

The book cover features a blue top section, a white middle section, and a black bottom section. A red trapezoidal shape is on the left, and a yellow trapezoidal shape is on the bottom right. The title 'Adaptiveness in Action' is in large black font, and the subtitle 'Exploring the Processes and Outcomes of the Agile Way of Working' is in smaller black font.

Adaptiveness in Action

Exploring the Processes and Outcomes
of the Agile Way of Working

Rubin Steegh

Adaptiveness in Action:

Exploring the Processes and Outcomes
of the Agile Way of Working

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Adaptiveness in Action: Exploring the Processes and Outcomes of the Agile Way of Working

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Chapter 1



Introduction

In a time characterized by rapid technological advancements, environmental upheavals, and geopolitical shifts, the concept of uncertainty has become a central theme in global discourse (Ahir et al., 2023; Andaloussi & Maggi, 2023; IMF, 2023). This uncertainty is no longer an abstract concern but a tangible reality impacting every sphere of life, particularly the world of organizations (Alfes et al., 2023; Griffin et al., 2007; Wright et al., 2018). The relentless pace of digitalization (Caputo et al., 2021; Kuusisto, 2017; Legner et al., 2017; Parviainen et al., 2022), the unpredictable consequences of climate change (United-Nations, 2020, 2023; Yang, 2021), and the volatility of the international order (Adam, 2023; Hinshelwood, 2023) have created a complex tapestry of challenges for organizations. This tapestry includes (but is not limited to) challenges such as continuously adapting to new technologies, upskilling workforces, recruiting talent with expertise in digital technologies, ensuring business models remain competitive, ensuring environmentally sustainable operations, and adjusting to changing regulations and trade policies (Koçak et al., 2023; Sarta et al., 2021). The recent, rapid advancement of artificial intelligence arguably increases the already high level of uncertainty with its potential to be highly disruptive (Bourton et al., 2018; Grote & Griffin, 2022).

The effect of this burgeoning uncertainty on organizations is profound and multifaceted. It compels them to operate in an environment where change is not only constant but also unpredictable (Bloch et al., 2012; Prange, 2016, 2021). Traditional models of organizational strategy and planning, which rely on stability and predictability, and associated traditional management practices and organizational structures, such as top-down decision-making, fixed long-term planning, and standardized processes, are increasingly inadequate in this new reality (Caputo et al., 2021). As a result, there is a pressing need for organizations to cultivate greater adaptiveness – the ability to respond swiftly and effectively to unforeseen changes and disruptions (Griffin et al., 2007; Park & Park, 2019; Pulakos et al., 2019). This adaptiveness is crucial not just for organizational survival but also for maintaining a competitive edge. When organizations can adapt faster than their competitors, they convert a potential threat into a formidable advantage, positioning themselves as leaders in their respective fields (Dagnino et al., 2020; Nijssen & Paauwe, 2012; Teece et al., 2016).

To cultivate greater adaptiveness, the agile way of working was first introduced in organizations in the late 1990s and early 2000s (Abrahamsson et al., 2009; Hoda et al., 2018). The agile way of working emerged from the software development industry, where a group of experts gathered to uncover better ways of developing software in the face of an environment that was becoming increasingly unpredictable and

reliant on information technology¹ (Abrahamsson et al., 2009; Conboy, 2009; Hoda et al., 2018). Software developers were at the forefront of these changes due to the quick growth of information technology at this time (e.g., the dot-com bubble). Their new approach was formalized with the influential Agile Manifesto (Beck et al., 2001; Schwaber & Sutherland, 2020). The Agile Manifesto expresses four values and twelve principles and centers on shifting from traditional, plan-driven approaches to work to a more flexible, iterative, and people-oriented approach (Agbejule & Lehtineva, 2022; Fernandez & Fernandez, 2008; Moe et al., 2010). This new approach, the agile way of working, is characterized by self-organized, cross-functional, and cohesive teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle² (Hoda et al., 2018; Hoda et al., 2017; Moe et al., 2010). To fully illustrate the fundamental differences between traditional and agile ways of working, a comparative analysis is provided in Knowledge Box 1.1 (Abrahamsson et al., 2009; Agbejule & Lehtineva, 2022; Beck et al., 2001; Fernandez & Fernandez, 2008).

Knowledge Box 1.1 Comparative analysis of traditional and agile ways of working.

Values	Agile	Traditional
1. Individuals and interactions vs. processes and tools	Emphasizes direct communication, team collaboration, and individual competencies. Decentralized decision-making, team empowered to make changes.	Relies on defined processes and tools. Hierarchical approach, decisions typically made by management and strict adherence to predetermined tools and processes.
2. Working software vs. comprehensive documentation	Focuses on quick and iterative delivery (2-4-weeks). Documentation is still important but takes a backseat to delivering work product increments.	Requires extensive documentation at each stage before moving forward. Can include requirement specifications, design documents, test plans, which can slow down processes.
3. Customer collaboration vs. contract negotiation	Encourages ongoing customer collaboration. Feedback is incorporated continuously, allowing flexibility, and seeking alignment with customer needs.	Follows the terms set out in a contract with limited customer interaction. Changes to the scope or requirements are often difficult and may involve formal contract amendments.
4. Responding to change vs. following a plan	Adaptable to change, also late in the development process. Re-evaluation of priorities and consequently adjustments is frequent (when needed).	Linear and sequential approach, where changes are difficult and costly once the project has progressed beyond the initial stages. The focus is on adhering to the original plan.

¹ The agile way of working is especially prominent in environments characterized by unpredictability and a growing reliance on information technology. In other contexts, an agile way of working may not offer benefits due to high predictability and a need to schedule upfront (e.g., construction).

² Agile teams characterize the agile way of working as the central unit of organizing; therefore, agile teams and the agile way of working are used interchangeably.

The agile way of working is considered commonplace in software development (Hoda et al., 2018; Rigby et al., 2018), and growing evidence suggests it is widely implemented nowadays (Alfes et al., 2023). There are examples from services, research and development, government, education, and also human resources, marketing, and retail (Koch et al., 2023; López-Alcarria et al., 2019; McMackin & Heffernan, 2021; Mergel et al., 2018; Peeters et al., 2022; Prange, 2021; Rigby et al., 2016). In Knowledge Box 1.2 examples are provided of three organizations that use the agile way of working and the benefits they claim to have gained from it.

Knowledge Box 1.2 Examples of organizations using the agile way of working.

Organization	Implementation and benefits
Spotify	Spotify, founded in 2006, was “born agile”, never having used traditional management practices, but always relying on the agile way of working. In the practitioner community, there is often discussion of the “Spotify model”. This refers to small, cross-functional agile teams known as “squads”. Each squad is given a high degree of autonomy and responsibility for a specific area of a product. To coordinate among squads, there are “tribes”, “chapters”, and “guilds”. These also facilitate knowledge sharing and skill development (Hardy, 2023; Mankins & Garton, 2017).
Microsoft	Microsoft has integrated the agile way of working across many of its divisions, including the development of Windows, Azure, and Office. This shift has helped in moving from traditional software release cycles to more frequent updates and features. Adopting Agile at Microsoft also meant a cultural shift towards more openness, collaboration, and customer-centric development processes. At Microsoft, they relate their agile transformation to quicker release cycles, higher product quality, better alignment with customer needs, and increased employee engagement (Denning, 2019; Hinshelwood, 2023).
Alibaba	Alibaba implemented the agile way of working as they sought to drive innovation and creativity across teams and businesses. Furthermore, they wanted to foster collaboration and synergy to service customers and consumers better. The agile way of working has enabled Alibaba to rapidly develop and deploy new features, effectively manage large-scale online shopping events (e.g., Singles’ Day), and stay competitive in the e-commerce market. It also fostered a culture of innovation and continuous improvement (Alizila, 2021; Yang, 2021; Zhen, 2018).

As may be evident from the earlier descriptions, the agile way of working is a concept/phenomenon born in practice that also continues to be nurtured there (Baham & Hirschheim, 2021). According to research, there are recurring discussions in the agile way of working literature of issues that have not been adequately addressed over time (Baham & Hirschheim, 2021; Conboy et al., 2011; Conforto et al., 2016; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Ghobadi & Mathiassen, 2016; Wang et al., 2012; Werder & Maedche, 2018; Yu & Petter, 2014). These discussions have primarily centered around two critical aspects: (1) the conceptualization of agile teams and their agile way of working and their effectiveness (Conboy et al., 2011; Conforto et al., 2016)

and (2) the use of theoretical frameworks to understand the processes employed, especially concerning adaptiveness (Baham & Hirschheim, 2021; Dybå & Dingsøy, 2008). Given the current widespread interest in the agile way of working, these issues have significance, and in this dissertation, I³ aim to address these in an integrative and parsimonious manner and thereby contribute to the agile way of working literature.

The relevance of the study of agile teams and their way of working in the broader management field is further underscored by their increasing prevalence in modern organizational structures. Tannenbaum et al. (2012, p. 3) express that “many organizations are using work teams as a way to be more agile to meet environmental and competitive demands”. Additionally, they write that these work teams have dynamic composition, deal with technology and distance, and are empowered and delayed – characteristics that agile teams exemplify. Such an evolution calls for reexamining longstanding assumptions in team research, such as the stability of team membership, structures, roles, and goals (Caputo et al., 2021; Hewett & Shantz, 2021; Tannenbaum et al., 2012). Alfes et al. (2023) echo this sentiment, advocating for developing new conceptual frameworks that address these evolving dynamics, particularly in the context of the agile way of working. This dissertation aims to contribute to this emerging body of management research, challenging existing paradigms and integrating insights from various disciplines to build a comprehensive understanding of agile teams and their impact on adaptiveness.

Overall, this dissertation aims to provide a substantial contribution towards the agile way of working and broader management literature as it seeks to delve deep into the agile paradigm and explore its influence on adaptiveness. To achieve this objective, this dissertation is guided by the following research question and sub-questions:

How does the agile way of working help organizations cultivate greater adaptiveness?

1. What do we know about agile teams and their effectiveness?
2. How can we explain agile teams' effectiveness?
3. How do organizations embed the agile way of working?
4. First, each of these is explored in further detail. Second, an outline of this dissertation is provided.

³ In case of the dissertation, “I” is the referent. In case of the chapters/studies, which multiple people contributed to, “we” is the referent.

1.1 Key issue 1: What do we know about agile teams and their effectiveness?

The widespread adoption of the agile way of working has catalyzed rapid growth in research focusing on agile methodologies, practices, and, most notably, agile teams (Abrahamsson et al., 2009; Hoda et al., 2017). The rapid growth is evidenced across diverse disciplines, including software development (Hoda et al., 2017; Hummel et al., 2013), project management (Koch et al., 2023; Serrador & Pinto, 2015), and, more recently, business and management (Peeters et al., 2022; Rietze & Zacher, 2022). While such cross-disciplinary attention facilitates a lively academic debate, it has also led to a dispersion of insights due to the lack of integration across these varied fields. Consequently, despite all efforts, this presents a significant challenge for conceptualizing the agile way of working and what constitutes agile team effectiveness. This issue is potentially compounded by the diverse disciplines not building upon each other's insights, resulting in siloed knowledge. Moreover, the diversity in foci of the agile way of working (e.g., methodologies, practices, teams), indicators of effectiveness (e.g., general team effectiveness, individual task performance, agility) and research designs (e.g., many grounded theory studies, no clear specifications of multilevel studies, some intervention designs), hinders scholars of this body of literature to gain an overarching picture of the literature.

Thus, this diversity underscores a need for a more integrated exploration of agile teams and their effectiveness to take advantage of the breadth of research. By integrating these different strands of research, a nuanced and comprehensive understanding of agile teams' conceptualization and effectiveness may be gained. Moreover, a future research agenda that builds upon the breadth of research can be formulated, potentially contributing to cumulative insights. Additionally, this provides opportunities to empirically test the effectiveness of the agile way of working.

Specifically, in this dissertation, I aim to compile, organize, and synthesize the dispersed research on agile teams. To do so, we use the input-mediator-outcome-input (IMOI) model as a theoretical anchor. The IMOI model captures the team literature's significant understanding of how teams reach effectiveness. It describes team tasks(s) and situational demands, and the fundamental processes and emergent states that teams use to convert input into outcomes such as team climate, cohesion, knowledge, skills, and abilities (Kozlowski, 2018). Additionally, the IMOI model captures reciprocal linkages that describe how work teams navigate different episodes of action and transition (Ilgen et al., 2005; Kozlowski, 2018; Marks et al., 2001). Building on the IMOI model categories, we present and discuss a parsimonious overview of the key team task(s) and situational demands of agile teams and the process and emergent

states employed by agile teams. Furthermore, we include the indicators of agile team effectiveness explored by the three academic disciplines of software development, project management, and business and management. This effort can be found in Chapter 2, and the insights gathered and formulated in its future research agenda inform the following empirical chapters.

Chapter 3 and Chapter 4 rely on the conceptualization of the agile way of working derived from Chapter 2, utilizing the concepts of agile team orientation, customer collaboration, cross-functional collaboration, reflexivity, and shared leadership. In Chapter 3, the focus is on the relationship between the agile way of working and adaptiveness at the team-level. In Chapter 4, the investigation shifts to the individual level, examining the impact of the agile way of working on sustainable performance – consisting of adaptivity and work engagement. This approach allows for a comprehensive understanding of how the agile way of working influences not just teams as a whole but also the individuals within them.

In sum, Chapters 2, 3, and 4 collectively provide a systematic and empirical examination of the conceptualization and effectiveness of the agile way of working.

1.2 Key issue 2: How can we explain agile team effectiveness?

This dissertation's second issue concerns using theory to understand the processes that lead to agile team effectiveness. Current studies on the agile way of working and agile teams, while expansive, often demonstrate limited engagement with theoretical frameworks (Baham & Hirschheim, 2021; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Yu & Petter, 2014). This gap may be partly attributable to the agile way of working's practical origins, as encapsulated in the Agile Manifesto (Beck et al., 2001), which has emphasized methods and practices over theoretical exploration. As a result, studies on the agile way of working and agile teams lack robust theoretical discourse, with no dominant perspectives offering a comprehensive explanation or prediction of how agile teams reach effectiveness. In several instances, theoretical frameworks like group development models (e.g. Gren et al., 2020; Moe et al., 2010), the input-process-output model (de O. Melo et al., 2013; Wood et al., 2013), and job design (Tripp et al., 2016) have been utilized. Furthermore, recent publications show scholars using the job-demands resources model (Rietze & Zacher, 2022) and psychological safety theory (Hennel & Rosenkranz, 2020; Kakar, 2018a; Peeters et al., 2022). The use of these is encouraging, albeit in a limited capacity.

This dissertation aims to aid to bridge this gap by employing theories such as the IMOI model (Ilgen et al., 2005; Kozlowski, 2018; Marks et al., 2001), Goal-setting theory (Kleingeld et al., 2011; Kramer et al., 2012; Latham & Locke, 2007), Self-determination

theory (Deci et al., 2017), and Substitutes for leadership theory (Kerr & Jermier, 1978), providing a more nuanced understanding of how agile teams reach effectiveness.

The IMOI model (chapter 2) offers a valuable structure for examining teams and may provide an opportunity to link the research on the agile way of working to the broader team literature. This linking is essential to integrate agile teams research with the wider context of team effectiveness studies, as it provides access to more cumulative theoretical insights and a common language of established concepts to understand teams (Hollenbeck et al., 2012; Mathieu et al., 2017). Goal-setting theory helps understand how the agile way of working may drive adaptiveness (i.e., team adaptive performance; Kramer et al., 2012; Nahrgang et al., 2013). Goal-setting theory is particularly relevant to the agile way of working (chapter 3), as agile teams engage in a near-constant cycle of goal setting and refinement. Furthermore, agile teams set these goals participatively, and throughout their cycles, incorporate customer feedback. Self-determination theory is also relevant in this setting, given that self-organization is one of the core principles of the agile way of working (chapter 4). The Agile Manifesto proclaims to “build projects around motivated individuals, give them the environment and support they need and trust them to get the job done” (Beck et al., 2001). By using Self-determination theory, insight into the individual motivations and behaviors that are pivotal to the success of agile teams are incorporated. This individual-centric approach is complementary, but also crucial, as the collective effectiveness of a team is ultimately driven by its team members (Deci et al., 2017; Felin et al., 2015). Finally, the role of leadership in agile teams is explored through the Substitutes for leadership theory (chapter 4), especially examining the distinct role of the Product Owner. While not a hierarchical management role, Product Owner behaviors have similarities to traditional management (e.g., determining the Product Goal, setting tasks), and this role’s interaction with the agile way of working may be vital to understand how leadership roles function within agile frameworks (Kerr & Jermier, 1978).

It is important to note that all these theories have process-oriented approaches, which is precisely what the literature on agile teams necessitates (i.e., mediator-to-mediator linkages; Baham & Hirschheim, 2021; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Yu & Petter, 2014). By incorporating these theories, this dissertation responds to the calls for a deeper theoretical engagement in agile team studies.

1.3 Key issue 3: How do organizations embed the agile way of working?

Up until now, I highlighted two key academic issues concerning the agile way of working: the conceptualization of the agile way of working and agile team effectiveness (Conboy et al., 2011; Conforto et al., 2016) and the use of theoretical frameworks to understand the processes

employed, especially in relation to outcomes like adaptiveness. At the same time, there is a third issue: a significant portion of research on agile teams predominantly focuses on their internal functioning. While this focus is crucial given the two key issues identified earlier, it is equally important to acknowledge that agile teams do not operate in a vacuum. They are part of larger organizational systems, and their effectiveness can be influenced by external factors such as leadership styles, training programs, and organizational support functions (Ilgen et al., 2005; Kozlowski, 2018). The IMOI model, which serves as the theoretical anchor to organize, compile, and synthesize the agile team literature in this dissertation, recognizes these external factors as crucial in shaping, leveraging, or aligning team processes (Ilgen et al., 2005; Kozlowski, 2018). Studies have begun to explore these aspects, such as showing the crucial role of the empowerment-enhancing and empowerment-reducing activities of leaders that impact agile team effectiveness (Grass et al., 2020). However, emerging research in this area is limited (Grass et al., 2020; Gren et al., 2020; Spiegler et al., 2021), indicating how little is empirically known about the roles of Product Owners and Scrum Masters. Despite their involvement in agile teams, there is a dearth of research evaluating the performance quality of these roles and their impact on agile team functioning. In Chapter 4, we address this oversight by examining if the supportive behaviors of Product Owners serve as a moderator of the relationship between the agile way of working, psychological empowerment, and individual sustainable performance.

Furthermore, socio-technical systems thinking poses that when the core system governing the way of working changes, the design of supporting systems within an organization also evolves (Pasmore et al., 2018; Pasmore, 1995). Research findings show that Human Resource Management (HRM) is a critical system affected by the agile way of working (De Smet, 2018; McMackin & Heffernan, 2021; Mollet & Kaudela-Baum, 2022; Roper et al., 2022). The HR practice of performance management seems particularly affected (Cappeli & Tavis, 2016, 2018). Understanding the interplay between the agile way of working and traditional performance management systems is crucial, as performance management is a key HR practice linked to the development and survival of organizations (Aguinis, 2014; Nijssen & Paauwe, 2012). Chapter 5 explores this interplay, focusing on the potential tensions between the agile way of working and traditional performance management systems. Through a multiple case study in four Dutch organizations, I will explore how agile frameworks coexist or require realignment with performance management systems (or: vice versa). This investigation brings recent developments in performance management into the academic discourse (DeNisi & Murphy, 2017; Gorman et al., 2017). It explores how the agile way of working is embedded and facilitated within organizations, going beyond mere agile methods and practices to examine organizational support functions.

1.4 Outline of the dissertation

The research questions are addressed through one systematic literature review and three empirical studies. The chapters are structured as follows:

Chapter 2: This chapter presents a systematic literature review of 74 studies on agile team effectiveness. Its first goal is to compile, organize, and synthesize the dispersed agile team literature. Its second goal is to address two facets of agile teams that have not been fully addressed in the extant team effectiveness literature: their specific purpose of managing uncertainty and their distinctive combination of characteristics (self-organized, iterative, cross-functional, customer-oriented). The Input-Mediator-Outcome-Input model serves as a theoretical anchoring point. Insights from this chapter inform subsequent chapters in this dissertation.

Chapter 3: This chapter reports on an empirical study exploring the relationship between the agile way of working and team adaptive performance, with a focus on team goal specificity and team goal difficulty as mediating factors. Using structural equation modeling on data from 319 agile team members across 71 agile teams and 7 organizations, the study's first goal is to investigate the impact of goal-setting in agile teams. The second goal was to apply Goal-setting theory to the agile context, addressing the theory's generalizability and filling theoretical gaps in the agile literature. The findings highlight the significant role of specific team goals in dynamic settings.

Chapter 4: This chapter examines the influence of the agile way of working on individual sustainable performance, mediated by psychological empowerment, and moderated by the supportive behaviors of Product Owners. The study, using data from 211 agile team members across two questionnaires (i.e., time-separated measurements), had as its aim to understand how the agile way of working impacts individuals. Furthermore, it addresses sustainable performance as a critical success factor in agile contexts. Moreover, it explores non-traditional leadership roles like that of Product Owners, resulting in the development and introduction of a novel scale to measure the supportive behaviors of Product Owners.

Chapter 5: Focusing on the interplay between the agile way of working and traditional performance management (HR practice) in organizations, this chapter theoretically identifies three potential tensions between the agile way of working and traditional performance management. Subsequently, it empirically examines these through a multiple case study in four Dutch organizations. The chapter aims to understand how systems. As a result, it brings recent developments on contemporary performance management into the academic discourse. Moreover, it looks beyond agile methods, practices, and implementation to explore how the agile way of working is embedded and facilitated by organizations and support functions.

Chapter 6: this concluding chapter synthesizes the findings from the previous chapters, addressing the main research question and its sub-questions.

Chapter 2

Understanding how Agile Teams Reach Effectiveness: A Systematic Literature Review to Take Stock and Look Forward

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Abstract

In a global environment that continues to challenge organizations' responsiveness, agile teams have proliferated in diverse sectors of practice and streams of research. However, scholars also indicate that agile teams, their way of working, and how they achieve effectiveness seem to be an undertheorized phenomenon. To better account for and understand how agile teams reach effectiveness, we aim to compile, organize, and synthesize the agile team literature using the IMOI model as a theoretical anchoring point. We systematically reviewed 74 studies on agile teams and identified their key input, mediator, and outcome factors. This effort has, consequently, allowed us to identify crucial theoretical and methodological gaps in the understanding of how agile teams manage uncertainty and what is needed to close these gaps. Furthermore, we identified three themes relevant to all teams dealing with the management of uncertainty.

Key words: agile teams, team effectiveness, human resource management, organizational behavior

2.1 Introduction

Two decades ago, a group of experts from the software development industry convened to seek alternatives to documentation-driven, heavyweight software development processes (i.e., the agile manifesto; Beck et al., 2001). They believed that document-driven, heavyweight processes failed to provide sufficient customer value due to the challenges of accurately specifying requirements and rapid changes in the organizational environment and/or markets. For instance, the United Kingdom's National Health Service invested billions of pounds in a 10-year IT program that ultimately failed due to changing specifications, technical difficulties, and supplier conflicts (Wright, 2011). This problem is not unique, as data show that around half of large IT projects run over budget, behind schedule, and deliver less value compared to non-IT projects (Bloch et al., 2012). To address these challenges, a more agile approach to project management and customer collaboration emerged from the software development experts. Their more agile approach is based on people, collaboration, and building the types of organizational communities that attract, motivate, and retain workers (Beck et al., 2001). Notably, Spotify, a music, video, and podcast streaming company, adopted agile teams that self-organize, are cross-functional, and work and reflect in cycles of two to four weeks (Mankins & Garton, 2017). In the practitioner community, this model centered around agile teams has been associated with Spotify's ability to respond swiftly to market changes, such as the rise of podcasts, while maintaining alignment internally (Digital.ai, 2022; Fortune/Deloitte, 2021; Rigby et al., 2018; Rigby et al., 2016).

While agile teams emerged from the software development industry and may be considered the norm there (Abrahamsson et al., 2009; Campanelli & Parreiras, 2015; Dikert et al., 2016; Dybå & Dingsøy, 2008; Hoda et al., 2017), there are substantial indications that the adoption of agile teams in other settings is growing. These indications, perhaps unsurprisingly, come from some of the major consultancy firms who state that "agile is the new default way of working" (Deloitte, 2019, p. 3) and that "agility is today's challenge for every company" (PWC, 2021, p. 21). However, academic publications also support the further proliferation of agile teams into more diverse contexts. From these publications, we see the adoption of agile teams across contexts such as services, research and development, government, education, and also in human resources, marketing, and retail (Koch et al., 2023; López-Alcarria et al., 2019; McMackin & Heffernan, 2021; Mergel et al., 2018; Peeters et al., 2022; Prange, 2021; Rigby et al., 2016). Considering digitalization, which makes software development and IT more central to many jobs, and a more unpredictable global environment (Adam,

2023; Kuusisto, 2017; Legner et al., 2017; Parviainen et al., 2022; United-Nations, 2023), agile teams may grow in a variety of contexts.

Scholars of agile teams claim that how agile teams reach effectiveness is not fully understood and persistently report on “conceptual ambiguity” (Abrahamsson et al., 2009; Baham & Hirschheim, 2021, p. 103; Conboy, 2009; Conforto et al., 2016; Dybå & Dingsøy, 2008; Hoda et al., 2017). Moreover, reports describe difficulty with “understand[ing] a phenomenon that was born from and continues to be nurtured in practice” and a lack of theory that captures agile teams’ distinctive characteristics as a whole instead of separate aspects (Baham & Hirschheim, 2021, p. 104; Conboy, 2009; Conforto et al., 2016; Fisher et al., 2021). Agile teams, their way of working, and how they achieve effectiveness seem to be an undertheorized phenomenon (Ployhart & Bartunek, 2019; Sutton & Staw, 1995). The team effectiveness literature contains a significant understanding of how teams reach effectiveness (Ilgen et al., 2005; Kozlowski, 2018; Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; Marks et al., 2001; Mathieu et al., 2008; Mathieu et al., 2017). This understanding has been captured in the input-mediator-outcome-input (IMOI) model that presents the research on work teams and describes the fundamental processes and emergent states that teams use to convert inputs into outcomes (Ilgen et al., 2005; Kozlowski, 2018). Additionally, the IMOI model captures reciprocal linkages that describe how work teams navigate different episodes of action and transition (Ilgen et al., 2005; Kozlowski, 2018; Marks et al., 2001).

Despite the rich theoretical insights from the team effectiveness literature, there are two key facets of agile teams that are not fully addressed. First, the agile team concept addresses a specific purpose of organizing for rapid change in the organizational environment and/or markets and managing uncertainty. This relates to the original intent of the group of software development experts and continues to be echoed in scholarly descriptions of agile teams (Beck et al., 2001; Birkinshaw, 2019; Koch et al., 2023; Rigby et al., 2018; Serrador & Pinto, 2015). Although teams come in a variety of purposes and forms, many of the studies in the team literature have focused on stable teams with well-defined fixed tasks, which for agile teams is significantly different due to adaptation being prioritized and them determining tasks every two to four weeks (Hollenbeck et al., 2012; Ilgen et al., 2005). The second facet concerns the structure of agile teams, which consists of self-organized, cross-functional teams (Grass et al., 2020; Moe et al., 2010; Rietze & Zacher, 2022), but not necessarily self-managed teams, that have fast-paced transitions between action and transition episodes each two to four weeks (i.e., sprints; Kude et al., 2019; Layman et al., 2006; Santos et al., 2015). Agile teams involve their customer at the end of each sprint to gather feedback and set new goals (Drury-Grogan, 2014; Hoda et al., 2011; Wiesche,

2021). In a separate meeting at the end of a sprint, agile teams prioritize those tasks, reflect on team collaboration and coordination, and discuss any improvements they wish to make (Annosi et al., 2020; Fontana et al., 2014; Lee et al., 2015; Moe et al., 2010; Vishnubhotla et al., 2020). Considering these characteristics collectively, teams that are self-organized, work iteratively, are highly customer-focused, and staffed cross-functionally are not well accounted for in the team effectiveness literature (Baard et al., 2013; Kozlowski, 2018; Kozlowski & Bell, 2003; Kozlowski & Ilgen, 2006; Mathieu et al., 2017; Maynard et al., 2015; Tannenbaum et al., 2012). At the same time, the agile team research itself is dispersed over disciplines such as software development (Hoda et al., 2017; Hummel et al., 2013), project management (Koch et al., 2023; Serrador & Pinto, 2015), and recently business and management (Peeters et al., 2022; Rietze & Zacher, 2022). This dispersion complicates drawing out cumulative insights on how agile teams reach effectiveness.

To better account for and understand how agile teams reach effectiveness, we aim to compile, organize, and synthesize the agile team literature using the IMOI model as a theoretical anchoring point. This effort will contribute to greater conceptual clarity regarding how agile teams achieve effectiveness by combining the scholarly findings from the dispersed agile team literature. Moreover, it enhances the theoretical foundation for the relationship between agile teams and effectiveness by paying specific attention to the two key facets (i.e., specific purpose and distinctive characteristics of agile teams) that the team effectiveness literature has not fully addressed. Consequently, a theoretical foundation enhances our understanding of the relationship between agile teams and their effectiveness (Ployhart & Bartunek, 2019; Sutton & Staw, 1995). Thereby, on the one hand, reducing the field's "thirst for theory" and on the other, facilitating empirical testing (Baham & Hirschheim, 2021, p. 103). Furthermore, it allows for the identification of key gaps in the research and the formulation of a future research agenda (Klein & Potosky, 2019). Our findings may also be relevant and offer insights for team forms other than agile teams. Given that the current global environment is unlikely to see more stability and predictability due to global trends such as deglobalization and the rise of a multi-polar international order (Adam, 2023), further digitalization (Kuusisto, 2017; Legner et al., 2017; Parviainen et al., 2022), and the impact of climate change (United-Nations, 2020, 2023), organizations continue to be challenged by uncertainty. This makes a study of agile teams and what we know about how they reach effectiveness and successfully adapt to changing requirements, with their specific purpose and distinctive characteristics, broadly relevant. This is further evidenced by scholars of teams who point out that the nature of teams is changing and indicate that agile teams are exemplary of this

change (Mathieu et al., 2017; Tannenbaum et al., 2012). Hence, our study contributes to understanding modern teams, the future of work arrangements, and the kind of teaming that organizations use to enable adaptive responses to change.

2.2 IMOI model as theoretical anchor

The IMOI model is a conceptual framework that captures the findings from decades of research on work teams and describes the fundamental processes and emergent states that teams use to convert inputs into outcomes (Ilgen et al., 2005; Kozlowski, 2018; Kozlowski & Ilgen, 2006). The IMOI model provides a theoretical anchoring point for our literature review. In the IMOI model, environmental dynamics and complexity drive inputs such as the team task and the situational demands. Subsequently, teams convert inputs through processes and emergent states to cope with task demands and generate team effectiveness. Team processes are “the means by which members work interdependently to utilize various resources, such as expertise, equipment, and money, to yield meaningful outcomes” (Marks et al., 2001, p. 357). Emergent states are “constructs that characterize properties of the team that are typically dynamic in nature and vary as a function of team context, inputs, processes and outcomes” and “typically describe cognitive, motivational, and affective states of teams” (Marks et al., 2001, p. 357). Examples of key identified team processes are mutual performance monitoring, backup behavior, and feedback, while examples of emergent states are team climate, cohesion, and affect. Some scholars note that, at times, it may be difficult to characterize a construct as a process or emergent state (Fyhn et al., 2023; Ilgen et al., 2005; Marks et al., 2001), and others appear to consider these two to be the same (Kozlowski, 2018). However, it does seem from the team literature that what distinguishes these two is the dynamic aspect that is more explicit in emergent states, which may be considered as a continuum between stable and dynamic (Fyhn et al., 2023). Team cohesion, for instance, requires time to establish, and member churn could result in building or lessening cohesion. Factors such as leadership and team training may shape, leverage or align these processes. Work teams use processes and emergent states to transform their input into output. The prevalent view in the literature of when a team is effective has three facets: a) performance judged by relevant others external to the team, b) meeting of team-member needs, and c) viability (including members’ well-being), or the willingness of members to remain in the team (Hackman, 1987; Kozlowski & Ilgen, 2006, p. 79). Finally, the team’s output influences its environment, which implies that through reciprocal cycles, teams navigate different episodes of action and transition (Marks et al., 2001).

We use the IMOI model as a theoretical anchoring point to compile, organize, and synthesize the agile team literature to better understand how agile teams reach effectiveness. More specifically, as explained above, the IMOI model points to inputs, mediators (processes and emergent states), outcomes, and their reciprocal nature as crucial for such understanding. In the following, we first detail the methodology applied in the current systematic literature review. This allows us to identify what we know (i.e., findings section) and consider what we still need to know (i.e., discussion, key gaps, and future research agenda) about agile team effectiveness.

2.3 Methodology

We use systematic literature review (Rojon et al., 2021; Simsek et al., 2021; Tranfield et al., 2003). The first step was identifying the relevant literature on agile team inputs, mediators (processes and emergent states), outcomes, reciprocal nature, and their effectiveness. We searched the literature using the term “agile team” and variations such as “scrum team” or “agile squad” as well their plural forms in the databases Web of Science and IEEE Xplore. This search was initially performed on May 2, 2022, and then updated on February 2, 2023, to include all studies published or available for early access in 2022. For transparency and reproducibility, the search strings are reported in Table 2.1. We selected Web of Science as it includes nearly all disciplines and is one of the most expansive databases. IEEE Xplore was selected as the key database for agile team research (Hoda et al., 2017). Only English journal articles were included. The decision to specify the search for journal articles was based on our aim to cast a wide net while making claims based on research that adheres to good academic practice. We use academic peer review as a proxy for adherence to good academic practice and do not review grey literature or conference papers as these may use different review practices. Next, we specified where keywords should appear in the articles: the fields of title, author’s keywords, and abstract. The rationale was that agile teams should be central enough to the study to be mentioned in any of these fields.

Table 2.1 Search statement per database.

Web of Science	IEEE Xplore
((((((TI=(agile or scrum)) AND TI=(team* or squad*)) OR AB=(agile or scrum)) AND AB=(team* OR squad*)) OR AK=(agile or scrum)) AND AK=(team* or squad*)) AND LA=(English)) AND DT=(Article)	("Document Title":agile OR scrum) AND ("Document Title":team* OR squad*) OR ("Abstract": agile OR scrum) AND ("Abstract": team* OR squad*) OR ("Author Keywords": agile OR scrum) AND ("Abstract": team* OR squad*)

Note. *TI* = title, *AB* = abstract, *AK* = author’s keywords, *LA* = language, *DT* = document type

After removing duplicates, 283 studies remained. Three criteria subsequently guided the decision on whether to include studies for review. First, agile teams had to be studied as the core of the research. Second, the study should be empirical and set in the context of work (i.e., work teams). Third, the study must describe a relationship to agile team effectiveness to some extent, where effectiveness was studied in line with the prevalent view of team effectiveness with three facets: a) performance judged by relevant others external to the team, b) meeting of team-member needs and c) viability (including members' well-being), or the willingness of members to remain in the team (Hackman, 1987; Kozlowski & Ilgen, 2006, p. 79). We also include studies that have used self-reports on the performance facet to not exclude most studies. Considering the relatively small number of studies to be assessed on these criteria, they were read in full. The first author did this, while the second and third authors double-checked the included studies. In addition, the second and third authors audited a random selection of studies to evaluate whether they would assess them similarly. This was the case, and 53 studies remained. Backward and forward searches were applied to the 53 studies. The backward search resulted in the inclusion of 15 studies, while the forward search resulted in the inclusion of 6 studies. In total, 74 studies were included.

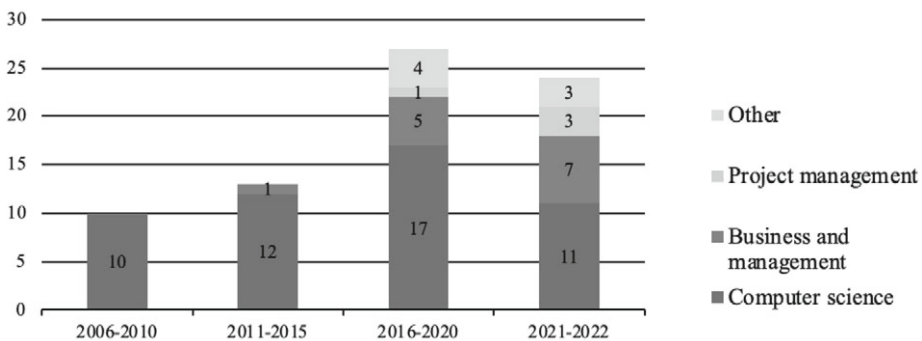
We apply thematic analysis to identify, analyze, and interpret information in the included studies (Braun & Clarke, 2006). Based on the IMOI model, we searched for the descriptions of agile teams, the processes and emergent states they use, reciprocal cycles, and the team effectiveness measures reported in the included studies. We looked specifically for concepts with conceptual relevance to the team (not the individual or organizational). A double coding process occurred in which the second and third authors reviewed a random sample of studies and then compared among authors. For each study, a coding scheme was used, and after completing all 74 coding schemes, we searched for themes in the data. We considered how different codes might combine to form an overarching theme. A code can be a particular construct used to study team effectiveness or a process that agile teams use to turn inputs into outcomes. A theme is a descriptive label that connects codes. After identifying themes, these were critically reviewed by the three involved authors, and changes were made. However, when the complete mapping worked, the reviewing of themes stopped. Whether the mapping worked was determined by using the criteria of 1) internal homogeneity (i.e., the codes within a theme are coherent) and 2) external heterogeneity (i.e., between themes, there are clear and identifiable distinctions; Braun & Clarke, 2006). The mapping also show how much attention particular elements of the IMOI model have received in the agile team research. As a result, we can report findings on team task(s) and situational demands, processes, emergent states, and agile team effectiveness. There has been

comparatively too little research on the factors that shape, leverage or align processes to make statements about them in the current review (Gren et al., 2020; Spiegler et al., 2021; Srivastava & Jain, 2017). The same is the case for reciprocal cycles (Annosi et al., 2020; Layman et al., 2006).

2.3.1 Description of studies

The systematic review included 74 journal studies. The first reviewed study was published in 2006; since then, there has been a steady growth in the number of studies. Ten studies were published from 2006 to 2010, 13 studies were published from 2011 to 2015, and 26 studies were published from 2016 to 2020. For 2021-2022, 25 studies were published or available for early access. Diversification is noticeable when identifying the fields in which they have been published. Where initially studies were only or majorly published by journals focused on computer science, since 2016, journals focusing on business and management and project management also published on agile teams (see Figure 1). This shows a diverse interest in agile teams and reflects the broader interest for and application of agile teams that are observed in practice. Regarding research design, 31 of the included studies were qualitative, 33 studies were quantitative, and 10 were mixed method. Concerning qualitative studies, case studies and grounded theory were often used (16 and 5 times). The subjects of data collection were, in most cases, software developers and software development teams in dedicated software companies. More recently, a greater variety of professional employees was investigated (e.g., in banking, retail, compliance, human resources). See appendix 1 for additional descriptive information regarding the studies.

Figure 2.1 Journals with specific interests published on agile teams.



2.4 Findings

Based on the review, we categorize our findings in inputs, mediators, and measures of agile team effectiveness (Ilgen et al., 2005; Kozlowski, 2018; Kozlowski & Ilgen, 2006). We separated mediators into team processes and team emergent states (Marks et al., 2001). Table 2.3 provides an overview of our findings and includes the proportion of studies in which a given theme was used (i.e., X out of 74 studies).

Table 2.3 Key findings per review question.

	Input (team task and situational demands)	Processes (mediator)	Emergent states (mediator)	Outcome (effectiveness)
Review question	(1) What are the team task(s) and situational demands of agile teams?	(2) What are the key team processes (mediators) of agile teams studied?	(3) What are the key emergent states (mediators) of agile teams studied?	(4) How is agile team effectiveness studied?
Key findings: theme and sub-themes* <i>Number of studies that address a particular theme</i>	Specialized, complex tasks <i>74 out of 74 studies (100%)</i>	Shared leadership <i>67 out of 74 studies (90.5%)</i>	Agile team orientation <i>42 out of 74 studies (56.8%)</i>	Performance <i>56 out of 74 studies (75.7%)</i>
	Software development <i>57 out of 74 studies (77.0%)</i>	Reflexivity <i>44 out of 74 studies (59.5%)</i>	Shared mental models and transactive memory system <i>16 out of 74 studies (21.6%)</i>	Generic assessment of effectiveness <i>39 out of 74 studies (52.7%)</i>
	Customer collaboration <i>26 out of 74 studies (35.1%)</i>	Empowering behavior <i>23 out of 74 studies (31.1%)</i>	Psychological safety <i>14 out of 74 studies (18.9%)</i>	Adaptive performance <i>19 out of 74 studies (25.7%)</i>
	Cross-functional <i>34 out of 74 studies (45.9%)</i>			Success in software development <i>12 out of 74 studies (16.2%)</i>
				Sustainability and team member well-being <i>12 out of 74 studies (16.2%)</i>

Note. * Sub-themes only apply to “specialized, complex tasks” and “performance”.

2.4.1 What do we know about the team task(s) and situational demands of agile teams?

The team task describes what teams do and sets the minimum requirements the team members must meet. Based on the reviewed studies, most agile teams are engaged in software development and delivery to customers (alternatively: stakeholders, user;

Hoda et al., 2017), and all agile teams somehow deal with complex and specialized tasks. Software development and delivery are expertise, meaning that it is required that agile team members possess capabilities regarding software development (e.g., requirement engineering, developing software, testing software). In contrast, other team members must be skilled at collaborating with the “business” that the software is delivered to. Capabilities that 1) enable the agile team to work together with their stakeholders effectively, 2) deliver software to their stakeholders, and 3) adjust if needed are vital capabilities in agile teams. At the same time, some overlap in capabilities is desirable so that team members can take work over from each other if required (Moe et al., 2010). So, agile teams are moderate-high in skill differentiation *or* cross-functional to meet their team task (Hollenbeck et al., 2012). Since software development is complicated, and it is expected to take time before agile teams collaborate effectively, agile teams should not have high levels of team member churn (Kadenic et al., 2023). In other words, agile teams have high temporal stability (Hollenbeck et al., 2012). In the reviewed studies that do not (exclusively) focus on software development, agile teams are also described as taking on specialized and complex tasks (e.g., Drury et al., 2012; Holtzhausen & de Klerk, 2018; Peeters et al., 2022), and thus it appears these capabilities are generalizable across agile teams in different contexts.

Agile teams’ way of working leads them to schedule their work activities in 2-4 week cycles to ensure effective coordination regarding their team tasks. In each cycle, the agile team members set their goals and break those up into more minor work activities. Each morning, the team members meet for 15 minutes to discuss progress on their work activities and whether they require help or information from other agile team members. At the end of each cycle, the agile team presents their progress to their stakeholders for review, and input is requested for the next cycle’s goal. The team members have a separate meeting to reflect on increasing quality and effectiveness. And then the next cycle starts. To ensure that all agile team members are engaged in this way of working, agile teams are self-organized and do not have a hierarchical leader; they are low in hierarchical differentiation (Hollenbeck et al., 2012). What appears from the reviewed studies, however, is that these teams do often have a “customer representative” and a “process manager” to make sure the above practices are indeed implemented and result in effective software development and delivery (Barke & Prechelt, 2019; Cornide-Reyes et al., 2021; Georganta et al., 2021; Hoda et al., 2013; Ramasubbu & Bardhan, 2021; Strode et al., 2022). The often-used Scrum framework for agile teams respectively labels these as Product Owner and Scrum Master (Holtzhausen & de Klerk, 2018; Kadenic et al., 2023; Moe et al., 2010; Schwaber & Sutherland, 2020; Srivastava & Jain, 2017).

2.4.2 What do we know about the key team processes (mediators) of agile teams?

Shared leadership. Agile teams have low levels of hierarchical differentiation that result in a distribution of leadership roles and influences among team members. We refer to this as shared leadership, characterized by lateral influence among peers that develops and increases as a team matures. Shared leadership emphasizes the social interactions among team members where they lead each other toward goal achievement (Wanget al., 2014; Zhu et al., 2018). While the low hierarchical differentiation in agile teams can be considered a structural component, shared leadership is both a behavioral (coordination) and cognitive (different roles, making use of the granted empowerment) process through which agile teams make their self-organization work. This is needed because to effectively perform their specialized and complex tasks the agile team needs each member to contribute and combine their knowledge, skills, and abilities. This point is even further stressed by the cross-functional nature of agile teams, which places a greater demand on all team members to actively contribute to the successful development of goals and execution of tasks. The reviewed studies describe shared leadership as the key to this and refer to “coordination” (Annosi et al., 2020; Li et al., 2010; Lindsjörn et al., 2016; Ryan & O’Connor, 2009; Ryan & O’Connor, 2013; Spagnoletti et al., 2022), self-organization (Annosi et al., 2016; Barke & Prechelt, 2019; Conboy et al., 2011; Grass et al., 2020; Hodgson & Briand, 2013; Moe et al., 2009, 2010; Rietze & Zacher, 2022), “shared leadership” (Cornide-Reyes et al., 2021; Drury-Grogan, 2014; Freire et al., 2018; Hennel & Rosenkranz, 2020; Holtzhausen & de Klerk, 2018; Vidgen & Wang, 2009), “team autonomy” (Gregory et al., 2022; Kude et al., 2019; Wood et al., 2013), and “team leadership” (Gren et al., 2019; Malik et al., 2021; Spiegler et al., 2021).

Empirical work has demonstrated that different roles exist in agile teams, each fulfilling a different function related to shared leadership. For instance, the Mentor guides and supports the team with the agile way of working (referring to the specific rituals such as the daily 15-minute meetings and demonstrations to customers). The Coordinator manages the collaboration with the customer (i.e., Product Owner) and a Champion who rallies support in the organization for the team, amongst other roles (Hoda et al., 2013). While these roles exist, there are no indications that any of these is more powerful than another, thereby maintaining a lateral influence among agile team members. These roles additionally imply a temporal element. While the team will have some degree of shared leadership from the start, over time, people grow into these roles and become more effective at them. This is also evidenced by reviewed studies that indicate that as teams mature, they become better at shared leadership,

which consequently enhances their effectiveness (Fontana et al., 2014; Gjøystdal & Karunaratne, 2020; Gren et al., 2019, 2020; Kadenic et al., 2023; Moe et al., 2009; Spiegler et al., 2021). The following quote further elaborates on the shared leadership of agile teams: *“Agile teams are meant to be democratic teams- where all members are considered peers at the same level, without a strict hierarchy in practice. Team members are empowered with collective decision-making and cross-functional skills, which increases their ability to self-organize”* (Hoda et al., 2013, p. 424).

Reflexivity. A critical behavioral and cognitive process that agile teams use is reflexivity, meaning they “overly reflect on their objectives, strategies, and processes, and adapt them to current or anticipated circumstances” (Schippers et al., 2007, p. 190). This includes communicating and coordinating objectives, strategies, and processes with stakeholders. Central to reflexivity is that teams reflect, plan, and adapt their plans if required and do this regularly. Reflection can be shallow (i.e., reflecting on the issues related to the task at hand), moderate (i.e., critical reflection on the tasks, goals, strategies, and processes of the team), and deep (i.e., reflecting on the norms and values of the team and their effect on its functioning). Teams that show reflexivity can act proactively (Konradt et al., 2016; Schippers et al., 2007). The reviewed studies on agile teams either explicitly or implicitly allude to the concept of reflexivity, stating that “feedback” (Dönmez et al., 2016; Freire et al., 2018; Layman et al., 2006; Woods, 2015), “reflection” (Georganta et al., 2021; Grass et al., 2020; Kakar, 2017; Kude et al., 2019; Rodríguez et al., 2012), and “adaptation” (de O. Melo et al., 2013; Drury-Grogan, 2014; Kaikkonen et al., 2018; Kakar, 2018a; Zia et al., 2018) are prevalent, and agile teams “embrace change” (Fontana et al., 2014; Ramasubbu & Bardhan, 2021; Spagnoletti et al., 2022; Venkatesh et al., 2020).

Agile teams depend on reflexivity to make their action phases of 2-4 weeks work and to transition between episodic cycles. During their daily 15-minute meeting, the agile team members engage in shallow reflection to inspect their progress toward the cycle’s goal and, if necessary, adapt this goal. It is also the moment to ask for support from other team members (Kude et al., 2019; Moe et al., 2010). Moderate reflection occurs when agile team members demonstrate their progress to customers for review. Customers actively provide feedback on whether the work provides sufficient value as it progresses, and while the team collects feedback, it may decide in collaboration with its customers that adaptation is required to deliver value (Ciriello et al., 2022; Hoda et al., 2011). Following the demonstration, the agile team members engage in a retrospective meeting focusing on increasing quality and effectiveness. It may include adapting their plans, interactions, processes, and tools, representing reflexivity’s deep reflection component (cognitive element of reflexivity). After gaining feedback and

engaging in reflection, agile teams determine a goal for the next cycle and implement the outcomes of their reflection in their plans (Barke & Prechelt, 2019; Stray & Moe, 2020). To provide a more vivid picture of how agile teams employ reflexivity, we use two quotes from reviewed studies: *“As these teams develop objectives at the start of each iteration [episodic cycle], agile teams, therefore, work under extreme time pressure to deliver working software in these short iterations with frequent, short-term decisions, using minimal documentation. The iteration-based focus enables agile teams to adapt and respond quickly to changing requirements as they deliver working software frequently, each iteration”* (Beck et al., 2001; Boehm, 2002; Drury-Grogan, 2014, p. 508; Fitzgerald et al., 2006; Okoli & Carillo, 2012). *“Customer collaboration is a vital feature and an important success factor in agile software development. Agile methods expand the customer role within the entire development process by involving them in writing user stories, discussing product features, prioritizing the feature lists, and providing rapid feedback to the development team on a regular basis”* (Hoda et al., 2011, p. 521).

Empowering behavior. That agile teams use shared leadership does not exclude that the team members report to some form of management. In organizations, there will be a structure that agile teams are part of and assigns them a person responsible for the team members. This person is not a part of the day-to-day tasks but instead administers performance management activities such as performance appraisal, development, and promotion or intervenes when undesirable phenomena such as groupthink or peer pressure arise (Brodnicki, 2021; Khanagha et al., 2021). It may also be the case, owing to the cross-functional nature of agile teams, that team members have different managers. These leaders or managers are often described with characteristics that match empowering leadership, a behavioral process that means to enhance the agile team's autonomy, control, self-organization, and confidence (Chen et al., 2007; Cheong et al., 2019). These empowerment behaviors are generally facilitative and motivational for team members to contribute to the team. In the context of agile teams, they also push the team members to embrace the processes of reflexivity and shared leadership. Following the above, as agile teams grow in their level of shared leadership, the extent to which this formal leader is involved declines. Reviewed studies describe the formal leadership of agile teams in terms such as “empowered” (Ciriello et al., 2022; Drury et al., 2012; Grass et al., 2020; Gren et al., 2020; Hoda et al., 2013; Holtzhausen & de Klerk, 2018; Kadenic et al., 2023; Maruping, Venkatesh, et al., 2009; Melo et al., 2013; Peeters et al., 2022; Strode et al., 2022), “facilitative” (Srivastava & Jain, 2017), and “supportive” (Barke & Prechelt, 2019; Khanagha et al., 2021; Moe et al., 2010).

The reviewed studies suggest an interplay between shared leadership among agile team members and empowering behaviors by leadership. For instance, in

teams, informal norms on the right kind of behavior develop, which may result in peer pressure (Khanagha et al., 2021). Peer pressure is associated with direct demands, open confrontation, or guilt-inducing comments, and it can constrain the team's effectiveness. Due to their shared leadership, agile teams are more prone to peer pressure (Khanagha et al., 2021). When levels of peer pressure reach undesirable levels, leaders of agile teams may apply diagnostic control, meaning to impose deadlines and provide feedback to support the team members in recognizing and resolving issues around destructive behavior. This impedes the shared leadership of the agile team, and it does not display empowering behavior. However, it does weaken the detrimental effect of peer pressure on agile team effectiveness. As peer pressure is dynamic, so is the behavior of leaders as they choose (or not) to respond to phenomena that threaten team effectiveness. When agile teams enter new circumstances, this dynamic between the team and a leader is also present. To elaborate, particular customer or organizational requirements may impede the shared leadership of the agile team when the leader decides to protect the team from these, which forces the team to follow (Alyahya et al., 2022; Ciriello et al., 2022; Hoda et al., 2010, 2011). Alternatively, a formal leader's hesitation or reluctance to embrace the agile way of working may also constrain the team's level of shared leadership (Grass et al., 2020). The following quotes illustrate the agile team-leader dynamic: *"Empowerment-enhancing behavior by the team can be mirrored by the corresponding leader-perspective, namely granting empowerment. The promise of satisfied team members who identify with and act responsibly regarding the product is the main motivation to engage in empowering behavior"* (Grass et al., 2020, p. 337). *"Some empowerment-reducing activities can be perceived as positive, for example, leaders helping the team, whereas others can be classified as negative, for example, leaders clinging to their formal power"* (Grass et al., 2020, p. 339).

2.4.3 What do we know about the key emergent states (mediators) of agile teams?

Agile team orientation. Team orientation is an essential emergent, affective state and refers to the "acceptance of team norms, the level of group cohesiveness, and the importance of team membership" in agile teams (Dickinson & McIntyre, 1997, p. 482; Moe et al., 2010). Furthermore, it describes a collectivistic attitude and members' commitment toward the agile team and its way of working – sometimes called the agile mindset (Gren et al., 2019; Moe et al., 2010; Tyagi et al., 2022). Additionally, team orientation means that agile team members assign high importance to the team rather than the individual, as they think of "we" over "me". Accordingly, agile teams prioritize team goals over individual goals, and team members are willing to participate in all

aspects of the team (Dickinson & McIntyre, 1997; Moe et al., 2010). Such commitment to the team will grow over time. Team orientation is such an essential emergent state in agile teams because the team members are highly dependent on each other to reach team effectiveness and therefore require all members to engage with the team. Team orientation will likely vary along with higher levels of reflexivity and shared leadership; team members are expected to prioritize these processes as they are instrumental for the entire team's effectiveness. In other words, they do not prioritize their individual performance but instead, put it to work for the team's benefit. Studies included in our review refer to team orientation by "cohesion" (Cornide-Reyes et al., 2021; Drury et al., 2012; Freire et al., 2018; Lindsjörn et al., 2016; Tyagi et al., 2022; Werder & Maedche, 2018) or simply "team orientation" (Dingsøyr et al., 2016; Freire et al., 2018; Gren et al., 2019; Hoda et al., 2011; Moe et al., 2012; Moe et al., 2009; Spagnoletti et al., 2022). Agile teams are also described as a "collective" with "whole-team responsibility" and "shared goals" (Fagerholm et al., 2015; Freire et al., 2018; Kula et al., 2021; Melo et al., 2013; Wood et al., 2013). The following excerpt shows the importance and volatility of team orientation for agile teams: *"The many interdependent tasks and the tight collaboration among individual team members together make cooperation a central issue. A competitive attitude-meaning self-interest at the expense of the overall performance of the team tasks may not benefit the work of the team"* (Lindsjörn et al., 2016, pp. 275-276; Tjosvold, 1998).

Shared mental models and transactive memory systems. Shared mental models and transactive memory systems are meaningful emergent, cognitive states in agile teams. We present these two concepts together since they overlap (e.g., correlation of .85; Ellis, 2006; Ryan & O'Connor, 2013), while we acknowledge that they are conceptually distinct.

Shared mental models are a concept of collective cognition and are considered the organized understanding of a team's mental representation of knowledge. Generally, there are task-based shared mental models, referring to a common understanding of team members regarding their task and the role the broader environment may play, and team-based shared mental models, which reflect the shared understanding of how the team members interact with each other (Converse et al., 1991; Mathieu et al., 2000). Shared mental models enable agile team members to act based on their understanding of the task demands and how these will affect their team's response (Barke & Prechelt, 2019). This knowledge facilitates proactivity in meeting situational needs and enhances the agile team's effectiveness (Junker et al., 2021). The rituals that are part of the agile way of working likely create shared mental models, as team members have daily alignment on their tasks, and therefore create clarity regarding their role in the team and the tasks they are working on, while the different levels

of reflection ingrained in these rituals grow and align the understanding of how the team interacts (i.e., reflexivity and shared leadership). Consequently, the degree of commonality and the quality of the shared mental models increases, benefiting agile team effectiveness. The reviewed studies point toward the criticality of shared mental models (Barke & Prechelt, 2019; Dingsøyrr et al., 2016; Gjøystdal & Karunaratne, 2020; Gregory et al., 2022; Kude et al., 2019; Moe et al., 2009; Spiegler et al., 2021; Strode et al., 2022).

Transactive memory is the “shared division of cognitive labor with respect to the encoding, storage, retrieval, and communication of different domains that often develops in close relationships” (Hollingshead, 2001, p. 1080; Lewis & Herndon, 2011; Wegner, 1987). Put simply, it refers to who knows what in a team and that this is known across members. Transactive memory systems must emerge as agile team members are specialists in some domains but not all, and the team members rely on each other for information from different domains (Ryan & O’Connor, 2013). This is due to the cross-functional nature of agile teams, required to deliver on the specialized and complex tasks these teams usually work on. Based on the rituals that agile teams use, transactive memory systems develop, which allows the knowledge held by team members to become connected and accessible to all. Because of quick and coordinated access to specialized expertise, agile teams benefit from enhanced communication and coordination, which results in improved team effectiveness. Explicit or implicit references to transactive memory systems are made in multiple reviewed studies (Dingsøyrr et al., 2016; Drury-Grogan, 2014; Fontana et al., 2014; Kakar, 2018a; Kula et al., 2021; Lee & Xia, 2010; Maruping, Zhang, et al., 2009; Ryan & O’Connor, 2013).

The following quote illustrates the importance of shared mental models and transactive memory systems for coordination: We provide a quote to illustrate the need that agile teams have for shared mental models and transactive memory systems to do their cross-functionality work and perform effectively: *“Transactive memory was found to be related to both the quality and quantity of social interaction... Furthermore, team tacit knowledge was related to transactive memory, providing evidence that tacit knowledge is created through social interaction, which increases the development of shared mental models”* (Ryan & O’Connor, 2013, p. 1622).

Psychological safety. “A shared belief among team members that they can take interpersonal risks and can be open about their mistakes” is an essential affective and cognitive emergent state in agile teams (Edmondson, 1999, p. 354; Edmondson & Lei, 2014). Such a shared belief is described as “psychological safety”, an interpersonal norm expressing the belief that the team will not embarrass, reject, or punish a team member for speaking up (Edmondson, 1999). Mutual respect and trust among the members of an

agile team are fundamental; they ease concerns regarding others' reactions to actions that may be considered "risky" and allow team members to be themselves. Teams with high psychological safety will see team members, for instance, bring up errors that may assist the team in making changes beneficial for team effectiveness. In contrast, in teams with low psychological safety, team members may be unwilling to bring up errors because they fear the response (e.g., being seen as incompetent), which threatens team effectiveness (Edmondson, 1999; Edmondson & Lei, 2014). Since agile teams rely on reflexivity and shared leadership processes, which center on team members speaking up and sharing their knowledge, skills, and abilities, psychological safety is crucial to develop so that agile teams can use these processes to their benefit (Peeters et al., 2022). That agile teams are also cross-functional stresses the previous claim further: when team members do not feel safe to share, the specific knowledge, skills, and abilities that they bring to the team may be wholly missed (Kakar, 2018a). Many reviewed studies reference "psychological safety" (Annosi et al., 2020; Cornide-Reyes et al., 2021; Gjøystdal & Karunaratne, 2020; Hennel & Rosenkranz, 2020; Holtzhausen & de Klerk, 2018; Peeters et al., 2022; Ryan & O'Connor, 2009; Spiegler et al., 2021; Strode et al., 2022; Vishnubhotla et al., 2020), while others refer to "trust" (Freire et al., 2018; Hodgson & Briand, 2013; Tyagi et al., 2022). To make the importance of psychological safety more tangible, the following quote addresses safety in the context of team resilience: *"To achieve team resilience, a team needs to provide structure and an environment, which enable open, free, and safe communication—psychological safety is a necessity for resilience. For example, a regularly held retrospective aims at free, open, and honest exchange among team members and their views on issues in the project and the team; AISD [Agile Information Systems Development] cannot work without psychological safety* (Hennel & Rosenkranz, 2020, p. 2).

2.4.4 What do we know about agile team effectiveness?

Agile team performance. Regarding agile team performance, we identified three sub-themes. The first sub-theme is a straightforward, generic assessment of the effectiveness, efficiency, and teamwork quality of agile teams (Agbejule & Lehtineva, 2022; Bianchi et al., 2020; Brodnicki, 2021; Dingsøyr et al., 2016; Freire et al., 2018; Gren et al., 2019, 2020; Gren et al., 2017; Holtzhausen & de Klerk, 2018; Junker et al., 2021; Kadenic et al., 2023; Kakar, 2017; Kude et al., 2019; Lindsjørn et al., 2016; Peeters et al., 2022; Ryan & O'Connor, 2009; Ryan & O'Connor, 2013; Wiesche, 2021; Wong & van Gils, 2022; Zaimovic et al., 2021). In these instances, performance was rated based on statements such as "this team does superb work" (Junker et al., 2021, p. 10) and "this team delivers high quality" (Peeters et al., 2022, p. 71). Analysis indicated positive effects, meaning that agile teams have high-performance levels.

The second sub-theme of agile team performance is how well they deal with changing circumstances or disruptions. We label this sub-theme: adaptive performance and associated codes are “adaptability” (Ciriello et al., 2022; Grass et al., 2020), “agility” (Spagnoletti et al., 2022; Wiesche, 2021), and “resilience” (Hennel & Rosenkranz, 2020). Positive associations are found between agile teams and their ability to adapt to circumstances and maintain performance without too many interruptions (Grass et al., 2020; Khanagha et al., 2021; Wiesche, 2021). In addition, their collaborative nature and design were linked to the enhanced resilience of the agile team (Hennel & Rosenkranz, 2020).

The third sub-theme of the performance of agile teams is their success in software development. Success was measured by software performance indicators such as bug severity, software complexity, and velocity (Licorish & MacDonell, 2018; Maruping, Venkatesh, et al., 2009; Maruping, Zhang, et al., 2009; Sathe & Panse, 2022) or performance was measured through the extensiveness and efficiency of the response of the agile team (Lee & Xia, 2010; Li et al., 2010). These are more software development context-specific outcomes than the first sub-theme. Lee and Xia (2010) uncovered relationships between agile teams and the effort and efficiency with software requirement changes were dealt with. Specifically, they found agile teams’ self-organization to reduce response extensiveness and to improve efficiency (which is good). In contrast, cross-functionality contributed to a more extensive response to requirement change (which is bad). Li et al. (2010) connected these insights, supplemented with their analysis, to delivering high-quality software. We additionally identified studies that assessed the software development performance of agile teams based on time, quality, and costs to reflect project success, innovative output (Kakar, 2018b; Khanagha et al., 2021; Malik et al., 2021), reduced efforts, and customer satisfaction (Hennel & Rosenkranz, 2020; Lee & Xia, 2010; Lee et al., 2020; Malik et al., 2021; Ramasubbu & Bardhan, 2021; Srivastava & Jain, 2017).

Sustainability and team member well-being. To ensure sustainability, teams require members to feel well enough to meet team tasks and situational demands. In the reviewed studies, we found concepts that relate to the well-being of agile team members. Regarding positive well-being, findings regarding higher levels of team and individual engagement (Peeters et al., 2022; Rietze & Zacher, 2022), contentment, and enthusiasm are found in the reviewed studies (Lindsjörn et al., 2016; Syed-Abdullah et al., 2006). At the same time, linkages were found between agile teams and reduced work exhaustion (Rietze & Zacher, 2022; Venkatesh et al., 2020), as well as reduced anxiety and depression (Syed-Abdullah et al., 2006). These findings indicate that working as part of an agile team has beneficial outcomes for the well-being of agile

team members, which plays a crucial part in the agile team's viability. Based on the reviewed studies, outcomes such as team member turnover or churn have not yet been studied.

2.5 Discussion

The main goal of our study was to compile, organize, and synthesize the agile team literature using the IMOI model as a theoretical anchor. We did this as the concept of agile teams seems to become more widespread, while theoretically two key facets of agile teams are not fully addressed in the current team effectiveness literature. First, the specific purpose of organizing for rapid change and managing uncertainty. Second, agile teams' distinctive structure combining characteristics that have not been collectively accounted for in the extant team effectiveness literature. Based on the IMOI model, four review questions anchored the review of 74 studies that resulted in the identification of key concepts to understand the effectiveness of agile teams. We continue to provide an overview of the key findings (see Table 2.3 as well) and their implications for other forms of teams facing rapid change and uncertainty and address identified gaps in the literature. We discuss opportunities for future research and the limitations of our work.

2.5.1 Key findings

Our synthesis of the agile team literature helps us address how agile teams work to effectively deal with rapid change and manage uncertainty. Our synthesis should not be considered exhaustive, yet it presents a parsimonious compilation and overview of where the literature currently stands. On input, our findings show that agile teams engage with specialized and complex tasks, mainly researched as software development until recently (e.g., Hoda et al., 2017), and have to manage customer and cross-functional collaboration.

Three agile team processes are primarily explored in the agile team literature: shared leadership, reflexivity, and empowering behavior (Freire et al., 2018; Grass et al., 2020; Hennel & Rosenkranz, 2020; Moe et al., 2010). In sum, these processes show agile teams pooling their diverse knowledge, skills, and abilities and collectively leading what work is prioritized, its coordination, and delivery to customers. Hierarchical management's role is supportive and encouraging without assuming an authoritative position. Furthermore, the team process of reflexivity supports agile teams with daily coordination, periodic feedback and reflection on objectives and the way of working, and planning and adaptation to ensure that the team remains effective. Agile teams involve their customer in this feedback loop.

Next to processes, our findings show that three emergent states support agile teams in converting inputs into outcomes. These are agile team orientation, shared mental models and transactive memory systems, and psychological safety (Annosi et al., 2016; Cornide-Reyes et al., 2021; Moe et al., 2010; Strode et al., 2022). Most scholarly attention has gone to the agile team orientation, which encompasses that team members accept the agile way of working and emphasize the team's success over their personal goals. It is an indicator of the cohesion in an agile team. Moreover, agile teams need to understand the team task and how team members interact, in tandem with knowing which team members possess specific knowledge, skills, and abilities (i.e., shared mental models and transactive memory systems) to speed up coordination and decision-making. Psychological safety, a feeling like one can take risks within the team and be themselves, supports team processes. Psychological safety will likely positively relate to shared leadership and reflexivity, improving their quality and effect on agile team effectiveness.

Regarding agile team effectiveness, studies focus on generic assessments of effectiveness (e.g., effectivity, efficiency). This is noteworthy considering that most of the research occurs within software development contexts that have more specific, contextual performance indicators available, for example, efficiency in dealing with software requirement changes (Lee & Xia, 2010; Li et al., 2010). On the other hand, there is a part of the literature that does focus on adaptive performance and success in software development (e.g., Grass et al., 2020; Khanagha et al., 2021; Wiesche, 2021), and a relatively recent focus on the sustainability and well-being of team members (e.g., Peeters et al., 2022; Rietze & Zacher, 2022). We find generally positive effects from input and mediators towards outcomes.

2.5.2 Crucial gaps and avenues for future research

Based on our research findings, we identified crucial gaps that reveal opportunities to further strength and deepen the agile team literature. We discuss these gaps and categorize them as either theoretical or methodological. These gaps point toward directions for future research.

Theoretical gaps. Our examination of the available literature reveals an absence of research that addresses mediator-to-mediator linkages within the context of agile teams despite the suggestions made in the IMOI model (Ilgen et al., 2005). While some studies in our sample have explored indirect effects between inputs and outcomes, such as Kude et al. (2019) who studied shared mental models and backup behavior as serial mediators, most studies primarily focused on single mediators. To comprehensively understand the mechanisms contributing to the effectiveness of agile teams, it is

crucial to investigate how mediators influence one another through mechanisms like serial mediation or system dynamics (Sterman, 2001). For instance, agile teams may influence outcomes via the effect of empowering behavior on psychological safety, where empowering behavior can either enhance or diminish the level of psychological safety within an agile team (i.e., serial mediation; Hennel & Rosenkranz, 2020; Hsu et al., 2017; Peeters et al., 2022). We strongly recommend that future research advances the understanding of the chain of linkages leading to agile team effectiveness and the conditions that may apply.

Second, in our findings we pay attention to various roles that come into play in agile teams under the theme of empowering behavior. Specifically, the roles of Product Owner and Scrum Master (Schwaber & Sutherland, 2020). However, given the significance of these roles in the functioning of agile teams in contrast with the limited attention they have received in agile team research, we strongly advocate an in-depth examination of their influence. Our review revealed an absence of studies that evaluate the performance quality of these roles and their relationship with the mediators and effectiveness of agile teams. As a result, the specific knowledge, skills, and abilities required for these still need to be empirically examined (Srivastava & Jain, 2017), as does these roles' (lasting) impact on agile team effectiveness. Furthermore, the lack of longitudinal studies leaves us with an unclear understanding of how these roles might evolve as an agile team matures and the consequences this has for their utilization within organizations.

Third, our findings reveal that a significant part of the outcomes used to assess agile team effectiveness revolve around generic performance indicators such as efficiency, overall effectiveness, and the quality of teamwork. This emphasis on generic performance indicators seems less aligned with the specific purpose of agile teams of managing uncertainty. There is a notable gap in the exploration of performance indicators more aligned with agile methodologies' core tenets. We recommend to give more attention to specific performance indicators such as the speed of decision-making or velocity (Maruping, Venkatesh, et al., 2009; Maruping, Zhang, et al., 2009), adaptive performance (Grass et al., 2020; Khanagha et al., 2021; Wiesche, 2021), customer satisfaction (Ciriello et al., 2022; Hoda et al., 2011). Furthermore, there is a growing, albeit still small, recognition of the importance of outcomes that focus on the sustainability and well-being of agile team members (Peeters et al., 2022; Venkatesh et al., 2020). Given their critical role in a team's long-term effectiveness (Hackman, 1987), we advocate for more attention to these aspects.

Fourth, a substantial part of the agile team research predominantly delves into the internal dynamics of agile teams. However, it is essential to recognize that these

teams do not operate in isolation. The IMOI model that we use as theoretical anchor also recognizes factors that shape, leverage or align processes such as leadership and team training, and only a few studies have addressed these so far (Grass et al., 2020; Gren et al., 2020; Spiegler et al., 2021). Yet, these already highlight some relevant intricacies to understand and invest in. For instance, the empowering-enhancing and empowerment-reducing activities that leaders may engage in, and their influence on the agile team's effectiveness (Grass et al., 2020). Furthermore, the influence of training on agile teams reaching maturity quicker, and therefore high levels of effectiveness, is hardly studied (Gren et al., 2020). We advocate for increasing academic attention for both factors. Considering that on leadership and team training there are lively scholarly communities, we expect considerable progress can be made in a short period of time. Next to factors that influence processes, the IMOI model describes reciprocal cycles, wherein teams' output influences their environment, which impacts team tasks and situational demands, and so forth. Also, here there have been only a few studies to pay attention to these explicitly (Annosi et al., 2020; Layman et al., 2006). Growing the understanding of how agile teams change over time, including the interconnections between agile teams and the coordination mechanisms that customers and organizations employ to cope with many internal and external interdependencies, is therefore highly relevant.

Methodological gaps. First, most of the reviewed studies have a cross-sectional research design. While cross-sectional data provide valuable insights, they come with well-established limitations, most notably the inability to establish causality and explore temporal processes. Since agile teams are characterized by reflexivity, their intricate processes are only fully comprehended by incorporating longitudinal research designs. Longitudinal methods will benefit the full understanding of the dynamics within agile teams that help or hinder sustainably achieving effectiveness. We advocate, in particular, for using longitudinal qualitative methods, which entail observation of agile teams over extended timeframes, such as the initial six months of their operation. Twemlow et al. (2022) provide an illustration of how this may be done with ethnographic methods. An alternative approach may be the use of process theorizing (Langley, 1999). Our review shows a relatively even split of qualitative-quantitative research designs. It is notable that agile team studies are often developed in relative isolation from each other and could build more on the methods used and knowledge gained in earlier work (Baham & Hirschheim, 2021; Conboy, 2009; Conforto et al., 2016), we advocate for greater convergency.

Second, it is worth noting that while agile teams are spreading beyond software development into various contexts such as services, research and development, and

government, the empirical studies on agile teams continue to revolve predominantly around software development. This is also true for studies published in journals that are not computer science (e.g., Hennel & Rosenkranz, 2020; Junker et al., 2021). To ensure generalizability of the current insights on agile team effectiveness, we advocate including diverse and representative samples aligned with the contexts wherein agile teams are implemented (Rigby et al., 2018; Rigby et al., 2016).

Third, in contrast to the lack of diversity observed in samples, there is heterogeneity in the scales of agile teams (e.g., Junker et al., 2021; Malik et al., 2021; Peeters et al., 2022; Rietze & Zacher, 2022). Some of these measures are adapted from previously validated scales, others are developed originally. What seems to be the case for each measure is that they are unique and only used in the specific study. It becomes clear there is little consensus on the measurement scales of agile teams, despite previous calls from scholars to strive towards common measures (Conboy, 2009; Conforto et al., 2016). Notably, the agile manifesto is often used as a foundational framework to develop measures (Beck et al., 2001). Therefore, we advocate for conceptual work that reflects on the agile manifesto and the measures derived from it. Such conceptual work can aim to develop a single measure for agile teams to foster convergence in agile team research.

2.5.3 Implications for teams facing rapid change and uncertainty

Our findings imply three themes for the effectiveness of team forms with specialized and complex tasks that deal with rapid change and uncertainty (e.g., ad hoc teams, cross-organizational teams, skunkworks teams). The first theme is *collaboration*. Our findings indicate that autonomous, cross-functional teams that indeed use their empowerment in the form of shared leadership relate positively to effectiveness despite frequently changing requirements. Their effectiveness is enhanced by short feedback loops within the team and with the customer and the regular assessment, planning, and adaptation of goals (Schippers et al., 2007). The implication for other forms of teams is that such an iterative way of working drives the opportunity and flexibility to adapt, cross-functionality provides the ability to adapt appropriately, and autonomy drives the motivation of team members to consequently do so (Bos-Nehles et al., 2023; Maynard, Mathieu, et al., 2012; Seibert et al., 2011). The main implications are to shorten episodic cycles, increase coordination frequency, involve everyone in coordination, and give them an equal say.

Second, the theme of *egalitarianism* reflects the findings of shared leadership and empowering behavior. As organizations address their responsiveness and flexibility, there is an expectation for work teams and, by extension, entire organizations, to adopt

a more egalitarian and flatter structure. Shared leadership indicates that work teams (increasingly) manage themselves. Empowering behavior reinforces this shift by implying that the role of (hierarchical) managers is evolving from day-to-day management to a more people-oriented focus (De Smet, 2018; Kurdi-Nakra et al., 2021; Roper et al., 2022). We anticipate that within teams, specific roles emerge that take over responsibilities traditionally held by hierarchical managers (e.g., Hoda et al., 2011, 2013; Srivastava & Jain, 2017). It is important to note that this shift does not imply a complete transition to fully self-managed teams (Mankins & Garton, 2017; Rigby et al., 2018). Agile recognizes the need for some form of management to ensure coordination and integration of activities, but this occurs at the inter-team level. The socio-technical systems thinking literature provides a lens through which to understand these developments as its once introduced the concept of “semi-autonomous groups” (Pasmore, 1995). Semi-autonomous groups were believed better able to manage the introduction of computer programs, “machines”, as they became increasingly important in how people collaborate. Agile teams nowadays still work with these “machines”.

Our third theme is *communal*. Communal refers to the collective ownership present not only in taskwork but in a way that features the closeness that agile team orientation and psychological safety express. This sense of closeness is vital to bring out the unique knowledge, skills, and abilities of team members, ensure team goals are prioritized, and facilitate ease of communication. It also helps team members to support each other to stay calm and positive under highly stressful circumstances. Each of these aspects benefit from high levels of psychological safety and a strong agile team orientation (Edmondson, 1999; Edmondson & Lei, 2014; Mach et al., 2010; Salas et al., 2015). An implication is to invest in interventions such as team-building initiatives and establishing open and respectful communication. For instance, the adoption of agile practices like “retrospective”, a mandatory meeting aimed at free, open, and honest exchanges among all team members regarding work-related issues and team dynamics may help (Hennel & Rosenkranz, 2020, p. 2; Schwaber & Sutherland, 2020). Furthermore, organizations can set clear expectations through organizational systems and top leadership to signal the importance of community and team performance (Edmondson & Lei, 2014; Ilgen et al., 2005; Li et al., 2011; Ostroff & Bowen, 2015). Moreover, communal speaks to team members getting to know each other better, knowing and respecting the unique experiences that everyone brings to the team. As a result, this can improve the team’s shared understanding of tasks and how to engage with each other (i.e., shared mental models; Converse et al., 1991; Mathieu et al., 2000), and the understanding of which team member knows what (i.e., transactive memory system; Converse et al., 1991; Lewis & Herndon, 2011). This should enhance

the adaptive performance of teams. Therefore, building a safe community is a key implication for teams dealing with uncertainty.

2.5.4 Limitations

The first limitation is the peer-review process that proceeds publication in academic journals as a quality measure. Although this ensured that the reviewed studies met a certain level of quality, it also excluded grey literature and conference papers from the review. Excluding these sources of information may have resulted in missing relevant information, also concerning the agile team concept continuing to be nurtured in practice (Baham & Hirschheim, 2021). However, we believe that we captured the seminal papers in the research on agile team effectiveness, as during the forward and backward search, we kept identifying relevant papers that we had already included based on the initial selection of 53 studies. In addition, saturation was present at the end of coding. Second, we decided only to include studies that center on agile teams. Agile teams or a variation of that label needed to appear in either the title, abstract, or keywords of a study for inclusion in the review. As a result, we have omitted studies focusing on, for instance, agile methodologies, agile practices, and agile adoption. Such studies also deal with agile teams and, therefore, may contain important knowledge of how agile teams reach effectiveness. However, considering that 74 studies are a significant number of studies, we do believe that such knowledge is also captured in our selection of studies and thus in our key findings.

2.5.5 Conclusion

In a global environment that continues to challenge organizations' responsiveness, agile teams have proliferated in diverse sectors of practice and streams of research. The main goal of the current systematic literature review was to compile, organize, and synthesize the literature on agile team effectiveness based on the team effectiveness literature. We identified a series of key inputs, mediators, and outcomes to understand how agile teams reach effectiveness. We formulated implications for other teams dealing with uncertainty and gaps in the extant research on agile team effectiveness. As a result, we enhanced the theorization of agile teams and addressed two facets of agile teams that the current team effectiveness literature do not address fully. Based on the findings, we advocate for future research that further builds on the cumulative understanding of agile teams and managing uncertainty as a researcher and practitioner community.

2.6 References of reviewed studies

The references below are the reviewed studies, for all references please see Chapter 11.

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Chapter 3

The Agile Way of Working and Team Adaptive Performance: A Goal-setting Perspective

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Abstract

The agile way of working gained prominence in business due to its promise of improving team adaptive performance. However, empirical assessment whether it indeed relates to the expected improvement in team adaptive performance and the underlying processes is lagging. We researched the link between the agile way of working and team adaptive performance in a diverse sample of 71 agile teams. Based on goal-setting theory, team goal specificity and goal difficulty were explored as mediators in this link. Results indicate that the agile way of working contributes positively to team adaptive performance, and team goal specificity partially mediates this relationship, while team goal difficulty does not. Our findings shed light on the goal setting processes involved in the agile way of working and contribute to our understanding of how the agile way of working grants autonomy to teams in setting and specifying goals, ongoing goal refinement, and the ability to prioritize goals.

Key words: agile way of working, adaptive performance, teams, goal-setting theory

3.1 Introduction

As contemporary organizations deal with the challenges and opportunities posed by information technology and an uncertain environment, the agile way of working has quickly become commonplace. This is because of its supposed ability to successfully create change and/or adapt to change (Abrahamsson et al., 2009; Fortune/Deloitte, 2021; KPMG, 2019; Prange, 2021; Rigby et al., 2018; Tannenbaum et al., 2012). The agile way of working is characterized by self-organized, cross-functional teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle (Hoda et al., 2018; Hoda et al., 2017; Moe et al., 2010). However, despite increasing prominence, we know little about whether the agile way of working relates to the expected improvement in adaptivity (Junker et al., 2021; Koch et al., 2023; Peeters et al., 2022). In the current study, we focus on adaptive performance, seen as anticipatory or responsive behaviors toward changes affecting job-related tasks, as an important facet of work performance for individuals and teams in environments characterized by rapid change and unpredictable events (e.g., Christian et al., 2017; Griffin et al., 2007; Marques-Quinteiro et al., 2015; Marques-Quinteiro et al., 2018; Park & Park, 2019). It is crucial to study how agile teams relate to adaptive performance to determine whether these teams deliver on their promise⁴ and whether organizations that implement them thus achieve the desired effect. Simultaneously, by increasing the knowledge of how agile teams reach adaptive performance, we advance our scholarly understanding of how modern teams function in organizations (Kozlowski, 2018; Kozlowski & Ilgen, 2006; Mathieu et al., 2017). Therefore, we explore the relationship between the agile way of working and the adaptive performance of agile teams.

As the underlying process of how the agile way of working influences adaptive performance remains unclear (Baham & Hirschheim, 2021; Conboy, 2009; Conforto et al., 2016), we investigate whether and how the agile way of working relates to adaptive performance using goal-setting theory (Latham & Locke, 2007). Goal-setting theory provides a perspective on the underlying process of the agile way of working's effectiveness as goals are set each 2–4-week episodic cycle, implying a near-constant process of goal-setting and adjustment. Goal-setting theory posits that specific and difficult goals coupled with feedback result in higher performance, especially when compared to nonspecific “do your best” goals. We build on goal-setting theory and propose that through several routines and rituals, the agile way of working positively influences goal specificity and difficulty. In turn, these positively affect adaptive performance. Although the majority of goal-setting research has addressed the

⁴ Thus, we study *performance as behavior*; this temporally proceeds *performance as outcomes* such as customer satisfaction (Kozlowski & Ilgen, 2006; Kozlowski, 2018).

individual level (Kleingeld et al., 2011; Locke & Latham, 2019; Mento et al., 1987), there is evidence that goal-setting theory can be applied to the team level as well (Kleingeld et al., 2011; Kramer et al., 2012). We build upon earlier team-level research that used goal-setting theory and apply it to the agile way of working.

Overall, we aim to empirically explore whether and why the agile way of working relates to team adaptive performance by exploring team goal specificity and difficulty as explanatory processes of this relationship. We do this based on a team-level sample of 71 agile teams collected in seven Dutch organizations across different functional domains that have implemented the agile way of working. We contribute to literature and practice in several ways. First, through the team-level inquiry into the relationship between the agile way of working and team adaptive performance, underpinned by goal-setting theory, we help clarify whether and why the central claims regarding the agile way of working are valid. As such, we build upon a limited amount of prior research, often conducted in contexts of IT (Grass et al., 2020; Junker et al., 2022; Wiesche, 2021), and investigate among a diversity of organizations, industries, and types of work whether the agile way of working indeed contributes to adaptive performance. Specifically, we collected a sample that, for instance, works on fraud prevention, public services related to social security payments, professionals who work in supply chain analytics. Thus, we test the relationship between agile teams and adaptivity in a much more diverse sample and so test whether the main claims regarding the agile way of working also apply outside of its original context of software development and IT. Second, we contribute by integrating the process of goal-setting as an explanatory mechanism into agile teams research. Previous studies have clarified the role of psychological safety climate (Peeters et al., 2022), the customer's involvement (Ciriello et al., 2022; Hoda et al., 2011), and proactivity norms (Junker et al., 2021) as explanations for why agile teams positively relate to performance outcomes (Serrador & Pinto, 2015). Since the agile way of working implies a near-constant process of goal-setting and adjusting we consider this a crucial mechanism to explore. Consequently, our study aims to help solve problems in the agile teams literature such as a lack of theory and the field's "thirst for theory" (Baham & Hirschheim, 2021, p. 102; Conforto et al., 2016). Third, we explore how goal-setting theory plays out within teams that apply the agile way of working and thus test the theory's generalizability in this context. This contributes to developing the goal-setting theory as we connect with the growing body of goal-setting literature that explores the team level and extend this into an agile context (Kramer et al., 2012; Nahrgang et al., 2013; van der Hoek et al., 2018). In addition, since we incorporate goal-setting as an underlying process in the link between work characteristics and team performance, we join the conversation on examining the full range of goal setting's effects (Locke & Latham, 2009; Ordóñez et al., 2009a, 2009b). Fourth, we support practitioners by assessing whether the agile way

of working is appropriate to reach adaptive performance. Our study can, thereby, lead to improved implementation through an increased understanding of how agile teams operate.

3.2 Theoretical framework

3.2.1 The agile way of working and agile teams' adaptive performance

Agile teams generally handle specialized and complex tasks, for example software development. The way of working includes several routines, rituals, and roles that allow agile teams to break specialized and complex tasks into more manageable pieces. Four rituals are central in the predominant agile framework: Scrum (Hoda et al., 2017; KPMG, 2019; Schwaber & Sutherland, 2020). The 2–4-week episodic cycles in which agile teams schedule their work are called sprints. At the start of each sprint, agile team members set goals and break those goals up into more minor work activities, referred to as the Sprint Planning and the Sprint Goal. Team members meet for 15 minutes each morning to discuss progress on their work activities and whether they require help or information from other agile team members – the Daily Scrum. As the sprint ends, the agile team presents achievements and progress to their customers in a Sprint Review; input is also requested for the next sprint goal. The team has a separate meeting to reflect on increasing quality and effectiveness, the Sprint Retrospective, after which a new cycle starts. To safeguard that these rituals take place, each team has a Scrum Master (i.e., a process manager and coach regarding the Scrum framework) and a Product Owner (i.e., the customer representative with whom the team sets its goals; Schwaber & Sutherland, 2020; Strode et al., 2022).

Our study focusses on the ways of working of agile teams, and there is no generally agreed-upon definition of agile teams or their way of working (Baham & Hirschheim, 2021; Conforto et al., 2016). Based on the literature we have come to the following definition of the agile way of working: self-organized, cross-functional teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle. In this definition five dimensions play a central role, which are consistently used to describe agile teams and their way of working. These are 1) customer collaboration, 2) cross-functional collaboration, 3) shared leadership, 4) reflexivity, and 5) agile team orientation. Regarding customer collaboration, this stems from the agile principle of “customer collaboration over contract negotiation” (Beck et al., 2001). The importance of customer collaboration is furthermore underscored in two principles of the Agile Manifesto (#1 and #2; Beck et al., 2001). Cross-functional collaboration is emphasized by the principle that states “business people and developers must work together daily throughout the project” (Beck et al., 2001). Shared leadership reflects agile team's self-organizing nature (principle #11; Beck et al., 2001;

Freire et al., 2018; Hennel & Rosenkranz, 2020; Holtzhausen & de Klerk, 2018), allowing team members to make decisions without managerial involvement. Studies have supported the centrality of these three dimensions (Annosi et al., 2016; Ciriello et al., 2022; Conboy et al., 2011; Dingsøyr et al., 2016; Grass et al., 2020; Hoda et al., 2011; Hodgson & Briand, 2013; Khanagha et al., 2021; Kude et al., 2019; Moe et al., 2010; Peeters et al., 2022; Spiegler et al., 2021). Reflexivity, defined as when teams “overly reflect on their objectives, strategies, and processes, and adapt them to current or anticipated circumstances” (Schippers et al., 2007, p. 190), mirrors the iterative and flexible nature of the agile way of working (e.g., Freire et al., 2018; Georganta et al., 2021; Santos et al., 2015; Schwaber & Sutherland, 2020). Implicit in our definition, team orientation is central to agile team’s collaborative mindset, where individuals serve team performance and customer value (Fagerholm et al., 2015; Gren et al., 2019; Lindsjørn et al., 2016; Moe et al., 2010; Wood et al., 2013).

The agile way of working is team-focused with teams being the core unit. This can be traced back to the early origins of the concept with the Agile Manifesto, which proclaims as one of its principles that “the best architectures, requirements, and designs emerge from self-organizing teams” (Beck et al., 2001). The often-used framework for the agile way of working called Scrum also defines it as such by stating: “the fundamental unit of Scrum is a small team of people, a Scrum Team. The Scrum Team consists of one Scrum Master, one Product Owner, and Developers” (Schwaber & Sutherland, 2020, p. 5). Furthermore, the agile way of working focuses on meeting complex and unpredictable environments and organizing for the change that people will undoubtedly face, thereby acknowledging that individuals have to pool their knowledge, skills, and abilities in self-organizing, cross-functional teams. Consequently, the agile way of working, can only be observed in team settings. As such, we conceptualize the agile way of working as a team-level construct in line with earlier studies (Ciriello et al., 2022; Junker et al., 2021; Moe et al., 2010; Strode et al., 2022).

We expect the agile way of working to influence team adaptive performance positively. Team adaptive performance is defined as “an emergent process where one or more individuals interact through cognitive and behavioral goal-directed action to cope with the demands of the environment” (Marques-Quinteiro et al., 2015; Maynard et al., 2015, p. 339). Griffin et al. (2007, p. 327) posit that “the changing nature of work and organizations has challenged traditional views of individual work performance” and that “early approaches to work performance did not account for the full range of behaviors that contribute to effectiveness when systems are uncertain and interdependent”. Adaptive performance is an indication of how efficiently a team dealt with unexpected events, whether it adjusts by taking reasonable action and remains calm and positive (Griffin et al., 2007; Marques-Quinteiro et al., 2015; Maynard et al., 2015). As a result of the agile way of working, agile

teams build continuous awareness of the demands in their environment, have a platform to interact with their customer on what they need, and can adapt plans accordingly. Furthermore, the inherent empowerment contributes to team adaptive performance by engaging members to play an active role, bringing out their cross-functional knowledge, skills, and abilities. This is necessary because of the specialized and complex tasks that must be met, and that may change. In other words, the shared leadership allows for high-quality decision-making and improved coordination. Moreover, the collective mindset of embracing the way of working and striving for team success motivates the agile team to engage with unexpected changes. Therefore, in line with the above and earlier findings from team-level studies (Christian et al., 2017; Junker et al., 2021; Koch et al., 2023; Marques et al., 2018; Park & Park, 2019; Peeters et al., 2022), we hypothesize:

H1: The agile way of working relates positively to team adaptive performance.

3.2.2 Agile way of working and goal specificity

Goal-setting theory asserts that specific and difficult goals coupled with feedback result in higher performance, especially when compared with nonspecific “do your best” goals (Kleingeld et al., 2011; Locke & Latham, 2019; Mento et al., 1987). Additionally, participative decision-making and goal-setting is beneficial for motivation and performance (Kramer et al., 2012; Van Mierlo & Kleingeld, 2010). In cases of specific and difficult goals that were set in a participative manner, individuals and teams are strongly motivated to focus their efforts on achieving a particular outcome. Empirical findings consistently indicate that goal-setting is associated with higher motivation and performance levels (Kleingeld et al., 2011; Locke & Latham, 2019; Mento et al., 1987). While initially, the goal-setting theory was applied to production contexts, this was later extended to environments including business, education, and healthcare. Evidence also indicates that goal-setting theory can be applied to the team level (Kleingeld et al., 2011; Kramer et al., 2012).

Agile teams set their Sprint Goals each 2-4 weeks during the Sprint Planning (Freire et al., 2018; Santos et al., 2015; Schwaber & Sutherland, 2020). This is only a brief period, which requires clarity and focus to achieve the Sprint Goal. Agile teams also adjust goals considering changes in customer requirements or external circumstances (i.e., reflexivity), suggesting the team will continuously be driven to clarify its current goals. Moreover, customer collaboration is influential, as the customer and the agile team collaboratively ensure clear team goals, thereby increasing goal specificity. Furthermore, since agile team members set goals participatory (i.e., shared leadership; Erez et al., 1985; Grass et al., 2020; Kude et al., 2019; Latham & Yukl, 1975; Peeters et al., 2022), this enhances goal specificity as members have clarity on the work required to be delivered at the sprint's end. Such

motivation to reach clarity is enhanced by an agile team orientation, which drives team members to work hard for the team's success (Lindsjörn et al., 2016; Moe et al., 2010; Wood et al., 2013), necessitating clear goals. In sum, the agile way of working will lead to more specific team goals due to the short time that goals are set in, the participation of the customer and the whole team, and an individual need to be clear on goals to understand how to contribute to the team's success. Therefore, we expect the following:

H2: The agile way of working relates positively to team goal specificity.

Specific goals enhance agile teams' ability to meet the demands of the situation and, thereby, enhance adaptive performance in several ways (Kramer et al., 2012). Clarity allows team members to align their efforts and resources towards the Sprint Goal. This avoids wasting time and energy on irrelevant tasks, leaving time and energy available to achieve the Sprint Goal. This prioritization also facilitates better decision-making since all agile team members know what is essential to achieve. Furthermore, specific goals help communication and collaboration among the team members. Since they know what needs to be accomplished, they can coordinate their activities more effectively while avoiding goal misunderstandings. Another area where agile teams benefit from specific goals is accountability and performance evaluation, which can occur more objectively. Accountability and performance evaluation consequently permit the team to identify improvement areas and take corrective action, when necessary, which is core to adaptive performance (Griffin et al., 2007; Kramer et al., 2012; Marques-Quinteiro et al., 2015; Maynard et al., 2015). In sum, specific goals provide agile teams with a clear direction for their work, enabling them to focus their efforts and regulate their behavior towards the common Sprint Goal and, if necessary, to adapt their goals too. Therefore, specific team goals drive adaptive performance in the agile ways of working. Hence, we hypothesize:

H3: Team goal specificity relates positively to team adaptive performance.

As the routines and rituals embedded in the agile way of working yield more specific team goals, this specificity enhances agile teams' ability to focus effort and adapt goals to deal with change (Freire et al., 2018; Grass et al., 2020; Kleingeld et al., 2011; Locke & Latham, 2019; Marques-Quinteiro et al., 2015; Maynard et al., 2015; Moe et al., 2010; Santos et al., 2015; Van Mierlo & Kleingeld, 2010). We posit that team goal specificity mediates the relationship between the agile ways of working and team adaptive performance. This process has yet to be empirically studied. However, there is

some empirical work available that can underpin this expectation. For instance, Werder and Maedche (2018) observed in a multiple-case study on agile teams that agile team members have high levels of job clarity. This was defined as an understanding of one's role and tasks. Job clarity was consequently related to effective coordination, which allowed the studied teams to deliver business value continuously. Based on goal-setting theory, we use similar reasoning as Werder and Maedche (2018), strengthening our belief that goal specificity will mediate between agile ways of working and team adaptive performance. In a study by Kadenic et al. (2023), the authors investigate in a sample of 182 agile team members whether using the rituals from the agile way of working and the agile team orientation results in performance. They find that the ability to prioritize, adapt plans daily towards the Sprint Goal, and the rituals taking place contribute to performance. This supports our hypothesis as it indicates that the agile ways of working contribute to prioritization and adaptation, arguments we also use from goal-setting theory. Consequently, we gather there is significant support for the following:

H4: Team goal specificity partially mediates between the agile way of working and team adaptive performance.

3.2.3 Agile way of working and goal difficulty

Next to goal specificity, we also explore whether the agile way of working relates to goal difficulty. There are two ways in which the agile way of working may result in more difficult goals. The first explanation is based upon the collaborative goal-setting in the agile way of working. The literature on goal-setting theory has argued that participative goal-setting increases the level of goal difficulty due to an enhanced degree of autonomy (or: control) that members feel over the goal (Kleingeld et al., 2011; Locke & Latham, 2012). The explanation for this effect is that when agile teams have considerable autonomy over goals (i.e., shared leadership; Erez et al., 1985; Grass et al., 2020; Kude et al., 2019; Latham & Yukl, 1975; Peeters et al., 2022), they can use more difficult goals for collective self-actualization and enhancement. The second explanation relates to how in the agile way of working, a Product Owner represents the customer or "the business" and sets goals with the agile team (Schwaber & Sutherland, 2020). Especially in IT or software development contexts, the Product Owner is considered the "business representative". Owing to this role description, the Product Owner will seek maximum value from the agile team to benefit their business (Ciriello et al., 2022; Hoda et al., 2011). One can imagine that the Product Owner will challenge the agile team members to deliver, for instance, an improvement to an automatic purchasing program or deliver

a new app that will grow the number of sales quickly. However, this may pose too great of a technical or human challenge for the team. This might result in a setting where the agile team and the Product Owner bargain over goals and their difficulty. We expect this bargaining to occur during the Sprint Planning, resulting in more difficult team goals. The agile team members will also be willing to commit to difficult goals as they feel motivated due to their level of autonomy. Therefore, we hypothesize:

H5: The agile way of working relates positively to team goal difficulty.

There are three ways in which more difficult team goals relate to higher levels of adaptive performance. One such way is through the role of motivation. Goal-setting theory poses that difficult team goals are inherently motivational, following, we would expect agile teams members to be highly motivated to reach their difficult goals (Erez et al., 1985; Kleingeld et al., 2011; Locke & Latham, 2019; Mento et al., 1987). We expect agile teams to show motivation by finding innovative ways to deal with unexpected changes, shifting focus and taking reasonable action in case of change, and developing new competencies to ensure performance (i.e., all facets of adaptive performance; Griffin et al., 2007; Marques-Quinteiro et al., 2015; Maynard et al., 2015). Similarly, difficult goals enhance collaboration in agile teams. These teams are interdependent (Beck et al., 2001; Kakar, 2018b), meaning that collaboration is integral, and the necessity to collaborate is strengthened when goals become more difficult. When team members work together, they also learn to trust each other (Hennel & Rosenkranz, 2020; Peeters et al., 2022). Collaboration and trust may enhance agile teams' ability to demonstrate adaptive performance. Furthermore, this ability is increased by the focus and prioritization that difficult goals drive. Like specific goals, difficult goals require the team to align their efforts and resources towards the Sprint Goal. This avoids wasting time and energy on irrelevant tasks, leaving time and energy available for performing and better decision-making. In sum, difficult goals increase the motivation of agile team members, drive collaboration, help prioritize work, and eliminate distractions; therefore, difficult goals relate positively to adaptive performance. Therefore, we expect the following:

H6: Team goal difficulty relates positively to team adaptive performance.

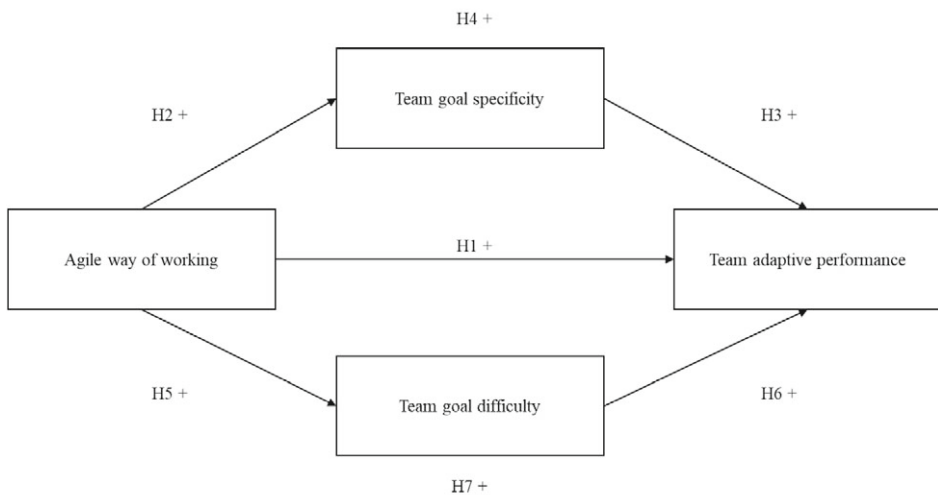
The agile way of working provides teams with decision-making autonomy that motivates them to set more difficult goals and a role (Product Owner) that challenges the team to set more difficult goals (Grass et al., 2020; Kude et al., 2019; Peeters et al., 2022;

Schwaber & Sutherland, 2020). Following goal-setting theory, these difficult goals motivate agile teams to collaborate more, prioritize work and eliminate distractions, enabling the team to effectively cope with the demands of the environment and demonstrate adaptive performance (Erez et al., 1985; Kleingeld et al., 2011; Locke & Latham, 2012; Mento et al., 1987). Although mediation by goal difficulty has not yet been empirically explored, some indications support this hypothesis. For example, Moe et al. (2012) describe cases where the agile team and Product Owner schedule intensive workshop sessions to ensure they set difficult (and specific) goals that provide the most business value. At the same time, the authors report that the agile team itself did so with caution since some goals that generate business value in the short term end up harming value for the client in the long term. As such, ambitious and difficult goals are set that ensure short- and long-term value. A similar observation is made by Ciriello et al. (2022) based on cases at a Danish IT service provider. They describe a dynamic of back-and-forth goal refinement between the team members and the Product Owner, which consequently impacts the agile team's adaptive performance. These studies apply a rationale similar to ours based on goal-setting theory. Hence, there is considerable support for the following hypothesis:

H7: Team goal difficulty partially mediates between the agile way of working and team adaptive performance.

We visualized the hypothesized relationships in the conceptual model in Figure 3.1.

Figure 3.1 Conceptual model



3.3 Method

3.3.1 Data collection and participants

We used a cross-sectional research design and collected quantitative data through questionnaires. Between April 2022 and October 2022, the data were collected among agile team members in the Netherlands. Organizations were included based on purposive sampling, which meant that the researchers looked for organizations that adopted agile practices and thus had gained some experience with the agile way of working. Within such organizations several teams were invited to participate. Two criteria applied: 1) adoption of agile practices and thus experience with the agile way of working, and 2) diversity in the organizations that participated. With these two criteria in mind, we continued with convenience sampling. This meant we leveraged existing relationships with practitioners because of earlier scientific collaboration or because they are affiliates of the university's platform for global HR excellence. As a procedure, the principal researcher validated whether agile practices were indeed used through a meeting with the contact person at each organization.

In total, seven organizations participated; see Table 3.1 for the sample characteristics. Participating organizations vary in size between 15.000 and 43.000 employees. 71 agile teams participated, representing 319 agile team members. Teams were included when at least 3 team members participated in the questionnaire (min = 3, max = 11, $M = 4.49$). Our sample differed in disciplines and functions. We sampled teams from financial services for fraud prevention, public service for social security payments, a semiconductor company for teams that work on supply chain analytics, and IT teams that develop software, maintain HR management applications, and ensure the safety of a major airline's IT infrastructure.

Table 3.1 Socio-demographic characteristics of the sample.

Industry	Number of organizations	Number of teams	Number of team members (% of total)
Aviation	1	7	32 (10.00%)
Financial services	2	23	102 (31.97%)
Industry	2	6	19 (5.96%)
Public administration, services	1	28	141 (44.20%)
Semiconductor	1	7	25 (7.84%)
Total	7	71	319

Table 3.1 Continued

Individual characteristic		Number of team members	% of total
Gender	Female	92	28.84%
	Male	221	69.28%
	Prefer not to say	6	1.88%
Age (in years)	< 26	11	3.45%
	26-35	80	25.08%
	36-45	87	27.27%
	46-55	68	21.32%
	55+	70	21.94%
	Missing	3	0.94%
Education*	Elementary school	1	0.31%
	Basic	2	0.63%
	Secondary	40	12.54%
	Higher	146	45.77%
	Academic	130	40.75%
Hybrid/remote working	Working fully remote	25	7.84%
	Working hybrid	291	91.22%
	Working fully in office	3	0.94%
Team tenure ±	Less than a year	73	22.88%
	Between 1-3 years	68	21.32%
	Between 3-5 years	15	4.70%
	More than 5 years	14	4.39%
	Missing	149	46.71%
		M	SD
Team's average organizational tenure (in years) ∞		11.00	11.90

Note. * Categories relate to the Dutch educational system, where elementary = elementary school, basic = VMBO, MBO1 and MBO2, secondary = HAVO, VWO, MBO3 and MBO4, higher = university of applied sciences, academic = university or PhD; ± from the public administration and services organization there is no data on team tenure, resulting in $N = 170$; ∞ $N = 313$, 6 are missing.

3.3.2 Measures

Previously validated scales were used to measure the concepts of interest. Questionnaires were available in Dutch and English; for the Dutch items, we applied backward-forward translation. Moreover, questionnaires were pre-tested with practitioners to ensure content validity and items adapted to use agile team as the

referent. Participants answered each item on a 5-point Likert scale, indicating the extent to which agile team members agreed with a statement (1 = completely disagree, 5 = completely agree, and for adaptive performance 1 = completely ineffective, 5 = completely effective).

Agile way of working. Given that there is no generally agreed-upon measurement of the agile way of working (Baham & Hirschheim, 2021), we measured the agile way of working based on the definition provided in our theoretical framework. This meant that we measured the agile way of working as a second-order factor that consists of five first-order factors: agile team orientation, cross-functional collaboration, customer collaboration, reflexivity, and shared leadership. For agile team orientation, we used a 4-item scale (Salas et al., 2015), with an example item “We all take responsibility for any poor performance by our team”. Cross-functional collaboration was measured with a 3-item scale (De Luca & Atuahene-Gima, 2007), with an example item “In our team, people from different functions, departments or expertise cooperate fully in establishing goals and priorities for our projects”. We measured customer collaboration using a 4-item scale (Peeters et al., 2022), an example item is “In our team, we work in close collaboration with our customers”. For reflexivity, we utilized a 5-item scale (Schippers et al., 2007), with an example item “In this team, we often discuss whether we are working effectively together”. And to measure shared leadership, we used a 3-item empowerment scale (Kirkman & Rosen, 1999), an example item is “My team determines as a team how things are done in the team”.

We decided to use existing scales rooted in the team literature to measure all five dimensions of the agile way of working rather than the recently developed scales for agile teams. There were two reasons for this. First, due to our focus on team behaviors that agile is meant to foster, we were less interested in the specific practices that are implemented that are the focus point of measures from Junker et al. (2022) and Rietze and Zacher (2022). Next to that, as our focus is on the team level, we felt the measures from Petermann and Zacher (2022) and Koch and Schermuly (2020) were not so appropriate to use due to their respective focus on the individual and the project.

Results from confirmatory factor analysis demonstrated that the items have sufficient factor loadings on the first-order factors. In turn, the first-order factors load sufficiently on the agile way of working ($CFI = .914$; $RMSEA = .063$, $SRMR = .052$; Hooper et al., 2008). Agile team orientation averaged $\Lambda = .865$; cross-functional collaboration averaged $\Lambda = .718$; customer collaboration averaged $\Lambda = .692$; reflexivity averaged $\Lambda = .759$; shared leadership averaged $\Lambda = .801$). Moreover, the first-order factors' internal consistency was sufficient (agile team orientation $CR = .744$; cross-functional collaboration $CR = .832$; customer collaboration $CR = .823$; reflexivity $CR = .795$; shared

leadership $CR = .582$). For internal consistency to be considered sufficient, we used a threshold of $.600$ (Hair et al., 2017), considering the limited number of items per first-order factor. Composite reliability for shared leadership is just below the threshold. Given the content validity that we achieved and that this measure was previously successfully validated (Kirkman & Rosen, 1999), we continued using it.

Team goal specificity. The 3-item measure for team goal specificity (Anderson & West, 1998) achieved perfect model fit ($CFI = 1.000$; $RMSEA = .000$; $SRMR = .000$) and sufficient factor loadings (average $\Lambda = .823$). The internal consistency was also sufficient ($CR = .863$). An example item from the scale is "In our team, we have clear team goals".

Team goal difficulty. The 3-item measure for team goal difficulty (Steers, 1976) indicated perfect model fit ($CFI = 1.000$; $RMSEA = .000$; $SRMR = .000$) and sufficient factor loadings (average $\Lambda = .823$); the internal consistency was also sufficient ($CR = .674$). We changed the referent from "I" to "team" in the items. An example item from the scale is "In our team, our team's work requires a great deal of effort for us to complete".

Team adaptive performance. To measure the adaptive performance of agile teams, we used a 4-item scale (Marques-Quinteiro et al., 2015; Maynard et al., 2015). There was a good model fit ($CFI = .982$; $RMSEA = .107$; $SRMR = 0.031$) with sufficient factor loadings (average $\Lambda = .823$). The internal consistency was also sufficient ($CR = .784$). An example item from the scale is "We find innovative ways to deal with unexpected events".

Control variable. Organizational tenure was used as a control variable. agile teams with higher average organizational tenure may be more capable of adapting because they have an extensive internal network, have been through several changes before, and have learned from them, or as a team are more in tune with each other. Each of these explanations could enhance the adaptive performance of the team and distort the findings of whether the agile way of working improves adaptive performance.

3.3.3 Analysis

Data aggregation. In line with the theoretical nature of the four concepts in the current study, we aggregated the data to the team level. Following the conventional cut-off points of $.05$ for ICC1 and $.40$ for ICC2, we obtained generally satisfactory conditions for aggregation (Bliese, 2000; van Mierlo et al., 2008). Specifically, for the agile way of working ICC1 was $.12$ and ICC2 was $.37$ ($F = 1.584$, $p < .01$), for team goal specificity ICC1 was $.14$ and ICC2 was $.43$ ($F = 1.738$, $p < .01$), for team goal difficulty ICC1 was $.11$ and ICC2 was $.35$ ($F = 1.548$, $p < .01$), and for team adaptive performance ICC1 was $.17$ and ICC2 was $.47$ ($F = 1.895$, $p < .01$). The ICC2 values for the agile way of working and team goal difficulty are just below the cut-off value. But, since the ICC2 value is sensitive to

sample size and we have a somewhat restricted size of 71 teams (Bliese, 2000), we continue with aggregation based on construct mean scores (van Mierlo et al., 2008).

Data analysis. We performed confirmatory factor analysis (CFA) and used Harman's one-factor test to examine whether common method variance was present in our study (Podsakoff et al., 2003). Result shows one factor accounting for 30.396% of the variance, below the 50% cut-off value. To ensure that our predictor (agile way of working) and outcome variables (team adaptive performance) are distinctive factors, we performed a CFA as well. We first ran all items belonging to the agile way of working and team adaptive performance as one factor, and subsequently, we ran them as the two factors we would expect to find. We used a chi-square difference test to assess whether the two-factor solution fit the data better (Hooper et al., 2008). Results indicate a significant improvement of fit (difference in $\chi^2 = 721.22$, difference in df = 6, cut-off value = 22.458, $p < .001$), confirming our expectation that the agile way of working and team adaptive performance are indeed distinct. Please see Table 3.2 for the full results. Following, we analyzed the hypothesized model with Structural Equation Modeling (SEM), in R Studio with the Lavaan package, due to its ability to test the fully specified model simultaneously. Considering the ratio of items to the sample size (30 items-71 teams), we moved forward with observed variables (team-level mean scores) to maintain a good indicator-to-sample size ratio (Hair et al., 2018). Consequently, we specified the model to be estimated with maximum likelihood using a bootstrapping of 10000 samples for robustness.

Table 3.2 Confirmatory factor analysis of the agile way of working and team adaptive performance.

CFA	One-factor	Two-factor
Chi-square	1202.131	480.911
Df	230	224
CFI	.646	.907
RMSEA	.115	.060
SRMR	.086	.054
Chi-square difference test	Value	
Difference in χ^2	721.22	
Difference in df	6	
Cut-off value, $p < .001$	22.458	

Note. The one-factor solution included all items belonging to the Agile way of working and team adaptive performance, whereas, in the two-factor solution they were placed on separate factors. Results indicate a significant difference, $p < .001$.

3.4 Results

Table 3.3 presents the means, standard deviations, and correlations. The agile way of working positively correlated with team goal specificity ($r = .623, p < .01$) and team adaptive performance ($r = .585, p < .01$), but not with team goal difficulty ($r = -.114, p > .05$). Team goal specificity did positively correlate with team adaptive performance ($r = .568, p < .01$). Team goal difficulty had no significant relationship with team adaptive performance ($r = .080, p > .05$).

Results from SEM indicate that the data match the hypothesized model ($\chi^2 = 4.661, df = 3, p = .198; CFI = .977; RMSEA = .088; SRMR = .059$); also see Table 3.4 and Figure 3.2. Specifically, there is a significant positive effect from the agile way of working to team adaptive performance, supporting Hypothesis 1 ($\beta = .374, p < .05$). The positive effect from the agile way of working to team goal specificity was significant ($\beta = .623, p < .001$), as was the positive effect from team goal specificity to team adaptive performance ($\beta = .373, p < .05$). Hence, Hypotheses 2 and 3 are supported. In addition, the indirect effect of team goal specificity between the agile way of working and adaptive performance was confirmed with bootstrapping, supporting Hypothesis 4 ($\beta = .232, 95\% CI [.060, .630]$). The effect of the agile way of working to team goal difficulty was not significant ($\beta = -.114, p = .331$), rejecting Hypothesis 5. The positive effect of team goal difficulty on team adaptive performance was only marginally significant ($\beta = .188, p = .074$). Considering our sample size ($N = 71$), we expect the effect to be significant with a larger sample size. Therefore, the results provide marginal support for Hypothesis 6. The non-significant effect from the agile way of working toward team goal difficulty resulted in that we found no significant indirect effect of team goal difficulty between agile way of working and team adaptive performance ($\beta = -.022, 95\% CI [-.100, .021]$), thus we reject Hypothesis 7.

Table 3.3 Descriptive information and correlations.

Concept	<i>M</i>	<i>SD</i>	1	2	3	4
1 Agile way of working	3.923	.283				
2 Team goal specificity	4.004	.430	.623**			
3 Team goal difficulty	3.598	.423	-.114	-.190		
4 Team adaptive performance	3.653	.334	.585**	.568**	.080	
5 Organizational tenure (in years)	10.184	7.111	-.148	-.229	.139	-.083

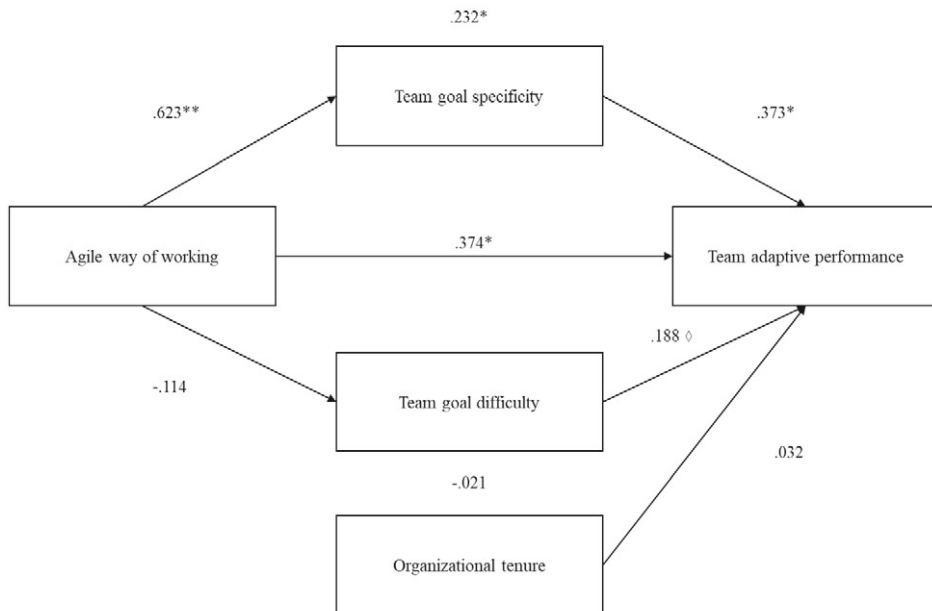
Note. $N = 71$ agile teams; ** = $p < 0.01$ (2-tailed) * = $p < 0.05$ (2-tailed).

Table 3.4 Results from structural equation modeling.

Predictor	Team goal specificity	Team goal difficulty	Team adaptive performance
	β	β	β
Agile way of working	.623**	-.114	.374*
Team goal specificity			.373*
Team goal difficulty			.188 \diamond
Organizational tenure			.032
Indirect effect team goal specificity			.232*
Indirect effect team goal difficulty			-.021
Total indirect effect of the agile way of working			-.002
R-squared	.338	.013	.457

Note. Model fit indices: $\chi^2 = 4.661$, $df = 3$, $p = .198$; CFI = .977; RMSEA = .088; SRMR = .059; $N = 71$ agile teams; β = standardized effect size; ** = $p < .01$, * = $p < .05$, $\diamond = p < .10$; the team members' average organizational tenure was a control variable.

Figure 3.2 Statistical model



Note. $N = 71$ agile teams; ** = $p < .01$, * = $p < .05$, $\diamond = p < .10$; the team members' average organizational tenure (in years) was a control variable.

3.5 Discussion

The current study explored whether the agile way of working delivers on its promise of enhancing team adaptive performance and whether, based on goal-setting theory, team goal specificity and difficulty can explain this relationship. Results indicate that the agile way of working is positively related to team adaptive performance, and goal specificity partially mediates this relationship. Considering our diverse sample of 71 teams from 7 organizations, the agile way of working contributes to successfully creating and responding to change. Contrary to our expectations, we found no effect from the agile way of working on team goal difficulty, while team goal difficulty contributed positively to team adaptive performance.

In line with previous findings (Junker et al., 2021; Koch et al., 2023; Peeters et al., 2022), we find a positive relationship between the agile way of working and team adaptive performance. These results show that an incremental, cross-functional approach to work, where goals are set in a participatory manner and only for a few weeks, after which reflection follows, and new goals are dynamically set, enables teams to meet the demands of the moment. Moreover, when team members are empowered to share responsibility and when these team members accept team norms and demonstrate commitment to the team, this enhances not merely the ability but also the opportunity and motivation of teams to adapt to changing circumstances and deliver high performance. Using goal-setting theory, our unique contribution shows that goal-setting may serve as an explanatory mechanism for the adaptive performance of agile teams, particularly considering team goal specificity. This supports the efforts to use more theory in the literature on the agile way of working to understand how agile works and contributes to quenching the field's "thirst for theory" (Baham & Hirschheim, 2021, p. 102; Conforto et al., 2016).

Our findings support the generalizability of goal-setting theory to the team level (Kramer et al., 2012) and imply that goal-setting theory's team goal specificity can be successfully applied to agile teams. This does not hold for team goal difficulty. The hypothesis was that goals would become more difficult in agile teams due to the participative goal-setting and the Product Owner that drive the team to set more difficult goals (Ciriello et al., 2022; Kleingeld et al., 2011; Locke & Latham, 2012; Moe et al., 2012). Setting more difficult goals would allow the agile team members more opportunities for self-actualization and enhancement and would allow the Product Owner to deliver more customer value (Kleingeld et al., 2011; Locke & Latham, 2012). Our results do not support this expectation. Goals may inherently be difficult in contexts where the agile way of working is implemented. It is observed that the agile

way of working allows teams to cut complex, and thus difficult, challenges up into smaller pieces, and through iterative development, agile teams discover the product they require to develop. Thus, our findings highlight a disparity between the original context in which goal-setting theory was developed (e.g., pulp and paper mills) and contemporary work (Locke & Latham, 2012; Locke & Latham, 2019). Through our study, we highlighted the significant role of specific team goals in dynamic settings. This underscores that goals are not static entities but tools that can facilitate adaptive performance in more dynamic settings (Latham & Locke, 2007; Latham & Steele, 1983; Latham & Yukl, 1975; Ordóñez et al., 2009a, 2009b).

Next to the implications above, a practical implication of our study is that the agile way of working can indeed be used to enhance team adaptive performance in diverse environments. Additionally, in our measurement of the agile way of working, we focused on a set of five factors. We did not include the specific agile practices (Junker et al., 2021; Schwaber & Sutherland, 2020). As a result, we add to the understanding that if the team design leads to these five factors, teams will enhance their goal specificity and adaptive performance. This may alleviate some of the pressure on performing all the rituals exactly as prescribed, a topic of discussion in the extant literature (Baham & Hirschheim, 2021). Consequently, organizations can also experiment more with different ways of shaping the agile way of working, its frequency of sprints, and implementation, providing an opportunity to tailor these ways of working to the specific organizational characteristics and differentiate oneself from competitors.

3.5.1 Limitations and future research agenda

The results of our study should be seen considering its limitations. First, we used a cross-sectional research design and self-reported data based on purposive and convenience sampling. Moreover, we did not include a control group of non-agile teams. Therefore, causal inferences about the impact of agile teams on team adaptive performance should be cautiously made. Practical feasibility explains our choices; we could only distribute the questionnaire once in the participating organizations. This meant we could not use a longitudinal or quasi-experimental research design. Despite these limitations, we collected a sample of 319 agile team members nested in 71 agile teams in diverse industries and functions, in contrast to more homogenous or individual-level samples often used (Koch et al., 2023). Additionally, our aim was to assess if agile teams deliver on their promise of adaptive performance rather than whether agile teams outperform traditional teams. For the future, we do suggest the more rigorous designs mentioned.

A second limitation is the measurement of the agile way of working, regarding which there is considerable debate in the agile team literature (Baham & Hirschheim,

2021; Conforto et al., 2016). Some argue that specific development techniques should be measured (e.g., Scrum events), while other state that agile should be measured as “a way of organizing and helping teams to anticipate, respond to, create, and learn from requirements” (Baham & Hirschheim, 2021, p. 108). We have adopted the latter approach because we were interested in how the agile way of working and team interaction drive adaptive performance. We understood from the participating organizations that they are diverse in the implemented techniques; and that they required a short questionnaire. As a result, we measured behaviors that allowed us to generalize across these organizations, adding to the strength of our findings. For future research we recommend testing how measures that specifically address agile practices (e.g., Koch & Schermuly, 2020; Rietze & Zacher, 2022) and our measure of the agile way of working relate to each other to see whether and how they influence each other. This should contribute to consensus on how to measure the agile way of working.

The third limitation relates to how we used goal-setting theory. We used team goal specificity and difficulty to understand how the agile way of working contributes to team adaptive performance. The next step in exploration may be an interaction effect between goal specificity and difficulty. Experimental settings indicate these can interact, which may offer an exciting future avenue for agile teams research (Kleingeld et al., 2011; Tubbs, 1986). Furthermore, goal-setting theory also recognizes goal acceptance and commitment (Locke & Latham, 2019). Owing to the participative decision-making in agile teams, we expect the agile way of working to positively relate to these. We recommend researching these concepts as underlying processes in how agile teams reach adaptive performance, especially considering our finding of partial mediation by goal specificity. Furthermore, we now studied team adaptive performance *as behavior*, and recommend for future research to include *performance as outcome*, such as customer satisfaction or unit performance, to understand the distal effects of the agile way of working. Moreover, we recommend broadening the exploration to test whether the relationship between the agile way of working and adaptive performance is similar across industries. We also call for exploring whether this equally holds for tasks with complex goals, such as software development, as well as for more simple goals, for instance call centers. Such exploration at first may be more qualitative in nature, allowing to also gain insights in how differentially organizations implement and use agile teams and how they manage interdependencies among agile teams.

3.6 References

Please see Chapter 11 for a complete list of all references in this dissertation.

Chapter 4

The Impact of the Agile Way of Working on Project Member Sustainable Performance: The Role of Psychological Empowerment and the Product Owner's Supportive Behavior

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Abstract

The agile way of working is recognized as a flexible project management approach that facilitates adaptation to change and addresses the numerous contingencies encountered in projects, particularly in complex and unpredictable contexts. However, the underlying mechanisms that drive the effectiveness of the agile way of working remain incompletely understood. In this study, we investigate the relationship between the agile way of working and the sustainable performance of agile team members, indicated by adaptivity and work engagement, and examine psychological empowerment as a mediator and supportive behaviors of the Product Owner as a moderator. Results reveal that the agile way of working enhances sustainable performance, with psychological empowerment playing a significant role as an explanatory mechanism. Moreover, substitutive effects were found between the agile way of working and the supportive behaviors of Product Owners, such as setting the Product Goal and ordering tasks. Specifically, the positive influence of agile way of working on empowerment was stronger when Product Owner supportive behavior was lower than when it was higher.

Keywords: agile way of working, Product Owner, sustainable performance, psychological empowerment

4.1 Introduction

In response to increasingly complex and unpredictable environments and the observation that the detailed upfront planning of traditional project management was not optimal to handle this, newer “lightweight” project management techniques have appeared (Conforto et al., 2016; Malik et al., 2021; Serrador & Pinto, 2015). One such lightweight project management technique that has gained significant attention is the agile way of working, originating from a group of software development practitioners (Beck et al., 2001; Conforto et al., 2016; Digital.ai, 2022). While the agile way of working was initially pioneered in software development and is still dominant there, other disciplines, such as human resource management and marketing, are also known to apply it (Alfes et al., 2023; Digital.ai, 2022; Peeters et al., 2022; Rigby et al., 2016). Projects managed with the agile way of working are characterized by self-organized, cross-functional, and cohesive project teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle (Hoda et al., 2018; Hoda et al., 2017; Moe et al., 2010). Project management methodologies, such as Scrum and Extreme Programming, are frameworks that support this way of working (Schwaber & Sutherland, 2020; Wells, 2009), with Scrum being the most widely implemented (Digital.ai, 2022). Evidence supports the effectiveness of these frameworks, demonstrating a positive relationship between the agile way of working and project success (Hennel & Rosenkranz, 2020; Hoda & Murugesan, 2016; Koch et al., 2023; Malik et al., 2021; Prange, 2021; Serrador & Pinto, 2015).

However, the behavioral mechanisms that drive the success of the agile way of working are not yet fully understood (Baham & Hirschheim, 2021; Conforto et al., 2016; Grass et al., 2020; Junker et al., 2021; Malik et al., 2021; Peeters et al., 2022). It is important to understand the behavioral mechanisms to fully grasp the intricacies of agile project management, refine and expand theoretical perspectives, and inform project management practice (Baham & Hirschheim, 2021; Conforto et al., 2016). We study these mechanisms by adopting a micro-level focus on agile project team members’ adaptivity and work engagement (Gerald & Söderlund, 2018). For project success, adaptivity is required to ensure that agile project teams maintain effectiveness despite change (Griffin et al., 2007), while work engagement expresses a positive, fulfilling, and pervasive affective-cognitive state that indicates whether these adaptive behaviors are sustainable (Schaufeli & Bakker, 2010). We refer to these two concepts together as sustainable performance. The sustainable performance of individual project members may be considered a crucial stepping stone to the ability of project teams to anticipate

and integrate change continuously. The project management literature has discussed the ability to anticipate and integrate change continuously as a key indicator of the success of project teams following the agile way of working (Conforto et al., 2016, p. 671). Despite recent attention to adaptivity and work engagement in project studies, their relationship with the agile way of working at the level of team members has not been addressed (Nauman et al., 2022; Rietze & Zacher, 2022; Xia et al., 2022).

We are, furthermore, interested in how the agile way of working impacts the performance of individuals in agile project teams due to the agile way of working increasing psychological empowerment (Beck et al., 2001; Drury et al., 2012; Grass et al., 2020; Malik et al., 2021; Tessem, 2014). Psychological empowerment means project members are motivated and driven to autonomously shape their work role and context (Spreitzer, 1995; Thomas & Velthouse, 1990). The role of psychological empowerment is implied in the Agile Manifesto, a declaration that outlines the values and principles of the agile way of working, which states to “build projects around motivated individuals, give them the environment and support they need and trust them to get the job done” (Beck et al., 2001). Hence, scholars have investigated the concept of psychological empowerment as a mechanism for the effectiveness of the agile way of working (Drury et al., 2012; Grass et al., 2020; Malik et al., 2021; Tessem, 2014). Findings suggest that psychological empowerment indeed fulfils a role as a mechanism in the agile way of working’s relationship to agile project teams’ ability to integrate change. However, whether this also applies to the micro-level of project members and whether adaptivity is sustainable has yet to be explored (Drury et al., 2012; Grass et al., 2020; Malik et al., 2021; Tessem, 2014).

In the agile way of working, the Product Owner fulfils a key role in relation to the project members’ work. The Product Owner’s role is to maximize the product’s value, develop the project goal, prioritize tasks, and ensure each project member understands these tasks (Schwaber & Sutherland, 2020). What “a product” is can be highly diverse and may be a service (e.g., the development of a website or mobile application) or a physical item (e.g., a fighter jet). In agile project teams, the project members rely on the Product Owner to clearly understand the product, formulate specific tasks, and relay feedback to stakeholders. This interplay between the agile way of working and the Product Owner’s behavior has the potential to impact the psychological empowerment of project members. Prior research suggests that the agile way of working context, characterized by high levels of autonomy, may interact with elements of the Product Owner supportive behaviors typically associated with leadership, such as goal development and task ordering (Hsu et al., 2017; Scott-Young et al., 2019). Specifically, studies identified substitution effects, which suggest that at

lower levels of the agile way of working, the Product Owner's supportive behavior is more salient for the project member's performance as goal development and ordering of tasks is more prominent. However, as the project members reach higher levels of the agile way of working, the Product Owner's supportive behavior decreases in prominence as team members become more adept at goal development, task ordering, etc. (Hsu et al., 2017). Considering that the substitutive effect may impact sustainable performance through psychological empowerment, we deem it valuable to investigate the interaction between the agile way of working and the Product Owner's supportive behavior.

The current study, conducted amongst 211 agile team members in the Netherlands, examines the relationship between the agile way of working and sustainable performance with the indicators of adaptivity and work engagement. In addition, it explores the mediating role of psychological empowerment and the moderating effect of the Product Owner's supportive behaviors in this relationship. To theorize these relationships, Self-determination theory (SDT) and the Substitutes for leadership theory are used (Deci et al., 2017; Kerr & Jermier, 1978). With our micro-level study, we contribute to a growing, more detailed understanding of the nature and social dynamics within agile project teams (Junker et al., 2021; Tripp et al., 2016). Additionally, by including a specific focus on sustainable performance, we acknowledge earlier work in project studies that highlights the need to study the ability to anticipate and integrate change continuously as a key indicator of the success of agile project teams (Conforto et al., 2016). As such, we are sensitive to the conversation on when the agile way of working is most appropriate to implement, namely, in complex and unpredictable environments (Prange, 2021; Serrador & Pinto, 2015). Furthermore, our study of the Product Owner's supportive behavior explores an alternative to leadership and leaders in projects (Geraldini & Söderlund, 2018; Hsu et al., 2017; Scott-Young et al., 2019). Consequently, we contribute to understanding how, in projects, people may lead and ensure project success outside of traditional project management and project leaders. To this end, we introduce a scale to measure the supportive behaviors of Product Owners.

4.2 Theoretical Framework

4.4.1 The mediating role of psychological empowerment in the link between the agile way of working and sustainable performance

The agile way of working refers to self-organized, cross-functional, and cohesive project teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks (sprints), after which they reflect, adapt, and plan for the next episodic cycle (Hoda et al., 2018; Hoda

et al., 2017; Moe et al., 2010). From this general description from the literature on the agile way of working, we distill five dimensions: agile (project) team orientation, cross-functional collaboration, customer collaboration, reflexivity, and shared leadership. An agile team orientation refers to accepting team norms and the agile way of working (Dickinson & McIntyre, 1997; Moe et al., 2010). It represents a collectivistic mindset and the individuals' commitment toward their team, project and the agile way of working (at times also called "the agile mindset"). Additionally, agile team orientation signifies that team goals are prioritized over individual goals. Cross-functionality means that agile project teams are staffed with members from diverse backgrounds in terms of expertise and/or functions. Customer collaboration implies that in the agile way of working, customers play a central role in frequently providing feedback on the projects' progress and updating them on whether the product they are building is still in line with customer needs. Reflexivity is the process by which agile project teams "overly reflect on their objectives, strategies, and processes, and adapt them to current or anticipated circumstances" (Schippers et al., 2007, p. 190). This includes communicating and coordinating objectives, strategies, and processes with customers. Reflexivity is crucial in making sprints effective, facilitating smooth transitions between them, and obtaining customer feedback. Shared leadership characterizes the agile way of working, with minimal hierarchical differentiation between individual members. It promotes lateral influence among peers and emphasizes social interactions that contribute to achieving goals (Zhu et al., 2018). The dominant Scrum framework for the agile way of working states that leaving out dimensions of the agile way of working could "render it useless" (Schwaber & Sutherland, 2020, p. 1), therefore, the agile way of working is studied as a unidimensional concept in the current study.

Psychological empowerment is explored as an underlying psychological mechanism explaining the agile way of working's effect on project members' sustainable performance. Psychological empowerment is a form of increased task motivation that reflects an individual's active orientation to their work role, and it indicates whether individuals feel a sense of control in their work (Spreitzer, 1995; Thomas & Velthouse, 1990). Four conditions make up psychological empowerment: meaning, competence, self-determination, and impact. Psychologically empowered individuals wish and feel able to shape their work role and context. We apply the Self-determination theory (SDT) to argue how the agile way of working constitutes a supportive environment that may increase the psychological empowerment (i.e., motivation) and sustainable performance of agile project team members. The SDT addresses the importance of supportive environments for human motivation, performance, and well-being (Deci et al., 2017); it has two central claims. First, there are two types of motivation:

autonomous and controlled. Autonomous motivation refers to acting full of volition, endorsement, and choice, driven by the inherent satisfaction and personal enjoyment of tasks. Controlled motivation relates to feeling externally pressured or compelled to behave, originating from contingent rewards, fear, or punishment. Second, satisfying the three basic psychological needs of autonomy, competence, and relatedness will relate to deeper internalization and more autonomous regulation. Hence, work environments that support basic need satisfaction are expected to demonstrate more autonomous motivation among workers and greater persistence, performance quality, and well-being over time than environments that thwart basic need satisfaction (Deci et al., 2017).

Applying SDT to the agile way of working, we argue that the agile way of working satisfies the basic needs. First, the basic need for autonomy is satisfied since project members are empowered to determine how to do their work; they make their own choices without being told by management (shared leadership). Additionally, project members collectively establish goals and create a plan for their work (reflexivity; Schwaber & Sutherland, 2020). The emphasis on collaboration and setting goals collectively supports satisfying the autonomy need (reflexivity; Junker et al., 2021; Moe et al., 2010; Tripp et al., 2016). Furthermore, autonomy is satisfied through collaborative interactions with customers, where individuals are free to exercise volition and choice in their actions instead of having requirements dictated to them (customer collaboration; Grass et al., 2020; Hoda et al., 2010). Second, the basic need for competence is satisfied as the agile way of working explicitly recognizes individual members' capabilities (cross-functionality; Peeters et al., 2022; Tripp et al., 2016). Moreover, reflexivity and customer collaboration satisfy the need for competence by providing opportunities for receiving individual feedback (Drury et al., 2012; Moe et al., 2010). Through feedback on their actions, skills, and goal achievement, agile project team members can be acknowledged for their effectiveness and capabilities while developing themselves. Third, that the agile way of working satisfied the basic need for relatedness is already evident in dimensions such as shared leadership and customer and cross-functional collaboration, which strongly create a sense of togetherness (Fontana et al., 2014; Hennel & Rosenkranz, 2020; Moe et al., 2010). To illustrate, the cross-functional nature of agile project teams brings diverse areas of expertise together and drives extensive collaboration to achieve results. The agile team orientation satisfies the basic need for relatedness by nurturing a sense of commitment among project members toward their collective goals rather than solely pursuing individual objectives (Gren et al., 2019; Moe et al., 2010; Schwaber & Sutherland, 2020). In sum, the agile way of working satisfies the three basic needs.

Consistent with the above arguments, SDT suggests that when the three basic needs are satisfied, and thus “individuals understand the worth and purpose of their jobs, feel ownership and autonomy in carrying them out, and receive clear feedback and supports, they are likely to become more autonomously motivated” (Deci et al., 2017, p. 20). Considering the sense of control (self-determination and impact), opportunities for skill development and mastery (competence), and collaborative and socially connected nature of the agile way of working (meaning), we propose that the agile way of working enhances autonomous motivation as expressed by psychological empowerment (Seibert et al., 2011; Spreitzer, 1995; Thomas & Velthouse, 1990). Existing literature has presented evidence of a positive relationship between dimensions of the agile way of working and psychological empowerment (Grass et al., 2020; Malik et al., 2021; Maynard, Gilson, et al., 2012; Seibert et al., 2011; Tessem, 2014). Consequently, we expect that the agile way of working will positively relate to the psychological empowerment of agile team members (Deci et al., 2017). Hence, we hypothesize that:

H1. The agile way of working positively relates to psychological empowerment.

The extant literature on psychological empowerment provides ample evidence that psychological empowerment positively influences performance (e.g., task performance, innovation; Maynard et al., 2012; Seibert et al., 2011). In the current study, we address psychological empowerment’s positive influence on adaptivity. Adaptivity is a facet of work role performance that describes “the extent to which an individual adapts to changes in a work system or work roles” (Griffin et al., 2007, p. 329). It reflects “the degree to which individuals cope with, respond to, and/or support changes that affect their roles as individuals” (Griffin et al., 2007, p. 331). The existing literature has established that high levels of psychological empowerment relate to individuals’ ability to anticipate problems and take independent action when faced with risk or uncertainty (Maynard, Gilson, et al., 2012; Seibert et al., 2011). Building upon this notion and SDT, we hypothesize that agile project team members who experience psychological empowerment are more inclined to actively engage in their work by anticipating emergent changes (uncertainty) and effectively adapting to them (action). These project members will demonstrate persistence and resourcefulness in overcoming obstacles toward goal achievement. Through the agile way of working, which enhances the experience of competency and impact (basic needs of competence and relatedness), individuals will feel empowered to implement their ideas and suggestions for change. As agile project team members do this, they likely develop new skills or take on new roles. In other words: they demonstrate adaptivity. Furthermore,

the agile way of working promotes self-determination (basic need of autonomy), encouraging agile team members to utilize these new skills actively. All these behaviors benefit adaptivity, as supported by previous research demonstrating that psychological empowerment leads to these behaviors and, ultimately, to more innovative outcomes within and outside the agile way of working (Grass et al., 2020; Malik et al., 2021; Seibert et al., 2011). Consequently, we hypothesize that psychological empowerment mediates the relationship between the agile way of working and adaptivity. However, we acknowledge that next to psychological empowerment, proactivity norms, training and development, or peer pressure may explain the relationship between the agile way of working and adaptivity (Gren et al., 2017; Junker et al., 2021; Khanagha et al., 2021). Therefore, we hypothesize partial mediation as follows:

H2. Psychological empowerment partially mediates the relationship between the agile way of working and adaptivity.

As a part of sustainable performance, it is crucial that agile project team members feel well in their work as low levels of energy may prevent them from keeping up with changes that affect their role (Halbesleben, 2010). Work engagement expresses “feeling well at work” as it is defined as a “positive, fulfilling, work-related state of mind” characterized by vigor, dedication, and absorption” (Schaufeli & Bakker, 2010, p. 13). Vigor refers to high levels of energy and mental resilience, the willingness to invest effort and persistence in the face of difficulties at work. Dedication addresses the strong involvement in work and the experience of significance, enthusiasm, inspiration, pride, and challenge. Absorption concerns one being fully concentrated and engrossed in their work, meaning that time passes quickly, and one may have trouble with detaching from work. So, work engagement is characterized by high levels of energy and a strong identification with work and is not momentary but rather a persistent and pervasive affective-cognitive state (Schaufeli & Bakker, 2010). SDT posits that when agile project team members’ basic needs are satisfied as manifested in psychological empowerment, this results in increased engagement, improved psychological well-being, and reduced exhaustion (Deci et al., 2017). Consequently, we anticipate that psychological empowerment drives project members to willingly invest effort and persist in the face of difficulty at work since they derive satisfaction and personal enjoyment from their tasks. The feelings of empowerment of agile project team members will lead them to be actively involved in their work and experience enthusiasm and pride due to their ability to make decisions and influence performance. Herein, psychological empowerment acts as a resource that facilitates work engagement due to the satisfaction of basic

needs that the agile way of working brings about. Previous research demonstrated a positive effect of psychological empowerment to work engagement (Joo et al., 2019; Ugwu et al., 2014). Following SDT's arguments that work engagement is contingent on basic need satisfaction and autonomous motivation (Deci et al., 2017) and consistent with our arguments that basic need satisfaction originates from the agile way of working and autonomous motivation is expressed through psychological empowerment, we hypothesize full mediation:

H3. Psychological empowerment mediates the relationship between the agile way of working and work engagement.

4.2.2 The moderating role of the Product Owner's supportive behavior

Agile project teams work in cooperation with their Product Owner, a role that the Scrum framework defines as "accountable for maximizing the value of the product resulting from the work of the [agile] team" (Schwaber & Sutherland, 2020, p. 5). What "a product" is can be highly diverse and could be a service (e.g., development of a website or mobile application) or physical item (e.g., a fighter jet). In each project that uses the Scrum framework, a Product Goal is defined, which describes the future state of the product, and can serve as a target for the project members to plan for (Schwaber & Sutherland, 2020, p. 11). The Product Owner's behaviors should seek to maximize the value of the product that the project members deliver. This includes accountability for developing and communicating the Product Goal, communicating the tasks that result in the Product Goal, ordering additional tasks, and ensuring that all tasks are transparent, visible, and understood by the agile project team members.

The supportive behavior of the Product Owner may influence the positive relationship between the agile way of working and psychological empowerment. To theorize about the role of the Product Owner, we draw upon the Substitutes for leadership theory (Kerr & Jermier, 1978). This theory suggests that factors such as task characteristics (e.g., structured tasks), organizational characteristics (e.g., well-established policies and procedures, strong culture), or attributes of individuals (e.g., high skill level, experience with the way of working) can influence the need for or impact of leadership. When such factors are present, they independently influence desired outcomes, making the presence of a leader less critical (Kerr & Jermier, 1978). The Product Owner's supportive behaviors overlap with hierarchical leadership to some extent. For example, defining the Product Goal and ordering tasks. Therefore, we consider the Substitutes for leadership theory suitable to use here. Based on

the theory, we expect substitutive effects between the agile way of working and the Product Owner in influencing psychological empowerment. Lower levels of the agile way of working express that project members may face challenges in collectively setting goals, establishing a plan to achieve those goals, and prioritizing their work. Consequently, the members rely more strongly on their Product Owner for these aspects. In this situation, the Product Owner's behaviors support them with feeling autonomous and competent. This is because the clarity on goals and associated tasks allows project members to decide on their own how to do the work best and enhances feelings of competency since they know what needs to be accomplished. These two basic needs positively influence psychological empowerment (Deci et al., 2017). As agile project team members obtain higher levels of the agile way of working, they develop a clear understanding of their Product Goal (i.e., clear backlog items) and enhance their self-organization and capabilities to plan work effectively. This reduces reliance on the Product Owner to communicate the product's purpose and associated goals and translate these into clear backlog items. Thereby, the agile way of working facilitates the satisfaction of autonomy, competence, and relatedness, positively impacting psychological empowerment. Consequently, we expect that the agile way of working and the Product Owner's supportive behaviors act as substitutes.

Existing research supports the idea that project members vary in their understanding of the agile way of working and ability to fully leverage its potential for basic need satisfaction and, thus, psychological empowerment (Fontana et al., 2014; Gren et al., 2019; Gren et al., 2017; Hoda et al., 2010; Kadenic et al., 2023; Ramírez-Mora et al., 2020). Furthermore, evidence suggests substitutive effects between work factors such as autonomy and reflexivity and leadership styles that involve behaviors similar to the Product Owner's supportive behaviors (Grass et al., 2020; Hsu et al., 2017; Jiang et al., 2015; Scott-Young et al., 2019; Whittington et al., 2004). Therefore, in line with the Substitutes for leadership theory and empirical research, we formulate the following hypothesis:

H4. The Product Owner's supportive behaviors moderate the relationship between the agile way of working and psychological empowerment, such that the Product Owner's supportive behavior weakens the positive effect of the agile way of working on psychological empowerment.

We combine our mediation hypotheses with our substitution hypothesis and consequently formulate the two following hypotheses:

H5. The Product Owner's supportive behavior moderates the mediation between the agile way of working and adaptivity.

H6. The Product Owner's supportive behavior moderates the mediation between the agile way of working and work engagement.

4.3 Methods

4.3.1 Data collection and sample

A cross-sectional time-lagged research design was selected for the data collection. Two measurement moments took place, separated by 6-8 weeks depending on sprint length. The concepts of agile way of working and Product Owner supportive behavior, along with socio-demographic information about the sample, were collected at the first time point, and two sprints later, data were collected on psychological empowerment, adaptivity, and work engagement. This design was informed by our intent to prevent common method bias from significantly influencing our findings. Data were collected among individual members of agile project teams between October 2022 and April 2023 using the Qualtrics software. Participants were found based on purposive and convenience sampling, and snowballing was applied. Through contacts in personal and professional networks (e.g., LinkedIn), individuals that used the agile way of working in projects were approached for participation in the research. Following the snowballing technique, we asked these individuals to invite others that also worked in the Netherlands and use the agile way of working to participate in the research.

In total, 273 agile project team members participated in the first moment of data collection. In the second moment, 225 agile team members participated (82% retention). Participants worked for diverse organizations and functions, representing the public (e.g., research university, employee insurance agency) and private sectors (e.g., e-commerce, banking). The majority was male (66.7%) and had completed a higher education degree (39.6% higher vocational education, 43.1% research university). All participants in the study worked according to Scrum (76%) or a variant of Scrum such as SAFe (24%), the Scaled Agile Framework that implements Scrum at the enterprise level. Regarding collaboration within their project teams, most work in a hybrid fashion (87.6%), with office and home-office days. Most members were relatively new in their respective project teams (41.8% < 1 year, 30.7% between 1-3 years), while a small number has been with their project team for over 5 years (6.2%), indicating high temporal stability. Table 4.1 provides a more detailed breakdown of the sample characteristics.

Table 4.1 Sample characteristics

Characteristic		<i>M</i>	<i>SD</i>
Age		39.76	11.647
		Total in numbers	% of total
Gender	Man	150	66.7%
	Woman	61	27.1%
	Missing	11	6.2%
Education	Elementary school	0	0.0%
	Basic	1	0.4%
	Secondary	27	12.0%
	Higher	89	39.6%
	Academic	97	43.1%
	Missing	11	4.9%
Hybrid/remote working	Working fully remote	8	3.6%
	Working hybrid	197	87.6%
	Working fully in office	9	4.0%
	Missing	11	4.9%
Project team tenure	Less than a year	94	41.8%
	Between 1-3 years	69	30.7%
	Between 3-5 years	36	16.0%
	More than 5 years	14	6.2%
	Missing	12	5.3%
Agile methodology	Scrum	171	76.0%
	Other (SAFe)	54	24.0%

Note. *N* = 225; some percentages may not add up to 100% due to rounding of decimals.

4.3.2 Measures

To measure the concepts in our study, we used existing measurement scales validated by previous research. The only exception is the measurement scale for Product Owner, which we developed ourselves. Agile practitioners provided a sense-check for all concepts to assess whether its phrasings would appropriately relate to the day-to-day reality of the agile way of working. As a result, we use “team” as referent in the items for the agile way of working, since the agile practitioners informed us that for project members this is how they mainly identify. Validity and reliability tests were performed using the Lavaan package for R.

Agile way of working has no generally agreed-upon measurement scale (Baham & Hirschheim, 2021). Therefore, we measured the agile way of working with five validated

measures for the five underlying dimensions. As a result, we have a 19-item scale that reflects agile team orientation (Salas et al., 2015), cross-functional collaboration (De Luca & Atuahene-Gima, 2007), customer collaboration (Peeters et al., 2022), reflexivity (Schippers et al., 2007), and shared leadership (Kirkman & Rosen, 1999). Participants answered each item on a 5-point Likert scale that ranged from “completely disagree” (1) to “completely agree” (5). Example items include “In our team, we often review our approach to getting the job done” (reflexivity) and “In our team, we work in close collaboration with our customers” (customer collaboration). Given the structure of the agile way of working concept, we performed a confirmatory factor analysis where the agile way of working was modeled as a second-order factor. The factor solution indicated sufficient fit with the data ($CFI = .910$, $RMSEA = .062$, $SRMR = .068$; (Hooper et al., 2008). All factor loadings were above the .600 threshold. Furthermore, internal consistency was generally also sufficient (measure: composite reliability, CR ; agile team orientation = .778, cross-functional collaboration = .809, customer collaboration = .786; reflexivity = .788, shared leadership = .597). The composite reliability for shared leadership was just below the threshold of .600 (Hair et al., 2017). However, given its content validity, importance to the concept of the agile way of working, and previous successful use (Kirkman & Rosen, 1999), we decided to include it. The unidimensional agile way of working measure indicated sufficient internal consistency ($CR = .866$).

Product Owner supportive behaviors did not have a measurement scale, and it was not appropriate to assess through existing leadership concepts (i.e., they did not fully capture the concept and its context), so we created our own (Boateng et al., 2018). Collaborating with six agile coaches and Product Owners, we formulated items based on the Scrum framework’s descriptions of the Product Owner role (Schwaber & Sutherland, 2020). The result was a 7-item scale with high content and face validity (see Table 4.2 for items). In addition, we tested the items with experts in leadership research to see if they linked the items with existing leadership concepts. The feedback was that the items show most similarity to transformational leadership (e.g., vision, empowerment, innovative thinking; Carless et al., 2000), but do not copy specific items. This confirms our reasoning that existing leadership concepts would not appropriately capture the concept and its context. However, it does suggest an initial, preliminary positing of the Product Owner’s supportive behavior in relation to validated academic concepts (convergent and divergent validity). We asked respondents to rate the Product Owner items on a 5-point Likert scale that ranged from “completely disagree” (1) to “completely agree” (5). After collecting data, we performed confirmatory factor analysis to test if our pre-defined single-factor structure matched the observed data. The factor

solution indicated sufficient fit with the data ($CFI = .981$, $RMSEA = .076$, $SRMR = .030$; (Hooper et al., 2008). All factor loadings were above the .600 threshold. Furthermore, internal consistency was also sufficient ($CR = .827$). As a result, we continue using our original measurement scale. Table 4.2 shows the factor loadings of our Product Owner supportive behavior measurement scale.

Psychological empowerment was measured with a 12-item scale (Spreitzer, 1995). Participants answered each item on a 5-point Likert scale that varied from “completely disagree” (1) to “completely agree” (5). Example items include “I am confident about my ability to do my work” (competence) and “I have considerable opportunity for independence and freedom in how I do my work” (self-determination). The second-order factor consisting of the first-order factors representing meaning, competence, self-determination, and impact, achieved good model fit ($CFI = .937$, $RMSEA = .090$, $SRMR = .067$; (Hooper et al., 2008), and sufficient internal consistency on each of its four dimensions (meaning = .835, competence = .847, self-determination = .815, impact = .859). All factor loadings were above the .600 threshold. Provided that research findings indicate “strong support for Spreitzer’s original conceptualization of psychological empowerment as a unitary construct” (Seibert et al., 2011, p. 998), we continue with psychological empowerment as a unitary construct. The unidimensional psychological empowerment measure indicated sufficient internal consistency ($CR = .892$).

Adaptivity was measured with a 3-item scale (Griffin et al., 2007) that achieved perfect model fit ($CFI = 1.000$, $RMSEA = .000$, $SRMR = .000$; (Hooper et al., 2008) and sufficient internal consistency ($CR = .690$). Participants were prompted to rate how often they have carried out certain behaviors in the past month on a 5-point Likert scale that ranged from “very little” (1) to “a great deal” (5). An example item is “Dealt effectively with changes affecting your team (e.g., new team members)”.

Work engagement was measured with a 3-item scale (Schaufeli et al., 2019) that achieved perfect model fit ($CFI = 1.000$, $RMSEA = .000$, $SRMR = .000$; (Hooper et al., 2008) and sufficient internal consistency ($CR = .823$). Participants were prompted to rate how often they feel a certain way about their job on a 7-point frequency scale that ranged from “never” (1) to “daily” (7). An example item is “At my work, I feel bursting with energy”.

Control variables that we used in the current study are age and gender to reduce confounding effects on adaptivity (age, higher age relates to lower adaptivity; Griffin et al., 2007) and work engagement (gender, women are reported to have higher levels of work engagement; Halbesleben, 2010).

Table 4.2 Items and factor loadings for the measure of Product Owner supportive behavior.

Item	Factor loading
My Product Owner clearly explains the reasons (the why) of user stories.	.742
My Product Owner clearly explains the goals (the what) of user stories.	.737
My Product Owner clearly communicates the vision of the end product to the team members.	.642
My Product Owner translates our goals into clear backlog items.	.654
My Product Owner makes effort to ensure that everyone in the team understands the backlog items well.	.778
My Product Owner makes an active contribution to the results of the team.	.668
My Product Owner listens carefully to the input of the team so that the right decisions are made at the right time.	.616

Note. $N = 211$ agile team members, $CR = .827$, $CFI = .981$, $TLI = .961$, $RMSEA = .076$, $SRMR = .030$

4.3.3 Data analysis

Due to missing values, the final sample size for the data analysis was 211. After checking the validity and reliability of the measures, the Harman single-factor test was performed to assess common method bias. Results indicate that the total variance explained by a single factor is 41.14%, which is below the limit of 50%, thereby indicating that common method bias does not significantly influence the concepts (Podsakoff et al., 2003). Given the hypotheses, Structural Equation Modelling (SEM) was deemed the most appropriate analysis technique (i.e., modeling a moderated mediation mechanism on two outcomes). The assumptions of linearity, lack of multicollinearity, multivariate normality, and adequate sample size were checked and satisfied. For information on the correlations between the concepts, we refer to Table 4.3. Table 4.3 indicates that the agile way of working and Product Owner's supportive behavior have a strong correlation ($r = .591$, $p < .01$), yet this falls below the threshold of .700 for multicollinearity. For SEM, considering the ratio of items to sample size (i.e., 46 items to 211 agile team members), we moved forward with observed variables (mean scores) to maintain a favorable indicator-to-sample size ratio (Hair et al., 2018). To analyze the hypothesized model, we used Mplus. The estimator was maximum likelihood and bootstrapping was used (2000 samples).

4.4 Results

The results of the SEM are reported in Table 4.4 and visualized in Figure 4.1. We only include the direct effects to ensure that Figure 4.1 is interpretable. Table 4.4 presents all results.

Table 4.3 Descriptive information and correlations

Concepts	M	SD	1	2	3	4	5	6
1 Agile way of working	3.822	.434						
2 Product Owner supportive behavior	3.833	.599	.591**					
3 Psychological empowerment	3.999	.472	.295**	.249**				
4 Adaptivity	3.708	.563	.269**	.188**	.205**			
5 Work engagement	5.824	.753	.131*	-.042	.445**	.243**		
6 Age (years)	39.760	11.647	.074	.148*	.119	-.178**	.051	
7 Gender – male ±			.056	-.035	-.045	-.025	-.068	.153*

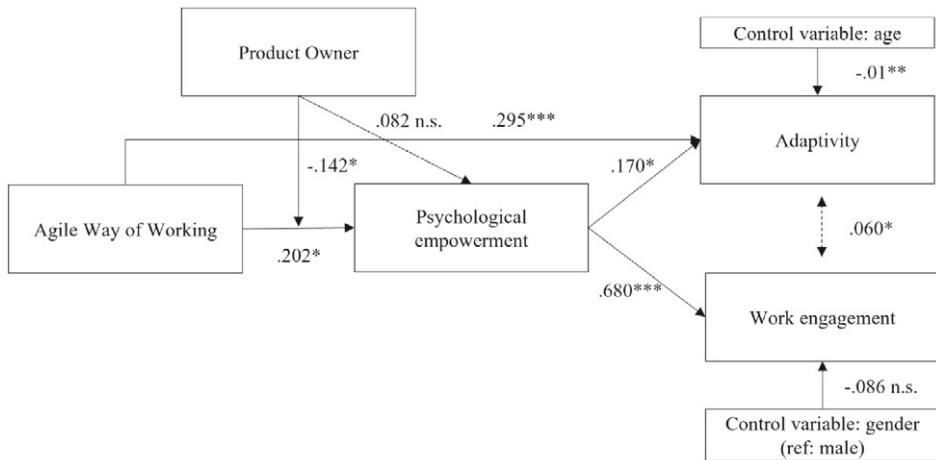
Note. N = 211 agile team members; ** = $p < .01$ (2-tailed) * = $p < .05$ (2-tailed); all concepts rated on a 5-point Likert scale, except for work engagement, which was rated on a 7-point scale (1 = never; 7 = always); ± Reference category for gender = male.

The results indicate that the specified model is an appropriate fit for the observed data ($\chi^2 = 15.201$, $df = 9$, $p > .05$; $CFI = .940$; $RMSEA = .057$; $SRMR = .040$; (Hooper et al., 2008). Hypothesis 1 expected a positive relationship between the agile way of working and psychological empowerment, and we found support for this relationship ($b = .202$, $p < .05$). Hypothesis 2 predicted that psychological empowerment partially mediates the relationship between the agile way of working and adaptivity. We found support for a relationship between the agile way of working and psychological empowerment (hypothesis 1), and between psychological empowerment and adaptivity ($b = .170$, $p < .05$), as well as between the agile way of working and adaptivity ($b = .295$, $p < .001$). The results do not support a statistically significant mediation effect at the 95% confidence level ($b = .034$, $p > .05$), as the p-value was .117. This is, however, close to marginal significance, which is discussed as occurring between the 90%-95% confidence level (Olsson-Collentine et al., 2019). So, we reject hypothesis 2. Hypothesis 3 states that psychological empowerment mediates the relationship between the agile way of working and work engagement. The relationship between psychological empowerment and work engagement ($b = .680$, $p < .01$) was significant, and the full mediation effect was confirmed ($b = .138$, $p < .05$).

Hypothesis 4 expected a substitution effect between the agile way of working and the Product Owner regarding psychological empowerment, as was indeed confirmed ($b = -.142$, $p < .05$). To ease the interpretation of this finding, we plotted the interaction in Figure 4.2. Figure 4.2 shows that the Product Owner’s supportive behavior weakens the relationship between the agile way of working and psychological empowerment. Product Owner supportive behaviors neutralize the positive effect of agile way of working on psychological empowerment. The Product Owner’s supportive behavior does not directly influence psychological empowerment ($b = .082$, $p > .05$). Hypothesis 5 expected that the Product Owner’s supportive behaviors moderate the mediation of the relationship between the agile way of working and adaptivity. Results did not support hypothesis 5 (PO

+1SD, $b = .024, p > .05$; PO -1SD, $b = .045, p > .05$). Hypothesis 6 predicted that the mediation of the relationship between the agile way of working and work engagement is moderated by the Product Owner, and was confirmed (PO -1SD, $b = .179; p < .01$; PO +1SD, $b = .096, p > .05$). These findings indicate that psychological empowerment positively mediates the relationship between the agile way of working and work engagement primarily when the Product Owner’s supportive behavior is less prominently present.

Figure 4.1 Statistical model



Note. $^{***} = p < .001, ^{**} = p < .01, ^* = p < .05$.

Figure 4.2 Moderation plot agile way of working-Product Owner-psychological empowerment

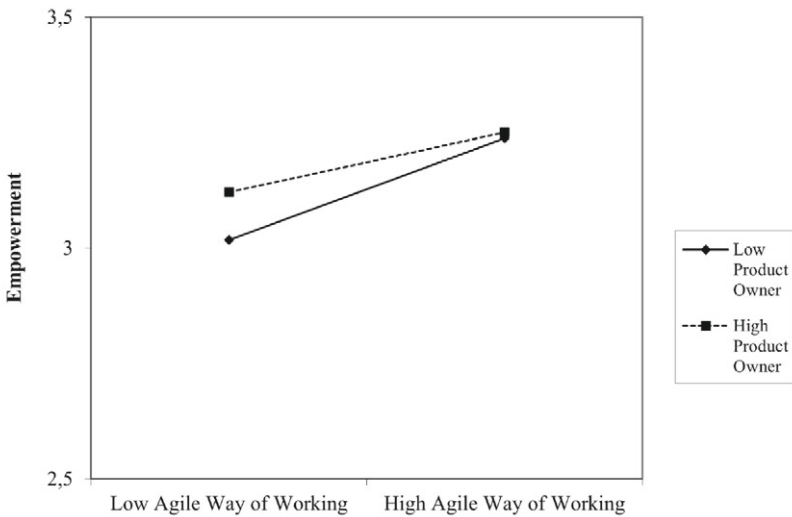


Table 4.4 Results from structural equation modeling, unstandardized

Predictor	Psychological empowerment	Adaptivity	Work engagement
	<i>b</i>	<i>b</i>	<i>b</i>
Agile way of working	.202*	.295***	
Product Owner	.082		
Agile*Product Owner	-.142*		
Psychological empowerment		.170*	.680**
Age		-.010**	
Gender - male			-.086
Covariance adaptivity and work engagement			.060*
Indirect effect AGILE WAY OF WORKING-EMP-AD			.034
Conditional effect: Product Owner +1SD			.024
Conditional effect, Product Owner -1SD			.045
Indirect effect AGILE WAY OF WORKING-EMP-WE			.138*
Conditional effect, Product Owner +1SD			.096
Conditional effect, Product Owner -1SD			.179**
<i>r</i> ² of adaptivity			.132
<i>r</i> ² of work engagement			.189

Note. Model fit indices: $\chi^2 = 15.201$, $df = 9$, $p > .05$; $CFI = .940$; $RMSEA = .057$; $SRMR = .040$.

$N = 211$ agile team members, not nested; *b* = unstandardized effect size; ** = $p < .01$, * = $p < .05$; age and gender (male was the reference category) were control variables.

4.5 Discussion

4.5.1 Major findings and contributions

Given the dynamic nature of project requirements in complex and unpredictable environments, projects may depend on individual project team members who must adapt effectively and respond constructively to changes that affect their project. Consequently, these performance behaviors must be sustained over time (Conforto et al., 2016; Xia et al., 2022). The current study's first finding shows that the agile way of working effectively increases individual sustainable performance. This indicates that the agile way of working, based on agile team orientation, cross-functional collaboration, customer collaboration, reflexivity, and shared leadership, positively influences agile project team members to be energized and dedicated and adapt effectively to change. Work engagement and adaptivity are expected to support and strengthen each other to ensure that project members can deliver long-term sustainable performance. As a result, the current study adds to the body of knowledge that has identified the agile way of working as an effective project management approach (Hennel & Rosenkranz, 2020; Hoda & Murugesan, 2016; Koch et al., 2023; Malik et al., 2021; Serrador & Pinto,

2015), and uniquely contributes to understanding about its impact on adaptivity and work engagement from a project member perspective (i.e., sustainable performance; Conforto et al., 2016; Nauman et al., 2022; Rietze & Zacher, 2022; Xia et al., 2022).

A second major finding of our study concerns the role of psychological empowerment in the relationship between the agile way of working and the sustainable performance of agile project team members. Results indicate that psychological empowerment mediates the relationship between the agile way of working and work engagement (H3) but not between the agile way of working and adaptivity (H2). Following SDT, these findings indicate that the agile way of working is a source for satisfying the basic needs of autonomy, relatedness, and competence (H1; Deci et al., 2017). In turn, satisfying basic needs fosters agile team members' desire and ability to shape their work role and context, enhancing their vigor, dedication, and absorption. A non-significant (close to marginal) mediating effect regarding adaptivity suggests that psychological empowerment is not the crucial mechanism that explains why the agile way of working relates to agile team members' adaptivity. However, given the significant direct effects, this may also result from a lack of statistical power. The direct effect confirms that the agile way of working inherently relates to adaptivity, stemming from sprints, a frequent adaptation based on feedback, and daily coordination among agile team members (i.e., reflexivity). Furthermore, it reinforces the notion that agile project team members who experience psychological empowerment are more inclined to engage in their work actively, anticipate emergent changes, and effectively adapt to them (Maynard, Gilson, et al., 2012; Seibert et al., 2011).

The above findings contribute to the research on the role of psychological empowerment in the agile way of working in two ways (Drury et al., 2012; Grass et al., 2020; Malik et al., 2021; Tessem, 2014). First, by studying the agile way of working as a unidimensional construct, we found a direct, positive effect on psychological empowerment. This contrasts with an approach of separate practices, where Malik et al. (2021) found that team autonomy and agile communication relate to psychological empowerment and team diversity and iterative & incremental development do not. The explanation for these differences lies in the conceptual nature of the agile way of working as a bundle of dimensions that creates a work environment that acts as a source for satisfying the basic needs of autonomy, relatedness, and competence (Deci et al., 2017). Because the dimensions mutually reinforce each other and satisfy the basic needs, separate agile practices will likely yield different effects on psychological empowerment. Second, by uniquely focusing on two indicators of sustainable performance on the level of team members, namely, adaptivity and work engagement, our study showed that both indicators benefit from implementing the agile way of

working. Consequently, we have broadened the scope of research on the agile way of working and the factors that psychological empowerment as a mechanism may explain (Conforto et al., 2016; Nauman et al., 2022; Xia et al., 2022).

The third major finding of our study is the substitution effect between the agile way of working and the Product Owner on psychological empowerment (H4, H5, and H6). Our findings provide unique insights as we are, to the best of our knowledge, the first to quantitatively study the Product Owner's role, thereby showing how this distinct role interacts with the agile way of working to shape individual sustainable performance. Specifically, we found that at lower levels of the agile way of working, the Product Owner's behaviors support psychological empowerment. This suggests that when agile team members struggle to act autonomously, the effects of the Product Owner's supportive behavior becomes salient in the absence of other factors. For instance, setting goals, planning, and prioritizing work collectively may pose challenges for these project members, leading them to rely more on their Product Owner for these aspects. In this scenario, the basic need satisfaction that facilitates psychological empowerment stems from the Product Owner's supportive behavior. Our findings indicate that the agile way of working as a supportive environment substitutes for the Product Owner's supportive behavior as higher levels of the agile way of working are reached (Kerr & Jermier, 1978). In line with our other findings, we found that the interactive effect of the agile way of working and the Product Owners is mediated toward work engagement by psychological empowerment. Our efforts contribute to a broader understanding of how the agile way of working interacts with the Product Owner role. In addition, we shed light on the Product Owner role as an alternative to traditional leadership in project management and how their behavior may influence individual project members. Moreover, by introducing a scale to measure the behaviors of the Product Owner, we provide a starting point for further exploration of the Product Owner's behavior and its influence.

4.5.2 Practical implications

Our first practical implication is that the agile way of working can be considered a successful approach for projects dealing with complex and unpredictable circumstances aiming to enhance individual adaptivity and work engagement. Whereas adaptivity, as a facet of work role performance, is traditionally regarded as the primary goal (Griffin et al., 2007), enhancing work engagement must also be seen as an important goal rather than a means to an end, as it captures the long-term sustainability of these adaptive behaviors. Furthermore, research has established that work engagement contributes to commitment, health, and reduced turnover intentions (Halbesleben, 2010), all of which should interest project managers. Projects and their members are

advised to embrace the agile way of working holistically, as our findings indicate that implementing it unidimensional fuels psychological empowerment and individual sustainable performance.

Second, our findings highlight the behaviors of the Product Owner. The role of the Product Owner is essential as they are responsible for effectively managing the backlog tasks, including setting work tasks and assigning priority to these based on customer input. However, our study also reveals that the agile way of working and the Product Owner can substitute for each other's effect on psychological empowerment (Kerr & Jermier, 1978). When agile project team members still need to build their capabilities on the related dimensions or struggle with them, the Product Owner's supportive behaviors are especially relevant for psychological empowerment. For example, when customers have not granted the project members considerable autonomy or are unwilling to collaborate following the agile way of working (Hoda et al., 2010). Consequently, Product Owners should be encouraged to facilitate customer engagement with the agile way of working and provide project members with feedback and clarity on the Product Goal. Additionally, assigning experienced Product Owners to newly formed agile project teams or members new to the agile way of working can enhance psychological empowerment and speed up achieving higher levels of the agile way of working. As such, the Product Owner may be instrumental in supporting and empowering project members in the agile way of working.

4.5.3 Limitations and future research

While our findings make valuable contributions, viewing them in light of our study's limitations is essential. First, the research design was cross-sectional, restricting our ability to establish causal relationships. The risk of common method bias was addressed by separating the measurement of the agile way of working and Product Owner from psychological empowerment, adaptivity, and work engagement. Although we conducted Harman's single factor test (Podsakoff et al., 2003), which suggested no significant issues of common method bias, it is important to note that the data within the two measurement moments remained cross-sectional. Furthermore, we only asked respondents to fill in the whole questionnaire once, as we separated the concepts across measurement moments, meaning that we could not control for change over time. For future research, we recommend a longitudinal design to prevent these issues.

Second, given the lack of an existing scale for the supporting behaviors of the Product Owner, we developed our own following the recommendations of Boateng et al. (2018). However, we acknowledge that we did not engage in comprehensive scale

validation involving data collection on various related concepts, nor did we statistically establish the distinctiveness or similarity of the Product Owner supporting behaviors compared to other leadership styles. Our Product Owner scale demonstrated favorable reliability and validity indicators through expert consultation and statistical testing. To further strengthen the scale, we recommend performing a scale validation study and, at minimum, including the concepts of transformational, transactional, and empowering leadership to evaluate the overlap or distinctiveness of the Product Owner construct and scale (Carless et al., 2000; Cheong et al., 2019). Moreover, the current study's findings show that in situations with high levels of the agile way of working, the Product Owner's supporting behaviors do not enhance project member psychological empowerment. We encourage to examine other mechanisms, like psychological safety (Peeters et al., 2022), to explore the beneficial influence of Product Owners.

Third, our study focused on the individual project member level and did not require that participants belong to the same agile project team. However, considering that the concepts of the agile way of working and the Product Owner also manifest on the team level, we recommend that future researchers take a multilevel approach. In that situation, psychological empowerment, adaptivity, and work engagement still play a role at the individual member level due to their conceptual nature as individual constructs. However, the agile way of working and the Product Owner supportive behaviors could be measured at the team level. Such an exploration and multilevel analysis would yield additional detailed, nuanced insights into the processes through which the agile way of working impacts sustainable performance. Moreover, we recommend including tangible indicators of project success (e.g., performance on time, quality, budget, customer satisfaction) next to adaptivity and work engagement as indicators of sustainable performance (i.e., serial mediation). This would offer further insights into the underlying mechanisms that drive the success of the agile way of working. As a result, scholars can demonstrate whether these are indeed stepping stones toward team and project-level outcomes, thereby further benefiting the understanding of the mechanisms of agile project management.

4.6 References

Please see Chapter 11 for a complete list of all references in this dissertation.

Chapter 5

The Agile Way of Working and Performance Management: Exploring Tensions with a Multiple Case Study

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Abstract

This study explores the agile way of working and its interplay with Human Resource Management (HRM) practices, particularly performance management. It highlights how the agile way of working, characterized by iterative work cycles and self-organizing teams, contrasts and interacts with existing performance management practices. Through problematization, three tensions are theoretically identified, and following, these are empirically examined in four Dutch case organizations. Data analysis shows how managers and employees experience these tensions and how they and their organizations have (or have not) dealt with the tensions. This study contributes to understanding how the agile way of working may reshape organizational systems and the challenges and strategies involved with aligning the HR practice of performance management with the agile way of working.

Key words: the agile way of working, human resource management, performance management, problematization, multiple case study

5.1 Introduction

The agile way of working is characterized by self-organized, cross-functional, and cohesive teams that set their own performance goals in close collaboration with customers and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle (Hoda et al., 2017; Moe et al., 2010). The agile way of working is spreading throughout contemporary organizations (e.g., John Deere, Microsoft, Spotify; Cappeli & Tavis, 2018; Hoda et al., 2017; Koch et al., 2023; Rigby et al., 2016; Serrador & Pinto, 2015) and changes not only the core work system of collaboration and coordination but also necessitates change in supporting systems (Pasmore, 1995, p. 16). A critical system that appears to be in a state of flux due to the agile way of working is Human Resource Management (HRM). Academic work shows that the introduction of the agile way of working leads to the emergence of “agile HR” (De Smet, 2018; McMackin & Heffernan, 2021; Mollet & Kaudela-Baum, 2022; Roper et al., 2022). Agile HR⁵ was defined by McMackin and Heffernan (2021) and expresses how HR departments (can) support agile teams in their way of working. At the same time, it also implies that HR departments transition toward the agile way of working. Mollet and Kaudela-Baum (2022) show that agile HR encompasses a shared responsibility for HR work and broad capability requirements of role holders (e.g., HR, employees, management, agile roles). Roper et al. (2022) find that HR departments primarily focus on traditional employment relationships and fail to support a greater variety of workers and employment relations, which agile HR will have to address. Until now there has been limited understanding of the HR practice of performance management in agile contexts. However, in many agile organizations, “annual performance appraisals are in many cases the first traditional practices to go” (Cappeli & Tavis, 2018, p. 2).

Performance management entails a range of HR activities that organizations engage in to enhance the performance of individuals, teams, and units, with the ultimate purpose of improving the effectiveness of the organization (Aguinis, 2014; Biron et al., 2011; DeNisi & Smith, 2014; Dewettinck & Vroonen, 2016). The range of activities typically includes an annual cycle of goal setting, monitoring progress towards goals, and an appraisal of whether goals were achieved. Recent developments in performance management include incorporating more continuous feedback and feedback from multiple stakeholders (De Smet, 2018; Gorman et al., 2017; Wigert & Barrett, 2020). However, despite these developments, in

⁵ McMackin and Heffernan (2021, p. 4) define agile HR as “an operational strategy, agile HR seeks to minimize waste and optimize the flow of value to its customers by organizing the HR function in multidisciplinary, empowered teams, that continuously align with changing business needs by sensing and adapting through open communication while operating in short cycles. Agile principles are reflected in all aspects of the HR operation including structures, roles, processes, and tools as well as skills and behaviors of HR management and HR employee”.

most cases, activities still occur within the traditional confines of the relationship between the manager and their direct report. So, the daily realities of the core work system of the agile way of working and the support system of performance management potentially need re-alignment (Pasmore, 1995). The performance management annual cycle of goal setting appears at odds with agile teams' much faster two-to-four-week cycles (Moe et al., 2010). This implies that in the agile way of working, goals can be set and evaluated several times before they are considered for an employee's appraisal, calling into question the necessity and valence of setting annual individual goals. In addition, within agile teams, most work activities occur outside of the view of a manager. We expect tension between (1) performance management activities with a manager and the daily reality of working in an agile team, between (2) annual performance management cycle and 2-4-week sprints, and between (3) individual employees setting goals and the agile teams they are part of setting goals, too. Such tension may be problematic for employee motivation and the alignment between systems, which could lead to a less consistent HR system. Research has indicated that less consistent HR systems may harm individual, unit, and organization-level outcomes (Boon et al., 2007).

The current study aims to shed light on these tensions between the agile way of working and performance management as, respectively, core and supporting organizational systems. We deem this relevant due to the continued spread of the agile way of working throughout organizations and interesting given the observations that performance appraisals are the first traditional HR practice to go (Cappeli & Tavis, 2018; Hoda et al., 2017; Koch et al., 2023; Rigby et al., 2016; Serrador & Pinto, 2015). Furthermore, performance management is a critical HR practice (Biron et al., 2011; DeNisi et al., 2021). Next to identifying tensions, we explore how organizations reshape their performance management to align with the agile way of working. As a result, we contribute to the literature by identifying assumptions of more traditional performance management that may not fit the context of the agile way of working. More specifically, we bring recent developments in performance management into the academic discourse (De Smet, 2018; Wigert & Barrett, 2020) and advance the understanding of agile HR (McMackin & Heffernan, 2021; Mollet & Kaudela-Baum, 2022; Roper et al., 2022). Concerning the agile literature, we look further than agile methods, practices, and implementation to explore how the agile way of working is embedded and facilitated by organizations and support functions (Hoda et al., 2017). Connecting with the growing body of research that critically approaches dominant assumptions of how organizations create value and subjects them to new contexts (Alfes et al., 2023; Hewett & Shantz, 2021), we use problematization to identify tensions (Alvesson & Sandberg, 2011). Problematization is used to identify potentially problematic theoretical assumptions of performance management when enacted in the context of the agile way of working. Consequently, we use multiple case

studies to gain detailed empirical accounts of how tensions may be experienced in four organizations that implemented the agile way of working (Eisenhardt & Graebner, 2007; Yin, 2003). Also, we develop comprehensive insights into the complex process of how organizations align their performance management with the agile way of working.

5.2 Exploring tensions between the agile way of working and performance management

The agile way of working emerged in software development as a response to the complexities and rigidity often encountered in traditional software development and project management. Conceptualized to address slow adaptation to change, inflexibility, and late discovery of issues, the agile way of working prioritizes iterative progress, collaboration, and flexibility (Serrador & Pinto, 2015). The agile way of working has permeated diverse areas such as marketing, human resources, banking, healthcare, and education (Cappeli & Tavis, 2018; Hoda et al., 2017; Koch et al., 2023; Rigby et al., 2016; Serrador & Pinto, 2015). The cross-industry adoption underscores a paradigm shift toward a more responsive, iterative approach to work across contemporary organizations (Alfes et al., 2023).

The agile way of working is characterized by self-organized, cross-functional teams that set their own performance goals in close collaboration with stakeholders and organize their tasks in episodic cycles of 2-4 weeks, after which they reflect, adapt, and plan for the next episodic cycle (Hoda et al., 2017; Moe et al., 2010). At this team level, the agile way of working is frequently operationalized through the Scrum framework (Schwaber & Sutherland, 2020), which espouses a non-hierarchical (flat) team structure composed of developers, a Product Owner, and a Scrum Master. This triad forms the center of the agile team that delivers work in small, value-driven increments called “sprints”. The label “developer” applies to any team member role that is not the Product Owner or Scrum Master. Product Owners maximize the product’s value, develop the product goal, prioritize tasks, and ensure each project member understands these tasks (Schwaber & Sutherland, 2020). What “a product” is can be highly diverse and may be a service (e.g., a website or mobile application) or a physical item (e.g., a fighter jet). Additionally, Product Owners ensure that the agile team’s work is aligned with organizational goals. The Scrum Master’s role is to support all team members in working according to the Scrum framework and is accountable for the agile team’s effectiveness. Key tasks are coaching team members in self-organization and cross-functionality, helping the team focus on achieving the Product Goal, removing (organizational) obstacles towards the Product Goal, and managing a positive and productive team climate (Schwaber & Sutherland, 2020). In the agile literature, the “agile mindset” is often discussed, referring to a collaborative mindset

where all team members serve team performance and customer value (Moe et al., 2010), prioritizing these two over individual performance.

As the agile way of working permeates larger, more complex projects and organizations, a need for expanding this way of working within organizations arose and frameworks such as the Scaled Agile Framework (SAFe) and Spotify model were introduced (Mankins & Garton, 2017; SAFe, 2022). These scalable and configurable frameworks allow organizations to apply agile, lean, and product development flow principles at a large scale (Conboy & Carroll, 2019; Dingsøy et al., 2019). At their most basic, these frameworks facilitate alignment, collaboration, and delivery across agile teams. Furthermore, these frameworks introduce “areas of expertise” (e.g., chapters) that group employees in specific domains led by managers who oversee their assignments and contributions to agile teams. Frameworks for a scaled agile way of working thus require organizations to adapt processes, roles, and tools in parallel. The entire organization transforms, not only at the team level (Conboy & Carroll, 2019). Thus, supporting systems, like HRM, require change to foster alignment to the core organizational system,

Because organizations scale their agile way of working (core organizational system), their HRM (supporting organizational system) may need to change accordingly. The HR practice of performance management may be particularly impacted (Cappeli & Tavis, 2018). Performance management refers to a range of HR activities that organizations engage in to enhance the performance of individuals, teams, and units, with the ultimate purpose of improving the effectiveness of the organization (Aguinis, 2014; Biron et al., 2011; DeNisi & Smith, 2014; Dewettinck & Vroonen, 2016). Performance management may be seen as a developmental process, providing employees with teaching, coaching, feedback, and tools to improve their performance. At the same time, it is a motivational process whereby rewards (e.g., salary raise, bonus) are tied to outcomes that are impacted by individuals (Aguinis, 2014). A key characteristic of performance management is that it is a continuous process or repetitive cycle that begins with planning individual or team performance by setting goals, involves monitoring said performance over time, and results in evaluating that performance. Consequently, performance management activities are goal setting, using appraisal systems, reward strategies, training schemes, coaching, and individual career plans. There is usually an annual cycle in which these activities occur.

The performance management process and activities are guided by line managers, who are positioned and trusted as a crucial link in the delivery of activities between an organization’s policies and the performance of employees (Aguinis, 2014; DeNisi & Smith, 2014). Line managers do so since they have daily contact with workers, processes, and potentially even customers, meaning they are best positioned to

perform such activities. Overall, performance management can be a holistic system that bundles the mentioned HR activities to motivate and steer individual employees and teams through strong and mutually reinforcing signals to develop and improve performance. In other words, the most essential purpose of performance management is to ensure that the entire organization works optimally to achieve desired results. Performance management also impacts decisions on promotions, demotions, and terminations (Aguinis, 2014, pp. 4-7).

There is a lively debate on how performance management should develop in the future (Cappeli & Tavis, 2016; De Smet, 2018; Gorman et al., 2017; Levy et al., 2017; Wigert & Barrett, 2020). This debate focuses on more frequent, ongoing feedback from multiple stakeholders (De Smet, 2018). In addition, there are calls to abolish the performance appraisal or at least make it more forward-looking instead of focused on prior performance. However, research indicates that despite this debate and some high-profile organizations making changes (e.g., Deloitte eliminating performance appraisals), developments such as abolishing performance appraisal, and ongoing and multi-rater feedback have not been implemented widely. At the same time, there are reports on the agile way of working not always being “all that agile”, as is illustrated by, for instance, areas of expertise (Conboy & Carroll, 2019; Dingsøyr et al., 2019).

Following, we use the above explanation to identify potentially problematic theoretical assumptions of performance management when enacted in the context of the agile way of working.

5.2.1 Tension 1: Manager-centric performance management vs. self-organized agile teams

The first tension identified is that performance management systems emphasize the manager-employee dyad, with the relationship and day-to-day interactions between manager and employee being pivotal (Aguinis, 2014; Biron et al., 2011; DeNisi & Smith, 2014; Dewettinck & Vroonen, 2016). Researchers assert that these informal interactions are crucial in the performance management process, where contemporary managers are not only evaluators of performance but also teachers, coaches, and mentors (Levy et al., 2017; Pulakos & O’Leary, 2015). Contrastingly, the agile way of working promotes a self-organized team structure (Moe et al., 2010). Team members collaboratively decide on task allocation and execution; feedback is mainly peer-driven. This significantly diminishes managers’ traditional role and influence in direct performance management processes. In agile teams, the manager’s role in daily operations and performance feedback is limited (Schwaber & Sutherland, 2020), since they operate outside agile teams and head areas of expertise, leading to a potential lack of insights

into daily employee performance. This may hinder managers' ability to teach, coach, and mentor. Furthermore, the situation can result in managers having a limited or skewed perspective of employees' day-to-day performance and contributions, potentially impacting the accuracy and effectiveness of performance appraisals (Aguinis, 2014; De Smet, 2018; DeNisi & Smith, 2014; Pulakos & O'Leary, 2015). Thus, the assumption of performance management to be manager-centric, may be challenged by the agile way of working's emphasis on self-organization and peer-feedback.

5.2.2 Tension 2: Annual performance management cycle vs. 2-4-week sprints

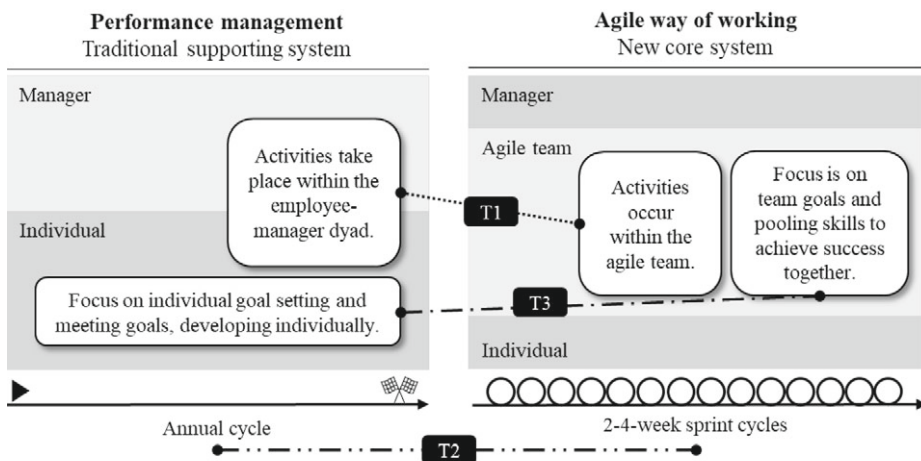
The second tension we identified is that performance management systems instill an annual cycle of goal setting, evaluation of progress towards goals, and an appraisal of whether goals were achieved (Aguinis, 2014; Biron et al., 2011; DeNisi & Smith, 2014; Dewettinck & Vroonen, 2016). Researchers and practitioners report that such an annual cycle is out of step with the way contemporary organizations do business (De Smet, 2018; Levy et al., 2017). This is further exacerbated in environments that adopt the agile way of working because the organization's business cycles are accelerated with the 2-to-4-week, value-driven sprints of agile teams (Moe et al., 2010). This implies that goals can be set and evaluated several times within the annual performance management cycle in the agile way of working. This calls into question the necessity and meaning of setting annual performance goals. Such tension may pose significant challenges for employee experience and engagement (Boon et al., 2007; Levy et al., 2017; Pasmore, 1995). Furthermore, this tension may undercut the fairness and transparency of the performance management systems. When employees receive feedback a considerable amount of time after the fact, it reduces their perceptions of fairness. In addition, because employees may have trouble retracing how their performance evaluation came to be, it makes the feedback appear less transparent. As a result, it may lead employees to reject feedback (DeNisi & Smith, 2014; Levy et al., 2017). Employee's rejecting feedback directly undermines the intention of a performance management system to improve effectiveness across the organization (Aguinis, 2014). Although the literature discusses a trend towards more continuous feedback involving multiple stakeholders (De Smet, 2018; Wigert & Barrett, 2020), evidence suggests that a shift away from annual performance management cycles has not been broadly adopted (Gorman et al., 2017; Levy et al., 2017). Furthermore, scholars highlight that "this is an area where the extant literature is almost nonexistent" (Levy et al., 2017, p. 168). Thus, there appears to be a tension between the more traditional set-up of the annual performance management cycle and the sprints of agile teams.

5.2.3 Tension 3: Setting individual performance goals vs. team-based agile working

The third identified tension is that performance management systems emphasize setting and evaluating individual employees' goals, development, and performance (Aguinis, 2014; Biron et al., 2011; DeNisi & Smith, 2014; Dewettinck & Vroonen, 2016). This focus on the individual, however, creates tension in organizations that have adopted the agile way of working. Namely, the agile way of working emphasizes team-based work both structurally, through self-organized teams, and culturally, via the agile mindset (Moe et al., 2010). A potential explanation for the tension derives from the conflicting signals sent by the two systems. Where the core organizational system of the agile way of working is team-based, the supporting system of performance management is individually focused. The signals sent by these two systems may lead to misaligned priorities. Mainly, when performance management ties rewards (e.g., salary raise, bonus) to individual performance, there is a risk of incentivizing employees to prioritize personal achievement over team performance. Such misalignment can severely undermine the essence of the agile mindset (Moe et al., 2010). While there is some literature about using performance management in team-based organizations (Scott & Einstein, 2001) and about mixing individual and team-based signals, empirical research in this area has remained limited (Gorman et al., 2017). However, it does seem that there may be tension between setting individual performance goals and a team-based agile way of working.

Figure 5.1 visualizes the differing assumptions of the two systems.

Figure 5.1 Assumptions of performance management and the agile way of working.



5.3 Method

The current study is a multiple case study (Eisenhardt & Graebner, 2007). Through problematization (Alvesson & Sandberg, 2011), we identified three tensions between performance management and the agile way of working. Consequently, we seek in-depth insights into how tensions may be experienced and how organizations align their performance management with the agile way of working. A multiple case study design is appropriate to gain insight into complex, real-world processes (Eisenhardt & Graebner, 2007; Yin, 2003). We use multiple cases to explore the tensions broadly, enable comparison between cases, and, as a result, have more robust findings. We combine inductive and deductive logic given that we interpret the data through the three tensions identified in theoretical analysis and empirically examine them in four cases.

5.3.1 Theoretical sampling

Theoretical sampling means we selected cases because they are specifically suitable for illustrating how organizations shape their performance management when they use the agile way of working (Eisenhardt & Graebner, 2007). As a result, we selected organizations with at least five years of experience using the agile way of working. This time may allow organizations to become familiar with the agile way of working and, potentially, shape their performance management to align. We looked for large organizations with formalized performance management policies (excluding small and medium-sized organizations). In line with these criteria, we contacted affiliates associated with our university's global HR excellence platform. At the same time, we looked into the involved scholars' networks to identify cases. As a result, we gained access to four organizations that employ several thousand employees and have their roots in the Netherlands. We asked for a contact person within each organization to identify highly knowledgeable informants (i.e., agile team roles, HR representatives, managers) to avoid the risk of retrospective sensemaking by participants (Eisenhardt & Graebner, 2007).

We refer to the four case organizations by pseudonyms:

EuroSafeguard is a financial services company that operates in insurance and asset management for individuals, businesses, and institutional clients. EuroSafeguard "life and pension" business widely applies agile to support digital transformation, organizational efficiency, and deliver customer value in a competitive business.

GrowthBank offers financial services (e.g., retail and corporate banking, asset management) to individuals, businesses, and agricultural enterprises. GrowthBank has

a long history of applying agile methods and has fully scaled its agile way of working to over 600 teams.

HealthGuardia provides health insurance. The IT department, including software development, currently has over ten years of experience with agile. They collaborate intensely with business departments. The organization is transforming to bring business and IT expertise closer together to serve their customers best.

VitaCorp is a multinational organization in chemistry with applications in nutrition, health, and beauty. They have over 30 agile teams in their Digital department, and there are smaller-scale applications in other domains, such as marketing and human resources.

5.3.2 Data collection

Most data were collected through semi-structured interviews, while other sources, such as internal documents or external publications by the case organizations, were also used. In total, 26 interviews occurred between January and September of 2023, which lasted 45-60 minutes (Table 5.1). A contact person in each organization did participant selection. We spoke with agile team members (e.g., developers, Scrum Master, Product Owner), HR professionals, and managers. Interviews were based on a topic guide (see appendix 2) designed and piloted by the research team. The topic guide focused on the agile way of working and performance management, interviewees' experience with these systems, and the people/roles involved. When interviewees seemed passionate about aspects (e.g., feedback in agile teams) or considered individual aspects highly relevant (e.g., temporal stability), the interviewer followed up. Since our study aimed to explore each case, less emphasis was placed on collecting equivalent data per interview. Interviewing stopped when saturation of insights occurred, meaning that little new information emerged from interviews. Interviews were fully transcribed.

5.3.3 Data analysis

Thematic analysis was used to analyze the data (Braun & Clarke, 2006). The interview transcripts were coded. Related codes were subsequently grouped into themes. The earlier theoretical analysis of the agile way of working and performance management served as a heuristic framework for the themes (Braun & Clarke, 2006; Eisenhardt & Graebner, 2007; Yin, 2003). The coding process took several iterations as new themes emerged. ATLAS.ti software was used for the coding process. This was done primarily by the first author, while the second and third authors reviewed the coding. Discrepancies were discussed, and appropriate changes were made.

Table 5.1 Sample description

Organization	Role	E/M*	Code
EuroSafeguard	Sr. HR business partner	E	ES1
	Agile coach	E	ES2
	Team manager	M	ES3_M
	Scrum master	E	ES4
	Product owner	E	ES5
	Product owner Agile transformation	M	ES6_M
	Performance management manager	E	ES7
GrowthBank	Product owner	E	GB1
	Product owner	E	GB2
	Developer	E	GB3
	Performance management manager (HR)	M	GB4_M
	Developer	E	GB5
	Product owner	M	GB6_M
HealthGuardia	Developer	E	HG1
	Developer	E	HG2
	Scrum master	E	HG3
	HR business partner	E	HG4
	Team manager	M	HG5_M
	Product owner	E	HG6
VitaCorp	Chapter lead	M	VC1_M
	Original initiator of agile	E	VC2
	Scrum master	E	VC3
	HR business partner	E	VC4
	Chapter lead	M	VC5_M
	Scrum master	E	VC6
	Developer	E	VC7

Note. E = employee, M = manager; ± F = face-to-face interview, V = virtual interview.

5.4 Findings

In this section, we present the findings from the multiple case study. Table 5.2 provides a detailed account of the agile way of working that EuroSafeguard, GrowthBank, HealthGuardia, and VitaCorp use and Table 5.3 shows their respective performance management systems. We refer to the information in these tables as we explore the three tensions across the four cases.

Table 5.2 Overview of the agile way of working per case organization.

	EuroSafeguard	GrowthBank	HealthGuardia	VitaCorp
Team-level framework	Scrum	Scrum	Scrum	Scrum
Org-level framework	SAFe, Spotify	SAFe, Spotify	SAFe, Spotify	SAFe, Spotify
Employees hierarchically grouped	Team based on task	Chapters based on expertise of employee	Areas of practice based on expertise of employee	Chapters based on expertise of employee
Label for agile team	Cluster	Squad	Squad	Squad
Label for manager	Clustermanager	Chapter lead, area lead	Teamleader	Chapter lead
Self-organization	High	High	High; self-management after reorganization	High
Membership churn	Low	Moderate – quarterly	Low	Low
Cross-functionality	Moderate	High	High	High
Scrum master	Yes – also Agile coaches	Yes – also Agile coaches	Yes	Yes – Agile coaches
Product Owner	Yes - “Priority Owner”	Yes - “Product Manager”	Yes	Yes

Table 5.3 Overview of performance management system per case organization.

	EuroSafeguard	GrowthBank	HealthGuardia	VitaCorp
Cadence	Yearly	Yearly	Yearly	Yearly
Obligatoriness	Obligatory	Voluntary (but <i>feels</i> expected)	Obligatory	Obligatory
Focal actors	Employee – manager – agile team	Employee – manager	Employee – manager	Employee – manager
Focal outcomes	Personal development goals Agile team goals	Individual goals: behavior, development, contribution KPIs in agile team	Individual goals: performance, vitality KPIs in agile team	Individual goals, area of expertise goals, chapter goals, department goals
Aim	Developmental; motivational	Developmental; motivational	Developmental; motivational	Developmental; motivational
Formal moments	4: goal-setting, snapshots (2); year-end appraisal	2: goal-setting, year-end appraisal, continuous dialogue	3: goal-setting, mid-year review, year-end appraisal	3: goal-setting, mid-year review, year-end appraisal
Continuous feedback	Yes, with manager when a need arises, if not, in personal canvas sessions (snapshots).	Yes, with manager during regular bila*	Yes, with manager during regular bila*	Yes, with manager during regular bila*
Opportunities to develop	Training opportunities, coaching by manager	Training opportunities, coaching by manager	Training opportunities, coaching by manager	Training opportunities, coaching by manager
Input for appraisal	Personal reflection employee, multiple stakeholders, IT-enabled feedback from coworkers, agile team members, manager	Personal reflection employee, multiple stakeholders, IT-enabled feedback from coworkers, manager, managerial calibration	Personal reflection employee, multiple stakeholders, manager, managerial calibration	Personal reflection employee, multiple stakeholders, IT-enabled feedback from coworkers, manager, managerial calibration
Scores in appraisal	2; satisfactory/unsatisfactory	9-grid based on performance in role and future fit	3; above, on par, below above expectation	5; excellent-insufficient; forced distribution
Rewards, “merit”	Salary increase – depending on possibilities within role.	Salary increase – depending on possibilities within role. Variable pay allocation.	Salary increase – depending on possibilities within role.	Salary increase – depending on possibilities within role. Variable pay allocation.

Note. *A bila is a frequent “bilateral” meeting between manager and employee.

5.4.1 Tension 1: Manager-centric performance management vs. self-organized agile teams

In each case, the performance management system focused on the manager-employee dyad. Performance management activities take place in a one-on-one meeting between manager and employee. Only EuroSafeguard includes the agile team in formal performance management moments (snapshots/personal canvas sessions). Moreover, employees work separately from their managers in self-organizing agile teams. Managers are most often the head of a specific area of expertise (e.g., “content marketing” or “behavioral science”). These areas of expertise are referred to as “chapter” or “team”, whereas agile teams are often referred to as “squad” or “cluster”. At HealthGuardia, an employee can be part of the software development *team* and work in a *squad* that develops and maintains customer service tooling. In each case, agile teams have relatively high temporal stability, meaning that employees are expected to be part of the agile team for at least a year. GrowthBank is an exception, where priorities are assessed every quarter, and team members may be reshuffled accordingly. Furthermore, each case utilizes IT-enabled feedback tools, enabling employees to seek, receive, and share feedback with their managers. Additionally, employees have bilateral meetings or ‘bilas’ with their managers more frequently than the respective performance management systems prescribe. Managers use these meetings to monitor progress toward goals and offer teaching, coaching, and mentoring.

Employees reflected openly, often without explicit prompting, on their experience of having a manager separate from their agile teams. Some mention that having a manager away from the daily business who can provide an outside-in perspective and serve as a sparring partner and coach is nice. These were employees who had more senior positions. The performance appraisal and how employees are evaluated seemed concerning. Employees wonder (some worry) how their manager collects feedback on their development and performance, if they even do so, and whether the feedback they collect accurately assesses a year’s worth of work. Managers themselves indicated they collect feedback on employees throughout the organization and aim to do every individual justice, yet sometimes feel conflicted between policy and reality (see the below quote from VC1). Employees refer to concerns of fairness and transparency. For instance:

“What I find difficult is that my chapter lead evaluates me at the end of the year while they do not see me working that often. They do hear about how things are going. But my Product Owner might be better able to assess how well or poorly I am doing my job.” (GB5)

“It will always be a matter of granting favors, because humans are social animals. There will always be preferences, so that makes being objective seem incredibly difficult in an appraisal, because there are so many facets involved that make it actually never objective.” (ES4)

In VitaCorp, employees (including managers) were most verbal regarding the fairness of appraisal, which they linked to the organization using a forced distribution in performance ratings. Similarly, HealthGuardia and GrowthBank use structures where managers calibrate performance appraisals before employees receive their scores – scores are not “forced” as in VitaCorp. Employees seemed to be aware of these and generally expressed a dislike for such practices:

“People might have to be given an unsatisfactory rating even though they have done well. Or in my case, I had to give people a ‘good’ rating, whereas, I might have given more people a ‘very good’. And that makes the conversation and the appraisal for many... I don’t know what the best word is... more unpleasant, more worthless.” (VC1_M)

“The performance calibration has already been done before the appraisal interviews. So, essentially, the scores are already set before the performance appraisal takes place.” (HG1)

Based on the above, tension 1 is experienced in these cases. In aligning systems to deal with this tension, the analysis indicates two approaches: keep things the same or change to align. GrowthBank and VitaCorp have not adjusted their performance management systems to align with the daily realities of the agile way of working. For GrowthBank, this is a deliberate choice, as they aim to stimulate employees to work on their personal development, and participation in the performance management cycle is not mandatory (employees indicate it does *feel* mandatory). At VitaCorp, changes to this part of performance management systems seem to lack the support of upper management. EuroSafeguard and HealthGuardia have embarked on more transformative efforts. EuroSafeguard has introduced the personal canvas, designed to replace the two mid-year review moments in their performance management system. Employees are asked to create a personal canvas, a one-pager describing their core values, strengths, ambitions, and areas of development. Then, agile teams discuss each member’s personal canvas twice a year, facilitated by an agile coach. The manager also participates and shares their personal canvas. HealthGuardia goes further and turns self-organizing agile teams into self-managed agile teams. Before this change, HealthGuardia had *team leaders* with “HR responsibilities”. These responsibilities mean that team leads manage absenteeism, recruitment, performance management, learning and development for 20-30 employees. The HR responsibilities are transferred to the self-managing agile teams. Product Owners receive HR responsibilities in one part of the organization, and employees can volunteer for these responsibilities in another part of the organization. In both scenarios, employees receive dedicated training and time to perform these tasks.

"We see it as a specialty, just as you can be a specialist in a particular coding language. So, we also see them as equals. As peers, you can have different specialties. One has the HR role as specialty, another has a technical specialty." (HG4)

5.4.2 Tension 2: Annual performance management cycle vs. 2-4-week sprints

Each case has an annual performance management cycle and sprints of 2-to-4 weeks. Performance management cycles include formal moments (goal-setting, evaluating, appraising) and an informal *continuous conversation*.

The differing duration (annual vs. 2-to-4 weeks) was not considered problematic. This, however, was not always the case. From the data, we infer three reasons why this tension is not perceived as problematic. First, despite the developmental and motivational purposes of performance management in each case, the primary emphasis is on development. The focus used to be much more on performance, with very strict appraisal formats and the threat of a performance improvement plan (both at HealthGuardia and VitaCorp interviewees had these). By emphasizing development instead, people may approach the process more relaxedly. Moreover, because development goals may take longer, they might not cause tension with the shorter sprint cycles. Some typical development goals that employees set are presenting in front of a group during presentations, improving their English, and growing as a t-shaped professional:

"My manager asks "are there any concerns? You want to train something? You want to learn something?" If you need any skill, it has a personal development purpose. Not for monitoring the activities what we are doing and what we are delivering." (VC7)

"And of course, we work with what we call T-shaped models. So, you do your main thing 80% of the time and 20% of the time you develop other skills." (GB2)

Second, managers appear open to adjusting goals when situations change (more than in the past), helping to keep goals relevant to employees. As one manager described:

"So, if someone says, 'Gosh, I wanted to do this, but the priorities have changed significantly, and I have contributed to this, or I have solved it in this way, or this did not work out and I dealt with it in this way.' That's what I think it's all about: How does someone handle things? How do they develop?" (HG5_M)

Third, the continuous conversation that these case organizations promote may prevent tension between the different cycles. Interestingly, continuous conversations were primarily discussed in the interviews with HR professionals. Employees instead referred to the bila. Still, the HR professionals and employees focused on the same

thing: frequent meetings with a manager to discuss how one is doing, what one is working on, the challenges faced, and one's ongoing development. The frequency of bila's differs from weekly to monthly, but a general rule of thumb was "once per sprint". An exception is EuroSafeguard, where the interviewed managers have one-on-one meetings when a specific need arises. Employees noted that the Dutch context, with a small power distance, might be especially suitable for bila's. In sum, bila's facilitate frequent, meaningful conversations between manager and employee, which prevent tension between an annual performance cycle and sprint. As such, the bila echoes the more recent developments of more continuous feedback discussed in the grey literature.

"Team leaders have a purely HR role. They don't see people working in daily practice. That sometimes makes it quite difficult to, on the one hand, provide good feedback or to check on 'How are you actually doing?'. There's such a distance between that it kind of has to be artificially bridged by a lot of bila's. But that also has an advantage, right, because it's someone at a distance who is really there for you, yes." (HG4)

"The moment you are constantly working with your squad as a team member, you get less exposure. Then your Product Owner and your Scrum Master see more of you than your manager. So how do you shape that? You know, everyone has bila's with their manager here, so there are contact moments. But having a bila is different from seeing someone in the field." (GB6_M)

5.4.3 Tension 3: Setting individual performance goals vs. team-based agile working

In each case, employees set individual goals in the performance management cycle and team goals as part of the agile way of working (i.e., Product Goal). When asked to what extent employees discuss their goals in agile teams, this appeared to be somewhat of a rarity:

"I asked the Product Owner of the squad for feedback in our HR information system. But I haven't really discussed within the squad my personal development goals. Maybe I should." (GB5)

"No, I really think it's quite individual. I think that few goals are set for the team. I think we have much more of that in informally talking with each other, just as we go. It doesn't lead to a performance agreement with someone or the team." (HG6)

"A few young people in my squad do. I think that's also the younger generation, being very open, like 'hey, I have something to learn here, can you help me with that?' So, there are two people in my team who are both forward-thinking with that, and they really share. Do I see that elsewhere? I actually don't. (GB2)

Most employees did not experience this tension as such. A first explanation for this may be that employees do not find it confusing where to focus due to mixed signals. This might be because the performance management systems in the cases have a developmental focus, which is not directly antagonistic to performance goals in agile

teams. Instead, for some, it may be perceived as synergistic, as they indicated a preference for a manager away from the daily reality of the agile team. However, EuroSafeguard presents an interesting case since they set agile team goals, and employees share that now that they do this, they now thought, “Why did we not do this before?” (ES4). EuroSafeguard focuses on personal development goals at the employee level and agile team goals at the team level. An example team goal from EuroSafeguard’s is completing all “life and pension” mutations within seven business days. Discussions on team goals and reflection on personal development are held at the same time with the entire agile team:

“You create your canvas and you sit down together as a team. You present your canvas. The whole team can listen in on that canvas. You then see, okay, these are the personal goals.” (ES5)

“They discussed it four times in the past year, always in an extended retrospective, with not only the guidance of their own scrum master but also the guidance of an Agile coach.” (ES1)

“So, we review our goals of the past quarter. We plan for the coming quarter and what are we going to do to contribute to these goals? Where are we? We also discuss our personal development with the personal canvas.” (ES6_M)

In VitaCorp, managers experiment locally with connecting performance management to the agile way of working. Employees have one of their goals set by the Digital department and are free to set two additional goals. Employees indicated that they have limited influence on achieving the department’s goal, given that hundreds of people are employed in the Digital department. Chapter leads (head of an area of expertise) suggest setting one goal with the chapter, leaving one goal to be set individually. For instance, in the Agile Chapter, the area of expertise for scrum masters and agile coaches, they decided to develop “agile awareness” trainings. Based on their performance as a chapter, they would also be appraised on this achievement. An illustration from VitaCorp’s Digital Marketing Chapter Lead:

“You set three goals each year. The first one is predetermined. That is determined within Digital. We need to achieve a certain NPS customer satisfaction. My people can’t do anything about that. So, I said last year, ‘well, since one is already determined for you, the other two are for you.’ Now, this year I think I have one Digital goal, one ‘what do we all think as a chapter,’ and one for yourself. Last year I deliberately didn’t do it. But I think, in hindsight, it might have been better to do it, it gives a sense of group identity that you are indeed pursuing something together. But I still want to have that conversation with the team whether they think so too. (VC5_M)

GrowthBank and HealthGuardia do not incorporate team goals in their performance management systems. Employees are asked to develop goals on behavior, contribution, and development (GrowthBank), and on performance and vitality (HealthGuardia). HealthGuardia presents a noteworthy case, given that the “HR

responsibilities” will become embedded within self-managing agile teams. This may change how goals are set or result in the integration of performance management and the agile way of working, as they indicate an ambition to ensure alignment between their way of working and HR practices.

5.5 Discussion

In organizations adopting the agile way of working, alignment between performance management and an agile way of working may be problematic. We theoretically identified potential tensions between the two systems and empirically examined how four organizations navigate and possibly re-align these. By juxtaposing multiple cases, our research sheds light on the diverse strategies employed. We present our findings and delve into their implications below.

We empirically observed a tension between manager-centric performance management and self-organized agile teams. This tension, frequently experienced and often viewed unfavorably by employees, underscores the mismatch between traditional organizational structures and managerial roles and the daily realities of working in an agile team - despite IT-enabled solutions for collecting feedback from multiple stakeholders. A second tension emerged in contrasting the annual performance management cycle with agile’s more frequent 2-4-week sprints. Interestingly, knowingly or unknowingly, this tension had been managed. The developmental focus of performance management systems, managers’ willingness to adjust goals, and continuous conversations (bila’s) contributed to mitigating potential conflicts. This shows that organizations have come to use more fluid and adaptive performance management approaches that resonate with the agile mindset. The third tension, individual performance goals against team-based agile objectives, indicated that discussion of individual performance goals rarely occurs in the agile team and that one of four cases facilitates such discussion. Interviewees did not express that they saw this as a tension. Nevertheless, there was recognition, particularly at the end of sprint cycles, that, at minimum, discussing individual goals within the agile team would benefit one’s development. These findings resonate with Gorman et al. (2017) and Levy et al. (2017) observations. Namely, while organizations experiment with new approaches to performance management, the core remains traditional, focused on individual goal setting and annual appraisals. This is evident in the case of EuroSafeguard and HealthGuardia, where experiments are underway, but not a revolution.

By looking further than agile methods, practices, and implementation, our study provides insights into how the agile way of working may alter organizations (e.g., introduction of areas of expertise and self-managing teams), the challenges faced

therein (e.g., tension 1), and the strategies employed to overcome these (e.g., personal canvas, frequent bila's). These findings contribute to the agile literature by revealing how agile teams are embedded in traditional organizational ecosystems (Alfes et al., 2023). Moreover, the findings show that three of the four case organizations keep hierarchical management, and that (agile) managers may need to rely more on communication with employees and their skills as teacher, coach, and mentor.

Reflecting on agile HR, we show that HR functions actively consider how to support the agile way of working and integrate it into the delivery of HR practices. However, among the cases, only one HR function (GrowthBank) has fully employed agile in its way of working. We note that the structured predictability offered by traditional approaches may suffice for many traditional HR functions. For instance, an agile approach may not be necessary in compensation and benefits, which typically follows an annual cadence. This observation may extend to HR practices such as diversity and inclusion and succession planning, where the predictability and planning of activities diminish the need for an agile way of working. Conversely, areas like recruitment and selection may be more amenable to this way of working. Here, vacancies could be periodically assessed on priorities, recruitment efforts such as campaigns focused in sprints, thereby optimizing resources based on the most pressing hiring needs.

5.5.2 Limitations and future research suggestions

First, methodological concerns: Although rich in detail, our multiple case study approach involves inherent subjectivity and potential bias. While we took measures to mitigate bias, using established best practices and collaborative analysis (Braun & Clarke, 2006; Eisenhardt & Graebner, 2007; Yin, 2003), our findings could benefit from further exploration. For example, a longitudinal qualitative study could examine how an organization adopts agile practices over several years, exploring the evolution of HR practices and their connection to the agile way of working during this period. Furthermore, these limitations remain despite efforts to minimize self-selection and retrospective sensemaking bias by requesting knowledgeable informants.

Second, the three tensions were theory-informed. Our results show that not all of them were experienced as tensions and that this additionally may differ based on people's cultural background. The small power distance observed in the interviews in Dutch workplaces and contrasted with multinational environments suggests that different cultural contexts could yield different tensions. Future research could explore these variations in other cultural settings to enhance the generalizability of our findings.

Third, agile HR, the concept of self-managing agile teams represents a new frontier for discovery. Future research could investigate these teams' dynamics and

understand how these fully self-governing agile teams may co-create HR practices (Hewett & Shantz, 2021). At the same time, broadening the scope to include other HR practices could provide a richer understanding of the evolving landscape of HR in agile organizations. Revisiting the current cases could offer valuable insights into the long-term impacts of making changes to core and supporting organizational systems.

5.5.2 Conclusion

Our study reveals key tensions between the agile way of working and performance management in Dutch organizations. These findings highlight the complexity of integrating the agile way of working in traditional corporate systems. As the agile way of working continues to permeate organizational structures, adapting organizational support systems (e.g., Agile HR) to align grows in importance. The current study, hopefully, provides meaningful leads for ongoing exploration, encouraging further research to deepen the understanding of agile work environments and their interplay with HRM.

5.6 References

Please see Chapter 11 for a complete list of all references in this dissertation.



Chapter 6



Discussion

Organizations have sought to cultivate greater adaptiveness (Griffin et al., 2007; Park & Park, 2019; Pulakos et al., 2019). To this end, the agile way of working has seen a notable rise across various industries (Alfes et al., 2023; Hoda et al., 2017; Koch et al., 2023; Rigby et al., 2016; Serrador & Pinto, 2015). Despite its growing prominence, the agile way of working is not fully understood within academic discourse, with several key issues limiting a deeper understanding. Guided by the research question, “How does the agile way of working help organizations cultivate greater adaptiveness?”, this dissertation delves into three key sub-questions, each pinpointing a key issue in the extant agile way of working and broader management literature. The ensuing discussion answers these sub-questions and examines the answers’ theoretical implications. Furthermore, a broader reflection is presented, based on four years of intensive study of the agile way of working. Limitations and future research, practical implications, and a conclusion follow this.

6.1 Key issue 1: What do we know about agile teams and their effectiveness?

The widespread adoption of the agile way of working catalyzed considerable cross-disciplinary research, spanning domains such as software development, project management, and business and management (Hoda et al., 2017; Koch et al., 2023; Serrador & Pinto, 2015). This expansion has led to a dispersion of theoretical insights, resulting in a lack of collective understanding of what the agile way of working and its effectiveness entail.

In tackling this key issue, this dissertation employed a theoretical and empirical approach. Chapter 2 theoretically anchors the dispersed literature using the IMOI model to systematically review 74 studies on agile teams. It compiles, organizes, and synthesizes the dispersed literature and thereby sheds light on the unique characteristics and specific purpose of agile teams in managing uncertainty. In particular, this chapter reveals that agile teams engage in specialized, complex tasks through cross-functional and customer collaboration. Key processes identified include shared leadership, reflexivity, and empowering behavior, while the focal emergent states are an agile team orientation, shared mental models, transactive memory systems, and psychological safety. Furthermore, Chapter 2 outlines what agile team effectiveness entails. The most frequently studied effectiveness concepts are generic assessments of performance, adaptive performance, software development success, and team members’ sustainability and well-being. Overall, these findings offer a robust, evidence-based heuristic framework for understanding the concept of the agile way of working and agile team effectiveness.

Building on these theoretical insights, Chapter 3 and 4 empirically explored the relationship between the agile way of working and team and individual adaptive performance. Chapter 3 addresses the linkage between the agile way of working and team adaptive performance. Chapter 4 examines its impact on sustainable performance at the individual level, encompassing adaptivity and work engagement. Informed by the heuristic framework presented in Chapter 2, these chapters conceptualize the agile way of working as a combination of agile team orientation, customer collaboration, cross-functional collaboration, reflexivity, and shared leadership. In Knowledge Box 6.1, these are described. Furthermore, the two chapters test adaptiveness as an effectiveness outcome, incorporating the critique that agility should be regarded as an aspect of agile team performance rather than merely a descriptor of certain practices (Conboy, 2009; Conforto et al., 2016). Both chapters demonstrate a positive association between the agile way of working and enhanced adaptiveness at the team and individual levels.

Knowledge Box 6.1 Key dimensions of the agile way of working, based on Chapter 2.

Concept	Description
Agile team orientation	Agile team members share a collectivistic attitude and commitment toward the agile team and its agile way of working – sometimes called the agile mindset (Gren et al., 2019; Moe et al., 2010; Tyagi et al., 2022). Team members assign high importance to the team rather than the individual, as they think of “we” over “me”.
Customer collaboration	To deliver value each cycle (sprint), agile teams closely collaborate with customers, meeting at the end of each sprint and presenting their progress. Within teams, the Product Owner functions as “customer representative and liaison” (Brodnicki, 2021; Khanagha et al., 2021).
Cross-functional collaboration	Since agile teams mostly work on complex and specialized tasks, agile teams consist of team members with diverse knowledge, skills, and abilities. The collaboration of members with diverse knowledge is seen as key for effectiveness (Drury et al., 2012; Strode et al., 2022).
Reflexivity	Agile teams reflect, plan, and adapt their plans if required and do this in cycles of 2-to-4 weeks. They include their customers and/or stakeholders in this process (Kude et al., 2019; Spagnoletti et al., 2022).
Shared leadership	Agile teams have low levels of hierarchical differentiation that result in a distribution of leadership roles and influences among team members. There is lateral influence among peers that develops and increases as the team matures (Hoda et al., 2013; Moe et al., 2010).

Accordingly, this dissertation significantly advances the understanding and conceptualization of the agile way of working and agile team effectiveness. Chapter 2 offers a parsimonious overview of the agile team literature, highlighting the defining characteristics of agile teams (i.e., input) and their way (i.e., processes and emergent states) of managing change and uncertainty (i.e., outcomes). Chapters 3 and 4 use

these findings to empirically show how the agile way of working positively relates to adaptiveness on multiple levels – another critique formulated by Conforto et al. (2016). These chapters help shine a light on the more nuanced and intricate effects of the agile way of working. A notable contribution of Chapter 2 is the revelation that most of the agile research has been conducted in the realm of software development, with 57 out of 74 studies focused on this domain. However, it also indicates a more recent, broader application of the agile way of working in diverse contexts. Hence, Chapters 3 and 4 explored more diverse samples, including agile teams in fraud prevention and HRM in banking, supply chain analytics in the semiconductor industry, and social security payments in public administration, for instance. This helps move the field beyond software development and enhances the generalizability of findings. This approach demonstrates that the agile way of working is applied in a broader array of settings and that its positive effects are not confined to software development.

6.2 Key issue 2: How can we explain agile team effectiveness?

The literature on the agile way of working suffers from limited theoretical engagement (Baham & Hirschheim, 2021; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Yu & Petter, 2014). The second key issue in this dissertation, therefore, addresses the need for theoretical frameworks to understand agile team processes leading to effectiveness. The practical origins of agile, as illustrated by the Agile Manifesto (Beck et al., 2001), have traditionally emphasized methods and practices over theoretical exploration (Hoda et al., 2017), with no dominant theories offering comprehensive explanations for agile team effectiveness.

The theoretical gap in understanding agile team effectiveness is addressed in this dissertation by employing diverse theoretical frameworks across multiple chapters. Chapter 2 used the IMOI model as a theoretical anchor, capturing the agile way of working in concepts that stem from the broader team effectiveness literature – a field with over 100 years of development (Mathieu et al., 2017). This integration is important as it facilitates access to cumulative insights. Chapter 3 applied Goal-setting theory within the agile context (Kleingeld et al., 2011; Kramer et al., 2012; Latham & Locke, 2007), emphasizing how participative goal-setting and continuous refinement drive team adaptiveness. The chapter explored goal specificity and difficulty as an explanatory mechanism for agile teams' adaptive performance and investigated the applicability of Goal-setting theory at the team level. Its main finding concerns the mediating role of team goal specificity, highlighting the significant role of specific team goals in dynamic settings. This underscores that goals are not static entities but tools that can facilitate

adaptive performance in more dynamic settings (Latham & Locke, 2007; Latham & Steele, 1983; Latham & Yukl, 1975; Ordonez et al., 2009a, 2009b). Chapter 4 engaged with Self-determination theory to understand psychological empowerment in agile teams and utilized Substitutes for leadership theory to analyze the Product Owner's role (Deci et al., 2017; Felin et al., 2015; Kerr & Jermier, 1978). Following indications from qualitative research, the interplay between the agile way of working (focused on the team members) and the Product Owner's supportive behaviors towards agile team members was explored. This chapter highlighted how the agile way of working positively impacts team members' adaptivity and work engagement, particularly noting the mediating role of psychological empowerment in this relationship. It indicated that the agile way of working context interacts with elements of the Product Owner's supportive behaviors typically associated with leadership in a substitutive fashion. Namely, when team members score low on the agile way of working, the Product Owner's supportive behaviors are important for psychological empowerment. However, this effect disappears when scores on the agile way of working increase, which implies team development towards higher levels of agile maturity.

6.3 Key issue 3: How do organizations embed the agile way of working?

The third key issue addressed how the agile way of working is embedded within organizational structures and practices. Recognizing that agile teams operate within larger organizational systems and that the agile way of working may provide a reason to adjust these, this dissertation explored the role of the Product Owner and performance management (HR practice).

Chapter 4 examines the role of Product Owners in agile teams, with a particular focus on their supportive behavior. The chapter specifically investigates how their supportive actions, such as clearly communicating the product vision, setting clear tasks, and listening careful to the input of agile team members, influence the relationship between the agile way of working, psychological empowerment, and individual sustainable performance. A key finding indicates that the empowering influence of Product Owners is most pronounced in agile teams with limited application or experience with the agile way of working (i.e., low scores). However, as teams gain more proficiency and maturity in the agile way of working, the role of Product Owners in psychological empowerment becomes less critical. Chapter 4 illuminates the evolving nature of leadership in agile contexts, highlighting that leadership roles like the Product Owner are crucial for empowering employees in the nascent stages

of agile implementation. However, their significance wanes as teams achieve higher levels of maturity (i.e., high scores).

Chapter 5 contains a multiple case study to examine how organizations integrate the agile way of working with traditional performance management systems. It explores three primary tensions between these two: (1) manager-centric performance management vs. self-organized agile teams, (2) the annual performance cycle vs. short sprints, and (3) setting individual performance goals vs. team-based agile objectives. This chapter uncovered how four organizations navigated these tensions, revealing diverse approaches from maintaining traditional performance management systems to transforming them to align better with the agile way of working. The main findings show that traditional manager-employee performance management is at odds with agile teams' self-organization. It leads employees to wonder whether their manager can appropriately evaluate their performance, for instance. The potential tension between the annual performance evaluation cycle and the frequent agile sprint cycles does not generally cause problems. This is because the focus is on development rather than performance (a change that the case organizations have made over time), and goals may be adjusted as situations change. The tension between individual performance goals and team-based agile work is not experienced strongly. However, it is noted as peculiar by employees that their performance goals are not regularly evaluated with their agile team members, despite these being the colleagues they interact with most. This observation underscores a mismatch between individual goal setting and the collaborative nature of agile team environments. This in-depth qualitative study contributes significantly to understanding the broader organizational context for embedding agile effectively. Chapter 5 additionally indicates that employees do perceive their Product Owners as leaders – which will be reflected below.

6.4 Reflections

Inspired by the findings of this dissertation, five themes for reflection emerged.

Theory. The dissertation enhances the theoretical understanding of agile team effectiveness by employing established theoretical frameworks and revealing their usefulness in the agile way of working context. In Chapter 2, the IMOI model is crucial in establishing a structured approach to examine the agile way of working research, thereby aligning it with the broader team effectiveness literature (Hollenbeck et al., 2012; Mathieu et al., 2017). This application of the IMOI model provides a useful means for further aligning agile team research with established team literature. In Chapter 3, Goal-setting theory illuminates a mechanism through which the agile way

of working fosters team adaptive performance (Kramer et al., 2012; Nahrgang et al., 2013), particularly emphasizing the importance of goal specificity. This application of Goal-setting theory, specifically to the agile way of working context, fills a significant gap in the literature, helping to understand how the near-constant process of goal setting and refinement in agile teams contributes to adaptiveness from a theoretical point of view. Similarly, in Chapter 4, the application of Self-determination theory and Substitutes for Leadership theory provide deeper insights into psychological empowerment within agile teams (Deci et al., 2017; Felin et al., 2015; Kerr & Jermier, 1978). Psychological empowerment is central to the agile way of working, as it aims to “build projects around motivated individuals” (Beck et al., 2001). This chapter shows how psychological empowerment emerges from the autonomy, competence, and relatedness dimensions stimulated by the agile way of working. Furthermore, through Substitutes for leadership theory, the chapter evaluates the non-traditional leadership role of the Product Owner. It examines how the Product Owner’s supportive behaviors interact with the agile way of working and influence the psychological empowerment experienced in the team. By using these theories, this dissertation responds to the call for deeper theoretical engagement in agile team studies. It significantly enhances the scholarly understanding of the processes that drive agile team effectiveness. Adding four theoretical perspectives to the discourse on the agile way of working strengthens the theoretical foundation on which claims can be made regarding its influence on people and overall effectiveness.

Agile way of working across contemporary organizations. Throughout this dissertation, it shows that the agile way of working is increasingly recognized as an effective approach for increasing adaptiveness to manage uncertainty. Sectors, organizations, and functional areas that implement the agile way of working appear to have a few things in common: the problem that needs solving is complex, the solution is unknown, and the requirements of the solution change over time. Simultaneously, work can be cut into smaller pieces and close collaboration with end customers is feasible. As argued, the agile way of working is highly suitable to deal with these conditions (e.g., in product development and marketing). Reflecting on this dissertation, several functional areas and sectors may furthermore benefit from adopting the agile way of working due to increased uncertainties. For instance, healthcare to cope with an aging workforce, education with the introduction of ChatGPT and how students may use it, transportation with self-driving vehicles, energy and utilities with the energy transition and rising electricity demands, and even agriculture with the introduction of precision farming. Each of these sectors may be able to use the agile way of working to

manage environmental uncertainties effectively and thereby create opportunities for innovation (and competition). In Knowledge Box 6.2, the conditions and two sector-specific applications of the agile way of working are detailed.

Turning to the internal context of organizations, adopting the agile way of working may lead to the assumption that significant restructuring is necessary. However, as Chapter 5 also indicates, this is not necessarily true. Empowered, cross-functional agile teams do, by definition, need matrix management in some form. However, this primarily requires that different functional disciplines learn to work together simultaneously instead of sequentially. Moreover, for leaders, instead of giving order, they learn to foster collaboration and innovation by asking guiding questions like “What do you recommend?” and “How could we test that?”.

Knowledge Box 6.2 Conditions for the agile way of working and two examples.

Conditions		
✓	Complex problem	✓ Solution is unknown
		✓ Requirements of the solution change over time.
✓	Work can be cut into smaller pieces.	✓ Close customer collaboration is feasible.
Examples		
FinTech – established	FinTech, short for financial technology, shows how companies handle uncertainty by using agile way of working. Many FinTech firms are now fully adopting agile ways of working (Barton et al., 2018; Goldstein et al., 2019). This helps them quickly adapt to changing needs in product development and deliver valuable services. Thanks to this approach, we see easy-to-use services like mobile banking and peer-to-peer payment apps such as Tikkie and Venmo.	
Healthcare – expected	Healthcare systems in many countries are under pressure because of aging populations (Kulik et al., 2014). This creates uncertainty due to a growing need for healthcare services with fewer workers available. Embracing the agile way of working can help these systems adapt to the uncertainty that is introduced. It can help to benefit from the opportunities of information technology. Such as automating routine tasks and AI assistance with diagnoses, which frees up healthcare professionals for care (Jiang et al., 2017; Secinaro et al., 2021).	

HRM. Chapter 5 elucidates the implications of adopting the agile way of working for supporting organizational systems. While Chapter 5 focuses explicitly on performance management, its implications extend to HRM departments and HR practices. Practices such as training and development, recruitment and selection, and people analytics seem particularly fit to benefit from the agile way of working, capitalizing on flexibility and responsiveness to deliver organizational value. However, echoing Hewett and Shantz (2021), the real value of HR practices materializes only

when they are actively used. In agile-transformed organizations, where hierarchical structures are redefined, and employee empowerment is heightened, traditional methods of value delivery through HR practices may be challenged. HR practices are often assumed to be delivered to employees by the line manager, but in the agile way of working the manager's role is reduced (Dewettinck & Vroonen, 2016; López-Cotarelo, 2018). This scenario may give room to a move towards HR co-creation, a continuous process wherein HR professionals and stakeholders create value through collaborative efforts to problem-solve and innovate in the design and use of HR practices to help them better satisfy stakeholders' needs (Hewett & Shantz, 2021, p. 2). Additionally, it calls for more direct delivery of HR practices to employees, potentially enabled by information technology. Reflecting on the practical experiences gathered during this dissertation, it is also apparent that HR professionals often view themselves as an "employee champion". This identity might face challenges as the delivery of HR practices increasingly integrates information technology and employees in agile teams assume greater responsibility.

Leadership. Based on the preceding chapters, especially Chapter 5, and further reflection, the agile way of working may lead to the emergence of three new leadership roles in organizations (De Smet, 2018; Denning, 2018). First, agile organizations are likely to have "chapters", which group employees in specific knowledge domains or functional competencies. The 'chapter lead' oversees a functional reporting line, focusing on building capabilities, equipping team members with necessary skills and tools, and deploying them to agile teams. These chapter leads do not engage in direct oversight of day-to-day team activities but rely on indirect feedback from Product Owners and team members to inform their appraisals and coaching (i.e., performance management activities). This approach allows them to have a relatively large span of control (e.g., 20-30 direct reports), which potentially eliminates management layers. Key challenges for chapter leads are likely to be a shift from direct, hands-on management styles (i.e., line management) to a role emphasizing capability building and resource allocation. Second is the 'area lead', who is responsible for a product line within the organization. An area lead focuses on value creation, growth, and customer service, drawing resources from chapters instead of building their own functional capabilities. Their role is more strategic, involving the development of business strategies and prioritization of opportunities. The challenge for area leads likely lies in letting go of direct ownership of their team and moving toward strategic business decision-making. Third, Product Owners play a pivotal role in agile organizations (see Chapter 4). They are not direct managers but act as orchestrators and coaches, ensuring that their

agile team delivers value. Product Owners face the challenge of “informally” leading without imposing excessive control. In many cases (Chapter 5), agile team members also perceive the Product Owner as their “logical” leader. Overall, these three roles reflect a significant shift in traditional management practices.

This shift may require organizations to critically review their leadership programs and talent management. Focus should primarily center on understanding the agile approach, going beyond the introduction of new words like “sprints” and “daily stand-ups”. Instead, focusing on the underlying values and principles of the Agile Manifesto (Beck et al., 2001) to make sure leaders do not mistakably continue to manage in ways that actually counter the agile way of working (see Knowledge Box 1.1). Examples are instilling deadlines instead of assigning priority to two or three objectives. Or being too involved in the agile teams. Leadership programs will likely require reevaluation to emphasize empowering and servant leadership styles. Such a change also works its way into HR practices like recruitment and selection (e.g., what competencies do we recruit?), performance management (e.g., what behaviors do we reward?), and strategic workforce planning (e.g., how do we recognize and invest in talent?).

Individuals in empowered, agile teams. Reflecting on the essence of the Agile Manifesto, which prioritizes “individuals and interactions over processes and tools” (Beck et al., 2001), it may initially appear counterintuitive that the theme of individuals in empowered, agile teams is positioned at the end. Nevertheless, it is important to recognize that, in fact, the central red thread running through every chapter of this dissertation has been the role of people in cultivating adaptiveness through the agile way of working. In a way, the agile way of working offers an alternative way of working centered on providing employees with ‘whole’ jobs – roles that are comprehensive, meaningful, and empowering (see Knowledge Box 1.1). This approach to work is holistic, enabling individuals to engage in tasks that are both fulfilling and impactful. Such an environment not only bolsters employee empowerment but allows them to observe the outcomes of their work directly. The job designs emerging from the agile way of working inherently possess the qualities that propel employees toward higher motivation (great for employee well-being) and (adaptive) performance (Fried & Ferris, 2006; Seibert et al., 2011; Van De Voorde et al., 2012).

6.5 Limitations and future research

Three overarching categories of limitations should be addressed next to those discussed in the preceding chapters.

First, the data in this dissertation, while highly diverse across industries, organizational sizes, tasks, and situational demands, were cross-sectional, self-reported, and confined to the Netherlands. Therefore, caution must be used in generalizing findings. Notably, a large portion of the teams involved in this research were engaged in tasks reliant on information technology, which may limit the applicability of the results to sectors where IT is less central, such as healthcare and education. Due to the cross-sectional nature of the data, the potential for common method bias and common source bias exists (Podsakoff et al., 2003). This limitation restricts the ability to infer causality from the findings. In Chapters 3 and 4, tests indicate that there is no issue with common method bias. Chapter 4 applies a time-separated measurement, limiting the potential of common source bias – but is technically not longitudinal. It must be pointed out, though, that in studying the agile way of working, it is challenging to avoid self-reported measures, given that agile teams do not have a single leader and leaders are not involved in daily team activities. Outcomes, however, can be assessed by externals such as customers. Future research can consider incorporating customer satisfaction as a relevant performance outcome. Moreover, adopting more comprehensive research designs, such as longitudinal studies or ethnographic approaches, could offer deeper insights. Longitudinal research could track the development of agile teams, revealing the time and effort required to achieve high effectiveness and the impact of member churn on this process. Ethnographic methods, on the other hand, could uncover potentially unexpected processes, identify informal roles that influence team effectiveness, and elucidate complex social dynamics that may be challenging to capture through quantitative methods.

Second, this dissertation's focus is specifically on the agile way of working rather than on individual agile practices or methodologies. From the start of this dissertation, the intent was to assist in converging various perspectives within the field. Conceptually, the agile way of working aligns perfectly with this goal. It encompasses the practical application of agile values and principles, aiming to create an environment conducive to their effective implementation. To achieve this, a systematic literature review was conducted, leading to the identification of key concepts for the agile way of working and its effectiveness. This process culminated in the development of a specific conceptualization and measure for the agile way of working that was used in the empirical chapters (Chapter 3 and 4). Recent literature has seen the introduction of several measurement scales for agile practices (Junker et al., 2022; Koch & Schermuly, 2020; Petermann & Zacher, 2022; Rietze & Zacher, 2022), each differing in focus. For example, they differ in the referent (i.e., projects,

teams, individuals) and the practices they include, while some omit self-organization despite others considering it fundamental to agile (Beck et al., 2001; Moe et al., 2010). With this dissertation, the aim was to delve into the application of the agile way of working, transcending beyond the implementation of specific practices. For instance, executing agile practices like a daily stand-up or a retrospective does not necessarily reflect its quality or effectiveness in fostering reflection or goal adjustment. The chosen approach, particularly the measurement scale employed, offers deeper insights into these nuances. This dissertation also raises questions about the interplay and relative importance of the five dimensions of the agile way of working. For example, customer influence can significantly impact a team's ability to implement agile effectively (Ciriello et al., 2022; Hoda et al., 2010, 2011). A lack of customer involvement in end-of-sprint demonstrations can impede a team's adaptiveness, as they miss out on crucial feedback. While the empirical studies treated the agile way of working as a cohesive bundle (with mean scale scores), future research can benefit from a more configurational approach. Applying latent class analysis could reveal different combinations within the agile way of working bundle, exploring how these variations might differentially influence adaptiveness. Such an approach would provide a more granular understanding of the dynamics within the agile way of working and its impact on effectiveness.

Third, the systematic literature review in Chapter 2 laid the foundation for the subsequent empirical chapters. However, it is important to note that psychological safety, shared mental models, and transactive memory systems were not directly explored in the empirical chapters. Instead, they examined goal specificity and goal difficulty (Chapter 3) and psychological empowerment (Chapter 4) as mediator-to-mediator linkages. The rationale for studying goal-setting lies in its alignment with the agile way of working's core mechanisms, where goals are continuously set and adjusted in brief, recurring cycles of 2-4 weeks (Kleingeld et al., 2011; Kramer et al., 2012; Latham & Locke, 2007). Psychological empowerment was selected based on existing literature suggesting it plays a role in the agile way of working's chain of linkages toward adaptiveness (Deci et al., 2017; Drury et al., 2012; Grass et al., 2020; Malik et al., 2021; Tessem, 2014). Yet, the extent to which this applies at the micro-level of team members remained unexplored. The moderate-to-large effect sizes found in the chapters underscore the significance of both team goal specificity and psychological empowerment within the agile context. Given that psychological safety (Edmondson & Lei, 2014), shared mental models, and transactive memory systems (Ellis, 2006; Ryan & O'Connor, 2013) have received considerable interest in the agile literature (see Chapter 2 for additional details), this dissertation sought to address new(er) mechanisms.

6.6 Practical implications

In earlier sections of this dissertation, the close connection between the agile way of working and practice has been highlighted. This link stems from the origins of the agile way of working and remains relevant as its development and refinement continue in practice today. Therefore, this dissertation has several implications for practice.

The initial practical implication of this dissertation does not emerge directly from its chapters' results but from the collaboration that made the dissertation possible in the first place. This dissertation was sponsored through a partnership between the People Management Center at Tilburg University (a part of the Department of Human Resource Studies in the Tilburg School of Social and Behavioral Sciences) and the multinational company dsm-firmenich (formerly DSM). The benefits of this collaboration are plentiful and have been detailed in an article in the Tilburg University Magazine (if interested, please see Trommels, 2022). A noteworthy benefit was being immersed in organizational practice, offering opportunities for informal interactions with individuals practicing the agile way of working and gaining insights into their experience (positive and negative) as well as their questions and concerns. This engagement with practice helped identify organizations interested to participate in data collection. In exchange for considerable participation in data collection (e.g., a minimum of five agile teams), organizations received a tailored dashboard summarizing their questionnaire responses at the team level, accompanied by a session explaining the concepts and findings. Knowledge Box 6.3 illustrates the dashboard.

The interest of organizations extended beyond the dashboard to the overarching findings and their implications. Consequently, this dissertation's findings have been presented to executive committees of multinational organizations, at program increment events (quarterly planning events involving numerous agile teams), and at practitioner conferences attended by hundreds of agile practitioners, such as the 2023 International Product Owner Day. These presentations have disseminated this dissertation's scholarly findings to organizations that use the agile way of working and have underscored their external validity.

Second, the agile way of working has sparked a vibrant debate in professional circles. Since its emergence, there have been debates between its evangelists who believe it to be a better, more innovative way of working and its critics who consider it to be hype and "old wine in a new bottle" (Ayberk, 2023; Dingsøyr et al., 2016; DNAMIC, 2021; Schlesinger, 2022; Williams, 2012). This dissertation contributes to this dialogue by providing a nuanced perspective on the agile way of working. To start, this dissertation clarifies its concept. This enables organizations to gain a more comprehensive understanding of what adopting "agile" entails. Moreover, the studies

agile teams. They are no longer directly involved in the work. Simultaneously, in this dissertation, it was identified that the Product Owner role within self-organizing agile teams can mirror aspects of traditional hierarchical management. Findings suggest that in teams perceived as less mature in their agile way of working (i.e., lower scores), members look to the Product Owner for direction. Hence, while the roles of traditional management are redefined, the leadership-like role of the Product Owner emerges. Additionally, these shifts often necessitate complementary changes in supporting organizational systems to maintain effectiveness. This dissertation reveals that the HR practice of performance management requires adjustments to fully align with the agile way of working. Consequently, organizations and their leaders that are implementing or scaling the agile way of working have to consider its broader implications. These include potential changes in leadership roles, adapting organizational systems, and the necessity for a cohesive vision.

6.7 Conclusion

This dissertation details my thorough exploration and integration of the dispersed literature on the agile way of working. This initiative led to a parsimonious and practitioner-supported conceptualization of the agile way of working. The conceptualization has withstood rigorous empirical testing in diverse samples, both at the team and individual levels, demonstrating a positive relationship with adaptiveness – a crucial attribute in today’s rapidly evolving business environment. Through this work, I have illuminated mechanisms and contextual factors essential for implementing agile. These insights span from agile teams to broader organizational systems, offering a comprehensive view of adaptiveness in action. This dissertation stands as a testament to the power of academic-practitioner collaborations, producing research that is not only theoretically robust but also practical and applicable. In essence, this work does more than just contribute to academic discourse; it serves as a microcosm of the agile literature itself. It showcases how organizations can foster adaptiveness through the agile way of working and was enabled by academic-practitioner collaboration. By addressing and affirmatively answering the guiding research question – “How does the agile way of working help organizations cultivate greater adaptiveness?” – I offer a comprehensive, nuanced and evidence-based understanding for organizations seeking to thrive in a time of unpredictability and rapid change.

6.7 References

Please see Chapter 11 for a complete list of all references in this dissertation.

Chapter 7

Scientific Summary in English

Introduction

This dissertation delves into the necessity for adaptiveness within organizations against the backdrop of rapid technological progress, environmental shifts, and geopolitical volatility. It emphasizes the imperative for organizations to navigate these ensuing complexities, highlighting the inadequacies of traditional organizational frameworks in addressing the emergent, dynamic challenges. The dissertation discusses a paradigmatic shift towards an agile way of working, originally rooted in the software development realm during the late 1990s and early 2000s. The agile way of working prioritizes flexibility, iterative development, and a human-centric approach, offering a critical departure from the erstwhile stability-focused, predictive planning models.

The dissertation explores three key issues in the scientific literature on the agile way of working: 1. Dispersion of understanding agile teams' conceptual nature and their effectiveness, 2. Understanding agile teams' effectiveness, and 3. the agile way of working's integration within broader organizational systems, particularly in the context of the HR practice of performance management. The research encompasses a systematic literature review and empirical studies to investigate the effectiveness of agile teams, the dynamics of team adaptive performance, the influence of the agile way of working on individual performance, and the interplay between the agile way of working and traditional performance management systems. This scholarly work aspires to provide a comprehensive perspective on the agile paradigm, highlighting its critical role in fostering organizational adaptiveness and strategic advantage.

Main findings (Chapter 2 through 5)

1: What do we know about agile teams and their effectiveness? The widespread adoption of the agile way of working catalyzed considerable cross-disciplinary research, spanning domains such as software development, project management, and business and management (Hoda et al., 2017; Koch et al., 2023; Serrador & Pinto, 2015). This expansion has led to a dispersion of theoretical insights, resulting in a lack of collective understanding of what the agile way of working and its effectiveness entail.

In tackling this key issue, this dissertation employed a theoretical and empirical approach. Chapter 2 theoretically anchors the dispersed literature using the IMOI model to systematically review 74 studies on agile teams. It compiles, organizes, and synthesizes the dispersed literature and thereby sheds light on the unique characteristics and specific purpose of agile teams in managing uncertainty. In particular, this chapter reveals that agile teams engage in specialized, complex tasks through cross-functional and customer collaboration. Key processes identified include

shared leadership, reflexivity, and empowering behavior, while the focal emergent states are an agile team orientation, shared mental models, transactive memory systems, and psychological safety. Furthermore, Chapter 2 outlines what agile team effectiveness entails. The most frequently studied effectiveness concepts are generic assessments of performance, adaptive performance, software development success, and team members' sustainability and well-being. Overall, these findings offer a robust, evidence-based heuristic framework for understanding the concept of the agile way of working and agile team effectiveness.

Building on these theoretical insights, Chapter 3 and 4 empirically explored the relationship between the agile way of working and team and individual adaptive performance. Chapter 3 addresses the linkage between the agile way of working and team adaptive performance. Chapter 4 examines its impact on sustainable performance at the individual level, encompassing adaptivity and work engagement. Informed by the heuristic framework presented in Chapter 2, these chapters conceptualize the agile way of working as a combination of agile team orientation, customer collaboration, cross-functional collaboration, reflexivity, and shared leadership. Furthermore, the two chapters test adaptiveness as an effectiveness-outcome, incorporating the critique that agility should be regarded as an aspect of agile team performance rather than merely a descriptor of certain practices (Conboy, 2009; Conforto et al., 2016). Both chapters demonstrate a positive association between the agile way of working and enhanced adaptiveness at the team and individual levels.

Accordingly, this dissertation significantly advances the understanding and conceptualization of the agile way of working and agile team effectiveness. Chapter 2 offers a parsimonious overview of the agile team literature, highlighting the defining characteristics of agile teams (i.e., input) and their way (i.e., processes and emergent states) of managing change and uncertainty (i.e., outcomes). Chapters 3 and 4 use these findings to empirically show how the agile way of working positively relates to adaptiveness on multiple levels – another critique formulated by Conforto et al. (2016). These chapters help shine a light on the more nuanced and intricate effects of the agile way of working. A notable contribution of Chapter 2 is the revelation that most of the agile research has been conducted in the realm of software development, with 57 out of 74 studies focused on this domain. However, it indicates a more recent, broader application of the agile way of working in diverse contexts. Hence, Chapters 3 and 4 explored more diverse samples, including agile teams in fraud prevention and HRM in banking, supply chain analytics in the semiconductor industry, and social security payments in public administration, for instance. This helps move the field beyond software development and enhances the generalizability of findings. This approach

demonstrates that the agile way of working is applied in a broader array of settings and that its positive effects are not confined to software development.

2: Explaining agile team effectiveness. The literature on the agile way of working suffers from limited theoretical engagement (Baham & Hirschheim, 2021; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Yu & Petter, 2014). The second key issue in this dissertation, therefore, addresses the need for theoretical frameworks to understand agile team processes leading to effectiveness. The practical origins of agile, as illustrated by the Agile Manifesto (Beck et al., 2001), have traditionally emphasized methods and practices over theoretical exploration (Hoda et al., 2017), with no dominant theories offering comprehensive explanations for agile team effectiveness.

The theoretical gap in understanding agile team effectiveness is addressed in this dissertation by employing diverse theoretical frameworks across multiple chapters. Chapter 2 used the IMOI model as a theoretical anchor, capturing the agile way of working in concepts that stem from the broader team effectiveness literature – a field with over 100 years of development (Mathieu et al., 2017). This integration is important as it facilitates access to cumulative insights. Chapter 3 applied Goal-setting theory within the agile context (Kleingeld et al., 2011; Kramer et al., 2012; Latham & Locke, 2007), emphasizing how participative goal-setting and continuous refinement drive team adaptiveness. The chapter explored goal specificity and difficulty as an explanatory mechanism for agile teams' adaptive performance and investigated the applicability of Goal-setting theory at the team level. Its main finding concerns the mediating role of team goal specificity, highlighting the significant role of specific team goals in dynamic settings. This underscores that goals are not static entities but tools that can facilitate adaptive performance in more dynamic settings (Latham & Locke, 2007; Latham & Steele, 1983; Latham & Yukl, 1975; Ordóñez et al., 2009a, 2009b). Chapter 4 engaged with Self-determination theory to understand psychological empowerment in agile teams and utilized Substitutes for leadership theory to analyze the Product Owner's role (Deci et al., 2017; Felin et al., 2015; Kerr & Jermier, 1978). Following indications from qualitative research, the interplay between the agile way of working (focused on the team members) and the Product Owner's supportive behaviors towards agile team members was explored. This chapter highlighted how the agile way of working positively impacts team members' adaptivity and work engagement, particularly noting the mediating role of psychological empowerment in this relationship. It indicated that the agile way of working context interacts with elements of the Product Owner's supportive behaviors typically associated with leadership in a substitutive fashion. Namely, when team members score low on the agile way of working, the

Product Owner's supportive behaviors are important for psychological empowerment. However, this effect disappears when scores on the agile way of working increase, which implies team development towards higher levels of agile maturity.

3: Embedding the agile way of working in organizations. The third key issue addressed how the agile way of working is embedded within organizational structures and practices. Recognizing that agile teams operate within larger organizational systems and that the agile way of working may provide a reason to adjust these, this dissertation explored the role of the Product Owner and performance management (HR practice).

Chapter 4 examines the role of Product Owners in agile teams, with a particular focus on their supportive behavior. The chapter specifically investigates how their supportive actions, such as clearly communicating the product vision, setting clear tasks, and listening careful to the input of agile team members, influence the relationship between the agile way of working, psychological empowerment, and individual sustainable performance. A key finding indicates that the empowering influence of Product Owners is most pronounced in agile teams with limited application or experience with the agile way of working (i.e., low scores). However, as teams gain more proficiency and maturity in the agile way of working, the role of Product Owners in psychological empowerment becomes less critical. Chapter 4 illuminates the evolving nature of leadership in agile contexts, highlighting that leadership roles like the Product Owner are crucial for empowering employees in nascent stages of agile implementation. However, their significance wanes as teams achieve higher levels of maturity (i.e., high scores).

Chapter 5 contains a multiple case study to examine how organizations integrate the agile way of working with traditional performance management systems. It explores three primary tensions between these two: (1) manager-centric performance management vs. self-organized agile teams, (2) the annual performance cycle vs. short sprints, and (3) setting individual performance goals vs. team-based agile objectives. This chapter uncovered how four organizations navigated these tensions, revealing diverse approaches from maintaining traditional performance management systems to transforming them to align better with the agile way of working. The main findings show that traditional manager-employee performance management is at odds with agile teams' self-organization. It leads employees to wonder whether their manager can appropriately evaluate their performance, for instance. The potential tension between the annual performance evaluation cycle and the frequent agile sprint cycles does not generally cause problems. This is because the focus is on development rather than performance (a change that the case organizations

have made over time), and goals may be adjusted as situations change. The tension between individual performance goals and team-based agile work is not experienced strongly. However, it is noted as peculiar by employees that their performance goals are not regularly evaluated with their agile team members, despite these being the colleagues they interact with most. This observation underscores a mismatch between individual goal setting and the collaborative nature of agile team environments. This in-depth qualitative study contributes significantly to understanding the broader organizational context for embedding agile effectively. Chapter 5 additionally indicates that employees do perceive their Product Owners as leaders.

Discussion

The dissertation's discussion takes a broader perspective on the above mentioned three key issues. It introduces broader reflections, limitations and future research, practical implications, and a conclusion.

Broader reflections. Theory: This dissertation enriches theoretical perspectives on agile effectiveness, utilizing the IMOI model, Goal-setting theory, Self-determination theory, and Substitutes for Leadership theory to contextualize agile within established team dynamics literature. It suggests that agile's emphasis on adaptiveness and continuous goal refinement can be systematically understood through these theoretical lenses.

Agile across organizations: Observations highlight agile's strategic importance in diverse sectors, noting its critical role in addressing dynamic market demands and technological advancements, particularly in software development and FinTech and addresses other sectors' potential to benefit from it, such as healthcare, transportation, and education.

HRM: The shift to the agile way of working impacts HRM practices, necessitating a move towards co-creation and direct delivery of HR services. This shift challenges traditional HR roles and emphasizes the need for HR practices that support agile principles.

Leadership: Agile implementation reshapes leadership roles, transitioning from hierarchical management to specialized area and chapter leads, and redefining the Product Owner's role within agile teams. This shift requires a reevaluation of leadership development and talent management to support the agile organizational structure.

Individuals in empowered, agile teams: The dissertation underscores the centrality of individuals in agile teams, advocating for job designs that provide meaningful and empowering roles, thereby fostering a conducive environment for adaptiveness and employee well-being.

Limitations and future research. The research acknowledges limitations such as its cross-sectional, self-reported data confined to the Netherlands, which may not fully represent the agile way of working's effects across different industries and countries. Future research is encouraged to adopt longitudinal and ethnographic methods to gain deeper insights into agile team development and effectiveness. The dissertation also calls for further exploration of the agile way of working's conceptualization and its impact on adaptiveness, suggesting a configurational approach to understand its dynamics better.

Practical implications. The dissertation underscores the practical relevance of the agile way of working, facilitated by academic-practitioner collaboration. It discusses how the partnership with organizations during the research provided rich insights into agile practices. The findings contribute to the debate on agile's effectiveness, highlighting its benefits in environments requiring adaptiveness and complex task management. Additionally, it reveals shifts in leadership roles within agile organizations, suggesting the need for organizations to rethink leadership and HR practices to align with agile principles.

Conclusion. The dissertation integrates literature on the agile way of working to offer a comprehensive understanding of its role in enhancing organizational adaptiveness. Through empirical research, it demonstrates the positive relationship between the agile way of working and adaptiveness at both team and individual levels. The dissertation acts as a bridge between academic research and practical application, showcasing the benefits of the agile way of working in fostering adaptiveness and addressing contemporary organizational challenges.

Chapter 8

**Wetenschappelijke Samenvatting in het
Nederlands**

Introductie

Dit proefschrift gaat in op de noodzaak van aanpassingsvermogen binnen organisaties tegen de achtergrond van snelle technologische vooruitgang, milieuverandering en geopolitieke volatiliteit. Het benadrukt de noodzaak voor organisaties om door deze resulterende complexiteit te navigeren en benadrukt de tekortkomingen van traditionele organisatorische raamwerken bij het aanpakken van de opkomende, dynamische uitdagingen. Het proefschrift adresseert een paradigmatische verschuiving naar een agile manier van werken, die zijn oorsprong vindt in de softwareontwikkeling eind jaren negentig en begin jaren 2000. De agile manier van werken geeft voorrang aan flexibiliteit, iteratieve ontwikkeling en een mensgerichte aanpak, en vormt een essentieel verschil met de voorheen op stabiliteit gerichte, voorspellende planningsmodellen.

Het proefschrift onderzoekt drie belangrijke kwesties in de wetenschappelijke literatuur over de agile manier van werken: 1. Versnippering van het begrip van de conceptuele aard van agile teams en hun effectiviteit, 2. Inzicht in de effectiviteit van agile teams, en 3. De agile manier van werken integreren binnen bredere organisatorische systemen, met name in de context van *performance management* als HR-instrument. Het onderzoek omvat een systematisch literatuuronderzoek en empirische studies naar de effectiviteit van agile teams, de dynamiek van team adaptieve prestaties, de invloed van de agile manier van werken op individuele prestaties, en de wisselwerking tussen de agile manier van werken en traditioneel *performance management* als HR-instrument. Dit wetenschappelijke werk streeft ernaar een uitgebreid perspectief te bieden op het agile paradigma, en benadrukt de kritieke rol ervan in het bevorderen van organisatorisch aanpassingsvermogen en strategisch voordeel.

Belangrijkste bevindingen (hoofdstuk 2 tot en met 5)

1: Wat weten we over agile teams en hun effectiviteit? De wijdverspreide adoptie van de agile manier van werken heeft veel interdisciplinair onderzoek gekatalyseerd, dat zich uitstrekt over domeinen als softwareontwikkeling, projectmanagement, en business en management (Hoda et al., 2017; Koch et al., 2023; Serrador & Pinto, 2015). Deze uitbreiding heeft geleid tot een versnippering van theoretische inzichten, wat resulteert in een gebrek aan collectief begrip van wat de agile manier van werken en de effectiviteit ervan inhouden.

Om dit belangrijke onderwerp aan te pakken, is in dit proefschrift gebruik gemaakt van een theoretische en empirische benadering. Hoofdstuk 2 verankert de verspreide literatuur theoretisch met behulp van het IMOI-model om 74 studies over agile teams

systematisch te analyseren. Het compileert, organiseert en synthetiseert de verspreide literatuur en werpt daarmee licht op de unieke kenmerken en het specifieke doel van agile teams in het managen van onzekerheid. In het bijzonder onthult dit hoofdstuk dat agile teams zich bezighouden met gespecialiseerde, complexe taken door middel van cross-functionele en klantgerichte samenwerking. De belangrijkste geïdentificeerde processen zijn gedeeld leiderschap, reflexiviteit en empowerment gedrag, terwijl de belangrijkste opkomende toestanden ("emergent states") een agile teamoriëntatie, gedeelde mentale modellen, transactieve geheugensystemen ("transactive memory systems") en psychologische veiligheid zijn. Verder schetst hoofdstuk 2 wat agile team effectiviteit inhoudt. De meest bestudeerde concepten van effectiviteit zijn generieke beoordelingen van prestaties, adaptieve prestaties, succes van softwareontwikkeling en duurzaamheid en welzijn van teamleden. Overkoepelend bieden deze bevindingen een robuust, op bewijs gebaseerd heuristisch raamwerk voor het begrijpen van het concept van de agile manier van werken en agile teameffectiviteit.

Voortbouwend op deze theoretische inzichten onderzochten hoofdstuk 3 en 4 empirisch de relatie tussen de agile manier van werken en team- en individuele adaptieve prestaties. Hoofdstuk 3 gaat in op het verband tussen de agile manier van werken en het aanpassingsvermogen van het team. Hoofdstuk 4 onderzoekt de impact op duurzame prestaties op individueel niveau, inclusief adaptiviteit en werkbetrokkenheid. Geïnformeerd door het heuristische raamwerk gepresenteerd in hoofdstuk 2, conceptualiseren deze hoofdstukken de agile manier van werken als een combinatie van agile teamoriëntatie, samenwerking met de klant, cross-functionele samenwerking, reflexiviteit en gedeeld leiderschap. Bovendien testen de twee hoofdstukken aanpassingsvermogen als een effectiviteitsresultaat, waarbij de kritiek wordt meegenomen dat wendbaarheid moet worden beschouwd als een aspect van agile teamprestaties in plaats van slechts als een beschrijving van bepaalde praktijken (Conboy, 2009; Conforto et al., 2016). Beide hoofdstukken laten een positieve associatie zien tussen de agile manier van werken en een verbeterd aanpassingsvermogen op team- en individueel niveau.

Dienovereenkomstig draagt dit proefschrift significant bij aan het begrip en de conceptualisering van de agile manier van werken en de effectiviteit van agile teams. Hoofdstuk 2 biedt een beknopt overzicht van de agile teamliteratuur, met de nadruk op de definiërende kenmerken van agile teams (d.w.z. input) en hun manier (d.w.z. processen en opkomende toestanden ("emergent states")) van omgaan met verandering en onzekerheid (d.w.z. uitkomsten). Hoofdstukken 3 en 4 gebruiken deze bevindingen om empirisch aan te tonen hoe de agile manier van werken positief samenhangt met aanpassingsvermogen op meerdere niveaus - een andere kritiek die

Conforto et al. (2016) formuleerden. Deze hoofdstukken helpen een licht te schijnen op de meer genuanceerde en complexe uitkomsten van de agile manier van werken. Een opmerkelijke bijdrage van hoofdstuk 2 is de onthulling dat het meeste agile onderzoek is uitgevoerd op het gebied van softwareontwikkeling, met 57 van de 74 studies gericht op dit domein. Het wijst echter ook op een recentere, bredere toepassing van de agile manier van werken in diverse contexten. Vandaar dat de hoofdstukken 3 en 4 meer diverse voorbeelden onderzochten, waaronder agile teams in fraudepreventie en HRM in het bankwezen, supply chain analytics in de halfgeleiderindustrie, en werknemersverzekeringen en uitbetalingen vanuit de overheid. Dit helpt het academisch vakgebied met inzichten uit andere omgevingen dan alleen softwareontwikkeling en vergroot de generaliseerbaarheid van de bevindingen. Deze aanpak laat zien dat de agile manier van werken wordt toegepast in een breder scala aan omgevingen en dat de positieve effecten niet beperkt blijven tot softwareontwikkeling.

2: Het verklaren van de effectiviteit van agile teams. De literatuur over de agile manier van werken lijdt onder een beperkte theoretische diepgang (Baham & Hirschheim, 2021; Diegmann et al., 2018; Dybå & Dingsøy, 2008; Yu & Petter, 2014). De tweede kernvraag in dit proefschrift richt zich daarom op de behoefte aan theoretische kaders om beter te begrijpen hoe agile teamprocessen samenhangen met de effectiviteit van agile teams. De praktische oorsprong van agile, zoals geïllustreerd door het Agile Manifesto (Beck et al., 2001), heeft traditioneel de nadruk gelegd op methoden en praktijken (Hoda et al., 2017), en er zijn geen dominante theorieën die uitgebreide verklaringen bieden voor de effectiviteit van agile teams.

De theoretische leemte in het begrijpen van agile teameffectiviteit wordt in dit proefschrift aangepakt door verschillende theoretische kaders te gebruiken in meerdere hoofdstukken. Hoofdstuk 2 gebruikte het IMOI-model als theoretisch anker, waarbij de agile manier van werken wordt gevat in concepten die voortkomen uit de bredere teameffectiviteitsliteratuur - een veld met meer dan 100 jaar geschiedenis (Mathieu et al., 2017). De integratie met de bredere teameffectiviteitsliteratuur is belangrijk omdat het de toegang tot cumulatieve inzichten vergemakkelijkt. Hoofdstuk 3 paste de *Goal-setting* theorie toe binnen de agile context (Kleingeld et al., 2011; Kramer et al., 2012; Latham & Locke, 2007), en benadrukte hoe participatieve doelbepaling en voortdurende verfijning het aanpassingsvermogen van het agile team stimuleren. Het hoofdstuk onderzocht de specificiteit en moeilijkheidsgraad van doelen als verklarend mechanisme voor de adaptieve prestaties van agile teams en onderzocht de toepasbaarheid van de *Goal-setting* theorie op teamniveau. De belangrijkste bevinding betreft de mediërende rol van de specificiteit van teamdoelen, waarbij de significante

rol van specifieke teamdoelen in dynamische omgevingen wordt benadrukt. Dit benadrukt dat doelen geen statische entiteiten zijn, maar hulpmiddelen die adaptieve prestaties in meer dynamische omgevingen kunnen faciliteren (Latham & Locke, 2007; Latham & Steele, 1983; Latham & Yukl, 1975; Ordonez et al., 2009a, 2009b). Hoofdstuk 4 richt zich op de Zelfbeschikkingstheorie ("Self-determination theory") om psychologische empowerment in agile teams te begrijpen en gebruikte Substituten voor leiderschapstheorie ("Substitutes for leadership theory") om de rol van de Product Owner te analyseren (Deci et al., 2017; Felin et al., 2015; Kerr & Jermier, 1978). Op basis van aanwijzingen uit kwalitatief onderzoek werd de wisselwerking tussen de agile manier van werken (gericht op de teamleden) en het ondersteunende gedrag van de Product Owner ten opzichte van agile teamleden onderzocht. Dit hoofdstuk benadrukte hoe de agile manier van werken een positieve invloed heeft op het aanpassingsvermogen en de werkbetrokkenheid van teamleden, waarbij met name de mediërende rol van psychologische empowerment in deze relatie naar voren kwam. Het gaf aan dat de context van de agile manier van werken op een substituerende manier interacteert met elementen van het ondersteunende gedrag van de Product Owner, dat typisch geassocieerd wordt met leiderschap. Namelijk, wanneer teamleden laag scoren op de agile manier van werken, zijn de ondersteunende gedragingen van de Product Owner belangrijk voor psychologische empowerment. Dit effect verdwijnt echter wanneer de scores op de agile manier van werken toenemen, wat impliceert dat het team zich ontwikkelt naar hogere niveaus van volwassenheid met de agile manier van werken.

3: Het inbedden van de agile manier van werken in organisaties. Het derde kernthema ging over hoe de agile manier van werken wordt ingebed in organisatiestructuren en -praktijken. Erkennend dat agile teams opereren binnen grotere organisatorische systemen en dat de agile manier van werken een reden kan zijn om deze aan te passen, onderzocht dit proefschrift de rol van de Product Owner en performance management (HR-instrument).

Hoofdstuk 4 onderzoekt de rol van Product Owners in agile teams, met een bijzondere focus op hun ondersteunende gedrag. Het hoofdstuk onderzoekt specifiek hoe hun ondersteunende acties, zoals het duidelijk communiceren van de productvisie, het stellen van duidelijke taken, en het goed luisteren naar de input van agile teamleden, de relatie tussen de agile manier van werken, psychologische empowerment, en individuele duurzame prestaties beïnvloeden. Een belangrijke bevinding is dat de empowerende invloed van Product Owners het meest uitgesproken is in agile teams met beperkte toepassing van of ervaring met de agile manier van werken (d.w.z. lage

scores). Echter, naarmate teams vaardiger en volwassener worden in de agile manier van werken (d.w.z. hoge scores), wordt de rol van Product Owners voor psychologische empowerment minder kritisch. Hoofdstuk 4 belicht daarmee de evoluerende aard van leiderschap in agile contexten, en benadrukt dat leiderschapsrollen zoals de Product Owner cruciaal zijn om team leden in hun kracht te zetten in vroeg in de agile implementatie. Deze invloed neemt echter af naarmate teams hogere niveaus van volwassenheid bereiken.

Hoofdstuk 5 bevat een meervoudige casestudy om te onderzoeken hoe organisaties de agile manier van werken integreren met traditioneel *performance management*. Het onderzoekt drie primaire spanningen tussen deze twee: (1) manager-centrisch *performance management* versus zelf-organiserende agile teams, (2) de jaarlijkse prestatiecyclus versus korte sprints, en (3) het stellen van individuele prestatiedoelen versus team-gebaseerde agile doelstellingen. Dit hoofdstuk laat zien hoe vier organisaties met deze spanningen omgaan, waarbij verschillende benaderingen naar voren komen, van het handhaven van traditioneel *performance management* tot het transformeren ervan om ze beter af te stemmen op de agile manier van werken. De belangrijkste bevindingen tonen aan dat traditioneel manager-werknemer *performance management* op gespannen voet staat met de zelforganisatie van agile teams. Het leidt er bijvoorbeeld toe dat medewerkers zich afvragen of hun manager hun prestaties wel op de juiste manier kan evalueren. De potentiële spanning tussen de jaarlijkse evaluatiecyclus en de frequente agile sprintcycli leidt over het algemeen niet tot problemen. Dit komt omdat de focus ligt op ontwikkeling in plaats van prestaties (een verandering die de onderzochte organisaties in de loop der tijd hebben doorgevoerd), en doelen kunnen worden bijgesteld als situaties veranderen. De spanning tussen individuele prestatiedoelen en teamgericht agile werken wordt niet sterk ervaren. Wel wordt het door medewerkers als eigenaardig ervaren dat hun prestatiedoelen niet regelmatig worden geëvalueerd met hun agile teamleden, ondanks dat dit de collega's zijn met wie ze de meeste interactie hebben. Deze observatie benadrukt een mismatch tussen het stellen van individuele doelen en de collaboratieve aard van agile teamomgevingen. Deze diepgaande kwalitatieve studie draagt significant bij aan het begrijpen van de bredere organisatorische context voor het effectief inbedden van agile. Hoofdstuk 5 geeft bovendien aan dat medewerkers hun Product Owners wel degelijk als leiders zien.

Discussie

De discussie in dit proefschrift biedt een breder perspectief op de bovengenoemde drie hoofdzaken. Het introduceert bredere reflecties, beperkingen en toekomstig onderzoek, praktische implicaties en een conclusie.

Bredere reflecties. Theorie: Deze dissertatie verrijkt theoretische perspectieven op agile effectiviteit, door gebruik te maken van het IMOI-model, Goal-setting theorie, Self-determination theorie, en Substitutes for leadership theorie om agile te contextualiseren binnen de gevestigde teameffectiviteitsliteratuur. Het suggereert dat de nadruk van agile op aanpassingsvermogen en voortdurende doelverfijning systematisch kan worden begrepen door deze theoretische lenzen.

Agile in organisaties: Observaties benadrukken het strategische belang van agile in diverse sectoren, met de nadruk op de kritieke rol ervan bij het aanpakken van dynamische marktfragen en technologische vooruitgang.

HRM: De verschuiving naar een agile manier van werken heeft gevolgen voor HR-instrumenten, waardoor een verschuiving nodig is naar co-creatie en het direct aanbieden van HR-instrumenten aan medewerkers in plaats van via hun manager. Deze verschuiving stelt traditionele HR-rollen op de proef en benadrukt de behoefte aan HR-instrumenten gestoeld op agile principes ondersteunen.

Leiderschap: Het implementeren van agile verandert de leiderschapsrollen binnen een organisatie, met een overgang van hiërarchisch management naar gespecialiseerde gebieds- en hoofdstukleiders, en een herdefiniëring van de rol van de Product Owner binnen agile teams. Deze verschuiving vereist een analyse en mogelijk aanpassing van leiderschapontwikkeling en talentmanagement om de agile organisatiestructuur te ondersteunen.

Individen in agile teams: Dit proefschrift onderstreept de centrale rol van individuen in agile teams, en pleit voor het ontwerpen van organisaties en teams die betekenisvolle en stimulerende rollen bieden, waardoor een bevorderlijke omgeving voor aanpassingsvermogen en werknemerswelzijn ontstaat.

Beperkingen en toekomstig onderzoek. Het onderzoek erkent beperkingen, zoals de cross-sectionele, zelfgerapporteerde data die beperkt zijn tot Nederland, en dus mogelijk niet volledig de effecten van agile werken in verschillende industrieën en landen weergeven. Onderzoekers worden aangemoedigd om in toekomstig onderzoek longitudinale en etnografische methoden te gebruiken om diepere inzichten te krijgen in de ontwikkeling en effectiviteit van agile teams. Het proefschrift roept ook op tot

verdere verkenning van de conceptualisering van de agile manier van werken en de invloed ervan op het aanpassingsvermogen, en suggereert een configurationele benadering om de dynamiek van agile teams verder en in meer detail te begrijpen.

Implicaties voor de praktijk. Dit proefschrift benadrukt de praktische relevantie van de agile manier van werken, gefaciliteerd door academisch-practitionele samenwerking. Het laat zien hoe de samenwerking met organisaties tijdens wetenschappelijk onderzoek rijke inzichten opleverde in agile teams. De bevindingen dragen bij aan het debat over de effectiviteit van agile en benadrukken de voordelen ervan in omgevingen die aanpassingsvermogen en complex taakbeheer vereisen. Daarnaast onthult het onderzoek verschuivingen in leiderschapsrollen binnen agile organisaties, wat de noodzaak suggereert voor organisaties om leiderschaps- en HR-praktijken te heroverwegen en af te stemmen op agile principes.

Conclusie. Het proefschrift integreert literatuur over de agile manier van werken om een uitgebreid begrip te bieden van de rol ervan in het verbeteren van het aanpassingsvermogen van organisaties. Door middel van empirisch onderzoek toont het de positieve relatie aan tussen de agile manier van werken en aanpassingsvermogen op zowel team- als individueel niveau. Het proefschrift fungeert als een brug tussen academisch onderzoek en praktische toepassing, en laat de voordelen zien van de agile manier van werken in het bevorderen van aanpassingsvermogen en het aanpakken van hedendaagse organisatorische uitdagingen.



Chapter 9

Citizen's Summary in English

Introduction

This summary distills the essence of a comprehensive 200+ page dissertation, reflecting years of scientific research. The study delves into how organizations must evolve to thrive amidst rapid technological advancements, environmental shifts, and geopolitical changes. Focusing on the agile way of working, which has roots in the software development industry, this research extends its application and understanding across various sectors.

Origin and nature of the agile way of working

The agile way of working, central to this dissertation, prioritizes flexibility, iterative development, and a human-centric approach. Unlike traditional project management methods that emphasize long-term planning and stability, agile encourages quick responses to change and continuous improvement. This research, conducted in the Netherlands, provides a rigorous academic analysis of the agile way of working in an attempt to understand its effectiveness in the difficult circumstances that it is used in.

Core findings

1. Deep dive into agile teams: Based on scientific research, the dissertation reveals that agile teams adeptly manage complexity through cross-functional and customer collaboration. Then, agile teams use shared leadership, reflexivity, and empowering behavior to tackle their tasks. This means that the teams organize themselves, there is no manager to tell them what to do. The teams decide together how they will work on certain tasks (this we call shared leadership). Because they work on difficult tasks for which it is difficult to plan long-term, they work in periods of 2-to-4-weeks and at the end of this period present their work to customers and ask for feedback. They also reflect amongst themselves how they did and if improvements are needed (this we call reflexivity). Agile teams have no manager, but they do have someone who talk to their customers to collect their requests and someone who helps them reflect (this we call empowering behavior). Next to these team processes, there is agile team orientation, psychological safety, and shared mental models and transactive memory systems. These reflect whether the team members prioritize the team (agile team orientation), feel safe to speak up within the team and share feedback (psychological safety), have a similar view on what the team should achieve and how to collaborate (shared mental model), and understand who knows what in the team (transactive memory system). These together are unique characteristics of agile teams, and allows them to effectively adapt and respond to uncertainties.

2. Understanding the effectiveness of the agile way of working: The study examines how the agile way of working enhances adaptiveness and performance at both team and individual levels. It evidently shows that an agile way of working, as described under #1 not only drives project success but also contributes to the well-being and sustainable performance of agile team members. Simply put, the agile way of working seems to be effective to deal with challenging tasks and because team members have a lot of input, feedback and a sense of community, they feel better at work too.
3. Organizational integration of the agile way of working: This research emphasizes the strategic integration of the agile way of working within broader organizational structures. It shows the evolving role of leadership, particularly the Product Owner, and how performance management practices need to adapt to support a more agile, team-centric approach. It means that in organization that use agile teams, the role of the traditional manager changes into a coach (who helps people find the best way to achieve their goals) instead of a trainer (who tells people what to do). For many organizations this implies that they need to reconsider what skills people need to be a good manager, and thus organizations need to adjust their policies accordingly (for instance, when they recruit new managers, or how they reward managers for their work).

Conclusion

Derived from years of scientific research, this dissertation offers a rich, evidence-based perspective on the agile way of working. It asserts that agility is paramount for modern organizations aiming to navigate the complexities of today's dynamic environment effectively and is good for the people in the organizations too. By embedding agile principles, organizations can foster a culture of adaptability, innovation, and continuous learning, ensuring their long-term success and well-being.

Chapter 10

Publiekssamenvatting in het Nederlands

Introductie

Deze samenvatting vat de essentie samen van een uitgebreid proefschrift van meer dan 200 pagina's, dat jaren van wetenschappelijk onderzoek weerspiegelt. Het onderzoek gaat in op hoe organisaties zich moeten ontwikkelen om te gedijen te midden van snelle technologische ontwikkelingen, milieuverschuivingen en geopolitieke veranderingen. Dit onderzoek richt zich op de agile manier van werken, die zijn wortels heeft in de softwareontwikkelingsindustrie, en breidt de toepassing en het begrip ervan uit naar verschillende sectoren.

Oorsprong en aard van de agile manier van werken

De agile manier van werken, die centraal staat in dit proefschrift, geeft prioriteit aan flexibiliteit, iteratieve ontwikkeling van projecten en een mensgerichte aanpak. In tegenstelling tot traditionele projectmanagementmethoden die langetermijnplanning en stabiliteit benadrukken, moedigt agile snelle reacties op verandering en continue verbetering aan. Dit onderzoek, uitgevoerd in Nederland, biedt een rigoureuze academische analyse van de agile manier van werken in een poging om de effectiviteit ervan te begrijpen in de moeilijke omstandigheden waarin het wordt gebruikt.

Belangrijkste resultaten

1. Analyse van hoe agile teams te werk gaan: Gebaseerd op wetenschappelijk onderzoek onthult het proefschrift dat agile teams bedreven zijn in het managen van complexiteit door cross-functionele en klantgerichte samenwerking. Vervolgens gebruiken agile teams gedeeld leiderschap, reflexiviteit en empowerend gedrag om hun taken aan te pakken. Dit betekent dat de teams zichzelf organiseren, er is geen manager die hen vertelt wat ze moeten doen. De teams beslissen samen hoe ze aan bepaalde taken gaan werken (dit noemen we gedeeld leiderschap). Omdat ze werken aan moeilijke taken waarvoor het moeilijk is om een langetermijnplanning te maken, werken ze in periodes van 2 tot 4 weken en aan het einde van deze periode presenteren ze hun werk aan klanten en vragen ze om feedback. Ze reflecteren ook onderling hoe ze het hebben gedaan en of er verbeteringen nodig zijn (dit noemen we reflexiviteit). Agile teams hebben geen manager, maar ze hebben wel iemand die met hun klanten praat om hun verzoeken te verzamelen en iemand die hen helpt te reflecteren (dit noemen we empowerend gedrag). Naast deze teamprocessen zijn er de agile teamoriëntatie, de psychologische veiligheid en de gedeelde mentale modellen en transactieve geheugensystemen. Deze weerspiegelen of de teamleden prioriteit geven aan het team (agile teamoriëntatie), zich veilig voelen om zich uit te spreken binnen het team en feedback te delen (psychologische veiligheid), een

gedeelde kijk hebben op wat het team moet bereiken en hoe samen te werken (gedeeld mentaal model), en begrijpen wie wat weet in het team (transactief geheugensysteem). Dit samen zijn unieke kenmerken van agile teams, en stelt hen in staat om zich effectief aan te passen en te reageren op onzekerheden.

2. Inzicht in de effectiviteit van de agile manier van werken: Dit proefschrift onderzoekt hoe de agile manier van werken het aanpassingsvermogen en de prestaties op zowel team- als individueel niveau verbetert. Het toont duidelijk aan dat een agile manier van werken, zoals beschreven onder #1 niet alleen het succes van een project bevordert, maar ook bijdraagt aan het welzijn en de duurzame prestaties van agile teamleden. Simpel gezegd lijkt de agile manier van werken effectief om te gaan met uitdagende taken en omdat teamleden veel inbreng, feedback en een gemeenschapsgevoel hebben, voelen ze zich ook beter op hun werk.
3. Organisatorische integratie van de agile manier van werken: Dit onderzoek benadrukt de strategische integratie van de agile manier van werken binnen bredere organisatiestructuren. Het toont de veranderende rol van leiderschap, in het bijzonder de Product Owner (degene in het team die met name met de klant contact heeft), en hoe performance management praktijken zoals het jaarlijks doelen stellen als medewerker, volgen van trainingen om beter in het werk te worden of het beoordelingsgesprek moeten worden aangepast om een meer agile, teamgerichte aanpak te ondersteunen. Het betekent dat in organisaties die agile teams gebruiken, de rol van de traditionele manager verandert in een coach (die mensen helpt de beste manier te vinden om hun doelen te bereiken) in plaats van een trainer (die mensen vertelt wat ze moeten doen). Voor veel organisaties betekent dit dat ze moeten heroverwegen welke vaardigheden mensen nodig hebben om een goede manager te zijn, en dus moeten organisaties hun beleid hierop aanpassen. Bijvoorbeeld wanneer ze nieuwe managers werven, of hoe ze managers belonen voor hun werk.

Conclusie

Dit proefschrift is gebaseerd op jarenlang wetenschappelijk onderzoek en biedt een rijk, op feiten gebaseerd perspectief op de agile manier van werken. Het stelt dat wendbaarheid van het grootste belang is voor moderne organisaties die effectief om willen gaan met complexiteit en snelle veranderingen. Dit proefschrift toont ook aan dat de agile manier van werken goed is voor de mensen in de organisaties. Door de agile principes en werkwijze te verankeren, kunnen organisaties een cultuur van aanpassingsvermogen, innovatie en voortdurend leren bevorderen, waardoor hun succes en welzijn op lange termijn wordt verzekerd.

Chapter 11



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*"I want to thank me for believing in me.
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I wanna thank me for having no days off.
I wanna thank me for never quitting.
I wanna thank me for always being a giver and trying to give more than I receive.
I wanna thank me for trying to do more right than wrong.
I wanna thank me for being me at all times."*

Snoop Dogg

Chapter 13

Appendices

Appendix 1

Chapter 2: Description of Studies

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Agbejule, A.	2022	International Journal of Organizational Analysis	Explore how the different combinations of traditional and agile project management enhance project success under different levels of teamwork quality.	Quantitative	Project team managers in the energy industry.
Alyhya, S.	2021	IEEE Transactions on Engineering Management	Identify the key activity dependencies that exist during remote customer involvement in distributed agile development and design a computer-based system capable of providing coordination support through managing these dependencies.	Qualitative (case study)	Two case studies, organizations located in Saudi Arabia, one develops IT solutions for the government and the other provides international business solutions.
Annosi, M.C.	2020	Journal of Business Research	Explain the way in which agile methods affect organizational learning in self-managed, team-based organizations	Qualitative (case study)	Semi-structured interviews, exploratory survey, and archival data; European, four different R&D organizations within a single multinational telecommunication company.
Annosi, M.C.	2016	Creativity and Innovation Man.		Qualitative	Four R&D organizations belonging to the same multinational telecommunication company
Barke, H. and Prechelt, L.	2019	PeerJ Computer Science	What dynamics arise in a self-organizing team from the negotiation of everybody's role?	Qualitative (grounded theory) + observational data	5 agile teams from diverse organizations (25-15,000 employees), developers, scrum masters and product owners were interviewed
Bianchi, M.	2020	Journal of Business Research	Investigate the relationship of plan-driven stage-gate and flexible Agile models with new product development performance.	Quantitative	Software developers that are members of four Italian virtual communities that focus on the development of internet software products.

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Brodnicki, K.	2021	E-mentor	Explore the impact of remote work on the level of communication and efficiency of Scrum teams.	Quantitative	Employees that work in organizations that have used Scrum for at least 2 years (no more details about the sample are included).
Ciriello, R.F.	2022	Information & Management	How do customer influence agile adoption within commissioned software teams?	Qualitative (case study)	Danish IT service provider
Conboy, K.	2011	IEEE Software	Describe the most important challenges that the transition to agile methods can cause and offer recommendations on how to address them	Qualitative (case study)	17 organizations in a large variety of industries, methods used were scrum, XP, crystal, and lean software development
Cornide-Reyes, H.	2021	IEEE Access	Identify the agile professional skills that the Chilean industry considers key to conform high-performance agile teams.	Quantitative	Chilean industry, agile community professionals
De O. Melo, C.	2013	Information and Software Technology	Provide a better understanding of the factors and mediators that impact agile team productivity.	Qualitative (case study)	Multiple-case study for 6 months in three large Brazilian companies that have been using agile methods for over 2 years.
Dingsøyir, T.	2016	IEEE Software	Review scientific studies of factors influencing collocated teams' performance and propose five factors that strongly affect performance. Plus, compare these propositions with the Agile manifesto's software development principles.	Qualitative	
Drury, M.	2012	The Journal of Systems and Software	Develop an understanding of the tactical and strategic decisions made in ASD teams; identify the obstacles to these types of decisions in ASD teams.	Qualitative (focus group and interviews)	Global consulting organization, a multinational communications company, two multinational software development companies, and a museum organization.
Drury-Grogan, M.L.	2014	Information and Software Technology	This study identifies iteration objectives and the critical decisions that relate to the golden triangle of project management success factors in agile software development teams working in two-week iterations.	Qualitative (case study)	Three cases of three teams (2 distributed across Ireland and India; 1 collocated in Ireland), multiple interviews per case and observations

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Fagerholm, F.	2015	Information and Software Technology	Understand how software developers experience the continuous adaptation of performance in a modern, highly volatile environment using lean and agile software development methodology.	Qualitative (case study)	Small and large organizations in consulting, telecom, computer security, embedded and wireless systems, and software design and development. Three are multinational and others are only based in Finland.
Fontana, R.M.	2014	The Journal of Systems and Software	Discover whether agile maturity is the same maturity as defined by current software process improvement models	Quantitative	Agile practitioners in Brazil
Freire, A.	2018	Information and Software Technology		Mixed (literature review, domain practitioner and case study)	Bayesian network model based on literature review and a domain practitioner
Georganta, E.	2022	Team Performance Management	Explore the team processes executed within and across performance episodes and their relation to team performance	Qualitative	German company in the development of new fitness equipment that uses Scrum
Gjostedal, S.	2020	International Journal of Information Technology Project Management	Explore the impact inadequate self-organizing teams have on agile project success.	Mixed (case study and questionnaire)	
Grass, A.	2020	Journal of Product Innovation Management	Shed light on the human side of adaptability	Qualitative	Two German and one multinational European firm
Gregory, P.	2022	Information and Software Technology	RQ1: How do newcomers integrate into an ongoing agile project team? And RQ2: How do agile practices particularly assist with onboarding into an ongoing agile project team?	Qualitative (single case study)	Co-located agile project team in a large IT department who regularly onboard inexperienced newcomers
Gren, L.	2020	Software: Evolution and Process	Investigate if, and how, team development from a group psychological perspective is related to some work practices of agile teams.	Quantitative	6 software development organizations and one university, countries: Brazil and Sweden

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Gren, L.	2020	IEEE Software	Explore the potential of group development training/psychology for agile software development teams	Mixed (intervention, follow-up questionnaire)	Agile teams in Brazil, IT departments at a large online media and social networking enterprise, and one org. that offers programming courses to individuals and organizations. SAP America customers
Gren, L.	2017	The Journal of Systems and Software	Investigate how building agile teams is connected to a group development model	Mixed	
Hennel, P.	2021	Project Management Journal	Investigate the specific practices and their behavioral implications from a team-level perspective	Qualitative (case study)	Three case studies in two large insurance companies and one software development company, all in Germany
Hoda, R.	2013	IEEE transactions on software engineering	Explore the informal, implicit, transient, and spontaneous roles that make agile teams self-organizing	Qualitative (grounded theory)	58 agile practitioners from 23 software organizations in New Zealand and India
Hoda, R.	2011	Information and Software Technology	Address the importance of adequate customer involvement on Agile projects, and the impact of different levels of customer involvement in real-life Agile projects.	Qualitative	16 software development organizations in New Zealand and India
Hodgson, D.	2013	Work, employment, and society	Trace the modes of control which operate on and through project teams in creative settings	Qualitative (interviews + observations)	medium-sized Canadian development studio in the video game industry
Holtzhausen, N. and de Klerk, J.J.	2018	Leadership & Organization Development Journal	Investigate to what extent Scrum masters make use of servant leadership and how this impacts the team's effectiveness via mediating processes.	Quantitative	71 Scrum team members and 22 Scrum masters in more than ten organizations based in Western Cape, SA
Junker, T.L.	2021	Human relations	Test and develop an integrative multilevel model to provide insights regarding how agile working shapes the behaviors and performance of teams and individuals.	Quantitative	German transport and logistics organizations (DB) undergoing an agile transformation
Kadenic, M.D.	2023	Information and Software Technology	Investigate the impact of team maturity, team composition, scrum values, scrum roles, and scrum events, on Agile team performance.	Quantitative	182 Agile team members in 22 Danish companies mainly in information technology, finance, energy and manufacturing.

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Kaikkonen, H.	2018	International Journal of Value Chain Management	study the use of self-managing teams in smaller and faster product development projects	Qualitative (case study)	Four large companies, 1 medium-sized and 1 small company. Industries are manufacturing, wholesale, and services
Kakar, A.K.	2017	Business Information Systems Engineering		Quantitative	Data collection as part of a 4-year project. The developers were employees of the university's industry partners and graduate students at the university who had to complete a real-life software project with the industry partners which included 18 large companies with 3 of them in the Fortune 500 list.
Kakar, A.K.	2018	Knowledge and Process Management		Quantitative	
Kakar, A.K.	2018	International Journal of Innovation Management		Quantitative	
Kakar, A.K.S.	2018	International Journal of Human-Computer Studies		Quantitative	
Khanagha, S.	2021	Journal of Product Innovation Management	Reveal the paradoxical relationship between high team autonomy and managerial controls and investigate the overlooked question of how various control mechanisms affect creativity and innovativeness.	Quantitative	Fortune 500 firm, leader in the telecommunications industry. Agile research and development teams and the various management layers.
Kude, T.	2019	Information Systems Research	Examine the team-level effects of pair programming on team performance	Quantitative	Global software firm
Kula, E.	2021	IEEE Transactions on Software Engineering	Explore the relationships between the factors that may influence software development effort and on-time delivery to make the software delivery in agile setting more predictable.	Mixed method (two case studies followed by statistical modelling of software repository data from 185 teams)	ING Bank

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Layman, L.	2006	Information and Software Technology	Understand how a globally distributed team created a successful project in a new problem domain using a methodology that is dependent on informal, face-to-face communication	Mixed	Project contracted to an organization with a development group in the Czech Republic by a US telecommunications software and hardware provider.
Lee, G.	2010	MIS Quarterly	Open the black box on agile development by empirically examining the relationships among two dimension of SD agility (response extensiveness and response efficiency of the software team), two antecedents that can be controlled (team autonomy and team diversity), and three aspects of SD performance (on-time completion, on-budget completion, and software functionality).	Mixed	Diverse set of organization (most in finance/insurance, manufacturing, software and "other")
Lee, J.C.	2020	Information Systems Journal	(a) Does a software team's AC effectively facilitate SPT (software process tailoring) performance, and, if so, how? (b) How do the three team-based knowledge antecedents influence AC, which in turn promotes SPT performance? (c) How do AC and SPT affect project performance?	Quantitative	
Li, Y.	2010	The Journal of Systems and Software	Use the dynamic capability theory to explain how team flexibility may explain the relationship between Agile tools and methods and a software development team's flexibility.	Quantitative	119 professionals from software development teams across a range of Chinese industries.
Licorish, S.A.	2018	Information and Software Technology	Study the relationships between task type and team attitudes, and how attitudes expressed in teams' communications might be related to their task completion performance when undertaking a range of activities.	Quantitative	IBM

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Lindsjorn, Y.	2016	The Journal of Systems and Software	Investigate the effect of teamwork quality on team performance, learning and work satisfaction in agile software teams, and whether this effect differs from that of traditional software teams.	Quantitative	Participants recruited at the Norwegian Agile Conference of November 2011, companies active in finance, telecommunications, shipping, oil, and consultancy
Malik, M.	2021	International Journal of Project Management	Explain why and how agile project tasks and practices generate the active involvement of team members by examining the cognitive underpinnings of agile project management.	Quantitative	People identified through LinkedIn sourcing, agile project managers and agile project team members
Maruping, L.M.	2009	Information Systems Research	To understand the conditions under which the use of agile practices is most effective in improving software project quality	Quantitative	Major US based client company
Maruping, L.M.	2009	European Journal of Information Systems	Examine the role of collective ownership and coding standards as processes and practices that govern coordination in software project teams.	Quantitative	Large software development firm in the US
Moe, N.B.	2010	Information and Software Technology	Provide a better understanding of the nature of self-managing agile teams, and the teamwork challenges that arise when introducing such teams.	Qualitative (case study)	Development department of a company that just introduced Scrum.
Moe, N.B.	2009	IEEE Software	Explore the main barriers and challenges on the team and organizational level when introducing development methods that rely on self-managed software teams	Qualitative (case study)	Two software houses and one manufacturing company, probably in Norway
Moe, N.B.	2012	Information and Software Technology	Understand the challenges of shared decision-making in agile software development teams	Qualitative (case study)	Two companies that recently adopted agile software development, employees in Norway and India
Peeters, T.	2021	Team Performance Management	Examine the relationship between the agile way of working and team performance and engagement, and psychological safety as a mediator.	Quantitative	Multinational bank; diverse functional domains (retail, compliance, information technology, human resources, mixed, other).

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Ramasubbu, N.	2021	MIS Quarterly	As a result, while much progress has been made on specifying and understanding the unique processes and operational aspects of an agile software development paradigm, there continues to be a dearth of rigorous integrative analysis on performance implications that are caused by conversion to an agile software development paradigm. This study aims to fill this gap in the literature on agile software operations by relying on a real-world policy experiment at a major software firm.	Quantitative	Leading global software services vendor firm collected data from a policy experiment.
Rietze, S.	2022	International Journal of Environmental Research and Public Health	Develop and test a model on the direct and indirect relationships between agile work practices, job demands and resources, and occupational well-being	Quantitative	Individuals from the relevant population of professionals working in agile development teams.
Rodríguez, D.	2012	The Journal of Systems and Software	This paper aims to provide a systematic empirical study of the impact of team size and other development factors in the productivity of software projects by using statistical analyses after preprocessing an ISBSG repository (release 10).	Quantitative	Data derived from the International Software Benchmarking Standards Group (ISBSG) repository
Ryan, S.	2013	Information and Software Technology	Enhance the understanding of human factors in the software development process and provide support for the agile approach, particularly in its advocacy of social interaction, by answering two questions: How do SD teams acquire and share tacit knowledge? and What roles do tacit knowledge and transactive memory play in successful team performance?	Quantitative	Small to medium organization in Ireland and UK
Ryan, S.	2009	The Journal of Systems and Software	Define and measure tacit knowledge at the team-level in the software development domain	Quantitative (scale development study)	

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Sathe, C.A.	2023	Journal of Advances in Management Research	Analyze the impact of the adoption of the Agile Mindset on the productivity of Agile software development teams in IT enterprises during COVID-19.	Quantitative	120 software development professionals in the Pune, India area. Including developers, scrum masters and other roles.
Spagnoletti, P.	2022	IEEE Transactions on Engineering Management	Develop a model of organizational agility capabilities and their microfoundations for software ecosystems.	Qualitative (case study)	R&D unit of major supplier of telecommunication equipment.
Spiegler, S.V.	2021	Empirical Software Engineering	Explore how leadership empowers a team to work in an agile way in real organizational settings with a particular focus on the changing Scrum master.	Qualitative (grounded theory); interviews with diverse agile roles	Automotive industry (11 divisions at Robert Bosch GmbH); bureaucratic company in the middle of their agile transformation
Srivastava, P.	2017	Team Performance Management	The paper aims to explore the leadership mechanisms desired for effective functioning of distributed self-organized scrum team members, leading to project success and overall customer satisfaction.	Mixed method with initially open-ended questionnaires followed up by semi-structured interviews	Scrum masters
Stray, V.	2020	The Journal of Systems & Software	Understand coordination mechanisms	Mixed methods (longitudinal case study with surveys, observations, interviews, and chat logs)	Large company with software development sites in China, Europe, and the United States
Strode, D.	2022	Empirical Software Engineering	Develop a model of teamwork effectiveness for agile software development that is based on empirical studies and knowledge in the research and practitioner literature and is tailored specifically for the agile practice domain.	Qualitative (focus groups, case studies and literature)	Three cases from a commercial bank in New Zealand, unit of analysis was an individual case of software development
Syed-Abdullah, S.	2006	Empirical Software Engineering	Explore how XP (agile) related to well-being and whether that differs for a different methodology	Mixed (observation, focus group interviews and questionnaires)	Student teams working on real industrial projects with their external clients, 5-6 teams per client

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Tyagi, S.	2022	Information and Software Technology	Develop a comprehensive framework to build trust in distributed agile teams.	Qualitative (grounded theory)	19 software organizations across India, Germany, Netherlands, UK, USA, Australia and New Zealand, organizations active in domains such as e-commerce platforms, digital solution providers, healthcare and banking and finance.
Venkatesh, V.	2020	Information Systems Journal	<ol style="list-style-type: none"> 1. What is the impact of agile method use on work exhaustion in individual developers? 2. How do individual developer skills influence the relationship of agile method use and developers' work exhaustion? 	Quantitative	
Vidgen, R.	2009	Information Systems Research	Identify enablers and inhibitors of agility and the emergent capabilities of agile teams	Qualitative (case study)	One small software house and one major IT company providing IT products and services
Vishnubhotla, S.D.	2020	Information and Software Technology	Investigate the association between the five factor model personality traits and the factors related to team climate (team vision, participative safety, support for innovation and task orientation)	Quantitative	Telecom company
Werder, K.	2018	Information Technology & People	Identify the different dynamics that explain different emergent states of agility within software development teams	Qualitative	Small software organization in Germany and Russia, larger medium-sized organization in the financial services in Germany, and medium-sized software organization in Germany.
Wiesche, M.	2021	Project Management Journal	Exploring how interruptions are handled in agile software development contexts.	Qualitative (grounded theory)	Two teams in automotive, one team in insurance and one team in banking
Wong, S.I.	2022	AI & Society	Investigate the role of the two types of task interdependence on the thriving of distributed Agile teams	Quantitative	Three Norwegian companies

Chapter 2: Continued

First author	Year	Journal	Study aim*	Study design	Characteristics of the sample*
Wood, S.	2013	Information and Software Technology	Assess the contribution of Agile methodology, agile-specific team methods, and general team factors in the performance of software teams	Quantitative	
Zaimovic, T.	2021	TEM Journal		Quantitative	IT sector in Bosnia and Herzegovina
Zia, A.	2018	Int. Journal of Advanced Computer Science and Applications	Explore the preferences in agile development for team size and the resulting quality effect on product/project.	Qualitative	Individual who work at software houses in Pakistan

Note. Empty cells indicate that the specific information was not clearly addressed in the review study.

Appendix 2

Chapter 5: Topic guide

Topic	Questions
Introduction	<ul style="list-style-type: none"> • Consent and start of the recording. • Personal introductions (the researcher starts by introducing the research, then the interviewee).
Experiences in/ with agile teams	<ul style="list-style-type: none"> • What are your experiences with working in an agile team? <ul style="list-style-type: none"> ◦ Collaboration, coordination, communication, autonomy, reflection, leadership within the team, multidisciplinary. • Have you started to see these elements differently over time? How did that happen? Can you elaborate on that? • Are there certain advantages compared to a “traditional” approach? For example, waterfall, Prince2. • Optional: Ideally, these elements come up directly during the interview. Otherwise, explicitly ask about: <ul style="list-style-type: none"> ◦ Difference in authorities and who makes choices for the team. Is it one person, the whole team, somewhere in between? ◦ Difference in skills within the team. Can you all do the same, does everyone have their own specialty, is it more nuanced? ◦ Stability of the team. Do you expect to still be working with this team in a year if nothing else changes (think of: motivation, reorganizations)? Or are you together as a team for a short time?
Performance Management	<p>In organizations, there is often an annual cycle of planning-monitoring-evaluating goals that ensures employees and teams work towards the goals from the strategy. There are several activities involved, and I am curious about how these take place in your team. Can you tell me about:</p> <ul style="list-style-type: none"> • How do you ensure you achieve your goals? Set them? • How are people rewarded because of their performance? • How is it assessed what someone’s performance is? What is the case for you? What does it look like in the team? Is it the same everywhere? • What if someone needs training or education? And coaching? In the case of career plans? <ul style="list-style-type: none"> ◦ Think of: promotion, other role, possibly in another organization... • For further exploration: <ul style="list-style-type: none"> ◦ How did this come about? ◦ Since when have you been doing this? ◦ Has it always been this way? From the beginning? ◦ Does it work well? Appropriately? Fairly? • Optional if not already discussed: <ul style="list-style-type: none"> ◦ Do these activities focus mainly on you as an individual or on you as a team? A combination? ◦ Is there an annual cycle? Or is there a different duration? Shorter (like the sprints)?
Involved actors	<p>We have talked about the activities that take place as part of performance management. Of course, several people are involved in this, as you have already mentioned (<i>paraphrase</i>), and I would like to know more about this:</p> <ul style="list-style-type: none"> • What is your own role? How would you describe your role in the team? <ul style="list-style-type: none"> ◦ And if you describe that role apart from your title? • What is the importance of your role in the team? • And what is the role of the Scrum Master? • And what is the role of the Product Owner? • And what is the role of the HR business partner or specialist or department? • Are there still matters where HR is actively involved? Related to performance management / what we discussed earlier. • Is there still a team leader? And what is their role?

Chapter 5: Continued

Topic	Questions
Involved actors (Continued)	<ul style="list-style-type: none"> • Optional: <ul style="list-style-type: none"> ◦ Is there possibly a line or department manager to whom several agile teams report? Or who is at least hierarchically responsible and thus also formally responsible for performance management (that person then also makes decisions about salary, promotion, training, education)? ◦ To what extent can the people in all these roles also make decisions independently? ◦ When decisions have to be made, for example, about a salary increase, promotion, or education, who decides then? ◦ Can you tell me about what that process looks like? It would be nice if you have 1 or 2 concrete examples. ◦ What can/can't you decide within your own team? ◦ What do you do, for example, within the team itself? These can also be things that you do informally and that are not imposed from above. ◦ Optional: do you still feel in the team that there is one leader?
Closing	<p>Thank you for participating in this interview. I like to close with two questions:</p> <ul style="list-style-type: none"> • Is there anything that is important to the topics we discussed, but has not come up yet? • Anything you would like to add to the information that you have provided?

