Do agile work practices impact team performance through project commitment? Evidence from the information technology industry

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Abstract
Purpose – Drawing on goal-setting theory and team effectiveness theory, the study aims to examine the impact of agile taskwork and agile teamwork on team performance. In addition, it investigates the mediating effect of project commitment on the impact of agile taskwork and agile teamwork on team performance. Furthermore, the study also tests the moderating role of career level on the impact of agile taskwork and agile teamwork on team performance.

Design/methodology/approach – Survey data were collected from 563 employees working in 290 information technology (IT) companies in India using a self-reporting structured questionnaire. Partial least squares path modeling was used to test the hypothesized model, and the Process macro was used to test the moderating effect.

Findings – The results show that agile taskwork and agile teamwork positively affect team performance and project commitment, and project commitment positively impacts team performance. Furthermore, project commitment fully mediates the relationship between agile taskwork and team performance and partially mediates the relationship between agile teamwork and team performance. Furthermore, the career level negatively moderates the impact of agile taskwork and agile teamwork on team performance.

Practical implications – The study shows the importance of agile work practices and project commitment to enhance team performance. Thus, the study provides managers with two strategies to improve their team performance.

Originality/value – There is a scarcity of research examining the distinct effects of agile taskwork and agile teamwork on team performance and the mediating role of project commitment in these relationships. Furthermore, as per the empirical evidence, no previous research has empirically examined the moderating role of career level in the agile taskwork-team performance and agile teamwork-team performance relationships.

Keywords Agile work practices, Agile taskwork, Agile teamwork, Project commitment, Team performance, Career level, IT companies

1. Introduction
Information technology (IT) companies extensively adopt agile practices to remain innovative and produce high-quality software more quickly (Tyagi et al., 2022; Sardana and Sharma, 2023). Furthermore, adopting agile practices is linked to other benefits, such as increased stakeholder satisfaction, enhanced efficiency in the team process, and greater employee wellbeing (Annosi et al., 2022). Agile practices provide a set of principles for working in an agile manner that emphasizes collaboration, flexibility, and responsiveness to change (Ciriello et al., 2022). IT companies believe that agile practices not just benefit software development teams but also teams working in different functional areas (Peeters et al., 2022). Agile practices require employees to collaborate in teams instead of working within hierarchically organized departments (Junker et al., 2022). In IT companies, agile practices also require team members

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to perform their tasks with high dedication, involvement, accountability, and willingness to participate (Dupret and Pultz, 2022), known as project commitment (Buvik and Tvedt, 2017). It may further affect the desired team outcomes (Peeters et al., 2022).

To uncover the impact of agile practices on team outcomes, it is important to understand how it influences the way team members interpret and understand their team effort (Annosi et al., 2022). Certainly, agile practices encourage rigorous continuous reflection, self-organizing teamwork, regular team interactions, and close collaboration with team members (Ciriello et al., 2022). Hence, advocates and supporters of agile methodologies assert that agile practices can improve the team performance of a project team (Saarikallio and Tyrväinen, 2023). Although agile practices have gained appeal in businesses, there is a lack of a theoretical framework that integrates this emerging concept with work teams (Junker et al., 2022) and project commitment (Buvik and Tvedt, 2017). However, most research that has connected management and organizational behavior theories to agile practices has used qualitative methods (Grass et al., 2020; Kavitha and Suresh, 2021). In addition, researchers have integrated agile practices with the core team characteristics of the agile manifesto and team development from a group psychological perspective (Gren et al., 2020; Peeters et al., 2022). Moreover, researchers argue that agile practices involve phenomena at the team level, which may influence team-level outcomes (Mergel et al., 2021).

The present study explores the concept of agile work practices centered on the team literature (Fisher, 2014; Mergel et al., 2021). Agile work practices are “a set of activities that can be used by almost any type of team to structure taskwork and teamwork in an agile way” (Junker et al., 2022, p. 1). Although the agile literature has established the significant role of agile practices, few studies have linked agile practices to team outcomes (Subramanian and Suresh, 2022; Junker et al., 2022). Prior studies also indicated the mediating mechanism through which agile practices affect employee and team outcomes. However, there is a paucity of literature on the effect of agile taskwork and agile teamwork that leads to higher project commitment and, in turn, to better team performance (Alipour et al., 2022; Heidt et al., 2022). Goal-setting theory postulates that setting specific, measurable goals contributes to higher performance. This study used agile taskwork, including iterative development and sprints, to predict team performance. These practices set specific and measurable goals that motivate team members to achieve team goals. Besides, team effectiveness theory suggests successful team building increases employee productivity and morale. This study also used agile teamwork, consisting of stand-up and retrospective meetings, to predict team performance. These meetings lead to team building and teamwork, enabling team members to perform well. Organizations using agile work practices depend on teams’ commitment to their project, which enhances team performance. Strong project commitment is necessary to achieve higher team performance (Ehrhardt et al., 2014).

Furthermore, the literature on agile practices also indicates the effect of the interaction between agile practices and moderators on team outcomes (Khanagha et al., 2022; Ciric Lalic et al., 2022). Yet, there is a dearth of studies examining the moderating role of career level between the agile taskwork-team performance and agile teamwork-team performance relationships. The present study fills this gap by presenting a theoretical model explaining how agile taskwork and agile teamwork affect team performance and project commitment and how project commitment influences team performance. It also describes how project commitment mediates the impact of agile taskwork and agile teamwork on team performance. Furthermore, it elucidates whether the career level (junior, middle, and senior-level positions) moderates the effect of agile taskwork and agile teamwork on team performance (see Figure 1).

The contribution of this study is manifold. First, it contributes to the literature on team performance by examining the agile way of working that enables flexibility, adaptability, and collaboration within a team by answering how agile work practices improve team performance. Second, it also contributes to the goal-setting theory (Locke and Latham, 2019)
and team effectiveness theory (Weisbord, 1985) by applying them to explain how agile taskwork and agile teamwork influence team performance. Third, this study contributes to the literature on agile work practices by describing how agile taskwork and agile teamwork enhance team performance via project commitment. Finally, this study explores the interaction effect of career level to demonstrate whether career level moderates the impact of agile taskwork and agile teamwork on team performance. The findings of this study have implications for IT companies aiming to adopt an agile strategy to improve team effectiveness and achieve competitive advantage.

2. Theoretical framework and hypotheses

2.1 Agile work practices: agile taskwork and agile teamwork

Agile practices have gained significant popularity in IT companies in India over the past few years (Kaur et al., 2023). India has become a major player in the global software development market. Agile practices have helped many Indian IT companies deliver high-quality software quickly and efficiently (Rahy and Bass, 2022). Since agile practices are often used in teams, Junker et al. (2022) conceptualized agile work practices based on the proven taskwork–teamwork distinction from the literature covering work teams (Marks et al., 2001). They further stated that agile work practices are guidelines that enable teams to organize taskwork activities and teamwork activities systematically that align with the principles of the agile approach. Primarily, agile practices are usually used in software development teams to efficiently develop their products or services, focusing on the end users (Hinderks et al., 2022).

Interestingly, agile work practices are not just tied to a particular agile method for software development, such as Scrum (Morandini et al., 2021) and Kanban (Weflen et al., 2022). Gradually, researchers endorse that any team can employ general principles of agile methodologies without necessarily following its tools and protocols to perform their tasks (Mergel et al., 2021; Annosi et al., 2022). Agile practices are particularly effective in environments where requirements are constantly changing or where there is high uncertainty about the outcome.
Increasingly, agile practices have been adopted by human resources, marketing, and other teams in the IT and other sectors (McMackin and Heffernan, 2021; Moi and Cabiddu, 2021). Given the present context, the study used agile taskwork and agile teamwork, which are closely related but distinct aspects of agile work practices (Salas et al., 2008).

Agile taskwork refers to the process of breaking down complex projects into smaller, more manageable tasks and working on them incrementally through iterative development and sprints (Chicha et al., 2023). Iterative development involves prototype development, experimentation with different ideas, quickly adopting an approach to changing requirements, and successive refinement of initial ideas (Pasuksmit et al., 2022). These prototypes are quickly improved during every iteration so the team can produce a possibly useable product increment at the end of each iteration. Sprints are short work cycles of tasks within an iterative development cycle (So, 2010). A sprint involves limiting the duration of work cycles to one to four weeks, reducing uncertainties, and increasing flexibility by keeping work cycles short. During the sprints, the team works on a set of user stories, and at the end of each sprint, the working product increment is delivered (Morandini et al., 2021).

On the other hand, agile teamwork refers to the team’s stand-up meetings and retrospective meetings that are essential for successfully implementing agile practices (Strode et al., 2022). Stand-up meetings are daily short meetings of the team to discuss new development in their tasks, hurdles that hamper team members from completing tasks, monitor the progress and discuss difficulties in their tasks (Singh and Strobel, 2022). It is usually limited to 15 min to maintain the team’s focus on important issues (So, 2010). Retrospective meetings involve team members taking their time to appreciate each other for their efforts, discussing what went well in the team, discussing their work processes, and critically reflecting on their work activities at the end of each iteration (Julian et al., 2019). In light of this, retrospective meetings can be considered an organized method for encouraging team introspection of task-related challenges. These meetings examine different techniques to increase team communication, quality, and productivity.

2.2 Agile work practices and team performance

Team performance can be described as the degree to which a team is able to accomplish predetermined goals (Hoegl et al., 2004). However, researchers have conceptualized team performance as a multidimensional construct (Lin et al., 2019; Peeters et al., 2022). Specifically, in product development projects, team performance dimensions include attaining predefined quality, schedule, and budget objectives (Hoegl et al., 2004). Team performance dimensions generally include effectiveness, efficiency, quality, and innovation (van Woerkom and Croon, 2009). In the present study, team performance refers to overall team performance, encompassing performance dimensions including product quality, budget, and schedule adherence (Hoegl et al., 2004). Many studies indicate that businesses that embrace the agile way of working want to improve team performance (Peeters et al., 2022; Olszewski, 2023). Notably, the performance of agile teams signifies the ability of a group of individuals to be adaptive and responsive to change to achieve their goals (Traini, 2022).

Previous research accentuated the investigation of the role of agile practices in teams (Karlsen et al., 2022). In particular, agile taskwork has been considerably identified as a predictor of team performance (Strode et al., 2022). Empirical studies in the IT industry show that agile taskwork can significantly impact team performance (Venkatesh et al., 2020; Malik et al., 2021). According to goal-setting theory (Locke and Latham, 2019), setting specific and challenging goals can lead to higher performance. In fact, specific and challenging goals act as a motivational cue that encourages team members to engage in their work. Agile taskwork provides a clear set of team goals through iterative development and short work cycles, increasing team members’ motivation and focus. Therefore, teams respond quickly to changing requirements and deliver high-quality work more quickly (da Costa Filho et al., 2022; Peeters et al., 2022).
On the other hand, agile teamwork emphasizes short meetings of teams to discuss new developments and challenges and monitor progress to ensure that the team is working toward a shared goal (Ciriello et al., 2022). Empirical evidence shows that agile teamwork can positively influence team performance (Strode et al., 2022). According to team effectiveness theory (Weisbord, 1985), effective teams have certain characteristics, such as clear goals, open communication, and a supportive team environment which can improve their overall effectiveness and performance. Agile teamwork promotes these characteristics by providing regular feedback, encouraging open communication, and fostering a culture of continuous improvement (Moe, 2013). By creating a supportive team environment, agile teamwork achieves a higher performance level (Moe and Dingsøyr, 2008). As mentioned above, agile taskwork and teamwork are essential and distinct components of agile work practice. Effectively using both taskwork and teamwork can lead to increased efficiency, higher quality results, and greater overall team success in project delivery. Therefore, the study proposes the following hypotheses:

**H1a.** Agile taskwork positively affects team performance.

**H1b.** Agile teamwork positively affects team performance.

### 2.3 Agile work practices and project commitment

Project commitment can be illustrated by acceptance of and strong conviction in the project’s goals and objectives, willingness to engage, and the desire to maintain membership in the project (Mohr and Nevin, 1990; Hoegl et al., 2004). It is the degree to which team members are investing in the success of the project and are willing to put in the effort required to achieve its goals (Zhu et al., 2021). Based on the viewpoint of social information processing theory (Salancik and Pfeffer, 1978), agile taskwork and agile teamwork can provide motivational cues from which team members develop project commitment that is encouraged by the team (Junker et al., 2022). As discussed earlier, agile taskwork requires team members to iterate their ideas and work in a short work cycle, strengthening teamwork and collaboration and providing autonomy. As a result, it helps to build a sense of camaraderie and shared ownership among team members (Pasuksmit et al., 2022).

On the other hand, as mentioned above, agile teamwork involves stand-up meetings and retrospective meetings by teams to discuss the work and appreciate team members’ efforts. It creates a feeling that they are working together toward a shared goal and that their contributions are valued and appreciated (Koch and Schermuly, 2021). As a result, they are more likely to be committed to the project’s success and willing to put in the extra effort required to achieve project goals. Researchers argue that when agile taskwork and agile teamwork are combined, they can create a virtuous cycle that reinforces project commitment (Amorim et al., 2021). Moreover, when team members work together on smaller, more manageable tasks, they can make progress toward achieving the project’s goals. The resulting sense of progress can help to build momentum and sustain motivation, even in the face of challenges or setbacks. It can further build their commitment to the project. Thus, the following hypotheses can be stated:

**H2a.** Agile taskwork positively affects project commitment.

**H2b.** Agile teamwork positively affects project commitment.

### 2.4 Project commitment and team performance

Scholars have recognized that agile teams may perform below expectations because they fail to put in their best effort and commit to project goals (Ehrhardt et al., 2014). Prior studies have also shown evidence of a connection between team members’ project commitment and
desirable outcomes (Hoegl et al., 2004; Gilbert et al., 2021). Nevertheless, most of this study was done at the individual level and outside the purview of agile teams and IT companies. Furthermore, researchers suggest that within an agile team, the commitment to the project of members can impact collective performance (Gilbert et al., 2021). This study argues that team members committed to their project are more likely to be motivated, engaged, and invested in the success of a project (Hoegl et al., 2004; Gilbert et al., 2021). Being committed, they are more likely to take ownership of their tasks and responsibilities and hold themselves and their teammates accountable for meeting their goals (Nauman et al., 2022). It can lead to better communication, collaboration, and a more positive team dynamic (Ehrhardt et al., 2014; Zhu et al., 2021). As a result, the team achieves a higher quality of work and greater efficiency, leading to better team performance (Buvik and Tvedt, 2017; Nauman et al., 2022). Hence, the following hypothesis can be framed:

\[ H3. \] Project commitment positively affects team performance.

2.5 Mediating role of project commitment

Research suggests that project commitment can mediate the relationship between agile work practices and team performance (Melo et al., 2013; Strode et al., 2022). According to Gomes Silva et al. (2022), the implementation of agile project management positively impacts all team members and the firm’s social, economic, and environmental dynamics. A study by Hoegl et al. (2004) found that inter-team coordination, project commitment, and teamwork quality are correlated with overall team performance. Their findings indicate that team members are more likely to perform better when they are committed to the project and feel that their work is meaningful. Agile work practices can foster this commitment by providing opportunities for collaboration, feedback, and continuous learning (Junker et al., 2022). Therefore, project commitment can play an important mediating role between agile taskwork-team performance and agile teamwork-team performance relationship. Thus, the hypotheses can be stated as follows:

\[ H4a. \] Project commitment mediates the relationship between agile taskwork and team performance.

\[ H4b. \] Project commitment mediates the relationship between agile teamwork and team performance.

2.6 Moderating role of career level

In IT companies, project teams are made up of individuals at different career levels, including entry-level, middle-level, and senior-level (Spiegler et al., 2021). Career level is often determined by experience, skills, and level of responsibility. The project team member has specific requirements to function effectively in an agile environment. Indeed, to transform complicated requirements into software solutions, team members need creativity and problem-solving skills (Strode et al., 2022). Specifically, for agile taskwork and agile teamwork, team members require skills such as communication, planning and prioritizing, time management, reflection, flexibility and adaptability, and collaboration (Khanagha et al., 2022). However, junior-level employees can thrive in agile work practices and make valuable contributions to their teams. Their fresh perspectives, energy, and enthusiasm can enhance the team’s agility and contribute to the overall success of the agile work environment (Nguyen and Malik, 2022). As a result, junior-level team members can perform well, and their contributions can be more valuable than their counterparts. This study also argues that the career level of team members can negatively moderate the impact of agile taskwork and agile teamwork on team performance, as junior-level team members can identify potential issues...
and develop more effective solutions. Thus, the impact of agile taskwork and teamwork on team performance will be better for junior-level team members than for mid-level and senior-level team members. Accordingly, this study proposes the following hypotheses:

\[ H5a. \text{ Career level negatively moderates the relationship between agile taskwork and team performance.} \]

\[ H5b. \text{ Career level negatively moderates the relationship between agile teamwork and team performance.} \]

3. Methods

3.1 Sample and data collection

Data were collected from employees working in IT companies in India. IT companies in India are increasingly adopting an agile way of working to attract more clients (Kaur et al., 2023; Singh et al., 2023). Agile approaches encourage improved communication and a practice-driven structure that fosters tight cooperation between team members, which enhances team effectiveness (Amos et al., 2022). IT companies broadly classified most teams as delivery teams and others as support teams. Delivery teams generate direct value for customers through IT services, IT maintenance, and IT consulting, whereas support teams comprise functions such as HR, finance, or customer relations (Junker et al., 2022). This study used an online survey method to collect primary data. A total of 563 samples were collected from respondents working in 290 IT companies in India. Table 1 provides details on the demographic profiling of the respondents. 89.5% of the respondents represented the delivery team, whereas 10.5% belonged to the support team. Most respondents (53.5%) were part of a team comprising 6 to 15 members. Majority of respondents were male (75.2%) compared to females (24.8%). The respondents from the age group of 26–30 years were 39.4% of the total respondents. A total of 39.9% of respondents reported to have a work experience up to three years, and 57.1% of the respondents were at senior-level positions.

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>424</td>
<td>75.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>140</td>
<td>24.8</td>
</tr>
<tr>
<td>Age</td>
<td>18–25 years</td>
<td>212</td>
<td>37.6</td>
</tr>
<tr>
<td></td>
<td>26–30 years</td>
<td>222</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td>31–35 years</td>
<td>95</td>
<td>16.8</td>
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<tr>
<td></td>
<td>Over 36 years</td>
<td>35</td>
<td>6.2</td>
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<tr>
<td>Work experience</td>
<td>0–3 years</td>
<td>225</td>
<td>39.9</td>
</tr>
<tr>
<td></td>
<td>4–6 years</td>
<td>158</td>
<td>28.0</td>
</tr>
<tr>
<td></td>
<td>7–9 years</td>
<td>120</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>10–12 years</td>
<td>37</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>Over 12 years</td>
<td>24</td>
<td>4.3</td>
</tr>
<tr>
<td>Career level</td>
<td>Junior executive</td>
<td>27</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Middle management</td>
<td>215</td>
<td>38.1</td>
</tr>
<tr>
<td></td>
<td>Senior management</td>
<td>322</td>
<td>57.1</td>
</tr>
<tr>
<td>Team classification</td>
<td>Delivery team</td>
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<tr>
<td></td>
<td>Support team</td>
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<td>10.5</td>
</tr>
<tr>
<td>Team size</td>
<td>Up to 5 members</td>
<td>84</td>
<td>14.9</td>
</tr>
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<td>6–15 members</td>
<td>302</td>
<td>53.5</td>
</tr>
<tr>
<td></td>
<td>16–30 members</td>
<td>93</td>
<td>16.5</td>
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<tr>
<td></td>
<td>Above 30 members</td>
<td>85</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Table 1. Demographic characteristics of the sample

Source(s): Author’s own creation
3.2 Measures
Agile work practices were measured using Junker et al.’s (2022) recently developed agile work practices scale. Agile work practices have two sub-dimensions: agile taskwork and agile teamwork. Agile taskwork was measured using three-item iterative development ($\alpha = 0.705$) and three-item sprint subscales ($\alpha = 0.743$). The sample items of iterative development and sprints subscales are “We quickly adapt our approach to changing requirements” and “We limit the duration of our work cycles to less than one month”, respectively. The agile taskwork items were rated on a five-point Likert scale (1 = fully disagree, 5 = fully agree). Agile teamwork was measured using the four-item stand-up meeting ($\alpha = 0.815$) and four-item retrospective meeting subscales ($\alpha = 0.788$). The sample items of the stand-up and retrospective meetings subscales are “We have a short meeting to discuss new developments in our tasks” and “We take our time to appreciate each other for our efforts”, respectively. The agile teamwork items were rated on a five-point frequency scale (1 = almost never, 5 = daily).

Project commitment was measured using the scale developed by Hoegl et al. (2004). This project commitment is a five-item scale appropriate to measure the team’s emotional attachment to the project. A sample item of the project commitment scale is “The team members are proud to be part of the project” ($\alpha = 0.849$).

Team performance was measured by using Hoegl et al.’s (2004) five-item overall team performance scale ($\alpha = 0.836$). On a five-point Likert scale, team members rated the degree to which they agreed with statements such as “Going by the current status, our team can be regarded as successful” (1 = strongly disagree, 5 = strongly agree).

3.3 Common method bias
Common method bias occurs when a single source of variance affects scores on multiple measures in a study. However, Podsakoff et al.’s (2003) procedural and statistical approaches were used to overcome common method bias. Before starting the survey, feedback on the survey questionnaire was collected to verify that the questions were simple to read and understand. Before data were collected, suitable instructions were given to respondents, and confidentiality and secrecy were guaranteed. Also, according to Harman (1967), a single-factor analysis was performed to determine whether the data set had any common method bias. Exploratory factor analysis (EFA) was performed using 23 items from all constructs, i.e. agile taskwork, agile teamwork, project commitment, and team performance. According to the results of EFA, only a single factor accounts for 29.876% of the variance, which is under the threshold of 50%, indicating that common method bias is not present in this study (Podsakoff and Organ, 1986).

3.4 Data analysis
Partial least squares (PLS) were used to test the proposed model. PLS is a multivariate statistical technique used for predictive modeling. It uses a component-based structural equation modeling (SEM) method to examine the connection between the latent variables (Sarstedt et al., 2019). PLS-SEM combines regression-based path analysis with principal component analysis to evaluate a structural equation model’s parameter (Ringle et al., 2020). It employs a composite model approach and is prediction-focused. PLS is a flexible and powerful modeling method that can be used in a wide range of applications that deal with complex, high-dimensional datasets is necessary. PLS-SEM is also helpful in addressing various challenges in HRM research (Ringle et al., 2020). Taking into account the advantages of PLS-SEM, it was used in the current investigation to test the proposed structural model. This study applied PLS-SEM in SmartPLS 4.0 software (Ringle et al., 2022).

To test the moderating effect, Process macro v.4.2 was used (Hayes, 2009). The Process macro is an ordinary least square (OLS) and a logistic regression path analysis tool that uses
centralized variables. This study used process model 1 to test the simple moderating effect. It allows testing the conditional effect by estimating the effect of the independent variable on the dependent variable at a certain point along the moderator and determining if this effect is significant.

4. Results

4.1 Measurement model results
As the present study has a reflective-reflective higher-order model, the measurement model assessment includes establishing constructs' internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2019). Agile taskwork and agile teamwork are two higher-order constructs in the structural model. These higher-order constructs have two lower-order constructs each. Iterative development and sprints are the lower-order constructs of agile taskwork, whereas stand-up and retrospective meetings are the lower-order constructs of agile teamwork. This study adopted a repeated indicator approach to form a higher-order construct from the items of their lower-order construct (Sarstedt et al., 2019). The agile task was formed using six items of iterative development and sprints, while the agile task was created using eight items from stand-up meetings and retrospective meetings (refer Table 2).

<table>
<thead>
<tr>
<th>Latent constructs</th>
<th>Indicators</th>
<th>Outer loadings</th>
<th>Cronbach’s alpha</th>
<th>Composite reliability</th>
<th>Average variance extracted</th>
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<tbody>
<tr>
<td>Iterative development</td>
<td>ID1</td>
<td>0.709</td>
<td>0.705</td>
<td>0.800</td>
<td>0.573</td>
</tr>
<tr>
<td></td>
<td>ID2</td>
<td>0.775</td>
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<td></td>
<td>ID3</td>
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<tr>
<td>Sprints</td>
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<td>S2</td>
<td>0.847</td>
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<td></td>
<td>S3</td>
<td>0.819</td>
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<tr>
<td>Stand-up meeting</td>
<td>SM1</td>
<td>0.761</td>
<td>0.815</td>
<td>0.879</td>
<td>0.644</td>
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<td>SM3</td>
<td>0.809</td>
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<td></td>
<td>SM4</td>
<td>0.790</td>
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<td>Retrospective meeting</td>
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<td>0.788</td>
<td>0.863</td>
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<td>0.769</td>
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<td>TP3</td>
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<tr>
<td></td>
<td>TP4</td>
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<td>TP5</td>
<td>0.779</td>
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</tr>
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</table>

Table 2. Results of the measurement model

Note(s): *higher-order construct
Source(s): Author's own creation
The values for the measurement model of lower-order latent components were obtained using the PLS algorithm. Moreover, to estimate the measurement model of the higher-order components, indicator loadings were obtained from the relationships of higher-order components with their lower-order components, which can be seen as path coefficients in the path model (Sarstedt et al., 2019). The item loadings for agile taskwork were obtained from its relationship with iterative development and sprints. The item loadings for agile teamwork were obtained from its relationships with stand-up and retrospective meetings. These indicator loadings were used as inputs to evaluate further the construct reliability and validity of higher-order agile taskwork and agile teamwork (Hair et al., 2019; Sarstedt et al., 2019). For the internal consistency of the constructs, both Cronbach’s alpha and composite reliability were used (Hair et al., 2019). It determines the degree of homogeneity among items that measure the same construct (Richter et al., 2016). Cronbach’s alpha and composite reliability of 0.7 and above establish the internal consistency of the constructs (Hair et al., 2021). The average variance extracted (AVE) and item loadings were used to evaluate convergent validity, which describes how closely a measure correlates with other measures of the same concept (Hair et al., 2021). When an item’s loading value is greater than 0.708 and the AVE score is 0.5 or above, the convergent validity of the constructs is considered established (Hair et al., 2021).

As presented in Table 2, the Cronbach alpha values ranged from 0.705 to 0.849, and the composite reliability values ranged from 0.796 to 0.892, which were greater than 0.7, demonstrating the internal consistency of all constructs. Item loadings ranged from 0.709 to 0.848, over the threshold of 0.708, and AVE values ranged from 0.573 to 0.864, larger than 0.5 establishing the convergent validity of all constructs. One item each from the subscale, iterative development (i.e. “We develop a prototype/pilot before layering out plans”), and sprints (i.e. “We plan our work activities in short sequences”) were removed for item loadings below 0.7.

The heterotrait-monotrait (HTMT) ratio criterion was used to assess the discriminant validity of the constructs. The HTMT criterion evaluates the extent to which the correlations between constructs (heterotrait correlations) are lower than the correlations between indicators of the same construct (monotrait correlations) (Hair et al., 2019). The recommended threshold for the HTMT ratio is 0.90 or lower (Sarstedt et al., 2019). However, the evaluation of the discriminant validity of a higher-order construct needs further examination. Lower-order components such as iterative development, sprints, stand-up meeting, and retrospective meeting should show discriminant validity between each other and all remaining constructs in the structural model, except for their higher-order component (Sarstedt et al., 2019). As shown in Table 3, the HTMT values obtained for all constructs were less than 0.9, demonstrating the discriminant validity of the constructs in the structural model.

4.2 Hypotheses testing

Bootstrapping was performed with 5,000 subsamples to determine the significance of the path coefficients. The results of the bootstrapping, as given in Table 4, showed that agile taskwork ($\beta = 0.156$, $p < 0.01$) and agile teamwork ($\beta = 0.181$, $p < 0.01$) had a significant positive effect on team performance. Therefore, hypotheses H1a and H1b were supported. Next, agile taskwork ($\beta = 0.257$, $p < 0.01$) and agile teamwork ($\beta = 0.319$, $p < 0.01$) had a significant positive effect on project commitment. Thus, hypotheses H2a and H2b were supported. Further, the project commitment had a significant positive effect on team performance ($\beta = 0.608$, $p < 0.01$). Hence, hypothesis H3 was supported. Moreover, the agile taskwork ($\beta = 0.156$, $p < 0.01$) and agile teamwork ($\beta = 0.194$, $p < 0.01$) had a significant indirect effect on team performance through project commitment. Thus, hypotheses H4a and H4b were supported. These findings revealed that the project commitment significantly mediated the relationship between agile taskwork and team performance. However, the direct
<table>
<thead>
<tr>
<th>Latent constructs</th>
<th>Agile teamwork</th>
<th>Agile taskwork</th>
<th>Project commitment</th>
<th>Team performance</th>
<th>Iterative development</th>
<th>Sprints</th>
<th>Stand-up meeting</th>
<th>Retrospective meeting</th>
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<td>Project commitment</td>
<td>0.495</td>
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<td>0.820</td>
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<tr>
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<td>0.535</td>
<td></td>
<td></td>
<td>0.530</td>
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<tr>
<td>Iterative</td>
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<td>0.587</td>
<td>0.530</td>
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<td>development</td>
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<tr>
<td>Sprints</td>
<td>0.324</td>
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<td>0.228</td>
<td>0.186</td>
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<tr>
<td>Stand-up meeting</td>
<td></td>
<td>0.432</td>
<td>0.427</td>
<td>0.404</td>
<td>0.415</td>
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<tr>
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<td>0.507</td>
<td>0.417</td>
<td>0.244</td>
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**Source(s):** Author's own creation
The effect of agile taskwork on team performance ($\beta = 0.030$, $p = 0.388$) turned out to be insignificant in the presence of a mediator (i.e., project commitment). Findings imply that project commitment fully mediates the relationship between agile taskwork and team performance. In the contrary, project commitment partially mediated the relationship between agile teamwork and team performance, as the direct relationship between agile teamwork and team performance was significant in the presence of a mediator (i.e., project commitment). Further analysis of the coefficient of determination ($R^2$) showed that agile taskwork and teamwork combinedly explained a 22.9% variance in project commitment. Furthermore, agile taskwork, agile teamwork, and project commitment collectively explained a 51.2% variance in team performance. According to Cohen (1988), $R^2$ above 26% is considered large. Therefore, the $R^2$ for team performance was large.

Finally, using process model 1, two simple moderation analyses were conducted with career level (i.e., junior, middle, and senior-level positions) as a moderator (Hayes, 2018). First, the moderating effect of career level on the relationship between agile taskwork and team performance was examined. Next, the moderating effect of career level on the relationship between agile teamwork and team performance was tested. Hayes and Rockwood (2020) stated that the confidence interval should not cross zero to establish a moderating effect. Bias-corrected confidence intervals (BCI) were obtained using 5,000 bootstrapping re-sample. As presented in Table 4, the results revealed the negative moderating effect of the career level on the relationship between agile taskwork and team performance ($\beta = -0.117$, $p < 0.05$, LL: $-0.234$, UL: $-0.001$) and agile teamwork and team performance ($\beta = -0.129$, $p < 0.05$, LL: $-0.253$, UL: $-0.005$). The conditional effects of the focal predictor at values of the moderator showed that at a low level of the moderator, the effect (0.353) of agile taskwork on team performance was high ($\beta = -0.523$, $p < 0.01$, LL: 0.263, UL: 0.444), and at a high level of the moderator, the effect (0.236) of agile taskwork on team performance was low ($\beta = 0.477$, $p < 0.01$, LL: 0.130, UL: 0.343), see Figure 2. It implies that when the career level increases from junior-level to senior-level positions, the impact of agile taskwork on team performance decreases. Similarly, the effect (0.503) of agile teamwork on team performance was high when the moderator was low ($\beta = -0.523$, $p < 0.01$, LL: 0.404, UL: 0.601), and the effect (0.373) of

<table>
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<th>Hypotheses</th>
<th>Paths</th>
<th>$\beta$-value</th>
<th>SD</th>
<th>$t$-values</th>
<th>BCI LL</th>
<th>BCI UL</th>
<th>VIF</th>
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<td>H1a</td>
<td>Agile taskwork $\rightarrow$ team performance (total effect)</td>
<td>0.156</td>
<td>0.035</td>
<td>4.436**</td>
<td>0.090</td>
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<td>1.246</td>
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<td>H1b</td>
<td>Agile teamwork $\rightarrow$ team performance</td>
<td>0.181</td>
<td>0.036</td>
<td>5.031**</td>
<td>0.116</td>
<td>0.256</td>
<td>1.293</td>
</tr>
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<td>Agile taskwork $\rightarrow$ project commitment</td>
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<td>0.054</td>
<td>4.723**</td>
<td>0.151</td>
<td>0.363</td>
<td>1.161</td>
</tr>
<tr>
<td>H2b</td>
<td>Agile teamwork $\rightarrow$ project commitment</td>
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<td>0.041</td>
<td>7.783**</td>
<td>0.237</td>
<td>0.396</td>
<td>1.161</td>
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<tr>
<td>H3</td>
<td>Project commitment $\rightarrow$ team performance</td>
<td>0.608</td>
<td>0.037</td>
<td>16.406**</td>
<td>0.530</td>
<td>0.675</td>
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<td>Agile taskwork $\rightarrow$ project commitment $\rightarrow$ team performance</td>
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<td>0.035</td>
<td>4.436**</td>
<td>0.090</td>
<td>0.227</td>
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<td>Agile teamwork $\rightarrow$ project commitment $\rightarrow$ team performance</td>
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<td>0.029</td>
<td>6.739**</td>
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<td>Agile taskwork*career level $\rightarrow$ team performance</td>
<td>$-0.117$</td>
<td>0.059</td>
<td>1.974*</td>
<td>$-0.234$</td>
<td>$-0.001$</td>
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<td>H5b</td>
<td>Agile teamwork*career level $\rightarrow$ team performance</td>
<td>$-0.129$</td>
<td>0.063</td>
<td>2.040*</td>
<td>$-0.253$</td>
<td>$-0.005$</td>
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Note(s): *$p < 0.05$, **$p < 0.01$  
Source(s): Author’s own creation  

Table 4. Hypotheses testing
agile teamwork on team performance was low when the moderator was high ($\beta = 0.477$, $p < 0.01$, LL: 0.278, UL: 0.469), refer Figure 3. These findings reveal that the effect of agile teamwork on team performance decreases when the career level increases from a junior-level position to a senior-level position. Hence, hypotheses H5a and H5b were supported, concluding that the career level negatively moderates the relationship between agile taskwork and team performance and agile teamwork and team performance.

The $Q$-square was used to check the predictive relevance of the model. $Q$-square is a measure of the predictive ability of a PLS regression model. In PLS predict, the $Q^2$ value is a cross-validated measure of the goodness of fit of the PLS model (Sarstedt et al., 2019). The $Q^2$ value can range from negative infinity to 1. A $Q^2$ value of 1 indicates a perfect prediction,
while a negative $Q^2$ value indicates that the model performs worse than random (Hair et al., 2019). The calculated $Q^2$ values for endogenous variables, such as project commitment ($Q^2 = 0.218$) and team performance ($Q^2 = 0.218$), were greater than zero, establishing predictive relevance for an endogenous latent variable in the structural model.

To check the effect size, the $F$-square is used. $F^2$ is a statistical measure used to quantify the magnitude of the effect of an independent variable on a dependent variable in a regression analysis. In general, $F^2$ values of 0.02, 0.15, and 0.35 are considered small, medium, and large effect sizes, respectively (Sarstedt et al., 2019). The results showed that the effect size of agile taskwork on project commitment ($F^2 = 0.074$) was small, whereas the effect size of agile teamwork on project commitment ($F^2 = 0.114$) was medium. Next, the effect size of agile taskwork ($F^2 = 0.001$) and agile teamwork ($F^2 = 0.052$) on team performance was small. Furthermore, the size of the effect of project commitment on team performance ($F^2 = 0.584$) was large.

The variance inflation factor (VIF) measures the extent to which the variance of the estimated regression coefficient for a particular predictor variable is inflated due to multicollinearity (Sarstedt et al., 2019). VIF values lower than the threshold of 3 indicate nil or very little multicollinearity (Hair et al., 2019). However, VIF values ranged from 1.161 to 1.296 for all the constructs, indicating no need to be concerned about the latent variables’ multicollinearity (refer Table 4).

5. Discussion

The present study explores the emerging concept of agile work practices that are conceptualized based on the recognized taskwork–teamwork distinction in the team literature (Junker et al., 2022). The study examines how agile taskwork and teamwork directly impact team performance and project commitment, and how project commitment influences team performance. Furthermore, it examines how project commitment mediates the impact of agile taskwork and teamwork on team performance. This study also investigates whether the career level moderates the role of agile taskwork and agile teamwork in team performance.

In line with hypotheses H1a and H1b, the study results indicate that when team members adopt an agile work practice, they iterate ideas, work in sprints, and participate in stand-up and retrospective meetings. It facilitates goal orientation, collaboration, and teamwork; thus, team members can evaluate their performance each day and make changes as necessary, which improves collective performance of the team. These findings are supported by previous empirical studies (Malik et al., 2021; Peeters et al., 2022). Additionally, the results of the present study support the notion that the agile way of working improves team performance through quick product turnaround, regular team reflection, and everyday face-to-face communication (Peeters et al., 2022). The sample drawn from 290 IT companies comprising delivery and support teams shows that the agile way of working contributes to the success of the IT companies.

Consistent with hypotheses H2a and H2b, the findings reveal that the teams develop strong emotional attachments to their project when they follow agile taskwork and agile teamwork. These findings are consistent with previous empirical studies (e.g. Koch and Schermuly, 2021; Müller and Antoni, 2022). Agile teams typically work in short iterations, with regular feedback and reviews (Dupret and Pultz, 2022). These practices establish a sense of the overall project goal and ownership of their work, strengthening the team’s strong emotional connections with their project (Ogbonnaya, 2019; Koch and Schermuly, 2021).

In support of hypothesis H3, the results indicate that teams with strong project commitments are willing to put in the effort required to achieve the project’s goals. These findings are consistent with past studies by Newman et al. (2020) and Chiu et al. (2020). Moreover, a study by Koch and Schermuly (2021) supported the present finding, and it was observed that agile project management influences employees’ commitment. A team with
strong project commitment feels fully responsible for achieving the common project goals, feels proud to be part of the project, and values being part of this project, which influences team members to work collectively toward the project’s goals (Hoegl et al., 2004). Thus, project commitment plays a stronger role in improving team performance.

In hypotheses H4a and H4b, the study advanced the understanding that project commitment developed due to agile taskwork and agile teamwork practices will mediate the effect of agile taskwork and agile teamwork on team performance. The research also uncovers an underlying psychological mechanism elucidating how agile transformation leads to team effectiveness. This finding is a significant contribution because a mediating variable can help to understand the impact of agile taskwork on team performance, which is not directly related in the presence of a mediating variable. The findings align with the study by Peeters et al. (2022), which also revealed the mechanism through which the agile way of working may influence team performance. The agile way of working improves effective team performance through clarity, face-to-face interaction, reflexivity, self-management, and rapid turnaround of products (Peeters et al., 2022).

Consistent with hypotheses H5a and H5b, the study established that agile taskwork and agile teamwork are positively related to team performance, and these relationships are negatively moderated by career level. These findings support the assertion of Savino et al. (2017) that a team that has young members is more willing to share their knowledge and provide fresh ideas. In reality, young team members have a strong desire to learn, leading them to actively seek feedback and prefer to discuss novel concepts with those with extensive experience and high levels of professional competence. However, it’s important to keep the number of senior-level employees in a team limited to avoid much diversity among its members as it stifles innovation and knowledge sharing. The study found that the team members’ fresh perspectives, energy, and enthusiasm can enhance the effectiveness of agile taskwork and agile teamwork to impact team performance, confirming the aptness of goal-setting theory and team effectiveness theory to team performance.

6. Contribution
6.1 Theoretical contribution
The study has some important theoretical contributions. First, this study contributes to goal-setting and team effectiveness theories by identifying antecedents and outcomes. Goal-setting theory (Locke and Latham, 2019) explains how setting specific, challenging goals can motivate individuals to perform better and achieve higher levels of success. Findings contributed to goal-setting theory, as it affirmed that the iterative and goal-driven nature of agile taskwork provides specific and challenging goals that motivate the team, which helps agile taskwork achieve greater success in project delivery. Further, team effectiveness theory (Weisbord, 1985) explains the factors contributing to teams’ success in achieving their goals. Agile teamwork focuses on stand-up and retrospective meetings, which provide the team with a clear understanding of their goals. Promote positive relationships among team members, which helps them identify areas for improvement and develop strategies to improve their performance.

Second, prior research suggests that agile practices improve organizational and employee outcomes. The present study investigated the role of agile work practices on team outcomes. Also, agile work practices explored more extensively the recognized taskwork and teamwork distinction mentioned in the work team literature (Fisher, 2014). However, previous studies conceptualize agile practices based on psychological empowerment (Malik et al., 2021) and a group psychological perspective (Gren et al., 2020). Most studies on agile work practices are limited to linking agile working to management and organizational behavior theories, predominantly using a qualitative approach (Julian et al., 2019; Ozkan et al., 2022).
Third, this research highlighted the underlying mechanism through which agile taskwork and agile teamwork influence team performance. However, prior studies have investigated the direct impact of agile work practices on organization and team outcomes, such as project performance (Malik et al., 2021) and team maturity (Gren et al., 2020). The present findings demonstrated that project commitment mediates between agile taskwork-team performance and agile teamwork-team performance relationship. These findings highlight the significance of project commitment as a dynamic psychological process that affects team performance. However, past studies have explored innovative behavior (Malik et al., 2021), proactivity norms (Junker et al., 2022), and psychological safety climate (Peeters et al., 2022) as a mediator to explain the mechanism by which agile work practices influences outcome variables. By examining the direct and indirect effect of agile taskwork and agile teamwork on team performance through project commitment, this study provides evidence that agile taskwork and agile teamwork are vital as they generate a sense of emotional attachment and ownership toward their project. As a result, it reinforces the team to contribute to the success of project. The findings also imply that additional mediating variables can be used to explore the effect of agile work practices on team performance.

Moreover, the study also established the moderating role of the career level on the impact of agile taskwork and agile teamwork on team performance. However, prior studies have examined the moderating effect of project type, organization type, project technology uncertainty, and project novelty in the relationship between agile practices and desired project outcomes (Ciric Lalic et al., 2022). By exploring the moderating effect of career level on the impact of agile taskwork and agile teamwork on team performance, the present study demonstrates that fresh perspectives, energy, and enthusiasm of team members are significant as they affect the strength or direction of their relationship. The findings also suggest that more moderating variables can be studied to see how the impact of agile taskwork and agile teamwork on team performance depends on different moderators.

6.2 Practical implications

The study also offers important implications for practice. First, agile work practices employed by IT companies could be an important factor affecting project commitment and team outcomes such as team performance. Therefore, IT companies can invest more time and resources to enhance the effectiveness of agile work practices such as agile taskwork and agile teamwork at work. It is important to continuously evaluate and optimize agile work practices based on the unique needs and context of the organization to achieve the desired results. Specifically, team leaders can properly implement agile taskwork and agile teamwork to encourage team members to collaborate, engage in teamwork, and knowledge sharing to constantly improve team commitment, thereby enhancing team performance for the project’s success.

Second, the study unveils the significance of project commitment on team performance; hence, IT companies can bring in various interventions to foster project commitment, such as effective leadership, employee empowerment, employee development, reward, and recognition (Uraon, 2018; Uraon and Gupta, 2021). In addition, IT companies can also focus on other factors that enhance project commitment, such as team cohesion, team leader behavior, perceived project support (Ehrhardt et al., 2014), knowledge sharing (Buvik and Tvedt, 2017), and inter-team coordination (Hoegl et al., 2004). It has been seen that the leader’s emotional intelligence influences the project commitment of team members (Zhu et al., 2021). It is an important skill for personal relationships and workplace interactions. Thus, training can be provided to managers on emotional intelligence. Managers may need emotional intelligence to handle various aspects of team dynamics, such as effective communication, collaboration, clarity in roles and responsibilities, inclusive decision-making, and constructive conflict resolution, which can improve team members’ project commitment.
Third, the study reveals that the effect of agile work practices on project commitment for senior-level team members is low. Thus, the team leaders can evaluate the current implementation, identify barriers, provide training and support, and engage senior-level team members to improve their commitment to agile practices. Finally, the study showed the agile way of working is key for not just software development teams but any teams functioning in today’s fast-paced, complex business environment. Hence, IT companies can train employees on the agile way of working to implement agile work practices in various functional areas to enhance overall organizational effectiveness (Saarikallio and Tyrväinen, 2023).

7. Limitations and direction for future research
After following the appropriate research methodology and encouraging empirical findings, the present study has some limitations, like any other social science research. Although the study followed the procedural method to address potential threats of common method bias, the risk of this threat to validity cannot be eliminated with cross-sectional data. Hence, more longitudinal and experimental researches are required to draw definitive findings on causality. In addition, the response was collected from a single source on independent and dependent variables. Thus, the study cannot completely rule out potential influences that may have impacted the connections between these variables. However, future research may use the team leader’s rating of team performance instead of self-rating to allow a complete assessment of team performance in agile teams. Next, this study described the influence of agile taskwork and agile teamwork on team performance. Future studies may explore the influence of agile taskwork and agile teamwork on other employee and organizational outcomes, such as organizational citizenship behavior, project performance, and organizational performance, to understand how agile practices can affect these outcome variables. Further, the study provided evidence of the mechanism through which agile work practices affect team performance. Therefore, future studies can explore other potential mediating variables, such as organizational commitment (Uraon and Gupta, 2021), work engagement (Ali Abadi et al., 2023), and job embeddedness (Ampofo et al., 2023), to understand the various ways in which agile work practices affect team performance.

Moreover, the study explained the relationship between agile work practices and team performance in the presence of a moderator. Hence, future studies can examine moderating variables such as perceived work climate (Bresciani et al., 2023), perceived organizational support (Musenze and Mayende, 2023), and mutual trust (Wójcik-Karpacz et al., 2022) to understand how these variables work with agile work practices to influence team performance. Lastly, the present study was conducted in the context of IT companies. The generalization of findings to other populations must be made with caution, as management practices in the IT industry differ from those of other industries. Future studies may be conducted in other industries to understand the role of agile work practices. Similarly, the study was conducted in the background of an emerging economy, and the generalization of the findings is limited only to emerging economies.

References


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