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T-AGILE: A Guide to Teleworking in Agile Project Management

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Abstract

The COVID-19 pandemic and mandatory lockdowns have forced businesses to look more enthusiastically at telework issues in order to maintain some activity during this difficult time. But, depending on the nature of the work, teleworking is not always a very suitable solution. We wonder here whether agile project management is part of the practices facilitated or, on the contrary, constrained by remote work. Our research led us to compare interviews with experts, responses to a survey, and existing literature on the subject. We propose a guide for project managers to check whether everything has been put in place to facilitate agile project management in telework. We validated our guide with another expert on an ongoing project in a French company.

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Keywords: Agility, Telework, Remote working

1. Introduction

On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic, leading to the implementation of various health measures. This health crisis has forced a large number of people to choose remote working as a long-term solution, whereas it was once considered a luxury. For some, it has become a necessity or a viable alternative to on-site work. In the past, managers did not necessarily view teleworking favorably. The autonomy and freedom that remote work provided limited their control over tasks and led to distrust of their subordinates. However, the COVID-19 pandemic has allowed remote work to overcome these prejudices and become a possible alternative for workers used to going to their workplaces every day. In 2020, during the first lockdown in France, remote work experienced unprecedented growth, reaching 41% of employees and remote work remains very common, with 38% of employees working remotely at the end of 2021*. In addition, a new model is emerging, the hybrid mode,

* <https://newsroom.malakoffhumanis.com/actualites/malakoff-humanis-presente-les-resultats-de-son-barometre-teletravail-organisations-hybrides-2022-0686-63a59.html>

where employees alternate between face-to-face and distance work. 63% of managers believe that this new form of work will continue to develop, and 84% want to deploy it within their company[†]. As a result of these trends, we can conclude that telework or its variations are becoming the norm in many companies.

Over the last two decades, agile project management methods have gained popularity among many companies in the field of information technology. The Agile Manifesto was created when seventeen software development experts gathered to discuss the commonalities between their different development methods [1]. Its main focus is on bringing value to employees and optimizing collaboration between teams. With remote work becoming increasingly essential, it is important to question the feasibility of agile organizations where communication and human interactions are crucial. Therefore, we address the following question: is it possible to work in an agile manner while teleworking?

Background works are highlighted in the second section and the research methodology is explained in section 3. Section 4 analyzes the research results. Our proposal is made in section 5 and we conclude in section 6.

2. Background works

According to the International Labour Organization, telework or remote work is defined as the use of information and communication technologies (ICT), such as smartphones, tablets, laptops, and/or desktops, for work performed outside the employer's premises [2]. The term "telework" was first introduced by Jack Nilles in the mid-1970s [3]. This concept is rooted in the oil crisis in the United States, where it was realized that by leaving one in seven employees working from home instead of going to their workplace, it would no longer be necessary to import oil [4]. Since then, teleworking has continued to develop and become more accessible, partly due to the evolution of information technologies. Their adoption exploded in the 1990s and the number of teleworkers increased in the 2000s. In the US, growth was about 80% between 2005 and 2012, and telework remains much more popular and widespread in the US than in Europe [4]. Teleworking is not seen as an equivalent alternative to working in a workplace but as a privileged option by employees. However, managers often have a negative perception of teleworking, believing that if the worker is not present at their workplace, then they may not work with the same intensity or efficiency [5]. The COVID-19 crisis has compelled businesses to adopt new approaches and innovate rapidly. In response to health restrictions, remote work emerged as the sole viable solution. Across the globe, the pandemic has caused a significant disruption in employees' daily work routines, with most companies making a near-total transition to telework [6].

Agility is a concept that has been defined in different ways over the years, but the common thread across various definitions is its ability to adapt to change quickly and effectively. The term was first introduced in the context of flexible manufacturing in the mid-1990s, and it was described as dynamic, context-specific, aggressive in adapting to change, and oriented towards growth. Later, in 2002, agility was defined as the ability to create and respond to change for profit in a turbulent business environment. In recent times, several agile methods have been developed for application development. While each of these methods has its own unique characteristics, they all share the values and principles established by the Agile Manifesto in 2001. One of the most commonly used Agile frameworks is Scrum, with many companies already implementing some form of distributed Scrum within their organization [7]. Hence, our focus has primarily been on studying teleworking in the context of this specific agile method.

Several studies have already examined the impacts of telework. For instance, Burton et al. (2021) conducted an extensive manual and scientometric literature analysis to determine the current understanding of teleworking in the construction sector [8]. They suggested that future research should focus on case studies demonstrating the impact of teleworking practices at the organizational level on individuals, companies, and projects when most participants are telecommuting. Additionally, Miglioretti (2021) proposed a tool for assessing the quality of telework perceived by employees (QoT-q), to evaluate the effect of different levels of telework implementation on work outcomes [9].

The last year and COVID 19 pandemic have seen appearing several works specifically addressing Agility and Telework. However, the term "agility" in these works is often used to describe the capability to adapt to unpredictable circumstances and rapid changes, drawing on theories of adaptability, perception, reaction to change, and associated

[†] <https://www.oecd.org/coronavirus/policy-responses/le-teletravail-pendant-la-pandemie-de-covid-19-tendances-et-perspectives-e76db9dd/>

competitive advantages. The definition of agility varies across studies, and its significance in business survival has been further emphasized during the COVID-19 crisis. We found several papers which were really addressing the same problem of agile methods and telework. [10] proposes a work from the point of view of a mixed approach composed of remote work and 4 day work week, mainly looking at the effects on productivity, job satisfaction, and social culture. [11] only addresses the SCRUM method but raises interesting notions about its adaptation in the context of telework.

3. Research Methodology

The research process we used is described in the following figure.

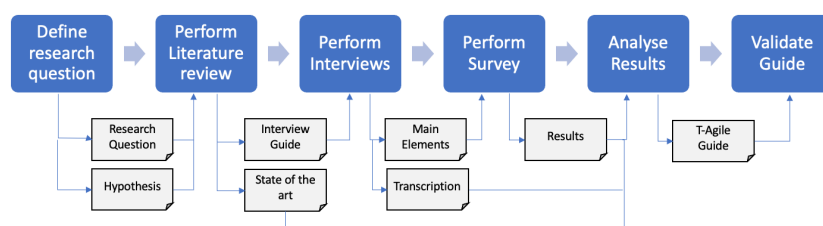


Fig. 1. Research methodology

Step 1: Define Research Question. The COVID-19 pandemic and subsequent lockdowns have forced many businesses to adapt to telework and continue with their agile work remotely. As a result, the feasibility and success of agile work in a telework environment have become a popular and pressing topic of interest for those involved in agile development. Thus, our research question is whether **is it possible to work in an agile manner while teleworking.**

This research question leads to the following hypotheses: H1: The Scrum Master plays a major role in the team's transition to remote working, H2: Communication is at the center of this transformation, H3: Teleworking agility requires only video-conferencing tools, H4: Keeping the rituals and setting up activities remotely helps maintain the synergy of the group, H5: Agility is a particularly suitable technique for teleworking, H6: Telework agility is only possible in large groups, H7: Telework agility is only suitable for a certain category of employees, H8: Telework agility helps maintain the well-being of team members, H9: 100% telework agility is not a viable solution in time, and H10: Hybrid work and agility are compatible and can last.

Step 2: Perform Literature Review. It is during the lockdown that the question of agility in telecommuting has gained significance and emerged as a concerning subject. Therefore, it is still a relatively new topic. However, there already exists a substantial body of scientific literature on the subject, including articles based on surveys or interviews. It was thus appealing to also rely on these resources to corroborate, contradict, or provide additional insights into the data collected during the interviews and questionnaire. The extraction of this data was carried out using thematic analysis, which involved retrieving and utilizing only the deemed relevant passages alongside the previously obtained information. We used Google Scholar and the SCOPUS scientific database to find the relevant works for our research question and snowball to find more related works. Different queries have been used combining the following terms: telework, remote work, agile, agility, project management, and so on. We did not conduct a systematic literature review but rather sought to provide a relatively broad overview of the subject that interested us.

Step 3: Perform Interviews. In this study, we chose to interview individuals who practice the role of Scrum Master. According to the Scrum Guide [12], the Scrum Master is a leader at the service of the team and must accommodate and supervise his team, ensure that agile events run smoothly and are respected in the time available, and remove obstacles that may arise. Given their multiple responsibilities and their crucial role in maintaining agility within the team, Scrum Masters are the most relevant stakeholders to be interviewed for this study. Then, three expert Scrum Masters from various sectors were interviewed. The project teams ranged in size from 5 to 30 members. The interviews were conducted in person, recorded via dictaphone, and lasted between 40 and 60 minutes. As explained in [13], there are three types of interviews: directional, non-directive, and semi-directional, and we opted for semi-directional interviews, allowing the speaker to explain their point of view more extensively. All interviewees answered the same

open questions about the experience of agility before and during telework, the challenges faced, and their beliefs about the future of telework agility. All transcriptions of the interviews can be found in [14]. We stopped after three interviews as the collected information seemed to reach a saturation point where no new main element was collected.

Step 4: Perform Survey. An online survey was conducted which comprised open-ended, close-ended, and mixed questions, divided into three main sections: context, problems and hypotheses about agility in teleworking, and the profile of the respondent. Google Forms was used due to its ease of use and free accessibility. The survey targeted individuals who work in IT teams utilizing agile methods and have experienced teleworking. It was shared with agile communities, colleagues, students, professors, and professional groups on LinkedIn, and we have received 35 responses during the allotted time dedicated to this stage. The answers came from apprenticeship students, trainees, managers, and providers, ranging in age from 18 to 56 years, and holding positions such as developers, architects, consultants, managers, project managers, Product Owners, or Scrum Masters, with an agile experience in telework ranging from 1 to 5 years. The online survey was developed based on the insights gained from the interviews to better define the questions and significant elements. The questionnaire and its analysis are detailed in [14].

Step 5: Analyze Results. The findings from the three preceding stages have been analyzed to address the research question. Each hypothesis was examined based on these three perspectives (section 4). A guide to Agility in telework has been defined, composed of the best practices that emerged from this analysis (section 5).

Step 6: Validate Guide. We validated our Guide to Telework (T-agile guide) by subjecting it to evaluation by another expert who applied it to a specific case study (section 5).

4. Results analysis

4.1. Telework agility: a necessary adaptation

This section discusses challenges and solutions for shifting to telework in agile project management.

Scrum Master leadership role (H1). As per the Scrum Guide [12], the Scrum Master is responsible for various duties towards the team, Product Owner, and the organization. This includes guiding team members towards self-management and multidisciplinary collaboration, helping the team focus on creating value, removing obstacles that may hinder team progress, and ensuring the effectiveness of agile rituals. The Scrum Master facilitates the development process and ensures that the team uses the full range of appropriate values, practices, and agile tools [15]. Based on the survey, the interviews, and the literature, we can validate H1 as trustworthy, as shown in Table 1.

Table 1. H1 Study Results

H1: The Scrum Master plays a major role in the team's transition to remote working
<p>Survey. The survey revealed that the Scrum Master played a significant role in the transition from face-to-face to remote work, ranking second after managers in terms of importance. According to respondents, the Scrum Master was responsible for driving the necessary changes to maintain agility, implementing new tools, improving the use of existing tools, and ensuring adherence to all agile ceremonies. Additionally, the Scrum Master maintained regular contact with team members and provided encouragement to the team.</p> <p>Interviews. Throughout their interviews, the Scrum Masters described the numerous challenges they faced in helping their teams adapt to the agile approach of working from home. These included regularly assessing team morale, integrating new team members, implementing new tools and agile practices, and promoting agile ceremonies.</p> <p>State of the art. The role of the Scrum Master is crucial in the transformation towards remote agility, given the tasks that they are responsible for. As stated in [16], the importance of the Scrum Master has increased during the health crisis, as their role is to facilitate remote agility.</p>

Communication Issues (H2). Communication plays a crucial role in the IT industry, managing relationships between project stakeholders [17], and fostering trust and transparency within teams, making software development more efficient for companies [18]. The authors of the Agile Manifesto recognized the importance of communication as a foundation of agility. Agile practices require frequent and effective communication. Barriers to communication should be minimized, and direct means of communication should be ensured. Table 2 confirms the importance of communication as validated by the survey, interviews, and state-of-the-art.

Table 2. H2 Study Results.

H2: Communication is at the center of this transformation

Survey. In response to the question "Which principles were the most difficult to maintain?", more than 75% of the respondents placed interactions between individuals in the first position. Many found it challenging to communicate with colleagues remotely and felt obligated to respond when solicited. Therefore, their understanding of communication has changed.

Interviews. One expert stated that the primary challenge for agility during this period is communication, and several Scrum Masters agree that communication is a cornerstone of agility. Working remotely, they faced many challenges with their team, such as communicating with the business or adapting to digital communication. Once they adapted, they felt that communication was well-managed and even improved.

State of the art. Communication and social interactions were the most affected aspects of the transition to telework, according to [19]. Respondents reported encountering difficulties and explained the changes that were made to maintain communication. In a separate study [20], most interviewees considered the transition to fully online communication as the most challenging aspect of the shift to telework.

Evolution of agile tools and practices (H3 & H4). To maintain agility while working from home, companies had to make changes and adapt their practices. Some agile principles, such as co-location and planning agile rituals and ceremonies, were rigorously applied. However, teams faced challenges due to the lack of physical equipment as tools for managing agile projects. Therefore, it was essential to adapt agile practices and adopt new tools to ensure successful telework. Three types of tools have proven to be extremely useful during the lockdown: web conferencing tools, visual management tools, and project monitoring tools. We invalidate H3 (Table 3), but we validate H4 (Table 4).

Table 3. H3 Study Results.

H3: Teleworking agility requires only video-conferencing tools

Survey. The majority of respondents utilized new communication, visual management, and project monitoring tools within their teams. They also took advantage of new features in previously implemented tools. Additionally, they incorporated animations during meetings, increased the frequency of agile rituals, and utilized mini-teams and virtual cafes.

Interviews. The Scrum Masters who were interviewed and implemented significant changes within their teams did not only rely on video conferencing tools. They employed various tools and practices that were similar to those mentioned by the respondents to achieve agility in telework. One expert even introduced peer programming to promote socialization and knowledge sharing.

State of the art. The findings of [20] contradict the hypothesis that using various tools and peer programming is ineffective in achieving agility in remote work. As per [21], a successful transition to remote work depends on several factors, including the quick adoption of digital tools like virtual boards, communication tools, and collaboration tools. These findings are confirmed by [11] with a quick adaptation to new digital tools.

Table 4. H4 Study Results.

H4: Keeping the rituals and setting up activities remotely helps maintain the synergy of the group

Survey. Most of the respondents in the survey stated that they continued to follow agile rituals and ceremonies, and also met informally with their team. They reported that these new measures helped them maintain the team's synergy and harmony, and gave them a sense of belonging.

Interviews. The interviewees observed that the team had been re-energized and found a renewed spirit and cohesion as soon as informal meetings were established. They emphasized that maintaining rituals and adding new ones, when necessary, allowed for the monitoring of each team member and helped to keep the communication channels open between team members.

State of the art. Agile rituals and ceremonies are organized to increase team collaboration and productivity [19]. [22] and [23] suggest incorporating informal communication points to maintain social interaction and compensate for the lack of physical co-location. [24] states that social practices, such as daily meetings, can help maintain social interaction within teams. Strict routines can become more flexible remotely [11].

4.2. Agility as a lever for success at home.

We aim to illustrate the benefits of applying agile principles to telework. Firstly, we will demonstrate that in many ways, agile principles align with telework, and vice versa. Secondly, we will provide evidence to show that agility can be implemented in various types of companies and is suitable for different types of individuals. We will also argue that applying agility helps to maintain the well-being of teleworking team members.

Adequacy Principles (H5). As stated in the Agile Manifesto, "the simplest and most effective method of conveying information to and within the development team is face-to-face dialogue" [15], early agile teams were designed to work in a co-located setting. Thus, applying agile principles to remote work may seem challenging or even impossible. However, distributed teams, where team members do not necessarily live in the same location, have been traditionally used by many groups. It enables many companies to tackle current global challenges and become more competitive, allowing employees to stay in their current country and accept job opportunities more easily. Distributed agile teams face numerous challenges beyond just working from home. They have additional responsibilities such as coordinating between different time zones and establishing collaboration between several development cultures. However, telework agile is a popular option that has already proven successful. It is reasonable to assume that many of the principles and practices of agility align with telework. Table 5 shows why we confirm H5.

Table 5. H5 Study Results.

H5: Agility is a particularly suitable technique for teleworking

Survey. Over 86% of the respondents consider agility to be the most fitting approach for teleworking. All participants practicing agility for three or more years believe that it is the most suitable technique. Agility makes it easier for them to manage their remote work on a daily basis.

Interviews. The Scrum Masters are completely convinced of the suitability of agility for telework. One of the experts believes that agility, based on collaboration and transparent communication, provides a solid foundation for telework. Another expert adds that with the current tools available, it is very easy to implement both telework and agility.

State of the art. The Agile Manifesto and telework appear to complement each other. The manifesto's principle of embracing change [25] is exemplified in the recent pandemic, which forced millions of employees to telework. Agility teaches teams to adapt to unforeseen circumstances and be comfortable with any situation, enabling them to take appropriate measures and maintain productivity. Remote agility has been successful even before the pandemic [26]. Managers and experts agree that agility and agile project management work well in a telework setting [20]. Additionally, studies have shown that remote projects using Scrum are more likely to succeed [27].

Suitable for a large number of companies (H6). In the constantly evolving and innovative field of IT, there is a high demand for IT teams across various sectors such as banking, defense, telecommunication, digital services, software publishing, industrial and commercial enterprises, and government agencies. Agility has been gradually adopted in various professional environments, including start-ups, SMEs, and large national and international companies. These organizations have recognized the benefits of agile methods, which allow for rapid adaptation to changes and quicker product development. However, large companies often encounter more difficulties in implementing agile methods due to hierarchical issues and the need to adapt their organizational culture. Therefore, the implementation of agility requires an adaptive approach that can help organizations maintain their competitiveness. Table 6 shows that H6 has been invalidated.

Table 6. H6 Study Results

H6: Telework agility is only possible in large groups

Survey. Participants almost all agree that agility in teleworking is possible.

Interviews. Our experts work in companies of different sizes and sectors with varying resources, yet they all agree that their respective companies have successfully adapted to and adopted agile practices in teleworking, while maintaining productivity.

State of the art. Many studies ([19], [20], [21]) have analyzed data from various sectors and businesses and have all come to the conclusion that team productivity remains constant or even improves with the adoption of agile practices in teleworking.

Suitable for a large number of employees (H7 & H8). The Scrum Guide [12] states that agile teams are composed of multidisciplinary members who possess all the skills required to create value at each iteration. These teams are self-managed and decide amongst themselves on tasks, deadlines, and how to execute them. Our findings validate both H7 and H8 (confirmed through the survey, interviews, and state of the art research, as shown in Tables 7 and 8).

Table 7. H7 Study Results

H7: Telework agility is only suitable for a certain category of employees

Survey. The questionnaire was administered to a diverse population of individuals, including men and women aged 18 to over 56 years old, occupying various positions such as managers, service providers, trainees, and apprentices. Over 82% reported a positive experience, and an equal proportion of them was satisfied or very satisfied with how agility allowed them to comprehend and cope with this situation.

Interviews. The interviewees identified various categories of employees who initially seemed hesitant to work remotely but could benefit from agility and its practices to adapt to telework. This suggests that remote agility can be a viable option for a wide range of individuals.

State of the art. A study by [19] which surveyed 96 respondents with diverse backgrounds found a favorable attitude towards teleworking with agility and that individuals have been able to adapt to it.

Table 8. H8 Study Results

H8: Telework agility helps maintain the well-being of team members

Survey. Over 82% of the respondents rated their well-being at work between 7 and 10, with the majority rating it an 8. They feel appreciated, challenged, empowered, and part of a team, which all contribute to their well-being.

Interviews. Our experts suggest that implementing informal agile practices can be highly effective in boosting team morale and maintaining well-being.

State of the art. [21], based on scientific literature such as [28] and interviews with several agile development teams, validated the hypothesis that the well-being of agile team members remains stable or even increases during telework. At the same time, this work rejected the hypothesis that there is a decrease in the well-being of agile team members.

4.3. Towards a trivialization of telework?

Telework is a positive experience for many employees, improving their quality of life by saving them transport time, offering freedom in time management, reducing stress, and providing benefits for family life. It can take different forms, such as a "total" form where the team works only from home (remote work) or a hybrid format with some days working on-site (telework). Therefore, it is important to examine this phenomenon to identify the best solutions.

Is 100% remote work a viable option? (H9). This refers to working exclusively from home. During the first lockdown, this practice became widely adopted due to health restrictions, with companies having no choice but to implement it. It was noted that despite the circumstances, the world economy managed to maintain itself and even led to impressive productivity gains in some cases. Results from the questionnaire indicate that over 75% of respondents have already worked in a 100% remote setup. However, this hypothesis remains unverifiable through the survey and is still an open question based on the interviews and state-of-the-art research (Table 9).

Table 9. H9 Study Results

H9: 100% remote work agility is not a viable solution in time

Survey. Only one respondent is currently working 100% remotely, while more than 66% of those who have already worked remotely consider teleworking and agility to be compatible. However, it is unclear whether they advocate for it in the future or not.

Interviews. The interviewees explain that while 100% remote working is possible, it may not be desirable as it can lead to difficulties such as a loss of communication and interactions.

State of the art. In [19], respondents were asked to reflect on future work options, but the possibility of exclusively working remotely (100% remote work) was not mentioned.

An hybrid solution: between face-to-face and distance (H10). The hybrid form can take various forms [20], such as some workers working in the office while others working from home and taking turns, or the entire team working face-to-face and remotely on the same days. It offers employees the benefits of working from home, while also allowing them to regularly interact and collaborate with colleagues in a physical space. This approach aligns with the foundational principles of agility, such as human interactions and co-location. Agile ceremonies can also take place during face-to-face meetings. Moreover, the hybrid solution is a good compromise, as it allows for the continued use of invested equipment and the use of office premises. This hypothesis (H10) has been verified and therefore validated.

Table 10. H10 Study Results

H10: Hybrid work and agility are compatible and can last

Survey. According to the survey, 88% of the respondents are currently using the hybrid work model. They consider co-location to be important but not necessarily mandatory, which is in line with the hybrid work concept.

Interviews. The Scrum Masters have advocated for the hybrid work option, considering it fully compatible with agility. They see it becoming the norm in the future.

State of the art. According to the majority of respondents in [19], the hybrid model is the preferred way of working in the future. This is in line with the decisions of many organizations, as reported in [16] and [20], to implement hybrid work after the pandemic.

5. T-Agile, or how to be agile in telework

Following the study, we have developed a guide called T-Agile (which stands for *Agility in Telework*) consisting of best practices to help agile teams prepare for and successfully transition to remote work (Fig. 2). The aim is to train teams to work remotely by adapting agile practices while maintaining team well-being and business goals.

T-Agile validation. We enlisted the expertise of a scrum master who works with two teams on the same product in a French company. Each team consists of 8 members with diverse skills, including developers, UX designers, accessibility specialists, UI designers, test automation engineers, and business analysts. The expert agreed to simulate the implementation of the guide by filling them out as if they were starting their teams' shifts in March 2020 during the first lockdown, thus providing feedback and comments (see Fig. 3). Our expert found that the guide comprehensively covers the issues that teams may encounter when working from home. While practices may need to be adjusted depending on the context, the guide provides a solid framework for starting the process. The results suggest that this guide is a strong foundation for helping an agile team transition to remote work, even if some steps may not be applicable to every team depending on their context and needs. It is important to adapt it to the team's specific challenges and identify the elements that are most relevant to their needs.

A. Ensure Proper Distancing Adaptation	
Tasks - Contact team members individually - Discuss professionally and informally - Identify and resolve potential issues - Indulge and listen - Welcome newcomers Goal : Ensure the well-being of the team so that they can be in optimal working conditions	Responsible: Scrum Master Concerned: The team Tools: Web conference tools Period: Always with more attention at the start
B. Learning to communicate in distance	
Tasks - Remove a priori caused by distancing (discomfort with asking a colleague, feeling obligated to respond immediately to a message) - Set up asynchronous communication - Creation of communication channels - Communicate through visual media Goal: Achieve a level of communication and collaboration similar to face-to-face	Responsible: Scrum Master Concerned: The team Tools: Dialogue and digital tools Period: From the beginning of telework
C. Reconnect with people outside the team (customer, business, other teams)	
Tasks Create dedicated communications channels - Provide access to team project monitoring tools to external people - Create a process to guide them in describing their needs on project monitoring tools - Intensify sending emails Goal : Achieve a level of communication and collaboration with these actors similar to face-to-face	Responsible: Scrum Master Concerned: The team Tools: Web conference and project management tools Period: Always with more attention at the start
D. Adapt meetings to distancing	
Tasks - Toggle meetings online - Learn how to manage the use of the video camera - Learn how to manage the use of screen sharing (for those who share and those who watch) - Learn how to make an exchange attractive (camera, interactive board, etc) Goal : Maintain human communication and interaction	Responsible: The team and the scrum Master Concerned: The team Tools: Web conference and visual project management tools Period: Always with more attention at the start
E. Improve user experience of project monitoring tools	
Tasks -Clean up the presentation of tickets/cards Create discussion spaces in map comments - Further train the team on tool Goal : - Facilitate teamwork - Make use of the tool, which has become the team’s only reference point, and attractive - Satisfy the team	Responsible: Scrum Master Concerned: The team Tools: Project management tools (ex: Jira) Period: Directly from the start
F. Maintain team visual management	
Tasks - Purchase of new visual management software - Set up an online board - Place cards on board - Train team on tools Goal : - Virtually replace equipment used on site for agile project management (Post-it, whiteboard, etc.) - Allow the team to have the same comfort as in person	Responsible: Direction and Scrum Master Concerned: The team Tools: Visual project management tools (ex: Klaxoon) Period: Directly from the start
G. Implementation of peer programming	
Tasks - Form pairs - Determine pilot and observer in duo - Code Pilot and Observer simultaneously check written lines - Regularly switch roles Goal : - Share knowledge - Work effectively - Socialize	Responsible: Lead developer and team Concerned: the developers Tools: Remote connectivity software (e.g., Teamviewer) Period: Directly from the start
H. Adapt agile rituals and ceremonies	
Tasks - Diversify agile rituals (e.g., community) - Increase the duration of dailys if necessary - Energize meetings (e.g. use of white board) Goal : - Dedicate time to verbalize issues - Have a better view of the work done by others - Re-energizing Agile Rituals	Responsible: Scrum master Concerned: the team Tools: Web conference and visual project management tools Period: Directly from the start
I. Setting up informal moments	
Tasks - Set up online meetings to recreate informal moments such as virtual cafés, virtual aperitifs or games (karaoke, drawing is winning, etc.) - Plan these times regularly (once a week for coffee or aperitif and once a month for games) and on a significant niche. Goal : - Address lack of informal time (coffee break, lunch) - Recreate these moments of sharing in distance - Regain team spirit and cohesion - Straighten out team tensions - Create a sense of belonging to a group	Responsible: Scrum master Concerned: the team Tools: Web conference tools, board games, coffee breaks, etc. Period: Directly from the start

Fig. 2. T-AGILE guide.

A. Ensure Proper Distancing Adaptation (From March 17, 2020 until today)	
To do: Identify and resolve potential issues	Comments. It can be difficult to detect and resolve team member issues especially those related to their emotions and feelings.
B. Learning to communicate in distance (From March 17, 2020 - continuous adaptation following the requirements)	
To do: Remove a priori	Comments. In my opinion, a priori issues are difficult to combat and often persist.
C. Reconnect with people outside the team (Done)	
All tasks already done or not applicable	Comments: The other teams already had access to our Jira and it always worked well; Sending emails is not applicable to our context. Our company's policy is to avoid sending large volumes of emails and to promote a more consistent speaking time. My team, therefore, favored verbal exchanges.
D. Adapt meetings to distancing (Done)	
All tasks done	Comments: Screen sharing was already a team practice; Using the camera is a practice I keep reminding you of; Making exchanges attractive is a task to be constantly improved.
E. Improve user experience of project monitoring tools (Done)	
Tasks already done or not applicable	Comments: This step did not need to be implemented because the team already had a very good mastery and some habits of the Jira tool; An interesting phenomenon has been the appearance of much larger maps.
F. Maintain team visual management (Done)	
Tasks done or not applicable	Comments. These tasks had already been completed as some team members had already had the opportunity to telework.
G. Implementation of peer programming (Several months after the start of telework)	
All tasks have been done	Comments: Peer programming was already used in person. At the beginning of telework, this practice was abandoned and then brought back into the mainstream a few months later; The formation of the pairs takes place naturally between the members of the team.
H. Adapt agile rituals and ceremonies (From March 17, 2020)	
All tasks have been done	Comments: At the start, the dailys were longer as the team needed more time to describe their work progress but also to find out about the others work. The duration was naturally regulated after a few weeks/months; Teleworking was an opportunity to renew and experiment with new things at agile meetings and ceremonies.
I. Setting up informal moments (One month after the beginning of telework)	
All tasks have been done	Comments. These informal items were the initiative of the team and were set up by itself. It could take the form of lunch, coffee or virtual afterwork.

Fig. 3. T-Agile application to a case study.

Validity threats. We conducted an analysis of potential biases that could threaten the validity of our research. **Construct validity:** The interview questions were extensive, which may have caused respondents to provide shorter answers leading to possible misinterpretations. To prevent this, we asked clarifying questions during the interviews when uncertainties arose. **Internal Validity:** We worked in pairs during the data collection to identify each result, and researchers who did not participate in the data collection were responsible for the procedure and results of the data analysis to avoid bias. **External Validity:** the study was conducted solely in France, which limits the generalizability of employee characteristics both in interviews and the survey. Nonetheless, we compared our findings with existing international literature. The main limitation of our work is the number of survey responses, which can be considered inadequate for our second stage. Nevertheless, in the first stage, three experts were sufficient to identify the primary hypothesis and determine which agile values or principles were worth studying. To address this limitation, we supplemented the survey results with insights from the literature review and interview responses. **Conclusion validity:** We have presented and discussed our findings with another expert. In this context, no major ambiguities or inconsistencies were found.

6. Conclusion

We attempted to address the research question, "Is it possible to work in an agile manner while teleworking?" by gathering data from three interviews, a survey, and existing scientific literature. Based on our research, we conclude that it is indeed possible to practice agility while teleworking. In fact, certain aspects of telework are facilitated by agility and its principles, making it a highly suitable technique for remote work. The principles of the Agile Manifesto and agile values, such as embracing change, continuous improvement, and fostering a healthy and transparent team

environment, are excellent examples of this. After the necessary adaptation, telework has convinced companies and their employees to continue using it, even with the easing of health measures. Currently, companies have two options: 100% remote work and hybrid work. From an agility perspective, hybrid work is the most optimal solution as it maintains the benefits of teleworking while also preserving interactions and communication, which can sometimes be difficult to manage remotely, by returning to the physical office on an occasional basis.

We have proposed T-Agile, a guide for Agility in Telework, to ensure good agile project management when introducing telework in a team, and validated it with an expert, yielding good results. Given the results obtained, it is legitimate to ask whether agility in telework, specifically hybrid work, will become the norm in IT project management in the long term.

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