The effects of working agile on team performance and engagement

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Abstract

Purpose – This study aims to examine the relationship between the agile way of working and team performance and engagement. Furthermore, psychological safety climate was investigated as a mediator of this relationship. As organizations are increasingly adopting the agile way of working method beyond the information technology (IT) setting, the authors researched its effects in teams across a variety of functional domains.

Design/methodology/approach – Survey data was collected from 97 agile teams working in various functional domains in a multinational bank. The data was analyzed using structural equation modeling.

Findings – Results indicated that the agile way of working is directly and positively related to team engagement and performance. Moreover, psychological safety climate acted as a partial mediator of each of the respective outcomes.

Originality/value – This study illustrated that the agile way of working is beneficial for teams beyond the IT setting, as it is positively associated with psychological safety climate, engagement and performance across functional domains.

Keywords Agile, Psychological safety climate, Team engagement, Team performance

Paper type Research paper

Introduction

Based upon a belief that software development teams should be more collaborative and client-focused (Wood *et al.*, 2013) to respond to the volatile, rapidly changing environment (Gren *et al.*, 2020; Liu *et al.*, 2015) and to maintain high productivity, innovation and software quality (Grass *et al.*, 2020; Melo *et al.*, 2013; Papatheocharous and Andreou, 2014), the agile manifesto has been written almost two decades ago (Beck *et al.*, 2001). According to this manifesto, teams should be self-managing, self-reflective, have a quick product turnaround, make efficient use of their resources, work in close collaboration with their stakeholders and interact primarily through face-to-face communication (Beck *et al.*, 2001). The resulting agile teams are defined as small, democratic and cross-functional teams in which members are empowered to take collective decisions and do not have strict hierarchies in place (Hoda *et al.*, 2012). Nowadays, the agile way of working has become common practice among information technology (IT) teams. As this particular method of working is believed to be beneficial for teams regardless of the teams' functional areas, other domains such as sales have begun to implement the agile way of working too (Edmondson and Gulati, 2021; Mergel *et al.*, 2018).

The rationale behind the benefits of the agile way of working is often explained through its agile work practices. For example, as a team becomes more self-managing, it is argued that team members have more leeway to complete tasks in line with customer requirements, thereby resulting in better products, quicker product delivery and more positive feelings among employees about their work (Grass *et al.*, 2020). As such, agile way of working can

intrinsically motivate employees to perform (Malik *et al.*, 2021), facilitate employee engagement (Khanagha *et al.*, 2021) and boost employee satisfaction (Tripp *et al.*, 2016). Although a few empirical studies have demonstrated a link between agile ways of working and team performance within the IT sector (Melo *et al.*, 2013; Ramirez-Mora and Oktaba, 2018; Wood *et al.*, 2013), little is known about the effects of the agile way of working in other functional domains (Hobbs and Petit, 2017). This is problematic as the context in which the agile way of working is successful, the so-called "agile sweet spot," is very specific in terms of team size, tasks involved, organizational culture and setting (Kruchten, 2013). As a consequence, there have been warnings that the agile way of working may not be suitable (Edmondson and Gulati, 2021) or even fail (Kruchten, 2013) when taken out of its (IT) context. Nevertheless, as organizational role models such as Netflix, Spotify and Amazon have embraced the agile way of working (Rigby *et al.*, 2018), there is an ever-increasing adoption rate of the agile way of working among organizations operating within and outside of the IT context (Edmondson and Gulati, 2021). In this paper, we therefore investigate the effects of the agile way of working among teams across a range of functional domains. As increased performance levels are one of the primary motivations to implement the agile way of working, we will first empirically assess the impact of agile ways of working on team performance. Second, as the agile way of working is believed to be linked to increased levels of engagement by actively involving team members in their work (Malik *et al.*, 2021), and many organizations are actively striving for an engaged workforce (Berkey, 2019), we will also assess its effects on team engagement. Team engagement refers to a positive, fulfilling and motivational state of work-related well-being, which is characterized by team members having high levels of energy (vigor) in performing their collective tasks and being enthusiastic and involved (dedicated) in their work (Tims *et al.*, 2013).

Moe *et al.* (2010) argue that the agile way of working results in certain team interactions and dynamics that are beneficial to team performance and engagement. However, remarkably little empirical research has been devoted to understanding how the agile way of working positively influences team outcomes (Fagerholm *et al.*, 2015). Therefore, our third objective is to advance knowledge on "why and how" the agile way of working leads to beneficial outcomes (Malik *et al.*, 2021 p. 10). Recently, it has been argued that psychological safety climate, a positive team dynamic frequently found to be predictive of team engagement and performance within the team literature (Frazier *et al.*, 2017), is a key factor in explaining agile teams' success (Buvik and Tkalich, 2022). Psychological safety climate is a shared belief among team members that they can take interpersonal risks and can, for instance, be open about their mistakes (Edmondson, 1999). Based upon the previous, this study investigates whether psychological safety climate may indeed be an important emergent state that explains how the agile way of working leads to enhanced team performance and engagement.

In sum, by examining the impact of the agile way of working on team engagement and performance via psychological safety climate among teams from various functional domains, this study contributes to further understanding what teams may gain from adopting the agile way of working and explain the underlying mechanisms involved. In addition, although this study builds on insights from the teams' literature to explain how practices inherent to the agile way of working (e.g. self-management and reflexivity) result in team outcomes (Konradt *et al.*, 2016; Magpili and Pazos, 2018; Mathieu *et al.*, 2008), it also adds new insights. Specifically, the agile way of working is argued to offer teams a way to strategically deal with the fast-changing environment in real time (McKinsey & Company, 2018) through a combination of agile work practices that mutually reinforce each other. As such, we will not examine the unique effect of any specific agile way of working practice on

team outcomes (as is common in teams literature). Instead, we will investigate whether the combination of agile way of working practices (as one concept) leads to beneficial effects for teams operating in fast-changing environments. From a practical point of view, organizations can use our findings to validate their beliefs about the potential benefits of the agile way of working on top of the anecdotal stories provided by renowned tech firms like Netflix and Spotify (Rigby *et al.*, 2018). Furthermore, practitioners can use our findings to assess whether the current trend to adopt the agile way of working beyond their IT department (Mergel *et al.*, 2018) is a viable strategy supported by empirical evidence. Finally, our findings will help practitioners gain more insight into why the agile way of working may lead to beneficial team outcomes.

Theoretical framework
Agile way of working
To pursue the team characteristics recommended by the agile manifesto, agile teams typically use various agile practices. For example, to achieve quick product turnaround, agile teams typically plan their work in "sprints" (i.e. brief, predetermined time periods) of a few weeks and have a "retrospective" meeting after every sprint to reflect upon their functioning (Espinosa-Curiel *et al.*, 2018; Tripp *et al.*, 2016). However, agile practices can be applied in many ways. For example, the sprint can differ between teams in duration and approach (Gren *et al.*, 2020; Papatheocharous and Andreou, 2014; Tripp *et al.*, 2016). To make matters even more complex, Hess *et al.* (2019) found that teams use different agile practices and value them in different ways. Consequently, large differences between how teams use agile practices exist. Therefore, in the current paper, we focus on the core team characteristics that the agile manifesto recommends (Beck *et al.*, 2001), and which are also consistently mentioned in the agile team literature (Espinosa-Curiel *et al.*, 2018; Grass *et al.*, 2020; Gren *et al.*, 2020; Liu *et al.*, 2015; Moe *et al.*, 2010). These practices are self-management, face-to-face communication, reflexivity, product turnaround, simplicity and customer interaction.

First, self-management refers to the ability of the team to make their own decisions about their work. Second, face-to-face communication is seen as the primary form of team communication and refers to the frequency and quality of face-to-face interactions among team members. Third, product turnaround refers to the frequency, consistency and sustainability of the team's delivery of outputs. Fourth, team reflexivity refers to the ability of the team to (regularly) reflect and learn from their previous experiences. Fifth, simplicity is defined as "the art of maximizing the amount of work not done" (Beck *et al.*, 2001) and relates to only spending resources on tasks that have added value. Sixth, frequent and close collaboration with customers is advocated by the agile manifesto. It focuses on clarifying what the customer wants and needs, thereby enabling teams to spend their resources accordingly (Beck *et al.*, 2001). As the explanatory mechanism studied in the present study, psychological safety climate, is focused on internal team dynamics, the externally focused customer interaction dimension will not be considered. We use "the agile way of working" to refer to the first five core characteristics. These five characteristics can mutually reinforce each other, because team reflection, for instance, is typically of higher quality when it is done face to face (Marques-Quinteiro *et al.*, 2021), as it allows teams to get to the root of a potential problem (Otte *et al.*, 2017). As a result, it can be argued, in line with Otte *et al.* (2018), that face-to-face team reflection is more likely to result in increased team communication in comparison to teams who reflect through another method. Therefore, we will study the effect of the set of agile practices on team outcomes. This approach is also in line with the literature on human resource management (Jiang *et al.*, 2012) which suggests

that (human resources) practices may be interdependent and act in a synergetic way such that their combined effect is greater than the sum of their individual effects. Finally, this bundle of agile work practices will primarily focus on the quality of the agile way of working, rather than the frequency to which teams engage in any of the core activities of working agile (e.g. reflexivity). There are large context-driven fluctuations between how often teams engage in typical agile activities (Hess *et al.*, 2019), and this focus aligns more with the agile principle to provide teams "the work environment and support they need" (Beck *et al.*, 2001).

Agile way of working and team performance

For many companies, the primary motivation to adopt the agile way of working has been to increase their performance (Ramirez-Mora and Oktaba, 2018). We follow the research of Fagerholm *et al.* (2015) on team performance among agile teams which primarily distinguishes between efficiency (i.e. quickness and minimal use of resources) and effectiveness (e.g. achieving those goals with the highest added value) of the team. Empirical research in the IT sector shows that the agile way of working can improve team performance (Melo *et al.*, 2013; Ramirez-Mora and Oktaba, 2018; Wood *et al.*, 2013), which can theoretically be explained by the core practices of the agile way of working. Concerning team efficiency, it can be argued that due to quick *product turnaround*, the likelihood of team members working ahead of schedule and spending their time on ill-defined and perhaps even irrelevant tasks decreases (Fagerholm *et al.*, 2015). Moreover, as all team members agree upon which goals they would like to pursue during a specific time frame (i.e. sprint), members are enabled to focus on those tasks relevant to achieving the current team goals (*simplicity*). With frequent *face-to-face communication* between members that occurs in a way in which any obstacles and requests for help can be discussed, it can be argued that the agile way of working can increase the efficiency of a team (Dingsøyr *et al.*, 2016; Ramirez-Mora and Oktaba, 2018). Similarly, the agile way of working may also lead to an increase in the effectiveness of the work. As a result of short product turnaround, daily face-to-face communication and frequent team *reflexivity*, members of an agile team can review their performance daily and adjust accordingly (Fagerholm *et al.*, 2015; Tripp *et al.*, 2016). In particular, the opportunity to ask each other questions, seek feedback, experiment and discuss errors is argued by Dingsøyr *et al.* (2016) to enable the team to learn and improve its effectiveness. Consequently, it can be concluded that the agile way of working could help a team become more efficient and effective. This leads to the first hypothesis:

H1. The agile way of working is positively related to team performance.

Agile way of working and team engagement

In addition to achieving higher team performance, the core characteristics of the agile way of working are also likely to be positively associated with employee outcomes such as team engagement. The research of Grass *et al.* (2020), for instance, showed that as agile teams become more *self-managing*, they get a better feeling for what it takes to complete a task for a customer in a satisfying manner. As a result, team members have reported feeling more positive about their work. This notion is also supported by empirical work on agile teams (Tripp *et al.*, 2016) and in the engagement literature (Schaufeli, 2012). Additionally, it can be argued that due to frequent face-to-face communication and reflexivity, agile team members can form strong personal relationships with each other (McHugh *et al.*, 2011), which has been linked to higher levels of engagement (Schaufeli, 2012). Although there is, to the best of

our knowledge, no empirical support yet for the relationship between the agile way of working and engagement, other affective outcomes such as organizational commitment and job satisfaction have been found to be positively related to the agile way of working (Moe *et al.*, 2010; Tripp *et al.*, 2016). Therefore, we propose the following:

H2. The agile way of working is positively related to team engagement.

Agile way of working and psychological safety climate
The core elements of the agile way of working, such as face-to-face communication, reflexivity and quick product turnaround (McHugh *et al.*, 2011), have been argued to enhance open, trusting and honest communication between team members (i.e. psychological safety climate; Ramirez-Mora and Oktaba, 2018) in prior literature. However, to date, there appears to be only primary support for the relationship between the agile way of working and other related emergent states, such as trust (McHugh *et al.*, 2011) and team cohesion (Wood *et al.*, 2013). Nevertheless, within the psychological safety climate literature, there is support for the assumption that the agile way of working can foster a psychologically safe climate. In their meta-analysis, Frazier *et al.* (2017), for instance, found that work environments that signal that employees are trusted with important decisions (i.e. self-management), have clarity about their roles and rely on each other to complete their tasks are important antecedents for enhancing a psychologically safe climate. Furthermore, Akan *et al.* (2020) argue that because psychological safety climate is an interpersonal construct, the conversations within the team influence its emergence. This claim is also supported by the literature review of Newman *et al.* (2017), in which the authors find that the extent of interaction, familiarity, the quality of the relationships between team members and perceived social support, all positively influence the psychological safety climate of a team. As face-to-face communication is advocated as the primary means of communication within agile teams, it can thus be expected that the agile way of working fosters the psychological safety climate within a team. This leads to the third hypothesis:

H3. The agile way of working is positively related to psychological safety climate.

Psychological safety climate and team performance and engagement
Within the literature, there is a large amount of support for the notion that psychological safety climate leads to improved team performance and engagement (Frazier *et al.*, 2017; Newman *et al.*, 2017). Concerning performance, it has been argued that because employees feel that it is safe to take the initiative or make mistakes, members benefit from each other's expertise, learn from past mistakes and can focus upon the task at hand (Edmondson, 1999; Frazier *et al.*, 2017). Concerning engagement, scholars have argued that teams who value their psychological safety climate may reciprocate in the form of increased levels of engagement, in line with the principles of social exchange theory (Blau, 1964; Newman *et al.*, 2017). Consequently, we expect the following:

H4. Psychological safety climate is positively related to team performance.

H5. Psychological safety climate is positively related to team engagement.

Mediating role of psychological safety climate
In the team literature, psychological safety climate is predominantly viewed as an emergent state that explains how certain (team) characteristics and behaviors influence outcomes like performance and engagement (Mathieu *et al.*, 2008; Newman *et al.*, 2017). The input-mediator-output-input model (Ilgen *et al.*, 2005; Kozlowski *et al.*, 1999), which has been used in agile studies (Melo *et al.*, 2013), argues that inputs (e.g. characteristics of a team, like self-management) cause certain states to emerge within the team (e.g. knowledge sharing and psychological safety climate) and eventually lead to positive outcomes such as improved performance and engagement (Ilgen *et al.*, 2005; Mathieu *et al.*, 2008; Melo *et al.*, 2013; Newman *et al.*, 2017). Following this logic, the agile way of working may thus ensure that a more psychological safety climate emerges and, consequently, improve performance and engagement. Based upon this, our final set of hypotheses are as follows:

H6. Psychological safety climate partially mediates the relationship between *the* agile *way of working* and team performance.

H7. Psychological safety climate partially mediates the relationship between *the agile way of* working and team engagement.

Methods
Population and sample
The data [1] for this study was collected in collaboration with a multinational company operating in the financial sector that is recognized as one of the front-runners of the agile way of working. All teams within this company were eligible to participate in the study regardless of their size, functional domain or country of origin. A total of 168 teams (N = 1,591) volunteered to participate in the study and were promised a self-assessment report if at least five team members filled out the survey.

In total, 945 employees from 143 teams filled out the questionnaire in September 2020. The response rate was 59%. We cleaned this data on careless response styles in line with Leiner (2019) and the R package "Careless" (v1.2.1; e.g. straight lining and rushed responses). The cleaned data set consisted of 773 respondents in 138 teams. As the hypotheses were tested at the team level of analysis, we also filtered out teams with fewer than four responses to ensure a substantial proportion of the team filled out the survey. This led to a data set containing 97 teams (N = 623 individual respondents). As depicted in Table 1, the teams resided in ten different countries, had an average team size of ten employees and worked primarily in IT and retail functions. Furthermore, the teams' agile maturity differed according to their members. In Table 2, a number of personal characteristics of the respondents can be found. In line with the overall worker population of this company, the gender ratio of the respondents was almost 50–50, their ages were primarily below 45 years and the majority graduated from a university.

Measures
We used a combination of newly designed scales based upon the agile manifesto [2] and adapted preexisting scales for this study. Specifically, we shortened and contextualized scales with the help of agile coaches to meet the organization's requirements. Therefore, an exploratory factor analysis was conducted first with all items central to this study using the package nFactors in R (v2.4.1). The expected eight factors were found: reflexivity, face-to-face communication, product turnaround, self-management, simplicity, psychological safety climate, engagement and performance. All factors had an eigenvalue above 1, but two items

Team characteristic	No. of teams
Country	
Philippines	27
Romania	36
Czech Republic	5
The Netherlands	8
Poland	8
Other[*]	13
Agile maturity	
Mostly traditional	6
In between	23
Mostly agile	55
Fully agile	13
Functional domain	
Retail	22
Compliance	9
Information technology	32
Human resources	7
Mixed	7
Other[**]	20

Notes: $N = 97$. [*]Other countries being Spain, Austria, Belgium, France, Italy and cross-border. [**]Other domains such as communications and finance or respondents who selected "Other" in response to this question

Table 1.
Characteristics of the teams (aggregated data set)

Personal characteristic	Respondents (%)
Gender	
Male	51.6
Female	41.3
No answer	7.1
Age category	
16–29	26.7
30–44	57.4
45–70	9.3
No answer	6.6
Educational level	
College	15.2
University	65.4
Graduate school	12.3
Other	1.6
No answer	5.5
Tenure with the team	
Less than a year	30.2
Between one and three years	45.9
Between three and five years	7.2
More than five years	11.6
No answer	5.1

Note: $N = 623$

Table 2.
Personal characteristics of the respondents (aggregated data set)

from the agile way of working scale appeared to have insufficient factor loadings. These included the items "In my team, we change our behavior based upon our past experience" (λ = 0.321 on the reflexivity scale) and "Within this team, we strive to deliver our products/ services frequently (i.e. a couple of weeks)" (λ = 0.246 on the product turnover scale). Therefore, these two items were dropped from the sequential confirmatory factor analysis (CFA).

The agile way of working: To measure the agile way of working, five subdimensions for the agile way of working were used. The subdimensions of reflexivity and product turnaround were measured using two items. Example items are "In my team, we reflect upon the way tasks are executed" (reflexivity; Schippers *et al.*; 2007) and "The products/ services this team provides are delivered at a constant pace" (product turnaround). The self-management, face-to-face communication and simplicity subdimensions were measured using three items each. Example items are "In this team, we determine amongst each other what needs to be done" (self-management; Kirkman *et al.* (2004)); "Within this team, we value (virtual) face-to-face conversations" (face-to-face communication); and "Within this team, we minimize the amount of unnecessary work that we do." The items were designed based upon the agile manifesto (Beck *et al.*, 2001) and interviews with agile coaches from the company. Like all other items within this questionnaire, the items were scored on a seven-point Likert scale ranging from totally disagree (1) to totally agree (7).

CFA was performed (using the package Lavaan, v.06–8 in R), and we calculated the fit of a second-order model in which the individual item scores (observed variables) were used to estimate their latent variable (e.g. self-management). These dimensions, in turn, were used to predict the second-order latent factor, the agile way of working. The resulting model showed a good model fit (*CFI* = 0.972, *RMSEA* = 0.052, *SRMR* = 0.041; Hooper *et al.*, 2008). Furthermore, all subdimensions loaded sufficiently on the agile way of working second-order construct (reflexivity, λ = 0.71; product turnaround, λ = 0.69; self-management, λ = 0.67; face-to-face communication, λ = 0.78; and simplicity, λ = 0.75). The internal consistency of the agile way of working (α = 0.87) and the subscales (reflexivity, α = 0.84; product turnaround, α = 0.82; self-management, α = 0.79; face-to-face communication, α = 0.78; simplicity, α = 0.79) were good.

Psychological safety climate: To measure psychological safety, three items from the scale from Edmondson (1999) were adapted. An example item is "In this team, members are open about their mistakes." As the scale consisted of three items, the CFA returned perfect model-fit indicators. The factor loadings were sufficient (average λ = 0.74), and the internal consistency of the scale was good (α = 0.78).

Engagement: Engagement was measured with three adapted vigor and dedication items from the scale of Schaufeli *et al.* (2006). Schaufeli and Bakker (2004) argue that vigor and dedication are the core components of engagement. An example item is "Members of this team are enthusiastic about their work." Once again, the CFA returned a perfect model with good factor loadings (average λ = 0.81). The internal consistency of the scale was excellent (α = 0.84).

Performance: Performance was assessed using four adapted items derived from van Woerkom and Croon (2009). An example item is "This team delivers high quality." The model-fit indicators of the CFA indicated a near-perfect model fit (*CFI* = 1, *RMSEA* = 0.003, *SRMR* = 0.005) and had good factor loadings (average λ = 0.85). The internal consistency of this scale was excellent (α = 0.91).

As factor analyses were used to validate the above scales, we followed the recommendations of DiStefano *et al.* (2009) and used factor scores instead of the mean scores

in further analyses. By using the factor scores, the weight of each item was brought in line with the contribution of the item to its latent factor.

Control variables: Team size and functional domain were used as control variables. First, agile teams are typically small in size (Lindsjørn *et al.*, 2016), as this is believed to be more beneficial to the execution of agile practices (e.g. self-management becomes more challenging in big groups). Therefore, large team size may negatively affect the effectiveness of agile practices. Second, we controlled for the effects of the functional domain, as the agile way of working originated in IT, which was also the first function to adapt the agile way of working in this organization. Therefore, we controlled for the effects of functional area by asking this (optional) question: "What is your functional group?" Respondents could select 12 different functional domains as answer options (e.g. IT, retail, risk and other). As the question was asked at the individual level, we used the most common response in a team. This means that if three respondents answered "IT" and two other respondents answered "retail," we assigned this team to the functional group IT. Furthermore, if an equal amount of respondents selected "IT" and "retail," we labeled that group as "mixed." In the end, we created the dummy variables "IT" ($N = 32$), "retail" ($N = 22$), "compliance" ($N = 9$), "Human Resources" (HR; $N = 7$), "mixed" ($N = 7$) and "other" ($N = 20$). The group "other," for example, consisted of teams working in finance or corporate strategy.

Data aggregation
Although all items from our questionnaire referred to the team level, we calculated the intraclass correlation indices ICC(1) and ICC(2) to justify aggregation to the team level using a one-way analysis of variance (Bliese, 2000) and the package "multilevel" (v2.6) in R. As can be seen in Table 3, all *F*-tests were significant, ICC(1) values were above 0.05 and ICC(2) values were above 0.40. Therefore, we can conclude that there is sufficient agreement between team members to justify aggregation to the team level (Klein and Kozlowski, 2000).

Analysis
We conducted structural equation modeling using the R package Lavaan (v.06–8) to test the conceptual model. Given the proportion of the number of items measuring our study variables on the one hand and the number of cases on the team level on the other hand, we decided to include the agile way of working, psychological safety climate, engagement and performance scores as manifest variables (i.e. the saved factor scores) rather than as latent variables (i.e. using the items as indicators) in our model to maintain a favorable indicator-to-sample-size ratio. The benefit of using Lavaan is that the package is designed for structural equation modeling and can thus be specified to simultaneously predict all the hypothesized relationships, including the indirect and total effects of the agile way of working on the outcomes.

Variable	F-test	ICC(1)	ICC(2)
Agile way of working	1.94***	0.13	0.48
Psychological safety climate	2.54***	0.19	0.61
Engagement	2.07***	0.14	0.52
Performance	1.69***	0.10	0.41

Note: *** $p < 0.001$

Table 3.
ICC values

Results

Table 4 shows the means, standard deviations and correlations of the study variables. In line with our expectations, the agile way of working correlated with psychological safety climate ($r = 0.80$; $p < 0.01$) as well as performance ($r = 0.69$; $p < 0.01$) and engagement ($r = 60$; $p < 0.01$). Furthermore, psychological safety climate correlated with engagement ($r = 0.58$; $p < 0.01$) and performance ($r = 0.63$; $p < 0.01$).

The findings of our structural equation model can be found in Table 5. In line with our expectations, we found that the total effect of the agile way of working was positively related to team performance ($\beta = 0.652$; $p < 0.01$) and team engagement ($\beta = 0.624$; $p < 0.01$). Therefore, our first two hypotheses were supported by the data. Furthermore, as our results showed that the agile way of working is positively related to the team's psychological safety climate ($\beta = 0.779$; $p < 0.001$), the third hypothesis was also supported.

With regards to psychological safety, we found, in line with H4 and H5, positive relationships with team performance ($\beta = 0.294$; $p < 0.05$) and engagement ($\beta = 0.391$; $p < 0.05$). Finally, we found that psychological safety climate partially mediated the relationship between the agile way of working and both outcomes in accordance with H6 and H7. First, we found that the agile way of working is positively related to the team's psychological safety climate, which in turn, is positively related to the team's performance ($\beta = 0.235$; $p < 0.05$). Second, we also found that the agile way of working indirectly relates to the team's engagement via psychological safety climate ($\beta = 0.255$; $p < 0.05$). A summary of the main findings can be found in Figure 1.

Discussion

This study aimed to examine the effects of the agile way of working on team performance and engagement across different functional domains and to explore the mediating role of psychological safety climate in these relationships. First, as expected, our results indicate that the agile way of working is positively related to both team performance and engagement. This is in line with previous empirical studies (Melo *et al.*, 2013; Ramirez-Mora and Oktaba, 2018; Wood *et al.*, 2013). Furthermore, it is in accordance with the engagement and work team literature, in which it has been argued that core agile characteristics, like self-management, lead to enhanced engagement among team members (Schaufeli, 2012). In addition, our results support the idea that the agile way of working enhances efficient and effective team performance through simplicity, face-to-face communication, reflexivity, self-management and quick product turnaround (Dingsøyr *et al.*, 2016). As we included 97 teams working in different functional domains within a multinational bank, it appears that the agile way of working is indeed beneficial beyond the IT setting.

Moreover, in line with the proposition that the agile way of working promotes open, trusting and honest communication among team members (Ramirez-Mora and Oktaba, 2018), we found that the agile way of working is positively related to psychological safety climate. In addition, following the psychological safety climate literature (Frazier *et al.*, 2017; Newman *et al.*, 2017), we found that psychological safety climate is positively related to team engagement and performance. Finally, in line with the input-mediator-output-input model (Ilgen *et al.*, 2005), the results indicated that psychological safety climate partially mediates the relationship between the agile way of working and team engagement and performance. These findings may, on the one hand, help practitioners explain why the agile way of working is beneficial and, on the other hand, show researchers that psychological safety climate is an important emergent state in the context of agile teams.

In sum, our findings indicate that organizations may benefit from implementing the agile way of working in teams operating in different functional domains. Therefore, the first

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Agile way of working	5.74	0.39	(0.76)	–	–	–	–	–	–	–	–	–	–
2. Psychological safety climate	5.35	0.65	0.80**	(0.78)	–	–	–	–	–	–	–	–	–
3. Engagement	6.05	0.45	0.60**	0.58**	(0.84)	–	–	–	–	–	–	–	–
4. Performance	5.77	0.49	0.69**	0.63**	0.67**	(0.91)	–	–	–	–	–	–	–
5. Retail	0.22	0.41	0.21*	0.21*	0.17	0.30**	1	–	–	–	–	–	–
6. IT	0.33	0.47	-0.01	0.17	-0.05	-0.09	-0.36**	1	–	–	–	–	–
7. Mixed	0.07	0.26	0.10	0.03	0.18	0.00	-0.14	-0.20	1	–	–	–	–
8. Compliance	0.09	0.29	0.13	-0.05	0.00	0.16	-0.16	-0.22*	-0.09	1	–	–	–
9. HR	0.07	0.26	-0.39**	-0.32**	-0.14	-0.27**	-0.14	-0.20	-0.08	-0.09	1	–	–
10. Other	0.21	0.41	-0.14	-0.22*	-0.14	-0.16	-0.26*	-0.36**	-0.14	-0.16	-0.14	1	–
11. Size	10.29	4.91	-0.08	-0.08	-0.01	0.03	0.06	-0.05	-0.06	0.08	0.17	-0.14	1

Notes: M and SD represent mean and standard deviation, respectively. Both values are based upon the aggregated mean scores. The Cronbach's alpha is displayed on the diagonal. Values range from 1 to 7 for the scale scores (1:4), where 1 is the lowest score and 7 is the highest score. The functional dummy variables (5:10) range from 0 to 1, and team size (10) refers to the absolute number of people within the team. *indicates $p < 0.05$; ** indicates $p < 0.01$

Table 4.
Correlations and
descriptives

Predictor	Psychological safety climate β	Engagement B	Performance β
Psychological safety climate		0.319*	0.294*
Agile way of working	0.799***	0.370**	0.417**
Retail	0.104	0.042	0.130
IT	0.201**	−0.032	−0.072
HR	0.036	0.114	−0.012
Compliance	−0.081	−0.010	0.112
Mixed	0.001	0.142	−0.029
Size	−0.015	0.036	0.066
Total effect of agile working		0.624**	0.652**
Indirect effect of agile working		0.255*	0.235*

Notes: * Indicates $p < 0.05$; ** indicates $p < 0.01$; and *** indicates $p < 0.001$
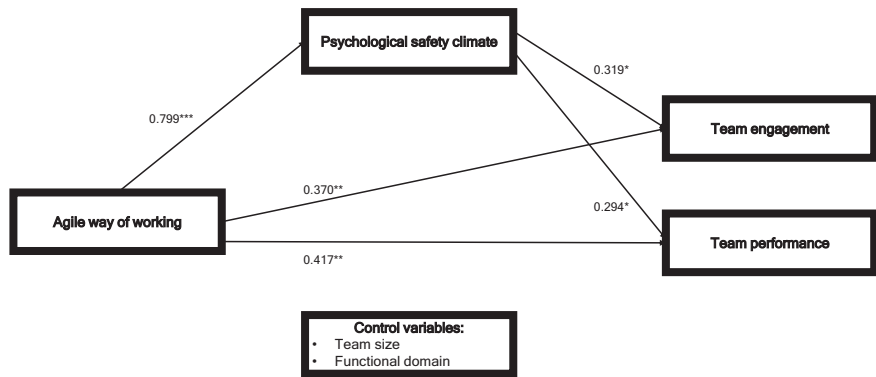
Table 5.
Results of structural equation model

Figure 1.
Hypothesized model with results of the structural equation model

Notes: N = 97; ***$p < 0.001$; **$p < 0.01$; and $p < 0.05$

practical implication which emerges from our study is that the agile way of working may be used to increase team engagement and performance. The second practical implication relates to the finding that adherence to the core characteristics of the agile way of working is beneficial, since organizations may now consider focusing on these characteristics instead of the actual agile practices that are currently used in the IT setting, such as the "retrospective," "daily stand-up" and "sprint planning." This is relevant, as teams may struggle when focusing exclusively on the practices. For example, Hobbs and Petit (2017) found that when teams work on multiple projects and with multiple stakeholders, teams are faced with many tasks that cannot be planned upfront. Consequently, a "sprint planning" in which the tasks for the upcoming period are planned upfront may be more difficult to create. This led teams to use agile practices selectively or not at all. However, if teams would focus on sprint planning, that is, teams self-organize their work while having a quick product turnaround, they may find that there are other, more fitting ways to adhere to the characteristics of the agile way of working. For instance, teams may find that creating a

more general planning to which they add new tasks daily may help them (e.g. Kanban board). Like the "sprint planning," this allows teams to control the tasks that need to be done and at the same time adheres to the principle of a quick product turnaround while also providing flexibility. As different contexts have their own challenges, this study thus indicates that teams may be agile about implementing and using agile practices as long as they strive for self-management, face-to-face communication, reflexivity, a quick product turnaround and simplicity.

The third practical implication is that organizations can use the agile way of working to foster a climate of psychological safety. This is important as psychological safety is related to many beneficial team outcomes (Frazier *et al.*, 2017) but does not emerge automatically (Edmondson, 2003; Edmondson and Lei, 2014). It has been argued that this is where the agile way of working can help. Specifically, Thorgren and Caiman (2019) argue that the core characteristics of the agile way of working, like self-management and frequent communication, can cause team members to view each other like family who have a shared responsibility and enables the creation of relationships strong enough for open, honest discussions that leave room for admitting mistakes. In the same vein, Buvik and Tkalich (2022) have argued that the self-management aspect of agile teams enables members to freely experiment and search for solutions, which can also lead to the emergence of psychological safety climate. Therefore, organizations interested in fostering a psychological safety climate may also consider implementing the agile way of working as a means to an end.

Finally, while scholars struggle to capture the concept of the agile way of working due to the many different agile practices and variations of these practices used (Hess *et al.*, 2019), our study may also help scholars look beyond agile (management) practices and focus upon studying why (the emergent states via which) and when (the conditions under which) these core beliefs and principles behind the agile way of working may be effective. Moreover, as our study illustrated, they may do this by applying an "agile bundle" approach. Specifically, we postulated and found support for the notion that agile practices may be grouped into an overarching bundle to achieve beneficial results similar to how multiple HR practices are used to foster a high-performance workplace climate at the individual level (Boxall and Macky, 2009; MacDuffie, 1995).

Limitations and directions for future research
This research comes with several limitations. First, although collaboration with customers is a critical component of the agile way of working (Espinosa-Curiel *et al.*, 2018; Gren *et al.*, 2020), we did not include it in our study. The reason for this was twofold. On the one hand, our study focuses upon the internal dynamics of agile teams by researching psychological safety climate as a mediator, which is why we decided to exclude this more externally focused element of the agile way of working. On the other hand, we also had statistical reasons for excluding this element from the paper. Specifically, the ICC(2) value indicated that it was not appropriate to aggregate the scores of customer collaboration to the team level (i.e. all items and the scale as a whole scored below the threshold of 0.40 (Klein and Kozlowski, 2000). A potential reason for this may be that members have different roles within agile teams and thus communicate with their stakeholders to various degrees. Nevertheless, as customer collaboration is considered to be crucial for the agile way of working (Beck *et al.*, 2001), we recommend scholars look further into this dimension in the future.

Second, all survey data was collected from the same source (the team members) at a single point in time. Although our data collection method reduced the burden for

participating in this research and ensured we could compare, for example, team performance in various functional domains, and a CFA model in which all items included in this research were loaded onto a single factor resulted in a poor fitting model, our research outcomes may have still been subject to common method biases (Podsakoff *et al.*, 2003). Although it is common within the team literature to reduce common method bias by asking team leaders to rate the team performance, we found that the absence of a strict hierarchy typical to the agile way of working (Hoda *et al.*, 2012), and its extensive, ever-evolving, distribution of leadership roles, made it difficult to point out any role capable of rating all relevant performance aspects for agile teams for two reasons (Gronn, 2002; Mathieu *et al.*, 2008; Spiegler *et al.*, 2021). First, although there are members within the team that focus upon certain aspects of performance, like efficiency (e.g. scrum master), customer satisfaction (e.g. product owner) or experts' personal development (e.g. chapter leader), we found that these individuals rarely considered themselves to be a manager and were unwilling to fill out a "manager survey" as a result. Second, as Spiegler *et al.* (2021) explain, leadership within agile teams evolves and can become more distributed over time as teams become more mature. To reduce the chances of potential common method biases in the future, we therefore recommend scholars to gather data from other sources, such as the scrum board or observation of team behaviors. To use performance scores rated by others in the future, we recommend that scholars explore the different leadership roles within agile teams and consider the context of the teams when doing so. This in line with how Spiegler *et al.* (2021) explored the role of scrum master. Additionally, we also recommend intervention studies in which teams' transitions to the agile way of working are observed to make causal inferences about the effects of this working method.

Third, following the literature on strategic human resource management (SHRM), we decided to study agile practices as a bundle. Specifically, the configural approach within SHRM proposes that when certain HR practices are combined, like, for instance, autonomy, information, development and rewards, more beneficial results can be achieved than one would assume based upon the sum of the individual effects (Boxall and Macky, 2009). Likewise, we assumed that synergetic effects may also occur among the agile practices described in the agile manifesto (Beck *et al.*, 2001). However, similar to many SHRM scholars, we did not test whether any interactions occurred between the different agile practices (Hauff, 2021) nor did we test contrasting configurations composed of different agile practices (Verburg *et al.*, 2007). Consequently, we recommend future research to assess whether such interaction effects exist between agile practices. Moreover, regarding configurations, we recommend scholars to examine the possibility that different configurations may, for example, be desirable depending upon the context the agile team works in (e.g. retail and tech).

Finally, we recommend that future research should research the possible mediators that may explain how the agile way of working leads to beneficial team outcomes. Although our research showed psychological safety climate is an important emergent state in explaining how the agile way of working may lead to improved team performance and engagement, our mediation effects are only partial and the majority of scholars assume that the agile way of working is indirectly related to team outcomes (Melo *et al.*, 2013; Tripp *et al.*, 2016). Therefore, other pathways may be researched in the future, such as shared mental models and team coordination (Dingsøyr *et al.*, 2016; Mathieu *et al.*, 2008).

Conclusion
In this research, we showed that the agile way of working leads to improved performance and engagement via – but not exclusively – through the psychological safety climate of a

team. Moreover, the agile way of working appeared to be beneficial across functional domains. This means that the increasingly widespread adaptation of the agile way of working in practice may indeed be a valid way to improve team performance and engagement for organizations.

Notes

1. Approved by the ethical review board of our university (project reference number: RP87).

2. © by the organization we collected the data in. For more information about the scales, please contact the first author of this paper.

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