to cloud computing. For this topic, TEMs often act as stakeholders that communicate non-adjustable deadlines for overarching infrastructure or architectural changes:

> *"We have massive technical debt that we need to tackle. At the moment, we must migrate to the cloud, like yesterday. And [our manager] is talking to all our stakeholders and saying 'No, we can't do your stuff right now'. She knows that we need a good, stable basis first." (PART4-3)*

Second, a new quarterly planning process for the IT teams has been established at INSUR in 2019 to map out the high-level tasks that a team takes on over the next three months. Nearly all team members criticize this process in the interviews due to its decision-making mechanisms: while teams are generally expected to decide themselves which tasks can be done based on project priorities and the team's availability in the upcoming quarter, every team has experienced an instance in which TEMs have overruled team decisions and sometimes pressured the team to take on additional work that it has not committed to in the initial process. These decisions are typically made by senior management instead of direct supervisors:

> *"The downside [of the quarterly planning process] is that the top managers, the department managers, make the final decision. My boss acts like the senior product owner. We need to tell it like it is." (TEM5-3)*

For process-related management, TEMs more commonly refrain from interfering in team decisions. If they still do interfere, managers are often confronted with major resistance from the teams. Interestingly, all teams that were interviewed – regardless of their ASD methodology of choice, years of experience, or other characteristics – referred to themselves as "troublemakers", "rebels", or "inconvenient":

> *"We were one of the pilot teams and we just figured it out ourselves. It's not like we're doing Scrum by the book today. We just choose whatever works for us. And I know that some people think that we're difficult, but I think it's good. But we certainly have some kind of reputation." (PART2-3)*

The teams visibly take pride in determining their work processes themselves and applying methods, tools, and practices as they see fit. Members of two of the teams indicated that they have experienced disagreements with their direct supervisors concerning their choice of ASD methodology, specifically Kanban instead of Scrum. In those cases, the managers had explicitly or implicitly voiced their preference for Scrum, but both teams decided to stand firm on their decision to practice Kanban in spite of managerial opposition.

> *"Right now we are deadlocked. We know that he prefers Scrum but it just makes no sense for us. […] At the end, we are the team and we need to work with it. If he accepts it or not." (PART3-2)*

One notable exception, when team have little discretion to design their own process, is the quarterly planning process: the process was established for all IT teams and participation is mandatory. Although most interviewees acknowledged that the quarterly planning increases transparency and predictability across teams, the process entails considerable preparatory efforts and enforces a relatively strict cadence in which work is done and results are assessed. Thus, the teams are required to establish new procedures to prepare the quarterly planning, commit in advance to complete a set of tasks, and adjust to the externally imposed timeline.

9.4.5 MANAGING BEYOND TEAMS

The third category of team-external management activities – managing beyond teams – comprises (a) building connections and (b) team ambassadorship. Building connections refers to activities in which the manager facilitates or supports the forming of a team's external connection to other teams or individuals to improve communication and cooperation across the organization. Team ambassadorship includes managerial actions to externally promote a team's successes, communicate and solve its challenges, and iteratively shape organizational processes and structures to allow the team to work effectively. In most cases, managing beyond teams refers to the whole team, but the team is often represented by individual employees acting as a point of contact for the team.

The activities of managing beyond teams have been a part of managers' responsibilities at INSUR since before the agile transformation started. Generally, interviewees often described respective behaviors when they talked about the positive aspects, or "good things", that their managers do:

> *"It's not like someone makes her do that, it's just her personality. She's really good at networking. And it's not like our project would fail without her, but she makes stuff easier for us. […] She has opened a lot of doors." (PART1-3)*

Nevertheless, these activities appear to be a responsibility that managers have on the side, or on top, of management imperatives such as formal supervision. If managers neglect their duties to handle overtime or staffing necessities, they may be reprimanded; if they do not engage in building connections or acting as the team's ambassador, there are no immediate consequences.

Building connections refers to a manager's creation of relationships and networks from or to the team. On the one hand, teams experienced their managers as facilitators in setting up groups of teams that tackle similar problems. For example, one team's manager had noticed that several teams in her organizational unit worked on disconnected infrastructure components and had too little regular communications, which resulted in frequent rework. She consulted with the team members and led an effort to establish periodic planning and review meetings across the five teams that ultimately allowed for more efficient and streamlined work for all teams involved. In other cases, TEMs often referred teams to the correct contact persons for specific topics or started the conversation between their teams and others. Vice versa, TEMs also often ensure that team members receive necessary information. For example, several managers have set up biweekly or monthly meetings in which they share news from other departments, staffing updates, upcoming changes, or human resource-related information.

> *"She organizes those department meetings, like once a month. And I like those a lot, because she is very structured and speaks briefly, comes to the point. […] She always summarizes the highlights of what goes on at INSUR, like the big picture." (PART1-4)*

Overall, however, not all teams rely on their TEMs to build connections for them: especially if teams or individual team members have been working on a product or project for a long time, they are often more knowledgeable than their managers on who to contact to resolve issues or create attention. Nevertheless, all interviewees appreciated a manager's efforts to create organization-wide information networks and keep all parties in the loop.

If TEMs engage in team ambassadorship, they act as both promoters and problem solvers. Regarding team promotion, some managers make a point of habitually encouraging team members to communicate success stories themselves. As several interviewees stated, product owners were often invited to present the team's work in front of senior leadership or executive committees or publish intranet articles on

completed milestones. This approach is highly appreciated by team members as managers do not take the credit for the team's work but rather shine the spotlight on teams themselves:

> *"[In the quarterly planning] there's a management review and for a long time, we as product owners were not allowed to be there. And at the end all the managers were like 'Look at what we achieved'. But actually, we, the teams, did that. […] [My manager] criticized that like a thousand times. And now, finally, we can attend the review, we're part of the decision." (PART4-2)*

Concerning the communication of problems and issues that arise, most managers take a different approach by gathering information on issues and presenting them to upper management or the responsible decision-makers. For example, one team described how one of their supervisors attended a team meeting in which the team noticed that a deadline for decommissioning an outdated software could not be met, presented the information in an architectural board meeting, and reached a compromise that worked for both sides. The problem-solving approach is not necessarily limited to issues concerning only one team. As an example, several developers across teams criticized that they regularly lacked administrative access rights to adjust settings on their own notebooks, which slowed teams down. One interviewee stated that their supervisor acted after learning about the issue and set up a working group to tackle the problem on an organization-wide level:

> *"We approached her so that she could bring the issue up to management. To choose the right language, have them understand our issue. She is some kind of communication channel to INSUR for us." (PART2-4)*

9.4.6 CONTEXTUAL FACTORS

We found that the degree to which different managers engage in the three categories of team-external management activities is contingent on a set of contextual factors concerning either (a) the manager or (b) the team.

We identified two contextual factors that play a role for the individual manager: First, technical expertise in the team's work context makes it easier and more tempting for a manager to engage in team-external management extensively, especially in the category of managing within teams. For example, one manager who formerly worked as a software developer in the same domain as her team has described the learning journey: today, she still has opinions on how to implement solutions, but she explicitly reminds herself regularly to let the teams figure it out themselves.

> *"I try to attend their Sprint Review as much as possible, but it's hard for me sometimes to not just tell them to try solution X. […] I mean, I still give my input, but it's up to them to make the final call." (TEM2-1)*

Still, for managers with less technical expertise, interference in technical decisions appears to be less probable and teams do not rely on their technically savvy manager to actively refrain from interference. Further, it is easier for managers with high technical expertise to determine suitable training opportunities for individual employees.

Second, we found evidence that TEM's behavior is influenced by both official and unofficial expectations from a manager's organizational environment. Official expectations include role descriptions and training material: for example, TEM in the IT department more often refrain from extensive task- and process-related management than their counterparts in various business departments as the IT management positions had explicitly been redefined to accommodate ASD teams. Further, TEM rely on their own supervisors to accept or actively encourage less involvement in a team's day-to-day work. Contextual factors regarding the team include team maturity, team-external dependencies, management complexity and power distance. If a team is more mature or experienced, TEM generally appear to have fewer reasons to interfere in task- and process-related management as teams take on those tasks themselves.

> *"It's different for TEAM2, they talk to there customers anyway. They set up a community themselves and keep it alive and engaging. I really don't need to involve myself here." (TEM2-1)*

For teams with extensive dependencies on other teams or individuals across the organization, TEM more often see the need to engage in task-related management to either ensure that the focal team completes work for another one or that the team's requirements on other teams are fulfilled. Accordingly, TEM engage in building connections more often. Complex management structures above the team appear to discourage TEM from intensive involvement especially for responsibilities regarding managing within teams. This may result from the fact that if more than one TEM in connected to a team, it is harder to make a single TEM responsible for failures or challenges. Further, supervisors of some but not all team members have no authority to manage the team as a whole or might face opposition from the other team members' supervisors for controversial decisions. Lastly, in the case of a lower power distance of the team to upper management, TEM's engagement in managing beyond team activities is less important as teams are able to take on those responsibilities themselves, effectively building networks and being their own ambassadors.

9.4.7 TEAM EMPOWERMENT

In sum, we have identified patterns in how TEMs' actions and behaviors influence team empowerment. These relationships are not necessarily unambiguous: while our data suggests that team-external management activities have a positive influence on some dimensions of team empowerment, that is not

necessarily true for all dimensions. Table 9-3 summarizes the observed relationships between the presence of categories of team-external management and the four dimensions of team empowerment (Kirkman & Rosen, 1999).

	Managing Individuals		**Managing within Teams**		**Managing beyond Teams**	
	Formal Supervision	Individual Development	Task-related Management	Process-related Management	Building Connections	Team Ambassadorship
Potency	o	+	--	--	+	++
Meaning-fulness	o	+	+	o	+	++
Autonomy	-	-	--	--	o	o
Impact	o	o	o	o	+	+
Legend: ++ strong positive influence; + positive influence; o no influence; - negative influence; -- strong negative influence						

Table 9-3. Potential relationships of team-external management and team empowerment.

In our data, we have found ample evidence that the first dimension of team empowerment, potency, is heavily influenced by team-external management in both positive and negative ways. In particular, managing within teams negatively impacts potency. As managers take over task and process organization, they – even unknowingly – signal to team members that they do not trust the team to do it themselves to a degree. Accordingly, the team's feeling of self-efficacy is often affected. One team member describes a meeting in which the direct manager took over a planning meeting unannounced:

> *"We spent two hours pointing fingers without estimating a single story. And then we had to list our technical debt, again, as we had done for many years. And we did all that so that she had some kind of explanation why we work so slow. Which we actually don't, I think. But she crashed the whole meeting for this." (PART4-4)*

On the contrary, team-external management enhances potency if managers help teams build inter-team connections that can help them work more effectively (e.g., finding specialists for one-time topics) or support individual employees in developing skills that in turn help the team as a whole. The positive effect on potency is especially salient for team ambassadorship. If managers take initiative to regularly praise and promote a team's work, the team feels valued and capable.

Concerning meaningfulness as the second dimension of team empowerment, the relationship is similar for the categories of managing individuals and managing beyond teams. If managers take actions to develop, connect, and promote a team, the team feels like its work must be worth such an investment; thus, managers create a sense of importance simply by engaging. In the same sense, a certain degree to which managers are managing within teams also appears to positively influence a teams'

meaningfulness – in direct contrast to the effect on potency. If managers refuse to engage at all in a team's task-related management, the team does not feel like its work matters for the organization. For example, one interviewee described a situation in which the team had to take a major strategic decision, and a TEM did not invest any time to understand the issue and weigh in on the decision:

> *"We explained [the issue] in several meetings but he did not take any notes or ask any questions. I didn't feel like he had any interest, but for us, it was a big thing. I mean, we are [a legacy system] and I know it's not the shiny new thing, but we will still be around for some years." (PART3-3)*

This may indicate a necessary trade-off that TEMs have to take between meaningfulness and potency, and finding the right balance is challenging – too much task-related management activities have strong detrimental effects in terms of perceived restrictions, too few may have a negative signaling effect of "I don't care" instead of the maybe intended attitude of autonomy and laissez-faire.

This is directly related to the findings as regards actual autonomy. Obviously, a high degree of team-external management of any category understandably has a negative or no influence. One interviewee summarized the involvement of their manager in day-to-day operations as follows:

> *"Sometimes, she asks how she could help us solve problems. But apart from that, we are pretty happy to be independent. As little interference as possible." (PART5-6)*

In fact, a low involvement in especially task- and process-related management increased the feeling of autonomy and trust in the team's decisions. For example, TEAM4 initially had a monthly planning meeting with all TEMs that was dropped after six months:

> *"It went from 'following a process' to 'they know what to do'. Today, we do not have this meeting anymore, because they trust us and know that we will come to them if we need any clarification." (PART4-2).*

Combined with our findings for potency and meaningfulness, the picture that emerges points to the relationship between managing within teams and empowerment not as clear-cut black-and-white.

For the fourth dimension of team empowerment, impact, we could not find any evidence in our data that it is influenced (positively or negatively) by TEMs' engagement in managing individuals or within teams. There are some indications that managing beyond teams is positively related to impact. For example, one TEM encouraged employees of the customer service unit to participate in the review meeting of TEAM1. As the team's objective is to create a system that simplifies and supports customer service, the team highly appreciated the feedback of the employees that actively worked with their system but did not communicate with the team until the manager initiated it. Similarly, one interviewee

described how a team of TEMs creates a biweekly newsletter that lists project success stories and often explicitly mentions how much money a team's work saves for the organization or project outcomes such as an increased number of users or user satisfaction.

9.5 DISCUSSION

9.5.1 IMPLICATIONS FOR RESEARCH

Generally, our findings concerning the categories of team-external management are in line with existing research on management roles for ASD teams (Hoda et al., 2013; Shastri et al., 2017), though we did not explicitly focus on roles that TEMs should take on for ASD teams but described the status quo of which roles are present in practice. Our theoretical model serves as a starting point to explain how contextual factors shape team-external management, which in turn influences how ASD teams develop team empowerment. We add to team-external leadership theory and the study of creating team empowerment for ASD teams in organizations.

Our data suggests that the relationship between team-external management and team empowerment is complex and depends on several contextual factors. While Rapp et al. (2016) have concluded that external managers, contrary to team coaches, did not significantly influence team empowerment for customer service teams, we did find opposing evidence for our case. These contrasting findings may partly be explained by the different nature of software development teams and the timing of our research, as our case organization was still in the process of reorganizing management structures at the time of the team interviews and guidelines across organizational units varied greatly. Further, ASD teams have more team-external dependencies than decentralized service teams and as such may require more involvement by managers operating outside of a team.

As our study was limited to a single organization, its generalizability is certainly limited to specific contexts. In a next step, our model of team-external management needs to be both refined and empirically tested. Thus, we propose a set of propositions for future testing. Due to the complex influence of team-external management, we expect relationships to team empowerment on the level of individual dimensions in some cases.

Most notably, we have found no indication that autonomy is increased by any form of team-external management overall. On the contrary, in line with existing research our findings suggest that management activities aimed at individuals and teams in general hinder autonomy. The same applies to a team's perceived potency: if TEMs take over decisions that a team would typically make themselves, it can negatively affect a team's feeling of self-efficacy and competence. As a result, we formulate our first proposition as follows:

P1: Activities related to managing of individuals and managing within teams by team-external managers negatively impact potency and autonomy of ASD teams.

Second, we suggest that formal supervision as a central activity performed by managers has no relevance for team empowerment. While team members expect those tasks to be handled and associate formal supervision with TEMs, the questions of who handles such tasks apparently does not matter. As a result, formal supervision is often delegated. In contrast, if TEMs engage in activities to develop individual team members, it could improve a team's assessment of their own skills and their feeling of value and importance for the organization. We thus propose:

P2a: Activities related to formal supervision of team members by team-external managers do not impact team empowerment (neither potency, meaningfulness, autonomy, or impact).

P2b: Activities related to individual development of team members by team-external managers positively impact potency and meaningfulness of ASD teams.

Third, our data suggests that teams appreciate if TEMs build networks between the team and its environment and act as a team champion and problem solver. While those activities do not increase a team's autonomy, all the remaining dimensions of team empowerment may profit from activities in the category of managing beyond teams. Therefore, we suggest the following proposition:

P3: Activities related to managing beyond teams by team-external managers positively impact potency, meaningfulness, and impact of ASD teams.

9.5.2 IMPLICATIONS FOR PRACTICE

Our research serves as a reminder for organizations that perform large-scale agile transformations to introduce empowered teams to pay close attention to changing requirements on TEMs. Our findings imply not only that engaging in some categories of team-external management can – positively or negatively – influence team empowerment, but also that the failure to assume management responsibilities can hinder team empowerment. Moreover, the dimensions of team empowerment are not affected equally by TEMs' actions. Thus, organizations need to make informed decisions particularly concerning the degree of autonomy that they want to grant ASD teams and change management structures and expectations accordingly. Ideally, our framework can be used as a basis for discussions between teams and TEM, summarizing the variety of actions and behaviors that TEM typically engage in and prompting conversations about the effect that they have on agile teams.

Overall, our findings can be summarized as follows: while the degree to which TEMs engage in activities related to managing within teams should decrease (as such activities tend to create conflicts), the managing of individuals and managing beyond teams are still tasks that should be performed by

TEMs for ASD teams. Notably, formal supervision could be delegated to the team as feasible, at least to some degree, as it does serve no purpose for creating team empowerment.

As contextual factors concerning both individual managers and teams apparently affect team-external management, the endeavor to adapt to changing demands cannot be left solely in the hands of individual TEMs. Instead, organizations can shape the team environment particularly with regard to expectations on TEMs from upper management, team dependencies, and management complexity.

9.6 CONCLUSION

Our goal was to gain an in-depth understanding of team-external management of ASD teams. We thus studied the case of a large organization that currently undergoes an agile transformation and has adjusted its approach to team management to accommodate for the needs of agile, empowered teams. We have uncovered evidence that team-external management does have an influence on how agile teams develop team empowerment and that in turn a set of contextual factors influence how individual TEM shape their role and activities. On this basis, we have developed a theoretical model of team-external management of ASD teams. As a next step, our model requires refinement and validation through empirical testing in new contexts.

APPENDIX

APPENDIX A – INTERVIEW GUIDELINE (STUDY 3)

[Group interviews – Project fundamentals & exploring stakeholders/managerial context]

Team background

- Please tell us about your team:
  - Project / product goal
  - Project duration or product roadmap
  - Team setup
    - Team size
    - Professional background of team members
    - Functional (disciplinary) unit of team members
  - Work methods
    - When did you start to use methodologies or practices?
    - Which agile methodologies or practices do you use? Are some practices mandatory?
    - Has your usage of agile methodologies or practices evolved? If yes, how?

Stakeholders and dependencies

- Who do you consider your stakeholders?
  - Role/job title of stakeholder
  - How do you interact with the stakeholder?
    - e.g., topic, frequency, occasion, setting
- Which dependencies do you have to other teams or functional units?
  - Who depends on your team?
  - Who does your team depend on?
- How do you gather requirements and decide what to do (next)?
  - Origins of requirements
  - Requirements analysis and prioritization
- Are there any other individuals that exercise influence or control over project/product decisions?

Closing

- Is there anything else you would like to talk about?

[Individual interviews (team member) – Exploring manager interactions and personal experiences in-depth]

Personal background

- What is your professional and educational background?
- What is your job title and which business unit do you belong to?
- Which experiences do you have with traditional and agile software development?
- What are your roles and responsibilities in your team?

Interactions with team-external managers

- Who is your direct supervisor?
- Which connection does your supervisor have to your project or product team?
- Which roles and responsibilities does your supervisor take on regarding …
    - you as an individual (e.g. disciplinary tasks: goal definition, performance management, vacation, overtime, personal development, coaching, mentoring)?
    - Your team (e.g. posing requirements, stakeholder, escalations, attending meetings)?
- How do you interact with your supervisor?
    - In which way (e.g. face-to-face, video chat, written communication)?
    - When, how often, in which intervals?
    - On which occasions?
- How do you perceive your interactions?
- Are there other individuals (esp. managers, e.g. of other team members) that assert control or influence on you or your team? (If yes: see above)

Closing

- Is there anything else you would like to talk about?

[Individual interviews (team-external manager) – Exploring team interactions and personal experiences in-depth]

Personal background

- What is your professional and educational background?
- What is your job title and which business unit do you belong to?
- Which experiences do you have with traditional and agile software development?
- Do you have any other management experience (before taking on your current position)?

Interactions with teams and subordinates

- How many subordinates/employees do you have? Which roles do they have?
- Which roles and responsibilities does your supervisor take on regarding …
    - Your subordinates?
    - The team's in which your subordinates work? Are there differences between teams?
    - The managers of your subordinates' team members?
    - Do you have any other management responsibilities?
        - Business or technical decisions?
        - Disciplinary tasks: goal definition, performance management, vacation, overtime, personal development, coaching, mentoring?
- How do you interact with your subordinates?
    - In which way (e.g. face-to-face, video chat, written communication)?
    - When, how often, in which intervals?
    - On which occasions?
- How do you perceive your interactions?
- How is your relationship to your own manager? Which roles does s/he take on? Do you perceive influence/control?

Closing

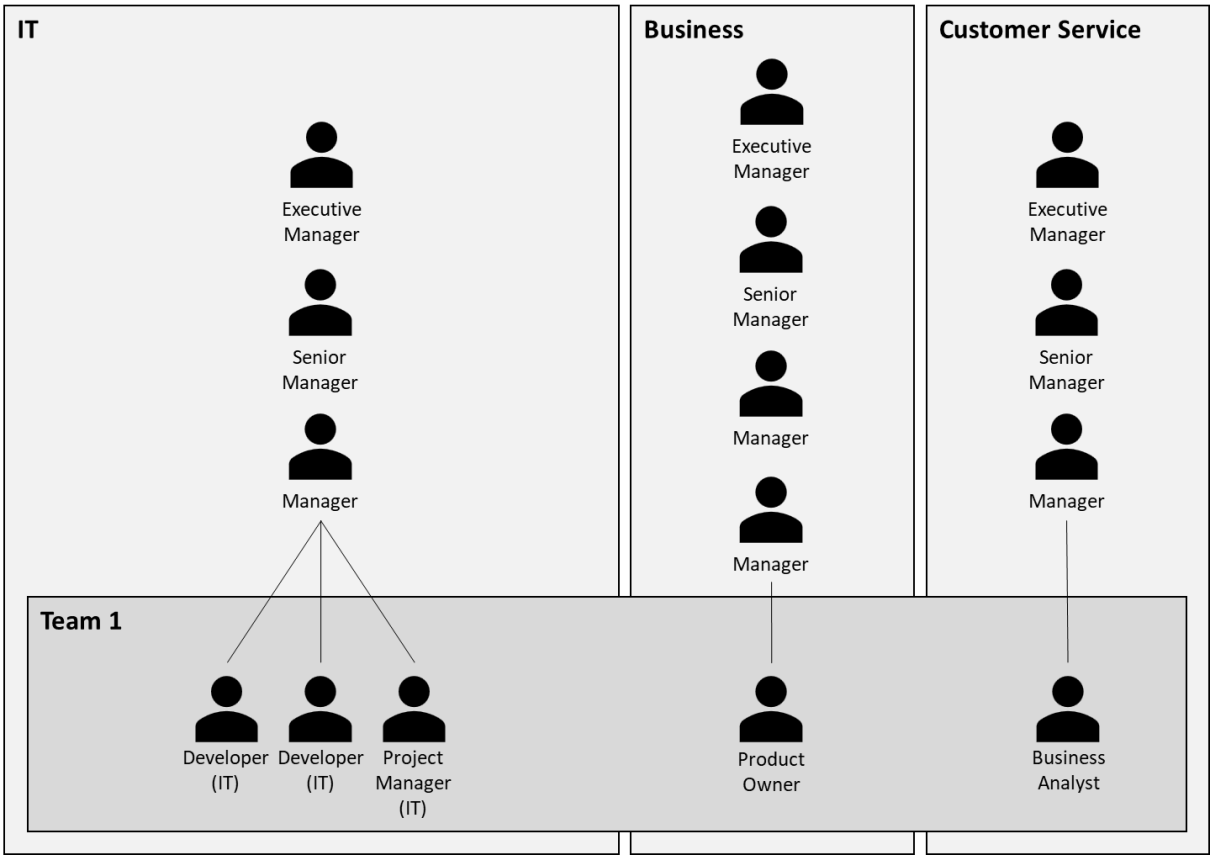
- Is there anything else you would like to talk about?

APPENDIX B – PARTICIPANT OVERVIEW (STUDY 3)

Team ID	Participant ID	Role
TEAM1	PART1-1	Business Analyst
TEAM1	PART1-2	Project Manager
TEAM1	PART1-3	Software Developer
TEAM1	PART1-4	Software Developer
TEAM1	PART1-5	Product Owner
TEAM1	TEM1-1	Second-Level Manager (IT)
TEAM1	TEM1-2	Second-Level Manager (Business)
TEAM2	PART2-1	Agile Coach
TEAM2	PART2-2	Software Developer
TEAM2	PART2-3	Software Developer
TEAM2	PART2-4	Software Developer
TEAM2	PART2-5	Product Owner
TEAM2	TEM2-1	Second-Level Manager (IT)
TEAM3	PART3-1	Business Analyst
TEAM3	PART3-2	Software Developer
TEAM3	PART3-3	Business Analyst
TEAM3	PART3-4	Agile Coach
TEAM3	PART3-5	Product Owner
TEAM3	TEM3-1	Second-Level Manager (IT)
TEAM3	TEM3-2	Second-Level Manager (Business)
TEAM4	PART4-1	Software Developer
TEAM4	PART4-2	Product Owner
TEAM4	PART4-3	Software Developer
TEAM4	PART4-4	Software Developer
TEAM4	PART4-5	Software Developer
TEAM4	PART4-6	Business Analyst
TEAM4	PART4-7	Agile Coach
TEAM4	TEM4-1	Second-Level Manager (Business)
TEAM4	TEM4-2	Second-Level Manager (IT)
TEAM4	TEM4-3	Second-Level Manager (IT)
TEAM5	PART5-1	Software Developer
TEAM5	PART5-2	Business Analyst

TEAM5	PART5-3	Business Analyst
TEAM5	PART5-4	Software Developer
TEAM5	PART5-5	Software Developer
TEAM5	PART5-6	Agile Coach
TEAM5	PART5-7	Product Owner
TEAM5	TEM5-1	Second-Level Manager (IT)
TEAM5	TEM5-2	Second-Level Manager (IT)
TEAM5	TEM5-3	Second-Level Manager (Business)

APPENDIX C – EXEMPLARY VISUALIZATION OF ORGANIZATIONAL STRUCTURES IN TEAM1 (STUDY 3)



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DECLARATION (ERKLÄRUNG)

Eidesstattliche Erklärung nach § 8 Abs. 3 der Promotionsordnung vom 17.02.2015

Hiermit versichere ich an Eides Statt, dass ich die vorgelegte Arbeit selbstständig und ohne die Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus anderen Quellen direkt oder indirekt übernommenen Aussagen, Daten und Konzepte sind unter Angabe der Quelle gekennzeichnet. Bei der Auswahl und Auswertung folgenden Materials haben mir die nachstehend aufgeführten Personen in der jeweils beschriebenen Weise unentgeltlich geholfen:

- Datenerhebung und -analyse:
    - Hani Hussein
    - Jana Feldkamp

Weitere Personen, neben den ggf. in der Einleitung der Arbeit aufgeführten Koautorinnen und Koautoren, waren an der inhaltlich-materiellen Erstellung der vorliegenden Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die entgeltliche Hilfe von Vermittlungs- bzw. Beratungsdiensten in Anspruch genommen. Niemand hat von mir unmittelbar oder mittelbar geldwerte Leistungen für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die Arbeit wurde bisher weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt.

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Ort, Datum	Unterschrift
Köln, 13.07.2024	M. Weidlich

CURRICULUM VITAE

Mareike Weidlich

Erfahrung

seit 04/2023
Head of IT Transformation & Strategy
AXA Konzern AG, Köln

- Koordination des IT-Transformationsprogramms
- Aufbau eines IT-Trainee-Programms
- Leitung der Digital Sustainability-Initiative
- Leitung der IT-Ressort School
- Organisation von Gremien und Koordination des erweiterten IT-Führungskreises
- Allokation von IT-Projektleitern
- Leitung einer Taskforce zum Ausbau kritscher Ressourcen in Engpassteams (Identity & Access Management)
- Koordination von übergreifenden IT-Recruiting-Aktivitäten und Universitätskooperationen
- Disziplinarische Führung eines 12-köpfigen Teams

05/2022 – 03/2023
IT-Projektleiterin Transformation & Strategy
AXA Konzern AG, Köln

- PMO für das strategische IT-Transformationsprogramm
- Organisation von Gremien und Koordination des erweiterten IT-Führungskreises
- Teilprojektleitung für operative Support-Aktivitäten im Bereich Identity & Access Management
- Übernahme von Sonderaufgaben für IT-Vorstand und Bereichsleiter
- Koordination von Universitätskooperationen

Ausbildung

05/2018 – 09/2024
Promotion Information Systems
Universität zu Köln

10/2015 – 05/2018
M.Sc. Information Systems
Universität zu Köln

10/2012 – 09/2015
B.Sc. Wirtschaftsinformatik
Universität zu Köln

09/2003 – 06/2012
Allgemeine Hochschulreife
Theodor-Heuss-Gymnasium, Radevormwald

Auszeichnungen und Stipendien

- Deutschlandstipendium (04/13 – 10/13 und 10/16 – 09/17)
- Dean's List der WiSo-Fakultät der Universität zu Köln (Top 10% der Kohorte)

05/2018 – 04/2022
Doktorandin
AXA Konzern AG, Köln

- seit 03/2020: Einsatz in Cloudifizierungsprojekt für das Dokumentenarchiv
  - Anforderungserhebung und -priorisierung sowie konzeptionelle Erarbeitung einer cloudbasierten Backup-Lösung
  - Abstimmung und Vertragsgestaltung mit internationalem Dienstleister
  - Stakeholder-Management und Gremienabstimmung, insb. im Bereich Datenschutz, IT-Security
- 05/2018 – 03/2020: Einsatz im Team Agile Operating Model
  - Mitentwicklung organisationsweiter Veranstaltungen, Instrumente und Rollen
  - Entwicklung und Durchführung von Schulungen
  - Beratung und operative Team-Unterstützung bei der Einführung agiler Methodiken

05/2018 – 04/2022
Wissenschaftliche Mitarbeiterin
Seminar für Wirtschaftsinformatik und Integrierte Informationssysteme, Universität zu Köln

- Forschung in den Themenbereichen Agile Transformation, Leadership und Enterprise Agility
- Vorbereitung und Durchführung diverser Lehrveranstaltungen

04/2017 – 03/2018
Werkstudentin (bis 07/2017: Praktikantin) im Bereich Technology Advisory & Global Offering Development
Accenture GmbH, Frankfurt/Bonn

04/2016 – 03/2017
Wissenschaftliche Hilfskraft (bis 08/2016: Tutorin)
Seminar für Wirtschaftsinformatik und Integrierte Informationssysteme, Universität zu Köln

Köln, den 13.07.2024

Weiterbildungen

- Zertifizierung PRINCE2 Foundation
- ITIL Foundation Certificate in IT Service Management
- Kurs „SAP FI – Hauptbuchhaltung und Jahresabschluss”

Weitere Kenntnisse

- Office365-Anwendungen (Word, Excel, PowerPoint, SharePoint, Project, PowerBI)
- JIRA, Confluence
- SPSS, R
- HTML, CSS

Sprachkenntnisse:
  - Deutsch – Muttersprache
  - Englisch – fließend (C2)