Agilité et résilience des équipes dans des environnements turbulents : une revue théorique

Agility and Team Resilience in Turbulent Environments: A Theoretical Review

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Résumé

L'entreprise moderne est confrontée à plusieurs défis. Ces défis existent parce que les entreprises traversent des périodes de turbulence marquées par des changements plus fréquents et plus constants. Afin de faire face à ces changements fréquents, l'entreprise doit accroître sa capacité de résilience organisationnelle, collective ou individuelle. Cela explique l'engouement pour la notion de résilience, tant chez les universitaires que chez les professionnels. Parallèlement, afin de suivre ces différents changements environnementaux, les entreprises s'orientent vers le développement de projets dont elles doivent garantir le succès. La réussite d'un projet est étroitement liée à sa méthodologie de gestion. La gestion de projet agile s'est imposée comme une approche largement adoptée en raison de l'importance qu'elle accorde à l'adaptabilité, à la livraison itérative de valeur et à la réactivité au changement. À travers cet article, nous cherchons à démontrer la contribution de l'adoption de méthodologies agiles dans la gestion de projet à la résilience de l'équipe. Les résultats suggèrent que les méthodologies agiles améliorent non seulement les performances des projets, mais renforcent également la capacité des équipes à s'adapter et à se remettre de situations défavorables. Enfin, l'étude examine les implications théoriques et managériales, souligne les limites de la recherche actuelle et propose des pistes pour de futures investigations empiriques.

Mots clés : Gestion de projet agile ; Résilience d'équipe ; Systèmes adaptatifs complexes ; Performance du projet ; Environnement turbulent.

Abstract

The modern enterprise faces several challenges. These challenges exist because companies are going through periods of turbulence marked by more frequent and consistent changes. In order to be able to cope with these frequent changes, the company must increase its resilience capacity in terms of its organisation, its employees or its Teams. This explains the enthusiasm of the notion of resilience, whether among academics or professionals. Simultaneously, in order to monitor these different environmental changes, companies are moving towards the development of projects whose success they must guarantee. The success of a project is closely linked to its management methodology. Agile project management has emerged as a widely adopted approach due to its emphasis on adaptability, iterative value delivery, and responsiveness to change. Through this article, we seek to demonstrate the contribution of the adoption of agile methodologies in project management on the resilience of the Team. The findings suggest that agile methodologies not only improve project performance but also strengthen teams' capacity to adapt and recover from adverse situations. Finally, the study discusses the theoretical and managerial implications, highlights the limitations of the current research, and proposes directions for future empirical investigations.

Keywords: Agile project management; Team resilience; Complex adaptive systems; Project performance; Turbulent environment.

Introduction

To navigate and thrive in an environment characterised by extreme volatility, uncertainty, complexity and ambiguity, more companies are moving towards agile methodologies to manage their projects. Agile methods are characterised by an incremental, iterative, adaptive and light weight approach, based on 1 to 4 weeks iterations, a functional, interdisciplinary and self-organised team. The ability to manage difficulties, doubts and changes is one of the fundamental advantages of the agile project management approach (Jalali et al., 2016). In the same context, organisations have an interest in developing their projects around motivated individuals who are able to cope with repetitive changes, because they are an important component to the successful completion of a project. Team resilience is a fashionable trend that could be defined as the aptitude of a team to get over problems, and obstacles or resist the pressures of adversity without crumbling (Amaral et al, 2015). Much research targeted to analyse agile project management, its methodologies, its principles, its benefits and limitations. Other research analysed the conceptualisations, antecedents and outcomes of resilience at the individual, collective or organisational level (Alliger et al., 2015; Amaral et al., 2015; Varajao et al., 2021), but very little have has attempted to investigate the link between the applying of agile approach in project management and team resilience, hence our interest in the topic. The principle reason of this study is to come up with a theoretical background for the contribution that the application of agile methodologies in project management may have on team resilience. In order to study this issue, we have chosen to respond to the research questions below:

- What are the specificities of agile project management?

- What is team resilience and what are its factors?

- Can agile project management contribute to team resilience?

To answer our research questions, we chose to conduct an integrative literature review because it allows us to link two fragmented topics. This review shows that agile project management promotes some significant factors to the resilience of the team. This paper is organised in the following way. We start our work by introducing a literature review in which we address the two themes that make up the research topic which are agile project management and team resilience. We continue with a presentation of the results of our analysis. We follow up with a discussion of the results obtained, highlighting the contributions, limitations and research perspectives.

1. Literature review

1.1. Agile Project management

Project management is the implementation of all needed knowledge, skills, tools and techniques to project activities to meet project requirements. It is achieved by applying and integrating, as appropriate, the project management processes selected for the project. In addition, it helps organisations to execute projects adequately (Project Management Institute, 2017). The project management as a discipline that we know today has emerged in the 1950s in the defence and aerospace industries (Jalali et al, 2016), which are inflexible and complex sectors. As a result, project management was characterised by attention to requirements specification and detailed planning defined at the beginning of the project. As the detailed plan is executed, control processes aim to limit changes that may affect the content, schedule or budget. This is the predictive approach to project management (Project Management Institute, 2017).

But project management methodologies are not a permanent tool of know-how, but rather a flexible framework, continuously modified and updated (Weber, 2017). The 1990s were marked by a recognition of the changing and active nature of project's environment (Bosch-Rekveldt, 2011). As a result, it was recognised that the complicated and unstable circumstances of a project had an impact on the forecast of which it was difficult or impossible to guarantee the reliability, and that change must be built into the project rather than anticipated and avoided (Priemus and Bosch-Rekveldt, 2013). Project management should evolve and follow the new characteristics of the environment in which the project develops, it needed to progress faster, and show more flexibility and responsiveness to the changing customer needs. Agile approach came to follow this trend.

Agile project management was originally a way to deal with the instability that characterised the environment of software development projects. Currently, numerous non-software systems face veritably analogous disruptive dynamics, this has encouraged the opening of other domains to agile methodologies (Ćirić & Gračanin, 2017). Agile project management is therefore characterised by an iterative and adaptive approach, grounded on short client- acquainted feedback circles (Scholza et al., 2020).

it has as its principles the continuous delivery of value to the customer, the common work of the whole project stakeholders, the support for changes, the motivation of team members, the implementation of positive working environment, the promotion of face-to-face communication, focus on technical excellence, sustainable work pace, simplicity (Conforto et al., 2014), in addition to having self-organising teams, constantly improving team effectiveness, delivering operational solutions often and measuring progress based on operational solutions (Agile manifesto, 2001).

The ability to manage difficulties, doubts and changes is one of the fundamental advantages of the agile project management approach (Scholza et al., 2020). The agile approach is supported by a dozen actively used agile methodologies, the most common of which are Scrum, ExtremeProgramming (XP), Lean product development, Kanban, Feature-DrivenDevelopment (FDD), Dynamic Systems DevelopmentMethod (DSDM) and the Crystal methods (Project Management Institute, 2015). According to the 16th State of agile report, the most used agile tools are Scrum and Kanban (Digital.ai, 2022). Scrum is an approach that consists of working in iterations called sprints which form the project cycle (Volovyk & Harmash, 2022). It defines five events which are: Product backlog refinement and Sprint planning meetings which occur at the beginning of the sprint, Daily scrum which takes place during the sprint and finally Sprint review and Sprint retrospective which take place at the end of the sprint. Scrum is based on five values: focus, courage, openness, commitment and respect (Project Management Institute, 2015). Kanban does not have a strictly designed process. It involves teams using a 'pull system' to move work through the development process. And in order to manage the workflow, the team uses Kanban cards representing the workflow. They use three types of cards that represent three levels of work: requested, in progress, completed. Kanban is based on five basic principles: the visualisation of the workflow, the limitation of the work in progress, the management of the flow, the clarification in details of all process policies, and the improvement through collaboration (Project Management Institute, 2015). Each of these methods has advantages. Although the methodologies differ, they share the same values and principles from the agile manifesto. Through these values and principles, agile approach intent to enhance the flexibility of the project, its quality and its business value (Volovyk & Harmash, 2022).

1.2. The Team in agile project management

Team is defined by Pina eCunha (2022) as two or further people. Those people interact socially by using virtual or face-to-face communication tools. They have one or further common objectives and are put together to accomplish relevant tasks at the organisational level. The Team members has interdependencies because they share the same objectives, workflow and outcomes but each person in the team have different role and responsibility. The people in a team are integrated together in an organisational system.

Some agile methodologies, more than others, provide more or less detailed descriptions of the different roles that make up the team. The book ACP Exam Prep, (2015), presents these different roles and responsibilities of most common agile methodologies. The Scrum method requires the Team to be composed of three roles: a) the Development Team or Agile Delivery Team which is composed of a group of professionals who build the product increments in each sprint. They have power and responsibility for numerous development tasks which consist of the planning, the elaboration of schedule and making the right decision to reach its goal (Moe et al., 2010); b) the Product Owner is in charge of maximising the business value by managing and grooming the Product Backlog. He prioritises therefore the elements of the product backlog that should be developed by the development team. He is also the representative of the different stakeholders; and finally c) the Scrum Master have the function of a servant leader of the agile delivery team. He removes any obstacles to their progress, facilitates their events (meetings) and coaches them. He also ensures that the Scrum methodology is understood and used effectively. Each of these roles must take responsibility, interact closely with the members, collaborate and work together to be able to complete the project during each iteration (Obergfell, 2020). The Extreme Programming XP methodology defines 4 roles in the Team. firstly, we have a) the coach who acts as a mentor for the Team. He or she guides the process to help the team become more effective. He also has the role of strengthening communication within the Team and between the different Teams. This role has many of the same responsibilities as the Scrum Master; b) the Customer is the representative who defines the requirements, priorities and direction of the project i.e. specifies the product to be developed, prioritises the features to be achieved, and confirms that the product actually works as intended. This position is similar to the Product Owner in Scrum; c) Programmers are the developers who build the product and finally d) Testers, they ensure quality standards are met and help the customer to define and write acceptance tests.

Approaches such as Kanban and Lean do not describe team structures in detail. In general, the perfect agile team should be collocated, interacts in face to face in a daily way and shall not exceed nine persons as an ideal team size (Lalsing et al., 2012). It has functional and interdisciplinary characteristics. Each team member should bring skills such as reflectivity, ambition, courage and resilience (Schuh et al., 2018). It must also show a capacity for self-organisation as agile teams continually modify their forms, organisations, directives, norms, relations, because they are aware of dynamic and changing nature of the environment is and finally obligations are not determined for each team member individually but to the whole team as a single entity. (Martin & Martin, 2006).

1.3.   Team Resilience

Resilience is a popularly used concept in several fields, psychology, environmental-science, engineering, and others sciences like management and organisation disciplines (Naderpajouh et al., 2018; Ungar, 2018). However, the notion of resilience can evolve and change depending on the level of analysis whether it is organisational, project, individual or others. (Varajao et al., 2021). Most existing studies focus on analysing the resilience in relation to individuals, while analysing and identifying the resilience of the team has become a real urgent need (Fey and Kock, 2022). Resilience at the individual level is most often defined as a capacity to keep a usual level of operating even in hard conditions and to recuperate rapidly from problems that came from adversity (Hartmann et al., 2020). It focuses on problem-solving ability, strong confidence, and a combination of ingenuity and counter-intuitive flexibility acquired through experience, repetitive work and preparation for even the most difficult situations (Lengnick-Hall et al., 2009, 2011). Team resilience has different specifications compared to individual level resilience because it takes into account the dimension of teamwork and interactions between its members (Mathieu et al, 2008). It is true that individual resilience has an impact on the resilience of the Team. However, the grouping of resilient people in a team does not systematically constitute a resilient team (Alliger et al., 2015). Team resilience should concentrate on forming a group structure based on the same directives and principles which are the result of a transformational leadership and reflective communications between team members in unforeseen situations, and promoting team improvement (Morgan et al., 2015; Van der Beek & Schraagen, 2015). By referring to Amaral et al (2015, p. 1182)

"Team resilience can be defined as the ability of a team to get over problems, and obstacles or resist the pressures of adversity without crumbling and allow for making needed adjustment to well execute different type of tasks, improve accuracy, durability and general performance".

This tendency to seek out resilience comes as a result of its demonstrated positive outcomes. In the organisations, resilience has a positive impact on its achievements, its level of efficiency and its creativity. For the team, resilience influences their mind-sets, behaviours and the way they conduct their works. While at the individual level, resilience influences employee wellness, conduct, behaviour, work and achievement (Raetze et al., 2021).

Preparing the Team to face complex and difficult situations is an important objective of project management. Trijp et al (2018) and Stoverink et al (2018) attests that no conceptualisation of Team resilience was commonly accepted. However, a few authors have listed determining factors that make the Team more resilient.

According to Morgan et al (2015) and Van der Beek and Schraagen (2015), the links between team members, which means how much they are connected and open to other teams are factors that contribute to team resilience. Being Open and having the goodwill to learn new skills were cited by Sutcliffe and Vogus (2003) as necessary conditions for team resilience. West et al. (2009) find that cohesion and cooperation have a beneficial influence on team resilience. Morgan et al (2019) found five main themes to improve the team resilience: a) pushing team members to achieve excellence in performance by inspiring, motivating and challenging them; b) Ensuring team a regularity by developing a system characterised by ownership and responsibility; c) developing an identity and cohesion based on an altruistic culture that will characterise the team; d) provide specific training for the team that will challenge them and make them face difficult and unexpected situations; and e) recommending fun and a positive attitude when dealing with stressful situations.

More recently, Varajao et al, (2021) proposed a theoretical model of 46 factors significant to team resilience which they divided into 7 groups of factors which are: a) Trust and Solidarity: these factors consist of encouraging teamwork and team spirit, promoting solidarity, collaboration, autonomy, versatility among project team members, and empowering the team to make decisions; b) Focus on results: This involves minimising ambiguity, establishing clear indicators of project results and ensuring systematic feedback while focusing the Team's efforts on project results;

c) Commitment: These factors include helping everyone in the team to see the value of the work they are doing, involving them in the development of the project plan and encouraging them to share their ideas while valuing them, developing the need for improvement in under-performers, aligning the whole team with the project goals, implementing project management that promotes a participative ideology and finally set up an encouraging system for the motivation the team members; d) Management and Accountability: these factors include minimising disruption during the project life cycle, communicating the priority tasks to everyone in the team, monitoring the project advance, avoiding bureaucracy, identifying the most appropriate strategy regarding project delivery, developing effective project risk management and communication processes, and helping the team to deal with changes; e) Conflict Adoption: These factors include identifying appropriate and inappropriate behaviours of team members, identifying and removing barriers to project implementation, promoting active listening and the general interest of the team, encouraging project team members to have positive attitudes such as acknowledging weaknesses and mistakes, asking for and accepting apologies and being well informed about the situation before making a negative judgment. f) Working conditions: this involves establishing favourable working conditions which include ensuring redundancy of non-human resources, guaranteeing adequate working conditions for the team, establishing flexible working hours, providing opportunities for continuous learning and stimulating a positive and loyal environment. g) Skills and behaviour: the factors in this group boil down to building teams with the required skills to carry out project activities and providing them with training to develop the skills that will be useful to them. Develop their ability to consider mistakes as a learning experience and boost self-affirmation. Identify the most impactful attitudes of the people in the team that can have a positive or negative influence on the team as a unit, and encourage the identification, the enhancement and the exploitation of the talents and skills of everyone in the team.

1.4. Theoretical Framework

The theory of Complex Adaptive Systems (CAS) has its roots in the natural sciences and describes how interactive agents, such as living organisms, adapt and evolve together spontaneously over time (Dooley, 1997). According to Holland (1995), CAS is "a system composed of interactive agents described in terms of rules. Agents adapt by changing their rules as experience accumulates" (Holland, 1995, p. 10).

Several researchers have applied the principles and ideas of CAS theory in management, organisational science, information systems, and agile project management literature (Jain & Meso, 2004; Nan, 2011; Radhakrishnan et al., 2022). The theory of complex adaptive systems (CAS) is based on three main components: agents, interactions and the environment (Nan, 2011). We used the study by Radhakrishnan et al. (2022), which analyses these three essential elements and their impact on the functioning of an agile project team in order to achieve project objectives. The findings are as follows:

- *Agents:*

Agents are the individual actors in a SAC. Depending on the phenomena being studied, these agents can be people, organisations, objects or concepts. Each agent is defined by its attributes and rules of behaviour. Attributes represent the internal states of agents. They are either fixed or variable (Nan, 2011). Attributes are important in two ways: first, they provide standards for agent capability. An agent's ability to achieve positive results (e.g., In agile projects, agents work closely together to ensure the project's progress. Their skills and experiences help them choose the right people to collaborate with. For example, the diversity of agents, such as their expertise or past experiences, plays an important role in how they respond to others (Holland, 1995). In an agile project, team members bring technical skills and domain-specific expertise, creating diversity that benefits the project. Similarly, clients may have diverse needs and project specifications. Behavioural rules are patterns that govern an agent's attributes and behaviours. An agent behaves according to their perception of their environment (Holland, 1995; Nan, 2011). In an agile project, project team members and clients have diverse cognitive abilities and levels of understanding. Consequently, project team members exhibit mutually adaptive behaviour based on their interactions with other agents (i.e., other team members and customers) and environmental changes (i.e., changes in requirements).

Our study argues that agile project team resilience results from mutually adaptive behaviour. Behavioural rules produce another vital element of SACs, interactions with other agents.

- *Interactions*

Interactions represent the mutual adaptation behaviours of agents (Nan, 2011). Agents follow interaction processors. Agents change their actions in response to interactions with other agents. Agents coexist and evolve together in an ecosystem where the adaptation of one agent affects the physical form of other agents in the ecosystem, leading to further adaptations and reciprocal changes (Nan, 2011). In an agile project, team members continuously interact with customers

to produce successful project outcomes. Constant feedback and collaboration with the customer shape the behaviour of team members to achieve positive results. Interactions could take the form of discussions about project deliverable priorities, evolving project requirements, and better methods for developing, testing, and executing the project. User needs vary greatly in agile projects, and project team members must continually respond to these changes. Tracking and monitoring become essential to producing the desired project results. Links are relational connections between agents based on an agent's attributes (Nan, 2011). In an agile project, where requirements are constantly changing, a web of relationships is established through constant interaction with other project team members (with diverse backgrounds) and customers. Project team members discuss changes in specifications, project deliverable priorities, development and testing techniques, and progress in terms of scope, schedule, cost, and quality with other team members and customers. Flows refer to the movement of resources through the set of agents and connections (Holland, 1995). Resources can be physical objects (e.g., laboratories and test facilities) or virtual objects (e.g., knowledge/information transfer). Flows provide energy to agents, and the system will degenerate if there are no flows. On the other hand, flows allow agents to feed within a SAC and facilitate their adaptation to mutual behaviours. In an agile project, project team members continuously exchange tacit knowledge with their clients. This transparent communication helps to achieve project agility and ensure its success.

- *Environment*

The environment is the setting in which agents operate and interact. The environment provides structures for actions and interactions to evolve. The interactions of agents can modify these structures. Agents collect resources from the environment and redistribute them among themselves (Nan, 2011). Changes in the socio-economic, organisational and technical landscape in an agile project lead to constantly evolving project requirements (Jain & Meso, 2004). Customers help project team members understand evolving needs and specifications by providing information and advice. The three essential components of a SAC collectively create a macroscopic observation. These observations are the aggregate properties of agents, interactions, and the environment. SAC theory explains how order can develop as individual actors increase their fitness within the adaptive landscape defined by their interactions and environment.

- *The concept of emergence*

SAC theory further notes that the 'emergent dynamic behaviour of these systems ... is the result of the interaction of its constituent elements with the uncertain and volatile socio-technical landscape' (Jain & Meso, 2004, p. 1662). When the requirements of an agile project change frequently, team members adopt adaptive behaviours based on their perceptions of the evolving socio-technical landscape. The successful project team prioritises customer requirements, works in iterations, and does everything possible to meet customer needs. Team members try to produce results that comply with changing specifications. For this reason, we argue that project agility leads to project team resilience.

- *The concept of self-organisation*

Self-organisation is the ability of interconnected autonomous agents in a SAC to evolve into an organised form without external force. Agents are independent because they can intervene in a meaningful way and determine the actions to be taken based on their perceptions of the environment. Agents are interconnected so that they respond to change around them, but are not overwhelmed by the information transmitted to them through this connectivity (Mittleton-Kelly, 2003). In a self-organised project team, individuals are responsible for managing their workloads, allocating work among themselves based on needs and best fits, and taking responsibility for the team's effectiveness (Highsmith, 2009).

2. Methodology:

The aim of this work is to analyse the contribution that agile project management can make to team resilience. To achieve this objective, we have chosen to conduct an integrative literature review. This choice is interesting when faced with fragmented research areas where direct empirical evidence is limited. Agile project management and team resilience were treated independently. We therefore chose the factors common to both areas, analysed them and proposed a conceptual model. For the literature review process, we used three electronic academic databases and platforms: Elsevier ScienceDirect, ResearchGate, and JSTOR. In these searches, we used combinations of the following keywords: 'Project management', 'Agile management', 'Agile methodologies', 'Scrum', 'Lean', 'Lightweight management', 'Change-driven', 'Incremental', 'Iterative', 'Resilience', 'Adaptive capacity', "Flexibility", and 'Team'. We then conducted a preliminary screening to remove articles that did not meet our inclusion criteria. We excluded articles with restricted access, duplicates, articles written in languages other than French or English, articles published before 2001, and studies unrelated to our topic.

The selected articles were then analysed to extract theoretical insights and empirical findings related to agile project management and team resilience.

3. Results

3.1. Synthesis of Empirical Studies on Agile Project Management

Our first step in the analysis was to review the various studies related to agile project management. In order to identify the main factors and practices, we chose to focus on the key success factors. Our analysis enabled us to identify certain key factors likely to promote team resilience. We presented these factors in table form. The table also highlights the context of the study, its methodology and its author. This work will form the basis for meeting the objective of our study.

Table I. Key Factors Influencing Agile Software Project Success

Authors	Context of Study	Method	Identified Factors
Dybå & Dingsøyr (2008)	Agile software development	Systematic review	Predominance of human and social factors: communication, collaboration, trust, customer involvement, face-to-face interactions, low hierarchy
Chow & Cao (2008)	Agile software projects	Quantitative survey	Critical factors: delivery strategy, agile engineering practices, team capability; variable importance of customer involvement and team environment
Stankovic et al. (2013)	Agile projects	Quantitative study based on Chow & Cao	Addition of factors related to project definition, project nature and planning for meeting deadlines and budgets
Misra et al. (2009)	Agile software development	Quantitative survey	Key human and organisational factors: customer commitment, collaboration, organisational culture, training, personal characteristics (collaboration, honesty, learning)
Prechelt et al. (2016)	Quality in agile teams	Conceptual study	Importance of collective responsibility for quality, rapid and realistic feedback, and continuous learning
Sfetsos et al. (2006)	Agile practices	Empirical study - mixed-methods	Technical practices supporting quality: pair programming, coding standards, refactoring, test-driven development
Ahimbisibwe et al. (2017)	Agile project success	Quantitative survey	Organisational factors (change management), team factors (communication, expertise, commitment), customer factors (support, user experience)

Tam et al. (2020)	Agile software projects	Quantitative survey	Team capability (expertise, motivation) and active customer participation as major determinants of success
Shameem et al. (2017)	Large-scale agility (GSD)	Systematic review (20 empirical studies)	Key factors: coordination, leadership, customer involvement, self-organising teams, knowledge sharing, technological infrastructure
Serrador & Pinto (2015)	Multi-industry agile projects	Quantitative Survey	Project experience and complexity influence agile project performance and success

3.2. Determinants of Team Resilience: A Multi-Level Perspective

Our analysis of various studies on team resilience led us to conclude that there are different antecedents of team resilience. These are multidimensional (individual, collective and organisational) and interconnected (Bowers et al., 2017; Raetze et al., 2021; Hartwig et al., 2020). We have therefore chosen to develop a table (Table II) summarising the main factors, the authors who presented them and their corresponding level of analysis.

Table II. Summary of factors and their roles for team resilience

Factors	Authors	Level
Team sensemaking	Talat & Riaz (2020)	Collective
Team bricolage	Talat & Riaz (2020)	Collective
Relational connections	Carmeli et al. (2013)	Collective
Knowledge sharing	Wei et al. (2022); Hamsal et al. (2022)	Collective
Team cohesion	Wei et al. (2022)	Collective
Team interactions	Hamsal et al. (2022)	Collective
Team coordination	Gomes et al. (2014)	Collective
Simulation dynamics	Gomes et al. (2014)	Collective
Crisis response activities	Gomes et al. (2014)	Collective
Collective positive emotions	Meneghel et al. (2016)	Collective
Interpersonal trust	Mathieu et al. (2008); Pavez et al. (2021)	Collective
Group potency	Pavez et al. (2021)	Collective
Individual resilience	Hamsal et al. (2022); Hendrikx et al. (2022)	Individual
Family support	Hendrikx et al. (2022)	Individual
Team familiarity	Hendrikx et al. (2022)	Collective
Organizational resources (work-life balance, well-being, equity, communication, career development)	Vera et al. (2017); Hamsal et al. (2022)	Organisational

Team resources (social support, feedback, learning culture, staff, budget, IT support, delegation)	Hamsal et al. (2022)	Organisational / Collective
Trust and solidarity	Varajao et al. (2021)	Collective
Focus on results	Varajao et al. (2021)	Collective
Work conditions (learning opportunities, fair environment, flexible hours)	Varajao et al. (2021)	Organisational
Skills and behaviours	Varajao et al. (2021)	Collective
Intellectual capital (human, structural, relational)	Cheng et al. (2023)	Organisational

3.3. Agile Project Management as an enabler for Team Resilience

Based on the results of studies on agile success factors and the antecedents of team resilience, this section aims to analyse how these two bodies of knowledge can be conceptually connected to each other. Although we have not found clear evidence linking agile project management to team resilience, it is clear that several agile practices promote mechanisms related to team resilience. In order to make this relationship more explicit, we have developed a correspondence matrix to map key agile practices that we have previously identified in the literature against the main antecedents of team resilience.

Tableau III. Matrix showing the correlation between agile practices and determinants of team resilience

Agile Practices	Team Resilience Antecedents
Continuous customer involvement	Trust, information sharing, coordination
Frequent communication (daily meetings, reviews)	Collective sensemaking, cohesion, uncertainty reduction
Self-organising teams	Autonomy, empowerment, adaptive capacity
Short iterations and rapid feedback	Continuous learning, anticipation, adjustment
Pair programming / collaboration	Social support, knowledge sharing, trust
Retrospectives	Reflexivity, collective learning, continuous improvement
Facilitative leadership	Psychological safety, engagement, trust
Agile culture (transparency, adaptation)	Climate of trust, flexibility, shared resources
Knowledge sharing	Intellectual capital, collective memory

Agile project management promotes several practices and factors that contribute to its success and can help build team resilience. Among these practices and factors, frequent communication facilitates cohesion and collective sensemaking, thereby reducing uncertainty. Short iterations mean faster feedback, so during retrospectives the team can learn from its mistakes, anticipate

and adjust its work. Establishing an agile culture based on transparency promotes trust and flexibility as well as the sharing of resources and knowledge, which strengthens the team's intellectual capital.

Agile practices encourage team self-organisation and collaborative work, which promotes autonomy, adaptability, sharing and support among team members. In such a context, leadership is facilitative and supports various resilience mechanisms. In addition, an involved client facilitates the flow of information, trust and coordination in the project.

3.4. Conceptual Model and Research Propositions

Based on the summary developed in the previous section, we were able to develop a conceptual model to show the contribution of agile project management factors to team resilience. Furthermore, the model highlights mediation mechanisms and contextual moderators. This model provides a theoretical framework for the process linking agile project management practices to project team resilience.

Figure I. Conceptual model linking agile project management practices to team resilience
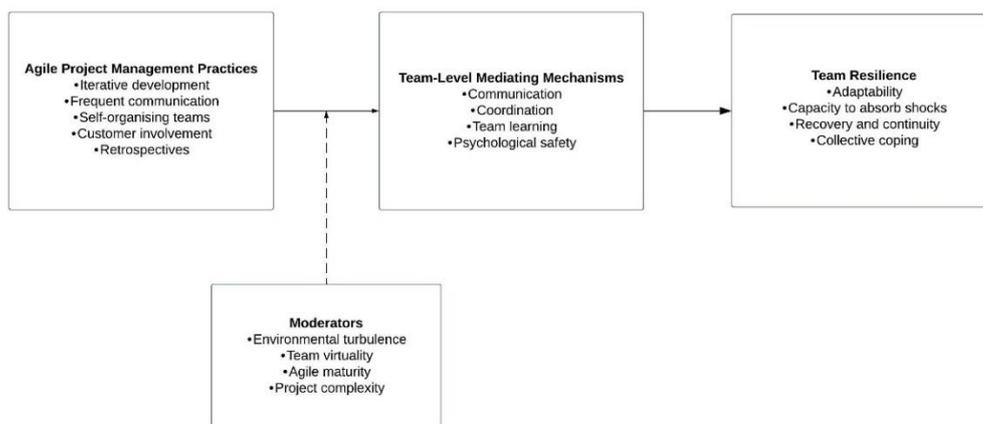
The proposed model suggests that agile practices influence team resilience indirectly through a set of core team processes, namely communication, coordination, learning, and psychological safety. Agile practices such as frequent interactions, iterative feedback, self-organization, and retrospectives enhance information sharing, shared understanding, and collective learning within teams. These processes, in turn, strengthen teams' capacity to anticipate, absorb, and adapt to disruptions, which are central characteristics of team resilience.

Furthermore, the model acknowledges that the strength of these relationships may vary depending on contextual conditions.

Factors such as environmental turbulence, team virtuality, agile maturity, and project complexity are introduced as moderators that can amplify or weaken the effects of agile practices on resilience-related mechanisms.

Conclusion & discussion :

Project teams operate in particularly demanding environments, characterised by uncertainty, interdependence, and strong time pressure. In such contexts, agile methodologies represent a relevant managerial approach, as they are grounded in principles such as self-organisation, adaptability, and continuous feedback. These principles resonate with the logic of complex adaptive systems, in which interactions between agents generate emergent, non-linear, and adaptive behaviours. From this perspective, agile project management can be understood as a structural and behavioural enabler of teams' capacity to cope with disruption, adapt to change, and recover from challenges, core attributes of team resilience.

Teams capable of managing adversity, adapting to stressors, and recovering after negative events are less exposed to the detrimental effects of uncertainty and pressure (Alliger et al., 2016). Bowers et al. (2017) argue that team resilience emerges from the interaction of multiple first-order states, such as stress management, leadership, communication, and information sharing, which collectively give rise to a higher-order emergent state of resilience. This multi-dimensional and process-based view of resilience aligns closely with the foundations of agile project management.

Recent research has increasingly examined the relationship between agility and resilience from organisational and project-based perspectives (Cantoni et al., 2019; Kadenic & Tambo, 2023). These studies suggest that agility and resilience are complementary capabilities that reinforce each other in unstable environments. However, our review confirms that, despite this conceptual proximity, no prior study has explicitly examined the contribution of agile project management to team resilience. The absence of direct empirical evidence explains why the present study adopts an indirect and integrative approach, focusing on the mechanisms through which agile practices may activate or strengthen known determinants of team resilience.

By cross-analysing the literature on agile project success and the literature on team resilience, this study shows that several determinants of resilience are implicitly embedded in agile practices.

Agile project management fosters intensive communication, coordination, and collaboration; empowers teams through self-organisation and autonomy; encourages collective learning through iterative cycles and feedback; and promotes trust-based relationships supported by facilitative leadership. These elements correspond to central resilience mechanisms identified in the literature, such as collective sensemaking, knowledge sharing, coordination, social support, and adaptive capacity.

Importantly, the findings suggest that the relationship between agile practices and team resilience is not direct but mediated by a set of collective processes. Communication, coordination, continuous learning, and psychological safety emerge as key mechanisms through which agile practices translate into resilience-enhancing outcomes. These mediating processes form the core of the conceptual model proposed in this study.

Furthermore, the analysis indicates that the strength of the relationship between agile practices and team resilience is likely to depend on contextual conditions. Factors such as environmental turbulence, team virtuality, agile maturity, and project complexity appear repeatedly in the reviewed studies and may moderate the effectiveness of agile practices in fostering resilience.

From an academic perspective, this study contributes to project management and organisational research by addressing a clear gap in the literature. By integrating insights from agile project management and resilience research, the study proposes an original conceptual framework that provides a structured basis for future empirical testing and theory development around the notion of agile team resilience.

From a managerial perspective, the findings suggest that the thoughtful and consistent adoption of agile practices can strengthen team resilience and enhance performance in uncertain environments. Managers can leverage agile routines, such as regular communication rituals, iterative planning, retrospectives, and participative decision-making, to reinforce learning, trust, and coordination within teams. Also, creating supportive conditions, including adequate resources, flexible work arrangements, and opportunities enhance team resilience.

This study has several limitations. First, it relies on a conceptual and literature-based analysis. Second, the synthesis is constrained by the scope of the existing literature. Finally, caution is required when generalising the findings, as resilience dynamics may vary according to team composition, organisational culture, and sector-specific constraints.

Future research could extend this work by empirically testing the proposed conceptual model. Longitudinal and multi-level studies would be particularly valuable. Comparative research could also explore how the impact of agile practices on team resilience differs according to agile maturity, team virtuality, or project type.

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