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Agile Distributed Teams: the combination of Agile and Distributed approaches

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Abstract

Purpose of the paper: Globalisation has encouraged companies to develop a distributed approach with teams dispersed across several sites. The covid-19 outbreak has accelerated this trend, forcing team members to interact virtually, challenging agile methodology performance. This study analyses the main aspects of the agile and distributed approaches that are different but complementary and can coexist within the same team.

Methodology: To achieve our objective, we develop a multiple case study collecting data mainly through in-depth, face-to-face interviews with distributed units of small and large companies. We also referred to other data sources such as internal reports and online documents to ensure data triangulation.

Main Findings: Our findings highlight the main issues related to distributed and agile approaches integration, similarities and differences between companies by underlining their primary triggers and critical aspects.

Practical implications: By implementing several tools and measures to mitigate these two approaches' contrasting effects, agile teams can benefit from an agile approach in distributed environments.

Originality/value: Our study investigates an overlooked topic by highlighting empirically the complementary approach, triggers and differences between agile management and distributed team in order to understand how agile teams work in distributed environments.

Keywords: Agile Management; Agile Distributed teams; Multiple-case study.

1 Introduction

The rapid evolution of market conditions is affecting how business projects are handled. Agile is one of the most frequent approaches companies choose to deal with such dynamism. The agile approach has been mainly developed as a mindset that involves a specific methodology to support software companies in delivering high-quality software (Lawal and Ogbu 2021). It relies on feedback (Berczuk 2007) and co-locating teams in a shared workspace where they can interact, improving communication and collaboration (Ghani et al. 2019). Accordingly, agile principles promote face-to-

face conversation as the most effective way to share information between team members (Deshpande et al. 2016).

However, over the years, globalisation supported by new technologies has encouraged companies to develop a distributed work approach with multiple teams dispersed around the globe or individual team members spread across several sites (Sharp et al. 2012).

The distributed approach helps companies find professional human resources worldwide, reducing time to market and production costs (Matalonga et al. 2013).

Although the distributed approach has been a strategic choice for organisations, after the Covid-19 outbreak, its adoption has accelerated. The Covid-19 pandemic forced companies to create virtual environments and promote interactions between employees through digital tools due to the impossibility of keeping workers and teams together in a specific location.

However, the distributed approach could sometimes challenge the agile methodology performance due to several issues caused by the physical distance between team members. Indeed, distributed teams are made up of organizationally or geographically dispersed members linked primarily through advanced information and communications technologies (Daft 2021). The physical distance negatively affects communication, collaboration, and coordination, influencing the control and quality of projects (Dorairaj and Noble 2013; Blomkvist et al. 2015; Sistla et al. 2016; Ghani et al. 2019), lack of trust and cohesion and therefore the absence of "team identity".

Therefore, due to the pandemic, the agile co-located teams working on a project could be distributed over several time zones and geographic locations (Smite et al. 2021) as they shifted toward virtual collaboration. This change might compromise their equilibrium and the benefits of the agile approach based on face-to-face interaction (Ghani et al. 2019; Sharp et al. 2012) and trigger several geographical, temporal, and cultural obstacles (Smite et al. 2021).

An agile distributed team is mainly characterised by two, apparently, opposite dimensions: a high level of agility together with a high level of virtual collaboration (upper right quadrant) (Figure 1).

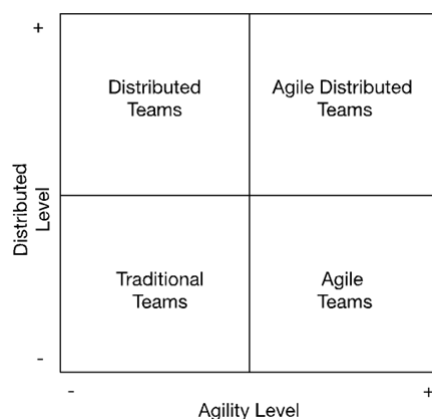


Figure 1 – Teams typology based on agility and distributed level

Source: authors elaboration

However, there is still a lack of understanding of the efficiency of agile distributed teams and the problems they encounter. Therefore, there is still space to go deeper into the functioning of agile distributed teams involving individuals “*working together to accomplish project goals from different geographic locations*” (Alzoubi et al. 2016, p. 22) by applying the agile methodology values and principles. More in detail, we address the following research question: *How can be distributed and agile approaches effectively combined?*

To answer the research questions, we investigate agile distributed teams with team members working alone in different locations inside the same country and abroad (Dorairaj et al. 2013; Sharp et al. 201) by adopting a multiple-case study approach in order to find similarities and dissimilarities between them (Eisenhardt, 1989).

The paper is structured as follows. The paragraph dedicated to the research background investigates the literature and the gaps the study wants to address. The methodology section describes the methods we adopted to explore the research gap and address the research question, including companies' profile descriptions. Then, the finding section shows the main results of the analysis. At the same time, the discussion and conclusion highlight the main issues related to distributed and agile approaches integration, similarities, and differences between companies by underlining their primary triggers and critical aspects, underlining implications both from a theoretical and an empirical point of view, and, finally, suggests future research directions.

2 Research background

Agile methodologies “*work very well in highly dynamic business and IT environment as they help the team to respond to change and continuously deliver business value*” (Shrivastava and Rathod 2015, p. 374). The agile approach is flexible and non-linear, and it encourages the embrace of changes allowing companies to deliver high-quality products favouring the achievement of customers' expectations (Thesing et al. 2021; Shrivastava and Rathod 2017).

Agile methodologies are iterative (Lawal and Ogbu 2021) and rely on feedback mechanisms (Berczuk 2007), constant face-to-face communication (Deshpande et al. 2016), close collaboration between team members, self-organisation (Sharp et al. 2012), and customer inclusion in the process of development (Thesing et al. 2021). They allow for lowering the development time of projects and harmonising goals with deliverables (Belsis et al. 2014).

The agile approach has been considered more efficient when implemented inside dedicated workspaces where small co-located teams work together (Lawal and Ogbul 2021; Ghani et al. 2019). Co-location represents one of the successful principles of the agile approach (Sharp et al. 2016) as it promotes informal face-to-face communication nurturing trust and cohesion among team members allowing their cooperation thus improving the team's performance (Gregory et al. 2022). Moreover, teams' co-location helps simplify problem-solving practices to speed up decision-making (Comella-Dorda et al. 2020).

Today, the benefits of agile teams' co-location such as face-to-face communication among members (Matalonga et al. 2013; Ghani et al. 2019), promptly feedback and updates (Sharp et al. 2012; Rizvi et al. 2015), mutual awareness, self-organisation, retrospectives (Shrivastava and Rathod 2015), and frequent delivery of working software (Sharp et al. 2012; Deshpande et al. 2016) could be compromised by the decision of companies to have team members dispersed around the world (Dorairaj et al. 2013) or across several sites (Sharp et al. 2012) within the same country (Alzoubi et al. 2016) that work on the base on virtual collaboration.

The adoption of a distributed approach has been encouraged by globalisation that has improved the opportunities to search for new resources around the world (Sharp et al. 2016; Sharp et al. 2012; Scharff 2011; Rizvi et al. 2015), sometimes relocating employees to lower-cost countries, accessing new and larger pools of talents (Ghani et al. 2019) and favouring the reduction of costs related to physical headquarters. Moreover, the increasing development of new technologies makes digital collaboration possible among team members, even at long distances.

However, the distributed approach's effectiveness may depend on difficulties in terms of culture, time, knowledge, and experiences by triggering challenges related to communication, coordination, cooperation, collaboration, and control (Ghani et al. 2019), reducing cohesion, and increasing inefficiency (Comella-Dorda et al. 2020). These problems strongly impact the team's dynamics by threatening the team life cycle and the socialisation process, causing, for instance,

barriers to trust development and the absence of team spirit (Dorairaj and Noble 2013; Dorairaj et al. 2013; Ghani et al. 2019; Šmite et al. 2021; Kahya and Seneler 2018).

Despite the difficulties generated by physical distance (Blomkvist et al. 2015), agile companies are moving more frequently toward a distributed approach (Majchrzak et al. 2014), recently encouraged by the advent of the covid-19 emergency.

The pandemic forced companies to keep their employees working from home and create a virtual environment to support the coordination and collaboration of their teams. On the one side, it has brought out different issues mainly related to the work-life balance, performance of agile work practices, adoption of communication and collaboration virtual tools, and the process of forming virtual teams (Mancl and Fraser 2020). On the other side, the pandemic has stimulated agile companies experimenting with remote working during the covid-19 emergency to quickly transition to a fully distributed approach to benefit from advantages deriving from the combination of both approaches. Indeed, the removal of geographical limits, related to the adoption of a distributed approach, favours offshoring and outsourcing processes, enhancing the progress of remote collaboration in agile teams (Mancl and Fraser 2020) that used to be co-located.

At the same time, the implementation of agile methods or working practices such as Scrum (Pries-Heje and Pries-Heje 2011; Paasivaara et al. 2008, 2009; Khmelevsky et al. 2017; Berczuk 2007; Holmström et al. 2006; Hossain et al. 2009) and the eXtreme programming (Paasivaara and Kruchten 2020) have been considered suitable for lowering communication, coordination, and control problems (Holmström et al. 2006), while agile retrospective revealed a high potential in improving distributed collaboration among team members (Duehr et al. 2021).

According to some studies, the agile distributed approach can support delivering better-quality products and developing “*flexible and evolving solutions*” to achieve companies’ business needs (Shrivastava and Rathod 2015).

Its adoption has recently increased as the application of different practices and tools (Lehtinen et al. 2014) has been recognised as able to reduce the impact of physical distance (Hossain et al. 2009; Holmström et al. 2006), improve communication (Kahya e Seneler 2018), lowering coordination and control issues (Sharp et al. 2012) by making the approach more effective (Phalnikar et al. 2009; Matalonga et al. 2013; Scharff 2011). However, the literature indicates that no single method or working practice can solve the problems related to implementing the agile distributed approach (Lous et al. 2018).

Moreover, the broad range of results identified in the literature mainly focused on communication issues (Alzoubi et al. 2016; Blomkvist et al. 2015; Korkala and Abrahamsson 2011) which are considered the main aspects affected by the agile distributed approach. In addition, most studies have mainly focused on software companies and multiple teams distributed worldwide. In contrast, less has been observed about teams with members dispersed across several sites (Sharp et al. 2012) within the same country (Alzoubi et al. 2016).

According to previous considerations, the physical distance seems to represent the main factor that triggers the emergence of several issues for agile teams that became distributed. The combination of agile methodologies and principles with the distribution of working teams brings to evidence the contrasting effects deriving from the differences between the two approaches.

However, the lack of literature on agile distributed teams encourages us to explore how companies can mitigate the issues emerging from combining the agile and distributed approaches in order to support business goals. Therefore, this study aims to understand how agile distributed teams deal with conflicts deriving from the contrasting features of the two approaches being able to make them coexist.

3 Research Methodology

To reach our goal, we adopted a qualitative methodology (Saunders et al. 2019) as it fits with our study's purpose to analyse the agile distributed dynamics through the respondent's perspective.

The qualitative approach is applied through the development of a multiple case study (Yin 1994), aiming to operate logical replication between cases (Eisenhardt 1991) with the intent to analyse similarities and dissimilarities among them (Eisenhardt, 1989). The choice to develop a multiple-case study design concerns the compelling evidence and the overall robustness of results it brings if compared to a single case study (Yin 2018) by helping the researchers capture the richness and complex details of the phenomenon under investigation (Lindgreen et al. 2021).

The case selection process followed the principle of purposive sampling (Campbell et al., 2020; Bakkalbasioglu 2020; Etikan et al., 2015), involving four companies located in different regions of Italy, with different sizes and belonging to other sectors (e.g., services, software). To be eligible as a selected case unit, each company had to implement the agile approach in a distributed environment with team members dispersed across several sites in the country (Sharp et al. 2012; Alzoubi et al. 2016) or in different countries relying on virtual collaboration in the development projects.

Primary data were collected through semi-structured interviews (Saunders et al. 2019), considered a good method to collect data by maintaining certain flexibility according to the flow of the conversation. However, to increase the effectiveness of the interview process, aiming to obtain richness in data collection and identify important elements for the analysis, we adopted an interview protocol (Yeong et al. 2018; Milagros Castillo-Montoya 2016) to link the research questions to the objectives of the analysis, refine the interview track and validate the questions. Thus, after collecting the feedback from the group of authors, we also included consultants as experts on the phenomenon to collect more specific comments and improve the interview track.

The interviews were addressed to key informants directly involved in the companies' agile distributed teams. All the interviews were conducted in Italian between July and October 2021 by resorting to Skype, Zoom or Microsoft Teams due to the impossibility of meeting respondents face-to-face. They varied in length from 45 to 60 minutes. Moreover, each interview was digitally recorded and transcribed to facilitate the data analysis.

In addition, to ensure data triangulation (Yin 2018), we adopted multiple data sources by collecting secondary sources such as companies' internal reports and online documents we retrieved on companies' websites.

Data analysis was conducted using NVIVO computer-assisted tool for qualitative data through which data coding was carried out separately for each source of data collected by two authors and then discussed among the group of researchers.

4 Cases description

In the following paragraphs, a short presentation of the profiles of the companies involved in the analysis is described. The description follows the narrative of the key informant interviewed integrated with other relevant data recovered from secondary data sources.

Moreover, to respect the request of companies to remain anonymous, we renamed them by using the letter of the alphabet.

4.1 Company A

Company A is a small company born in 2018 from the merger of two software development companies, adopting agile methodology albeit with different approaches. The idea of the merger was to create a single entity that would provide a range of development services to the companies.

Initially, the company adopted a partially distributed approach, thus maintaining three locations where members can occasionally meet to work together and having half employees distributed among the country.

With the entrance of the new managing director, all the physical spaces were closed, and the company became an agile distributed firm that employs thirty-five individuals and five external collaborators working distributed around the country with a turnover of 2.8/3 million.

4.2 *Company B*

Company B was founded as an agile distributed company founded in 2015 that developed a technological platform to introduce a payment method based on instalments that can be integrated via API (Application Programming Interface) on e-commerce platforms.

The company is the first one in Italy that has combined deferred payments on e-commerce platforms and peer-to-peer lending, which is generally adopted to give credit directly to people rather than credit finalised for consumption. It is supervised by Banca d'Italia, from which it received the licence and the authorisation to operate.

Moreover, it counts thirty-five employees dispersed in the Italian territory and a marketplace of private investors.

4.3 *Company C*

Company C is a multi-utility company part of a group that was born in 1909. It is today the first operator in the water distribution sector operating in several Italian regions and abroad to a lesser extent.

Today, the company is investing mainly in the electricity distribution sector, digitisation, and innovation in the water distribution sector, which is a fertile ground compared to other sectors where these have already taken place.

Moreover, the company has embraced the agile approach because of the need to respond promptly to changes in the regulatory environment and the increasing requests of customers. However, it was forced to adopt a distributed approach because of the Covid-19 emergency, not to postpone the agile project scheduled for that period.

4.4 *Company D*

Company D is a large company founded in 2003 and is part of a group operating in Europe in the telecommunication industry.

Since 2018, it has started developing new strategies and implementing new practice models, including the agile methodology.

In 2020, it started entering new markets (e.g., the fibre market) and embracing a distributed approach despite the difficult situation dictated by the covid-19 emergency that forces the project management teams to work remotely. Therefore, the company implemented essential changes to meet emerging needs and involved several players worldwide.

These changes pushed the company to adopt for the first time a distributed approach by mixing it with the already implemented agile approach.

Table 1 - Companies' characteristics

Company code	Size (Number of employees)	Year of establishment	Core Business	Agile and distributed implementation
Company A	Small company (From 10 to 40 employees)	2018	Software house for digital services	Oriented to the Agile Distributed Approach from the beginning (i.e., Strategic choice).
Company B	Small company (From 10 to 40 employees)	2015	Instalment payment on e-commerce, financed by private investors and supervised by Banca d'Italia.	Oriented to the Agile Distributed Approach from the beginning (i.e., Strategic choice).
Company C	Large company (More than 500)	1909	Multi-utility company	Constrained to Agile Distributed Approach due to the pandemic.
Company D	Large company (More than 500)	2003	Telecommunication company	Constrained to Agile Distributed Approach due to the pandemic.

Source: authors elaboration

5 Multiple case study evidence

The evidence collected from the multiple case study highlights how the companies develop their agile distributed approach by showing similarities and differences between teams by underlining their primary triggers and critical aspects.

5.1 Reasons for embracing the agile approach.

Interviewees have described the agile approach as a set of methodologies that help companies to face uncertainty and the changes in the environment wherein they operate. More precisely, a description that considers what all the companies think of the approach is given by the interviewee of company B, which described it as “a way through which you do business and solve and implement your vision, basically through a mission”.

Companies A and B introduced the agile approach from the beginning of their establishment. In the case of company A, its implementation was a natural consequence of the fusion between the two previous companies, already well-aligned to agile principles and methodologies. The team implements agile without focusing on a specific “protocol” to follow, adopting the Scrum methodology in a highly flexible manner according to emerging needs. Similarly, all members of company B agreed to implement the agile approach by encouraging a technological and cultural transformation guided by the interviewee’s ten years of agile experience in the software industry. In this case, the team is more aligned to the eXtreme programming technique than the Scrum one, working interactively with sprints of one to two weeks.

Moreover, company D has adopted agile methodologies such as Scrum for several years and in different projects to guarantee teams’ flexibility. On the contrary, company C introduced the agile approach and the Scrum method more recently for developing specific projects to be more flexible and reduce project development costs and time.

Embracing the agile culture means following agile principles and values linked to people more than technology. Therefore, trust, inclusion, transparency, respect, courage, and independence are the most critical aspects that drive the business development of these four companies. Transparency is vital to keep the teams aligned at all levels and “to encourage trust that leads companies to reach

important objectives” (Company C) and the sharing of information with the team helps members better understand the company's general situation.

Moreover, employees' well-being is extremely important in encouraging self-organisation instead of operating a rigid control activity on them. Self-organisation is conceived according to a twofold point of view. On one side, there is the single individual responsible for their activities, while, on the other side, there is the self-organisation of a team that has to reach specific objectives. In the cases of large companies such as companies C and D, self-organisation embraces several levels as the companies include different teams.

The reasons that encouraged companies to embrace the agile approach are mainly represented by the need to respond to market change and complex problems, reducing project development costs and time by being more flexible.

Flexibility represents the key to spending the appropriate amount of time and money on a project, reaching the prefixed objectives by developing what the client requests according to the market's needs innovating more quickly supporting value creation.

Therefore, by adopting the agile methodologies, companies aimed to actively involve the clients in the project by establishing reciprocal trust and collecting constant feedback to reduce the development time and costs of the process, contrasting the obsolescence of products delivered by adopting traditional approaches (e.g. waterfall).

Indeed, the culture of feedback is another essential reason for the agile approach implementation that allows companies to understand potential emerging problems. The feedback helps review and improve the companies' approach. For instance, company A underlined the importance of regularly sharing with clients the improvements in the project developments by highlighting that *“the weekly feedback of the clients on the progress of the projects allows in optimising the project development”*.

In addition to client feedback, company B also follows operates by following two different approaches to stimulate internal feedback between team members. On one side, the equal “coaching” feedback consists of internal sessions in which members have the opportunity to discuss their opinions. On the other side, there is also the “non-requested feedback”, which is contemplated when a member's behaviour is not good inside the team. In this case, *“the other members communicate it to that person, but it's up to him/her to understand how to improve it”*.

Other important reasons that encouraged companies to implement the agile approach are related to the willingness to bring the business world closer to the world of digital solutions according to changes dictated by the digital transformation process and the requests of clients that started becoming more digital and demanding. Moreover, responding to *“changes in the regulatory and normative environment that could not be responded to in the required timeframe”* (company C) represented another necessity for company C.

5.2 *The choice to be distributed*

To have the opportunity to decide where to live and work, companies A and B implemented a distributed approach from the beginning of their activities. The founders wanted to maintain a certain quality of employees' life, having the possibility to do a job they like in a place where they live well.

Choosing where to work without being forced to go to a specific workplace daily allows team members to feel comfortable doing their job. By acting this way, the companies aim to protect *“the quality of the work”* generated by the team and also support the obtaining of good job results. Moreover, they aim to have the opportunity to reach a higher number of skilled workers not available in their closed environment by accessing *“resources and skills distributed all over Italy”* that they probably *“wouldn't have searched if the team was co-located”* (company C) and optimise the costs of human resources.

All the companies have understood the real value of adopting the distributed approach even when adopting agile, as they have had the possibility to bring different cultures into the company and

acquire various resources to integrate inside their teams. For instance, the company D interviewee explicitly emphasised, *"Initially we were forced to adopt remote working because of the pandemic. But then we understood the effectiveness of distributed work, and we had a switch in project elaboration"*.

Moreover, by working distributed, team members work more on building trust by focusing on their objectives, thus reinforcing the self-organisation and eliminating (companies A and B) or drastically reducing control activities (companies C and D). Indeed, according to the principle of self-organisation of individuals and teams, workers' education is driven by the idea that they must be independent in managing their work, therefore controlling loose importance. For instance, company C, working with the Scrum method, fixes small objectives by measuring the increments within the sprints and then looking at those aspects that have not been achieved. This way of operating facilitates transparency while maintaining team members aligned with the company's objectives, improving trust despite physical distance. In addition, the impossibility of constantly supervising the members' activities pushed towards reducing their control activity on them.

Moreover, the freedom introduced by implementing the distributed approach encouraged companies C and D to extend it to other teams and new projects to find the right synergies with new members and face the complexity of the circumstances in the right way. For instance, at the time of the interview, company C already had five distributed teams dispersed in the Italian territory compared to its initial situation in which only one team was distributed. Concerning company D, the shift to a distributed approach has been definitive, and the company decided not to go back to work co-located anymore.

5.3 Supporting the agile distributed approach

While for companies A and B, the distributed approach was a choice from the beginning, in the case of companies C and D, it was something forced by the pandemic that brought them to experiment with a new approach to business.

Implementing the agile distributed approach required a change in the teams' member habits and the necessity for them to be prone to work dispersed in the territory by applying agile methodologies. Especially in companies A and B, these aspects were considered pre-conditions for effective integration between agile and distributed approaches, leading some team members to abandon the company because they did not find themselves in that approach.

In the case of company C, it was ready to start a new agile project by working face to face with colleagues and new entrant partners when the agile team was forced to distribute. Not everyone knows each other, and it *"took a little longer to create a team identity, to learn about each other's habits"*. The strongest impact of distribution was on innovation and the creation of new ideas. Indeed, the online design thinking sessions were described as less productive than face-to-face on-site sessions at the beginning. Therefore, the team felt *"a bit lost"*.

Similarly, in the case of company D, the covid-19 emergency imposed the project management teams working remotely during a period in which the team was welcoming new members from around the globe. Therefore, it was necessary to find new ways to support the team's coordination and *"not to suffer from the absence of physical contact between team members, with providers and those who will use the final product"*. The lack of informal communication between colleagues was replaced by formal communication concerning project objectives. Therefore, *"it took more time and effort to create harmony in communicating with distant colleagues"*, making connecting with new team members working on the project more challenging.

The physical distance and the impossibility of knowing the new member in person represented a problem for team building and cohesion. For instance, in company C, team identity and cohesion at first glance were challenged, while in company D, new members whose work habits were not well-known were less trusted by the team. To support the development of solid teams and contrast the problem of physical distribution, companies developed different digital experiments to recreate the conditions for team-building moments that generally happen on-site. Adopting digital tools (Miro,

Slack, Jira and Google Meet, Microsoft Teams and Trello) and virtual channels for effective cooperation and the financial support to team members to set up their workstations were fundamental.

In addition, frequent multiple group activities and one-to-one meetings were organised to allow team members to get to know each other, stimulating informal communication, cohesion and a clear understanding of the other's abilities. In company B, the agile-lean coaches have been necessary for supporting the team in finding bottlenecks, solving the problems, collecting metrics, taking care of the evolution of products and processes, improving the team performance and designing the meetings to make them productive.

Moreover, for companies A and B, another essential pre-condition to be agile and distributed was the absence of a C-level, which is *“one of the necessary prerequisites on which to implement the fusion between agile methodologies and distributed teams”* (company B). Accordingly, the company's A structure is based on functions without any well-defined organisational chart and with the presence of a formal director only as a temporary choice. Therefore, the decisions are taken by involving the entire team in the decision-making process.

Other necessary steps for implementing the agile distributed approach are the activities developed to stimulate the sharing of ideas that can lead to innovation and exploration of new strategies. An example is the adoption of the Lego Serious Play method in the investigation of new strategies and new business paths. This method consists in developing models with Lego bricks *“to create what you have in mind, instinctively! Then, by reasoning on what has been developed, you are able to give a real dimension to your model by expressing your ideas, values, and principles”* (company B). Moreover, company B also invested in developing narrative models that help describe how the company is organised and how it works *“for managing conflicts”* and help increase trust by *“aligning people on valuable conversations”*.

Furthermore, for companies A and B, the impossibility of occasionally meeting in physical locations with colleagues to cultivate human relationships impacts the team's stability. For instance, as explained by the interviewee of company B: *“when you cannot meet in person, you lose one thing that I think is critical, and that's the relationship, but not the professional relationship, the human relationship...[...]... I mean, in offices, groups of people get to know each other beyond work. When you share [spaces], you may even become friends with your colleague, go to dinner with him, go out with him, bring families together ...[...]... these are very normal dynamics ...[...]... in a distributed manner, you can neither love nor hate the other. We know each other little”*.

Finally, in the case of company D, cultural and language differences caused some trouble for members unfamiliar with the English language, creating misunderstandings between the parties involved. Therefore, to help the growth of team members, especially for learning how to use digital tools dedicated to communication with final users and collecting feedback by facilitating the activity of agents and analysts distributed in the territory.

6 Discussion and conclusion

This study focuses on agile distributed teams that have integrated agile values and methodologies with a distributed approach.

Four companies were involved in the analysis: two small companies (A and B) and two larger companies (C and D). The two small companies were born agile-oriented, demonstrating resilience during the Covid-19 emergency. On the contrary, pandemics' effects pushed the two larger companies to work remotely for a period and discover the benefits of teams' distribution, thus encouraging the implementation of a fully distributed approach.

The results of the multiple-case study highlight the main issues related to distributed and agile approaches integration, showing evidence of the similarities and differences between companies by underlining primary triggers and critical aspects.

According to previous literature (e.g., Ghani et al. 2019), our results show how important access to pools of talents is and the benefits of having members distributed in the territory. Indeed, by

implementing distribution, the companies understood the opportunity for hiring new employees worldwide and the possibility of lowering human resources costs while eliminating or diminishing the costs of the physical structures. At the same time, they welcomed skilled people into the team with a solid attitude to work with agile methodologies distributed in different places and with a desire to improve their soft skills. Especially in the case of small companies, this attitude became a parameter to consider when selecting human resources to contrast the potential abandoning once they already became part of the team.

Moreover, by setting up a flat organisation characterised by higher transparency towards employees and the Agile approach, the small companies stimulated the emergence of teams' internal leadership generally difficult to arise in a distributed environment compared to those in which team members work co-located. In addition, involving people in all aspects of the company's life, specifically in decision-making, has increased their alignment with companies' objectives. The willingness to develop a self-organised team more than implementing control activities has been fundamental to integrating the agile culture and methodologies with the distributed approach from the beginning.

On the contrary, the large companies understood that controlling members spread across the country or abroad was impossible. Therefore, the gradual abandoning of the control activities led them to appreciate the benefits of the agile distributed approach. They drop several prejudices, such as the initial idea that the agile approach cannot be implemented when team members are not working in the same room.

The implementation of the agile culture and methodologies combined with the distribution of team members was different in each company. They introduced a series of measures and invested in buying and implementing several digital tools that could contrast the physical distance, supporting collaboration and coordination.

The small ones have a well-radicated agile culture but implement agile methodologies by modifying them according to different companies' needs. For instance, following the principle that all team members are responsible for all the work done, they eliminated the Scrum master's role. This flexibility recalls the fact that there is not a specific formula or working practice that is favoured in applying the agile distributed approach, despite the high potential of some of them.

Furthermore, on one side, the development of formal online meetings was necessary to support and contrast the tension related to the high rhythm requested by different agile projects and the resulting pressure of difficult moments. Regarding this aspect, the role of the agile-lean coaches has been fundamental in designing functional meetings, not wasting time and resources, and developing productive meeting sessions. On the other side, more informal activities aligned to agile values and principles, such as challenges and contests, have favoured team cohesion and stimulated informal communication, preserving team identity and helping members to know each other better even when distributed.

In addition, asynchronous communication based on lots of written information and less verbal interaction withered human and professional relationships. The absence of face-to-face interaction and the development of virtual ones required more effort and time for new team members to find their place inside the team. With specific reference to the small companies, they already implemented measures before the pandemic by organising informal events and meetings in different locations to support non-professional human interaction. Despite their resilience during the pandemic, they needed to resort to digital tools for running virtual social events to continue stimulating effective informal communication. Concerning large companies, where team members have always been used to working within the same office, digital tools supported the creation of virtual events (e.g., aperitifs and digital coffee breaks) to stimulate informal conversations and cultivate human relationships facilitating team-building activities. These interventions help the evolution of the culture aiming at improving team members' soft skills according to agile values and principles, encouraging solid teams' development and, at the same time, facilitating work-life balance.

Concluding, the analysis shows evidence about the coexistence of distributed together with Agile management and the importance of agile distributed teams to rely on self-organisation to increase trust and workers' growth. Agile distributed teams can contrast the adverse effects of the physical distribution by setting up the agile values and principles by focusing more on people than technology and relying on digital tools to support team members in developing their activities. However, most of the efforts are mainly connected with the company's attitude to experiment with new ways to drive the agile teams dispersed on the territory by being flexible and adaptive.

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