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## HYBRID OR NOT? SELECTING CRITERIA WHEN SOFTWARE PROJECTS ARE STARTING TO USE HYBRID PROJECT MANAGEMENT APPROACH

**Abstract:** *This article assesses the understanding and state of hybrid project management. A research problem was formulated, asking how large organizations working on software projects can gain value from agile project management, focusing on the hybrid approach as the most fitting candidate. A systematic literature review was conducted (SCOPUS, Web of Science), and findings were presented, proving that the current understanding of hybrid is limited and mostly viewed as a combination of agile and waterfall. Also, it has been shown that the hybrid approach is quite beneficial, and large organizations most likely don't have any other choice than turning to hybrid if they want to stay competitive. The original value resides around challenging the current definition of hybrid and proposing a new framework that will establish boundaries of a hybrid approach, which goes beyond the literature reviews done so far. Research limitations are related to coverage or research articles analyzed.*

**Keywords:** *hybrid, approach, project, management, methodology, agile*

### 1. Introduction

The project management domain has a long history of bringing value to organizations (Morris, 2011), establishing control and management over complex initiatives, and increasing the probability of project success (Joslin & Müller, 2015). While there are multiple project success factors (Albert et al., 2017; Johannes & Mauritsius, 2022) that have a smaller or bigger impact on the overall success, one of them definitely is the project management methodology being used and how it's tailored or chosen to meet the project and organization's needs (Adzmi & Hassan, 2018; Stepanek, 2005).

In the last few decades, the project management domain went through significant evolution, with the emergence of new methodologies or frameworks designed to improve efficiency and effectiveness. Traditionally, project management methodologies have followed a sequential, linear approach known as the "waterfall" method (Garel, 2013). This approach involves breaking the project into distinct phases, with each of them having specific tasks and a set of deliverables that should be finished before moving further. Typical characteristics of the conventional approach are also significant preparation, breaking up the process into several phases, creating noticeable documentation, and a large part of

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the design work is done early in the project (Ambler, 1999; B. Boehm, 2002). The Waterfall methodologies are often used for projects with well-defined requirements and a clear understanding of the end product. Dynamics of the markets, transformation of economies, and customer demand, have pushed organizations to look for a fast-track way of enabling value creation and looking for better solutions (Chesbrough & Spohrer, 2006; Laursen & Svejvig, 2016).

In 2001, the Agile Manifesto was introduced (Manifesto for Agile Software Development, n.d.), which brought a new approach to project management that emphasized flexibility and adaptability. The approach was driven mainly because in the past still a lot of projects failed (Matta & Ashkenas, 2003) or finished over budget and time while struggling to meet ever-changing business needs and requirements (B. Boehm & Turner, 2003, 2005; B. W. Boehm & Papaccio, 1988).

Scrum or Extreme Programming (XP), which are well-known Agile methodologies, were formulated following the iterative development philosophy, where projects are divided into small increments known as "sprints," and requirements can be added or changed as the project progresses (Dingsøyr et al., 2012). Agile methodologies are well-suited to projects with rapidly changing requirements or uncertainty about the end product (Mustafa Dülgerler, 2015). Those methods, while originally coming from IT, where they have brought strong improvements in the software development process have gained popularity and started to be implemented in other areas such as engineering (Kohlbacher et al., 2011), R&D (Olsson et al., 2013), manufacturing (Walters et al., 2011), construction (Arefazar et al., 2022), aerospace (Parvez Alam & Toppur, 2019), human resources (Kavitha & Suresh, 2021) and others (Gunn et al., 2013), where strong positive effects were also recognized (Begel & Nagappan, 2007).

As agile methodologies gained widespread adoption (Al-Saqqa et al., 2020), a need

emerged for frameworks that could support the coordination and execution of agile practices at the enterprise level. This happened mainly due to the fact that competition increased globally and the need to go to market as fast as possible with new products got high on every CEO list, pushing also large organizations to find a way to have shorter and more flexible product development processes without sacrificing quality or efficiency (Jou et al., 2009; Tatikonda & Rosenthal, 2000). In order to ease the adoption in larger organizations, scaled agile frameworks emerged which were used to minimize the risk and bring in standardization (Carroll & Conboy, 2020). Currently, we have multiple frameworks, among which the most popular (Agnieszka Sienkiewicz, 2022) are ones like Disciplined Agile Delivery (DAD), Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), Scrum@Scale or Spotify Model, that offer a wide range set of various practices that can be implemented and applied across multiple teams and projects, however, their implementation is based across a large number of parameters (Almeida & Espinheira, 2021). As large organizations need to face much higher project and environment complexity, it has been noted that they need to find a way to adopt Agile practices and make them work and coexist with more traditional project management methods, which makes them more likely to venture into the hybrid models (Sommer et al., 2015).

Despite the increasing popularity, agile methods are not without their cons, among which we may list decreased record-keeping, high dependency on team maturity and flexibility, and not being effective for all types of projects (Reddy et al., 2021). Given the different approaches that each of those frameworks presents (as either being more predictive or adaptive), each of them had both pros and cons that created both threats and opportunities for organizations at different times. It was no surprise that organizations and managers started to mix those

methodologies together in order to tailor the project management framework to their organization's needs and goals. This has been recognized in the literature and multiple authors have looked into and analyzed agile management and the impact it can have, but also creating hybrid models (Serrador & Pinto, 2015) as well as recognizing that for organizations it may be better to focus on choosing the best combination of methods and practices rather than focusing just on the right methodology (Ambler, 2013; Batra et al., 2010; Carlos & Amaral, 2010; Cooper & Sommer, 2018), which supported the hybrid approach movement and showed that organizations should focus on their agility rather than just being Agile and following the methods (Bianchi et al., 2021).

Past literature reviews about hybrid project management were largely focused on the comparison between the classical (also known as traditional or waterfall) approach and Agile (Scrum), however, most of them missed the fact that the world has moved forward and gotten more complex in the last 20 years, and we cannot just be comparing those two. Between 1990 and today (2023) a lot of new project management methodologies emerged and now there is a larger potential to mix and choose from a variety of sources, not only two.

The research problem that the article is addressing is how large organizations that are conducting software development projects, can gain benefits of an agile approach (like a higher likelihood of success of projects) in a relatively short time, without going through a full-blown transformation and sacrificing control and some of the predictability in planning? This subject is being addressed through the lens of a hybrid project management approach, which, based on a literature review conducted seems to be one of the most promising candidates to solve the issue.

The aim of this article is threefold:

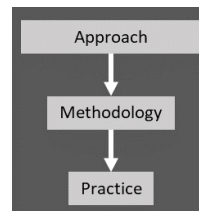
- Discuss and challenge the current understanding of the hybrid project management approach.

- Answer the question – when the methodology that is being used in the organization is starting to lose its original “identity” and becomes a hybrid?
- Confirm the potential of the hybrid approach and assess the risks and benefits it may bring to the organization.

## 2. Hybrid project management

A hybrid project management methodology combines at least 2 different project management methodologies to reach project goals and deliver a specific set of objectives. Mixing different approaches is becoming more popular in the project management domain, as organizations are aiming to claim the benefits of different methodologies while limiting the impact of their weaknesses.

Before venturing forward, a quick definition setting is required, because the terms approach, methodology, and practice describe different concepts (Figure 1). Following the guidance from A. Gemino (Gemino et al., 2021) we can say that the term approach is the widest one, which refers mainly to the overall principles that are guiding the project processes in the organization which may cover multiple methodologies. The methodology is more granular, as it describes the concepts and techniques to be used in operational space, and practice is nothing else than a specific method or technique used.



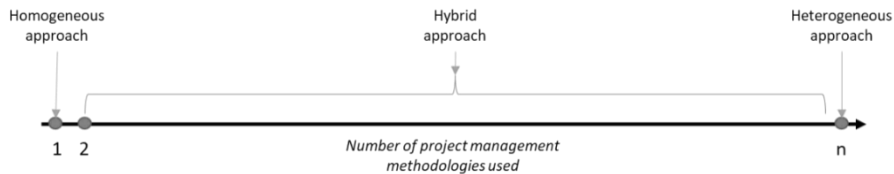
**Figure 1.** Terminology Structure

Going forward in the article, the main element of the study will be the term approach, as hybrid project management by definition is using more than one methodology, therefore

explicitly proving we should operate with a wider perspective in mind.

The project management approach is seen as either (Figure 2):

- Homogeneous – focused on one project management methodology.
- Hybrid – Mixing a number (2 or more) of project management methodologies, while recognizing their origin.
- Heterogeneous – Methodology agnostic, mixing all tools and techniques altogether.



**Figure 2.** Different approaches to project management

The main benefit of a hybrid project management methodology is increased flexibility and adaptability. For example, by combining Waterfall and Scrum methodologies, organizations can benefit from the flexibility and rapid iteration of Agile while also utilizing the structure and predictability of Waterfall. This can lead to improved project outcomes and increased customer satisfaction (Gemino et al., 2021). Another benefit of a hybrid project management methodology is improved risk management. By combining different methodologies, organizations can better identify and mitigate project risks. For example, by using a combination of Agile and Scrum methodologies, organizations can more effectively manage project timelines and deliverables (Kerzner, 2017).

To successfully implement a hybrid project management methodology, organizations must also have a good understanding of the needs of their project and the strengths and weaknesses of different methodologies. This requires a details analysis of the initiative, including its goals, objectives, and risks.

### 3. Systematic literature review

#### 3.1. Research planning and design

In order to search and conduct an analysis of existing sources that would be able to provide

more knowledge on the subject, we have performed a systematic literature review [SLR]. Review of existing literature are critical to any scientific work, and without doubt SLR is a well-defined and established method used in management discipline that provides a systematic and reproducible way of collecting, analyzing, reviewing, and synthesizing knowledge about a specific subject (Dorn et al., 2016). It also allows using bibliometric, content, term, and network analysis in order to look deeper into the network and relationships between various research areas (Reis et al., n.d.).

Following best practices (Kitchenham & Charters, 2007), the systematic literature review has been divided into 8 phases, which have been defined following best practices from Okoli (Okoli, 2015):

1. Defining the purpose, which has been outlined in the introduction section of the article
2. Agreeing on protocol and procedures
3. Agreeing on screening rules
4. Literature search
5. Data extraction
6. Appraise quality
7. Data Analysis
8. Review – sharing key findings, which are covered in chapter 3.3.

In the course of the planning, which has covered phases 1, 2, and 3, we have performed initial literature research, defined the objectives of the research, and agreed on the search strategy such as selecting keywords and screening criteria.

The main research questions that we hoped to resolve during the review were:

RQ1: What is the definition of hybrid project management, looking from the perspective of evolving project management discipline and the introduction of multiple new agile and scaled agile methodologies?

RQ2: Can project management or methodology have its “identity” and when it’s losing it?

RQ3: How to define and identify a point when organizations are moving from a Homogeneous approach to a hybrid approach (the tipping point)?

RQ4: What are the risks and benefits of using a hybrid approach?

### 3.2. Research planning and design

The next series of steps, which covered phases 4, 5, 6, and 7, have been covered under a wider term of research execution.

The research has been conducted in Scopus and Web of Science, which are leading literature databases with a large list of scientific literature from recognizable peer-reviewed sources, and consists of five steps (Figure 3).

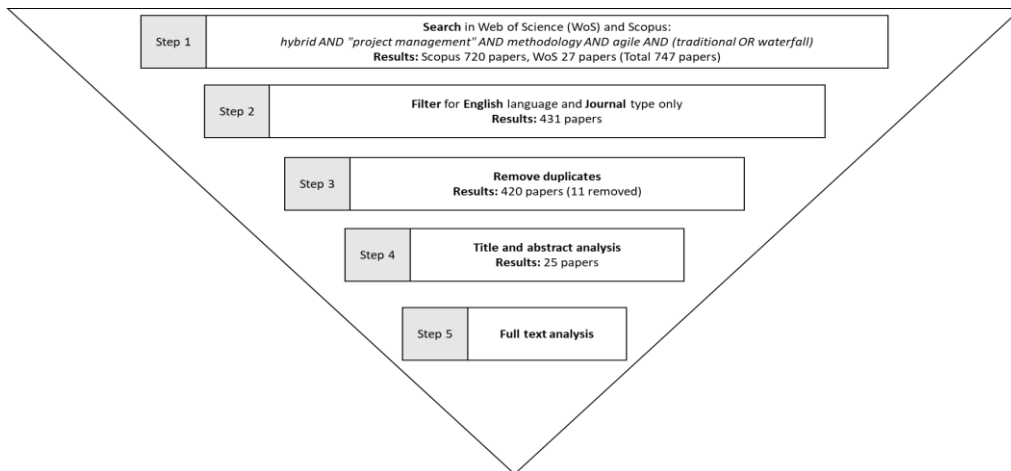


Figure 3. Systematic Literature Review - research strategy

- Step 1 – Wide search using a query string: hybrid AND "project management" AND methodology AND agile AND (traditional OR waterfall). The keywords were selected to capture a wide array of articles that are related to the hybrid project management approach and their reference to methodology definition as well as references to agile and waterfall – which should provide a reasonable overview of the level of knowledge in the area and allow to get answers to defined research questions,

without adding limitations that may narrow our perspective.

- Step 2 – Limiting the search to articles in the English language only and only coming from journals, which are likely to contain major contributions in the field (Webster et al., n.d.).
- Step 3 – Duplicates removal
- Step 4 – Analyzing the construction of titles and abstracts, in order to screen and select only those that :
  - o Are directly focusing on hybrid

- o project management and not on other management areas (like strategic management, customer journey, supply chain, or others).
- o In our screening we have focused on articles that related to software development or general IT projects, however, we have left a couple of papers from other industries that have shown the greatest promise.
- Step 5 – Performing a full-text analysis of a selected range of articles.

### 3.3. Reporting key findings

#### 3.3.1. Journal review

Looking at the range of selected articles from Step 1 of the research, which includes 747 positions published in peer-reviewed

journals, that are treating directly or about topics related to hybrid project management, there is a clearly visible trend in the volumes of articles that appeared in the past, with the rapid growth starting in the year 2014 (Figure 4). The likely reason for that scenario is the fact that till around 2010-2012, there was only a handful of project management methodologies being discussed, while after that point the whole Scaled Agile movement was born and the number of new methodologies in the field rapidly increased, which probably was related to the fact that having more methodologies available to combine together, created a trend of people and organizations trying to get the best out of them which was reflected in the scientific interest trend as well, which continues till today.

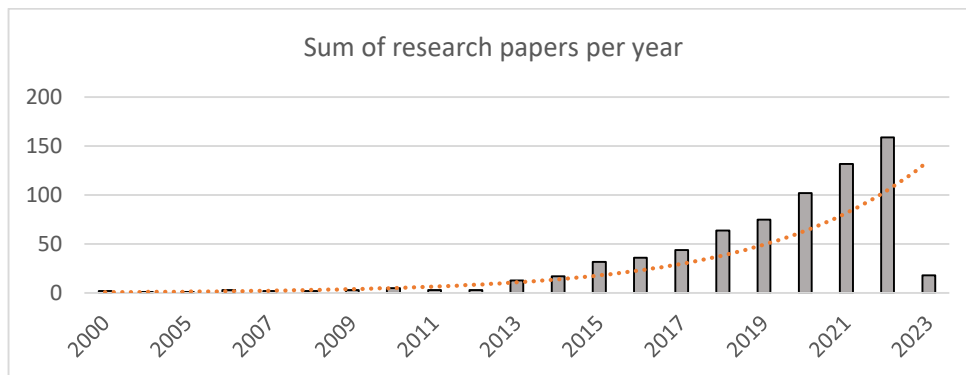
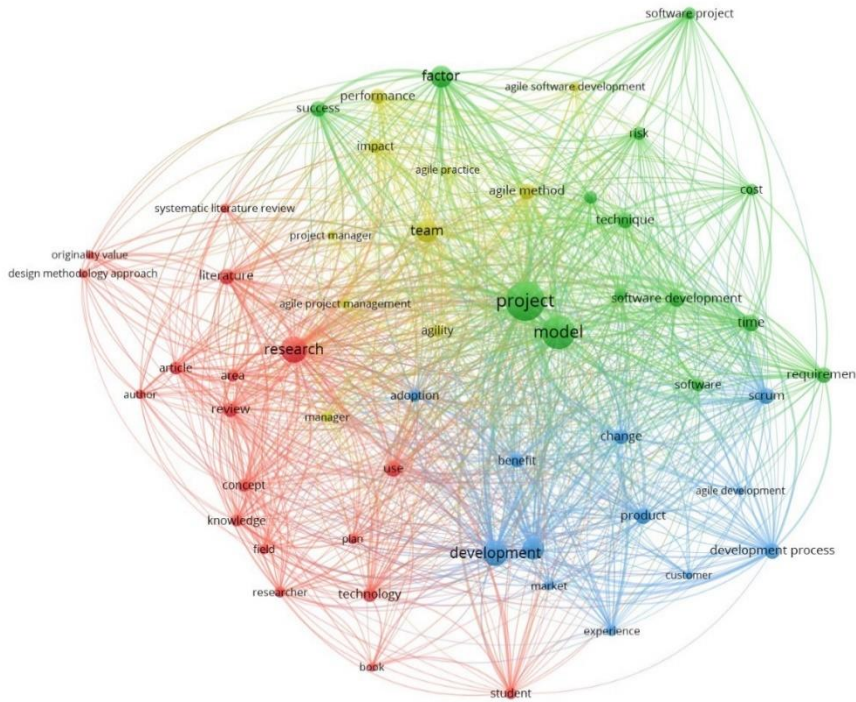


Figure 4. Chart - number of articles related to hybrid project management per year

Figure 5 is representing a cluster, or a network, of keywords found in titles and abstracts of a selected range of literature, where we have used software called VOSviewer (Jan van Eck & Waltman, n.d.). It allows us to make a few observations – first, it is clear that the literature on the hybrid approach is largely related to project model and methodology design. Second, looking at various clusters we can see a lot of references to agile project management and agile

methods or practices. Third, it appears that a lot of articles are related to the domain of software development and analyzing the hybrid approach in that context. This finding supports previous research and literature review, where similar observations were made (Papadakis & Tsironis, 2020).

26 literature positions were selected for full-text analysis, those were grouped into several themes.



**Figure 5.** Cluster of keywords created by VOSviewer using bibliometric data from systematic literature review

**Table 1.** Division of articles from SLR into themes

Theme	No of papers	References
Literature review	4	(Copola Azenha et al., 2021; Costantini et al., n.d.; Papadakis & Tsironis, 2020; Reiff & Schlegel, 2022)
Model building	14	(Afshari & Gandomani, 2022; Bianchi et al., 2021, 2022; Car-Pušić et al., 2020; Cooper & Sommer, 2016; Hariharan et al., 2015, 2016; Jabar et al., 2019; Parvez Alam & Toppur, 2019; Reddy et al., 2021; Sommer et al., 2015; Tyagi et al., 2013; Yahya & Sarah Maidin, 2023; Žužek et al., 2020)
Issues and challenges	2	(Sithambaram et al., 2021; Zasa et al., 2020)
Success factors	3	(Conforto & Amaral, 2016; Gemino et al., 2021; Mohanarajah & Jabar, 2015)
Case study	2	(K. Edwards et al., 2021; Mahadevan et al., 2015)

**3.3.2. Project Management methodologies standards literature**

During the full-text analysis of the selected articles and journals initial observations were made that led to the conclusion that a closer look at methodology values, principles, and

practices will be required. In one of the reviewed articles (Copola Azenha et al., 2021) there was a comparison between waterfall, hybrid and agile approaches in project management, focusing on elements like planning horizon, scope conformance or activities details, but it was still on a very



high level. Therefore we have decided to additionally expand the literature review to coursebooks and whitepapers, which are used to describe basic knowledge about the various methodologies. The reason for the expansion was due to limited information about project management methodology identity in scientific journals.

While selecting the coursebooks, we were selecting methodologies to be examined and had to agree on selection criteria. As the number of methodologies is significant and it's very subjective to decide which are worth being included in the comparison, we have decided to focus on the 10 most popular project management methodologies in the year 2022. Those 10 were divided into 2 groups, given the lack of consistent overview available, as most of the statistics were either focusing on scaled agile methodologies only or on times before scaled agile methodologies emerged. Given this, after researching and investigating a couple of different sources (Digital.ai, n.d.; Pulse of the Profession 2018: Success in Disruptive Times, n.d.; The 9 Most Popular Project Management Methodologies Made Simple, n.d.) that present results based on actual research, we have selected 5 scaled agile methodologies and 5 more general ones.

Selected 5 scaled Agile methodologies are SAFe, LESS, DAD, Nexus, and Scrum@Scale.

Selected 5 general project management methodologies or standards are: Waterfall, Agile, Scrum, PRINCE2, PMBoK.

While selecting the methodologies we have decided not to include approaches like Lean or Six Sigma, as those, even if appear on various "project management methodologies lists", they are not directly related to project management, as well as Kanban, Critical Path or Critical Chain approach, which are rather techniques or methods to be used than methodologies on their own.

Also, after consideration and analysis, we have decided not to add the so-called "Spotify

Model", as it is not really a methodology or a framework, but rather an approach to building organizational structure and empowering teams to choose whatever framework or methodology suits them (The Spotify Model for Scaling Agile | Atlassian, n.d.).

Please note that the description and listing of – especially, practices and techniques is not a complete list providing full coverage, which wouldn't be possible to reflect in a single article, but rather an example of key ones that allows to get a general understanding of the practice and approach it's suggesting.

### 3.3.2.1. PRINCE2 (AXELOS, 2017)

**Definition:** PRINCE2 is a process-based methodology, which provides the techniques and methods to effectively manage a project. It stands for PROjects IN Controlled Environments, originates from the UK government, and is used and recognized all over the world (PRINCE2 Methodology Explained | EUR, n.d.).

**Principles and values:** Continued Business, Justification, Learning from Experience, Define Roles and Responsibilities, Managing by Stages, Managing by Exception, Focusing on Products, Tailoring to the Environment.

**Processes, phases, or knowledge areas:** Starting Up a Project (SU), Initiating a Project (IP), Directing a Project (DP), Controlling a Stage (CS), Managing Product Delivery (MP), Managing Stage Boundaries (SB), Closing a Project (CP).

**Practices and techniques:** Business Case, Reports, Plans, Lessons Log, Daily Log, Risk register, Issue register, CMDB.

**Roles:** Customer, User, Supplier, Project manager, Project team, Administrator, Project Board.

### 3.3.2.2. Scrum (Schwaber & Sutherland, 2020)

**Definition:** It is a framework for managing teams and projects that focuses and emphasizes teamwork, accountability, and



iterative progress toward a concrete goal. It starts with a simple objective: begin with what can be looked at or known. Later, monitor and track the progress and tweak, as necessary (What Is Scrum? n.d.).

**Principles and values:**

- Transparency, Inspection, Adaptation.
- Commitment, Focus, Openness, Respect, Courage.

**Processes, phases, or knowledge areas:** Product backlog creation, Sprint planning and creating a backlog, Working on sprint, Testing and product demonstration, Retrospective and the next sprint planning.

**Practices and techniques:** Sprint, Sprint planning, Daily, Sprint Retrospective, Review, Product backlog, Increment, Sprint backlog, Backload refinement (activity).

**Roles:** Scrum Team, Developers, Scrum Master, Product Owner.

3.3.2.3. *Agile (Manifesto for Agile Software Development, n.d.)*

**Definition:** Simply explained, being Agile means being ready for change and motion, and in the project management world it's translated to delivery through continuous incremental improvement through frequent and not necessarily large releases.

**Principles and values:**

- Satisfying Customers with Fast and Continuous Delivery, Welcoming Changes in Requirements Even Late in the Project, Delivering Value Often, Breaking the Silos In Your Project, Building Projects Around Motivated People, The Most Effective Way of Communication is Face-to-face, Working Software is the Primary Measure of Progress, Maintaining a Sustainable Working Pace, Continuous Excellence Enhances Agility, Simplicity is Essential, Self-organizing Teams, Generating Most Value, Regularly Reflecting and Adjusting The Way of Working to Boost Effectiveness.
- People and interactions between them and more important than tools or processes.

Having working software is better than having large documentation. Collaborating with a customer brings more benefits than focusing on negotiating the contract. Plans are important but responding to changing requirements is more important.

**Processes, phases, or knowledge areas:**

Concept, Inception, Iteration, Release, Maintenance, Retirement.

**Practices and techniques:** Sprint / Iteration, Sprint planning, Daily sprint, Retrospective, Review Backlog.

**Roles:** Scrum Master, Development team, Product Owner.

3.3.2.4. *Scaled Agile Framework (SAFe) (SAFe 5 for Lean Enterprises, n.d.) (Manifesto for Agile Software Development, n.d.)*

**Definition:** The Scaled Agile Framework® (SAFe®) is a framework that includes a set of patterns that helps implement agile practices at a larger scale. It has a structure, well-defined roles and responsibilities and guidance on how to plan and execute work.

**Principles and values:**

- Taking an economic view, Applying systems thinking. Assuming variability. Preserving options. Building incrementally. Basing milestones on working systems evaluation. Visualizing and limiting WIP. Reducing batch sizes and managing the queue. Applying cadence. Synchronizing with cross-domain planning. Unlocking the intrinsic motivation of knowledge workers. Decentralizing decision-making. Organizing around value.
- Alignment. Built-in quality. Transparency. Program execution.

**Processes, phases, or knowledge areas:** Enterprise Solution Delivery, Agile Product Delivery, Team and Technical Agility, Lean Portfolio Management, Organizational Agility, Continuous Learning Culture, Lean-Agile Leadership

**Practices and techniques:** Design Thinking, Inspect and adapt, Release on Demand, CICD, Backlog, System demo, Iteration, Program Increment, Agile Release Train, UX, Scrum of Scrums, Team Backlog, Program Backlog.

**Roles:** Scrum Master, Product Owner, Product Manager, Release Train Engineer, Solution Train Engineer, Enterprise Architect, Agile Team Business Owner.

3.3.2.5. *LESS (LeSS Framework - Large Scale Scrum (LeSS), n.d.) (Manifesto for Agile Software Development, n.d.)*

**Definition:** It enables an organization to scale scrum to a larger number of teams that deliver a single product while working together. The fundamentals are the same as with the scrum team, but were expanded to cover the field of managing multiple teams elements.

**Principles and values:** Transparency, More with less, Whole product focus, Customer-centric, Continuous improvement towards perfection, Lean thinking, Systems Thinking, Empirical Process Control, Queueing theory.

Processes, phases or knowledge areas: Sprint Planning 1&2, Working on Sprint backlog, Product Backlog refinement, Sprint Review, Retrospective, Overall retrospective, Next Sprint.

**Practices and techniques:** Sprint Planning 1, Sprint Planning 2, Backload refinement (event), Sprint Review Retrospective.

Roles: Team, Product Owner, Scrum Master, Communities, Feature Teams.

3.3.2.6. *Disciplined Agile Delivery (DAD) (Agile Practice Guide | Project Management Institute, n.d.; Disciplined Agile Delivery | Disciplined Agile, n.d.)*

**Definition:** Disciplined Agile® Delivery (DAD) is a people-oriented agile approach to delivering IT projects. It addresses the full delivery life cycle and is flexible so it can

support various ways of working, and can be adapted to given organization needs.

**Principles and values:** Delighting customers, Being awesome, Looking at things with the right context, Being pragmatic, Having a choice that is positive, Optimizing flow, Organizing around products/services, Having enterprise awareness.

Processes, phases or knowledge areas: Inception, Construction, Transition.

**Practices and techniques:** Architecture strategy, Release planning, Test strategy, Project vision, Continuous delivery, Exploration.

**Roles:** Stakeholder, Team Lead, Product Owner, Team Member, Architecture Owner, Specialist, Independent tester, Domain expert, Technical expert, Integrator.

3.3.2.7. *Scrum@Scale (The Scrum@Scale Guide Online | Scrum@Scale Framework, n.d.)*

**Definition:** It is an alternative method of scaling agile teams, which is based on scrum fundamentals and enriched with complex adaptive systems theory. In this methodology, every team member is a part of both a scrum team as well as a larger ecosystem of the network of teams.

**Principles and values:** Commitment, Focus, Openness, Respect, Courage.

**Processes, phases, or knowledge areas:**

- Scrum Master Cycle - Cross-team coordination - Delivery Product release & feedback - Metrics and transparency - Team process - Continuous improvement & impediment removal
- Product Owner Cycle: - Strategic Vision - Backlog prioritization - Backlog decomposition & refinement - Release Planning

**Practices and techniques:**

Scaled Retrospective, Scrum of Scrums, Scaled Daily, Scrum Executive, Meta Scrum.

**Roles:** Product Owner, Chief Product Owner, Scrum Master, Scrum of Scrums Master, Executive Action Team.

### 3.3.2.8. *Nexus (Online Nexus Guide / Scrum.Org, n.d.)*

**Definition:** A Nexus is understood as a network of a couple (from 3 to 9) Scrum Teams that collaborate with each other on a single product. Typically, there is a single Product Owner responsible for a single Product Backlog.

**Principles and values:**

- Transparency, Inspection, Adaptation.
- Commitment, Focus, Openness, Respect, Courage.

**Processes, phases, or knowledge areas:** Product backlog creation, Nexus sprint planning, Working on sprint and daily integrations, Testing and product demonstration, Nexus retrospective and the next planning.

**Practices and techniques:** The Sprint, Cross-Team, Refinement, Nexus Sprint Planning, Nexus Daily Scrum, Nexus Sprint Review, Nexus Sprint Retrospective, Product Backlog, Commitment: Product Goal, Nexus Sprint Backlog, Commitment: Nexus Sprint Goal, Integrated Increment, Commitment: Definition of Done.

**Roles:** Product Owner, Scrum Master, Nexus Integration Team Scrum Team.

### 3.3.2.9. *PMBOK (PMBOK Guide | Project Management Institute, n.d.)*

**Definition:** The Project Management Body of Knowledge (PMBOK) is considered to be a fundamental standard, defining the terminology, best practices and processes, which has been created and maintained by the Project Management Institute (PMI).

**Principles and values:** Being a Caring Steward, Creating a Collaborative Environment for the Project Team, Engaging With Stakeholders Effectively, Focusing on

Value, Recognizing, Evaluating, and Responding to System Interactions, Demonstrating Leadership Behaviors, Tailoring with Context in Mind, Building Quality Everything, Navigating Complexity, Optimizing Risk Responses, Embracing Adaptability and Resiliency, Enabling Change, Achieving the Future State

**Processes, phases, or knowledge areas:** Initiating, Planning, Executing, Monitoring and controlling, Closing (5 process groups were part of PMBoK up to the 6th edition and have been removed in the 7th edition).

**Practices and techniques:** Expert judgment, Data gathering, Data analysis, Data representation, Decision making, Project Management Information System (PMIS), Meetings, Product Analysis, Prototypes, Problem-solving, Estimating, Strategies, Schedules, Risk categorization, Resource optimization, Testing and inspection, Recognition and rewards.

**Roles:** Project Manager, Sponsor, PMO, Project team, Business Analyst.

### 3.3.2.10. *Waterfall (M. Edwards et al., n.d.)*

**Definition:** As the waterfall is rather an approach than an actual methodology, there is no formal definition available, even more, an observation was made that for years Agile has been at the heart of ongoing research, and waterfall was abandoned as old-fashioned, even thou it's still massively in use, most of the articles are focusing on the problems related with the waterfall approach (Petersen et al., n.d.). Related to earlier quoted work, we can assume that waterfall may be perceived as a structured, formal, and sequential way of managing projects, that focuses significantly on the order of phases and documentation and has a formal view on change management which makes it less likely to easily adapt to any scope changes.

**Principles and values:** Sequential structure, Documentation, Upfront planning, Established timeline

**Processes, phases, or knowledge areas:**

Focusing on the systems development, an example of waterfall phases could be (Casteren & van Casteren, 2017):

Systems requirements, Software requirements, Analysis, Program Design, Coding, Testing, Operations.

**Practices and techniques:** Documentation, change control, testing, requirements analysis, Critical Path.

**Roles:** Project manager, business analyst, developer, tester.

This overview of the popular 10 project management methodologies shows that while each of them is unique and different, some share similarities in naming, definition, roles, or events, which may cause confusion and make establishing the hybrid approach hard to explain and define. Therefore it seems imminent that in order to distinguish two or more methodologies that would be combined together to form a hybrid approach, we need to reach out and look not only at their names but also at their principles and values, processes, or practices.

#### **4. Understanding of hybrid project management**

Most of the papers analyzed refer to the hybrid project management approach or methodology as a combination of different methodologies, linking in all cases to a mix of traditional and Agile methodologies, however, only a few of them are trying to define the hybrid approach (Copola Azenha et al., 2021), while the rest assumes it's the case.

Reviewed articles were mainly assessing two possibilities of using a hybrid approach:

1. Adding Agile elements into a traditional and predictive project management methodology.
2. Or quite the opposite, as enhancing Agile methodology with elements of the conventional project

management world, such as for example stage gates.

The first trend was reflected in the article describing the state space approach (Tyagi et al., 2013) where authors are suggesting to use both traditional philosophy and supplementing it with agile elements, allowing changes and iterative work only during some of the phases, but not directly during the work execution. A similar approach was presented in a model building exercise for a local government unit that handled construction and infrastructure projects, where they used mainly a plan-driven approach derived from IPMA and PMBOK (versions before introducing Agile elements there), which was being improved by adding Agile elements such as creating working groups similar to the idea of development teams and roles like product owner and scrum master (Car-Pušić et al., 2020). Reddy and others also proposed a method in which an Analytical Hierarchy Process (being a fundamental one) would be supplemented with the introduction of Agile sprints to bring the benefits of two worlds together (Reddy et al., 2021).

The second approach was described in some examples as well. One paper was showing how adding more documentation and a structured approach to the requirements gathering process can improve and help build consensus among various stakeholder groups (Hariharan et al., 2016). Others have evaluated the usage of the Agile Stage Gate [ASG] model in manufacturing firms, where it has been proven to bring in positive effects and improve the overall idea-to-product process by impacting time to market and better rate of success with developing new products (K. Edwards et al., 2021; Sommer et al., 2015). ASG was also analyzed from the context of issues and challenges required to implement it correctly, where three main areas have been identified as critical, which are integration across organizations, culture change and perception of the Agile approach (Zasa et al., 2020).

While it's clearly understandable why this view dominating, as those two were mainly recognizable methodologies for decades, nowadays reality is more complex and none of the articles analyzed was able to address issues of mixing methodologies such as, for example Scaled Agile Framework and LESS? Both are Agile, but both have different approaches to various elements.

Within the scope of SLR there were only three articles (Cooper & Sommer, 2016; Papadakis & Tsironis, 2020; Žužek et al., 2020) that spotted that the hybrid approach may be more complex and suggested a hybrid approach as mixing Agile with concurrent or in relation to a product development process, stepping away from traditional vs agile comparison, or that hybrid may mean a mix of systems that would produce a better (in terms of efficiency) model (Kuhrmann et al., 2017). Outside of SLR scope we have found a small number of other articles, that recognize that a hybrid approach means combining together multiple methods, which may mean agile and plan-driven, but mixing between agile, or just other. Examples of those are mixing together lean and agile, XP and Scrum, etc. (Papadakis & Tsironis, 2018).

Why is this important? Because now we have many more methodologies – a scenario where we would mix together Scrum and SAFe, by implementing techniques from SAFe such as Scrum of Scrums and PI Planning (quarterly planning) into pure Scrum methodology? Both are coming from an Agile background, but yet you are mixing two methodologies, therefore potentially moving into a hybrid ground? Looking at hybrid just through the perspective of the traditional vs agile approach does not provide necessary insights into that kind of scenario.

#### **4.1. Looking at methodology identity and finding the tipping point – when the approach is starting to be hybrid?**

Project management methodology identity contains a collection of principles, practices, and processes that define and guide the way

an organization manages its projects. It encompasses the strategies, tools, and techniques that an organization uses to ensure successful project delivery, including project planning, risk management, resource allocation, and stakeholder communication. A strong project management methodology identity can provide a consistent and structured approach to project management, which can result in improved project outcomes and reduced risk. This is because it provides a clear framework for project teams to follow, which can help ensure that projects are managed in a consistent and standardized manner) (Turner & Müller, 2003).

The literature review that has been conducted indicated that the project management methodology definition and its identity possibly should be expanded beyond the principles, practices, and processes, which are not always commonly comparable and adequate, but to have a wider definition of layers:

1. Principles and values – Establishing goals and approaches as well as values that should guide the project teams and their organizations in planning and delivering the work.
2. Processes, phases, and knowledge areas - defining the overall framework and logic.
3. Practices and techniques – those are all the tools, methods, and techniques used in the operational space, as well as typical role definitions, events, and artifacts that are required. PMI would define those as a “set of methods, techniques, procedures, rules templates, and best practices” (PMBOK Guide | Project Management Institute, n.d.).

In addition to this, we believe a deeper and more comprehensive definition should be forged. One that would relate to the term identity used not only in management, but in psychology, biology, and social sciences which is describing identity as a complex and multifaceted construct that refers

to an individual's sense of self, encompassing their unique characteristics, values, beliefs, and experiences (Phinney, n.d.).

This would suggest that when reviewing methodologies we should assess them not only on a high level but go deeper and also look for their uniqueness and how they differentiate from each other. While this element has not been so obviously called out in the past, in the methodologies that have emerged after the year 2010, quite often we may see that their authors are explicitly naming the difference between their methodology and something else.

None of the reviewed articles provided thoughts or a structured approach to when actually a methodology is becoming hybrid, most of them referring just to their definition of a hybrid approach as being a mix of two or more methodologies, however in reality that explanation seems to be vague and not covering a lot of potential scenarios, to which we will refer in our discussion.

We have found no clear evidence of a well-defined tipping point that could define when a project manager is starting to use the hybrid approach, which calls for future research and analysis in that area.

#### **4.2. Potential of a hybrid approach with a focus on risks and benefits**

In the selected range of articles, we have found numerous references to both benefits and risks that may apply to organizations using a hybrid project management approach. Gemino et al. have performed an international study on 477 projects and have proven that using a hybrid approach can bring as many benefits as just moving to agile, which has been confirmed by practitioners who are suggesting that hybrid is currently a leading approach in the project management field (Gemino et al., 2021). Those results were supported by another research done earlier showing that in high technology-based companies using a hybrid approach has a conclusive impact on the functioning of

both the project and the product (Conforto & Amaral, 2016).

Another article goes even further and calls out that the need for the adoption of the hybrid approach is fundamental to the survival of larger companies that need to face challenges related to cultural differences, client and project-specific requirements, or just specific processes and environments they need to operate in, as well as pointing out the trend of using the hybrid approach in more complex projects (Copola Azenha et al., 2021).

An interesting study was done, focusing on control mechanisms in Agile and Traditional approaches (Mahadevan et al., 2015), comparing them, and showing how a hybrid approach that would use both can bring significant benefits to the organization. The authors have divided different control mechanisms into agile and non-agile and described their various pros and cons, as well as the results of combining them to achieve better results.

Also, another benefit was raised and flagged by Constantini (Constantini et al., n.d.) saying that the hybrid approach is often used in situations where the adoption of full Agile approach is limited by organization culture and long-term usage of the predictive approach. In this case, hybrid seems like a natural middle step in evolution (leading to adaptive), making it easier to implement due to lower resistance to change.

The risk management perspective is an interesting one when assessing the pros and cons of a hybrid approach and has been addressed in another article (Afshari & Gandomani, 2022), which suggests that just moving to some Agile practices can increase the level of risk in the project, and they suggested using a combination of Scrum, XP and some standard PMBoK-aligned risk management approach to keep the benefits of going Agile, without sacrificing the project stability and security.

Despite these benefits, there are also several challenges associated with implementing a hybrid approach. One of the main

challenges is the complexity of managing different methodologies. Organizations must ensure that all team members are trained on and understand the different methodologies that are being used and that there is clear communication and alignment across the organization. Another challenge is the potential for confusion and lack of direction. Organizations must ensure that there is clear guidance on how to use the different methodologies, and that team members understand how to apply them in different situations (Munns et al., 1996).

## **5. Discussion**

The research conclusion clearly shows that most of the articles do not try to define the nature of the hybrid approach and assume it is mainly referring to Agile vs Traditional comparison and mixing those two approaches. Many of the articles say that hybrid means mixing two or more project management methodologies. Those definitions, while might have been true in the past, in the current modern project management world are questionable, as there are plenty of new project management methodologies, for example, related to the scaled agile approach, which are different between themselves, but cannot be captured in the iterative vs predictive approach concept. This is supported by data from years back, showing that already in the year 2017 as much as 71% of project management professionals adopted adaptive, agile, or hybrid agile (what they called a blended) approaches for their projects (as either using straight agile or a hybrid approach, and only 29% said that they do this rarely or never (Success Rates Rise 2017 9th Global Project Management Survey, n.d.), which again proves that with the widespread adoption of Agile, we cannot close the hybrid approach definition in a bipolar agile vs the traditional world, given that Agile in itself has a lot of complexity and different methods which has been proven earlier.

We propose to take a step back and first look at possible scenarios on when we would potentially consider using a hybrid approach:

1. Starting a new project
2. When a new initiative is started from scratch, the team assesses the project, organization and environmental needs and complexities to pick or define the best project management approach. This situation is simpler, as a methodology/approach is defined and used.
3. Changing the way an ongoing project is managed - now why would that happen?
  - a. Performance issues (that's a good reason to look at how the project is managed and what potential improvements can be made to the adopted approach).
4. Scaling up or down
5. This mustn't necessarily mean that we're venturing into a hybrid world, rather than potentially just a change of methodology is required. For example - so far, we just had 1 or 2 teams and Scrum was good enough, but now we will have more teams and need to move to other methodologies, but not necessarily go to hybrid.
6. Change of constraints (scope, time, quality, budget, other)

The original assumption was that the moment when project managers start to use a hybrid approach is when they start to mix two different methodologies. But what it means - referring back to the division between approach, methodology, and practice earlier, it means that one methodology is being supplemented with practices or techniques from a different methodology.

Again, let's consider a couple of challenging scenarios that will put this theory to the test.

### **5.1. Scenario 1**

A project manager is running a project with a couple of different teams using Scrum@Scale. So far they have performed backlog refinement as an ongoing activity,



but the team needs to formalize it, and starting next month this will be a formal event.

In this scenario, it appears that almost nothing changes, as we're still doing backlog refinement, and still following Agile principles, but in practical terms, we have changed how we execute a specific project management practice:

- Scrum@Scale defines backlog refinement as an ongoing activity
- LESS is looking at backlog refinement as a specific event.

And both of those methodologies are calling out this specific case as an example to differentiate between themselves.

So the conclusion here is that by doing that, we are heading toward a hybrid approach.

## **5.2. Scenario 2**

Imagine that a project manager works on a project related to regulatory requirements and follows a traditional waterfall approach relying heavily on PRINCE2. Given the issues with monitoring and controlling the progress, two additional practices have been implemented:

- Daily stand up to improve the communication within the team
- Kanban board to visually represent the progress of tasks being done

While the first impression might be that this is a classic example of a hybrid approach, where a traditional waterfall methodology is being enriched by Agile practices, we would like to challenge that view. Is this a hybrid approach? You could easily say that a daily stand-up and a Kanban board are just techniques that support the controlling stage process in PRINCE2 and are not forbidden there. Also, as such they do not stand in conflict with PRINCE2 principles, so why would we treat them as something that doesn't belong there originally?

The conclusion from this scenario is, that in this case, this wouldn't be a hybrid approach.

## **5.3. Scenario 3**

The project is run using best practices from PMBoK. Given the issues the team has experienced with requirements gathering, a new role has been implemented called Product Owner, who is responsible for articulating requirements and prioritizing them for a particular deliverable.

How to resolve that case? The role of a product owner does not exist per se in PMBoK and it comes mainly from the Agile world and Agile-related projects or product methodologies. But is merely introducing this role, which is a new element coming from a different methodology, enough to call it now a hybrid approach? In our opinion - it is not enough, as this new role solely does not change or challenge the underlying principles or processes of the currently used methodology in this case.

## **5.4. Scenario 4**

Last but not least scenario – the organization is promoting the usage of Scrum on team and project levels in all their projects, but still on portfolio level it's following a very strict and plan-driven annual budget planning process. Some may say, that those two are in conflict, but without going into the details it's hard to tell.

In a scenario where a budget is allocated to the team without requiring an up-front detailed plan and commitments for delivery, this wouldn't be a hybrid approach, as first and foremost, we need to understand that project and portfolio levels and methodologies are different, so still that wouldn't impact regular daily work on project level.

However, if to execute annual planning and budgeting, the organization portfolio leadership requires a detailed plan that is being tracked to the letter, then in fact this is putting pressure and having an impact on work done by the team and forcing them to work in some kind of uncomfortable mix

of the plan-driven and agile approach.

Those simple scenarios along with the key findings from the systematic literature review clearly show that the hybrid approach might not only be about mixing different technologies but also about mixing or altering practices, however every time they must be put in the correct context to assess them accurately. This leads to the conclusion that we need to define and understand those methodologies better and go deeper in the analysis, reaching out to their identities.

### **5.5. Discussion summary**

A literature review done earlier shows that most of the project management methodologies have specific attributes that could be divided into groups such as:

- Principles and values
- Process and knowledge areas
- Practices and standards

Now, looking back and trying to define when a project is knowing to a hybrid approach, we are suggesting considering a wider framework that would allow us to establish if a hybrid methodology is being used or not. This would include potential definition criteria such as:

- Organization is using a hybrid approach if it's enriching existing well-defined project management methodology with elements of another methodology or methodologies, which results in:
  - challenging or changing the main methodology values and principles, and/or
  - significantly altering its processes, and/or
  - changing the way that particular well-defined practices are executed.
- The organization is using a hybrid approach is it's designing a custom project management framework by combining elements from different

methodologies in a way that would challenge their original principles, values, processes, or the way that particular practices are being executed.

Note that in none of the points above, we are focusing on the naming of particular elements or roles, as many of them are the same, just using different naming conventions.

We recognize that this attempt to define the hybrid approach is still not precise enough and is open for interpretation, for example, what is called a significant change and what is not. With a multiverse of project management methodologies, where a lot of them are using similar practices and techniques, sometimes different by name or detail, it is getting tricky to draw a line.

Therefore we propose to keep an approach that project tailoring may result in adopting a hybrid approach, but only if the criteria mentioned earlier would be met, and if not then we would treat it as a minor change to the overall methodology.

A literature review conducted is strongly suggests that the hybrid approach is indeed bringing in much more benefits than risks to the organizations, making it an attractive opportunity for organizations – mainly large ones - that struggle to adopt modern project management methodologies or techniques to increase chances of project success.

## **6. Conclusions and opportunities for future review or research**

This review reflects the current state of knowledge about the hybrid approach in project management. It consists of a literature review done following the recommendations for planning and executing a systematic literature review. We have presented review literature that was chosen by specific criteria and analyzed, which has been expanded by insights into the project management fundamental coursebooks and definitions.

The paper showcased a few scenarios that explained why a traditional view of the hybrid

approach does not cater to all of the modern world's complexity and possibilities and why new criteria and definitions must be established.

We have also presented an attempt to define criteria that may be used when assessing if a hybrid approach is used in the project management field in the organization or is just a simple project tailoring being done with minor enhancements.

From our research findings and the following discussion, we have concluded that:

1. The definition of a hybrid project management approach must be updated and is still vague and requires investigation. New research should aim to include new scaled agile (and not only) methodologies that came to life in the last decade or so, without focusing merely on traditional vs agile comparison, especially when seeing changes and trends in methodologies and standards like PRINCE2 or PMBOK we can see they're heading now more into the agile space and therefore soon keeping agile vs traditional dispute may have a lesser reference.
2. Authors came up with initial guidance on how to define the usage of a hybrid approach, based on methodology identity consisting of principles, values, processes, and practices.
3. Further research is recommended to help draw the line between project tailoring and hybrid methods, as well as include new scaled agile (and not only) methodologies that came to life in the last decade or so.
4. The hybrid approach seems to have a high potential to be a leading trend for the near or longer future in project

management as it allows companies to have more agility in the more complex and demanding market and navigate cultural challenges or regulatory requirements while allowing to bring in the benefits or various project management methodologies.

5. While originating from the IT and software development industry, the hybrid approach seems to be gaining popularity also in other industries where there's a lot of research happening already proving its usage and benefits.

An interesting future research opportunity would be to follow up on that assumption:

- We know that project management should be used in organizations as it brings value and increases the chances of project success, which has already been described in multiple articles.
- We know that in most cases project tailoring is required or recommended by every organization (and it is recommended by many project management methodologies explicitly) and every project is different (by definition) and therefore potentially requires a different approach.
- And since the line between project tailoring and hybrid project management approach is very thin and undefined, some of the authors are even using it interchangeably. Can we then say, that there is a high probability that the majority of organizations and project managers are in fact – knowingly or unknowingly – using a hybrid approach? What consequences would that bring to the project management world and would that challenge the need to have any more individual project management methodologies?

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