

# **LITERATURE REVIEW – HYBRID PROJECT MANAGEMENT**

*Seminar paper*

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## **Abstract**

This literature review provides an overview of different hybrid project management methodologies, such as Water-Scrum-Fall, Waterfall-Agile, Hybrid V-Model and Agile-State-Gate after clarifying the historical background and emergence of hybrid approaches. The review emphasizes the compromise characteristics of hybrid management, where certain characteristics can be seen as both, advantages and disadvantages depending on perspective. It highlights the overlap in their advantages and disadvantages, indicating a lack of differentiation in the literature. Key success factors include clear alignments, defined goals and metrics such as openness to new methodologies. Use cases in IT and construction demonstrate the flexibility of hybrid project management. The research emphasizes the growing importance of the hybrid approach as an alternative to traditional and agile methodologies. Developing new competence profiles for project managers aligned with hybrid project control is required. By addressing these considerations and conducting further research, organizations and academia can enhance their understanding and implementation of hybrid project management, improving project success and organizational performance.

Keywords:

Hybrid project management; agile project management; traditional project management; project approaches; project management and methodologies

Databases:

AISeI, Google Scholar

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## 1 Introduction

As projects become increasingly complex and multifaceted, there is a growing recognition that traditional project management approaches, such as the waterfall method, may not fully address the evolving needs and dynamics of modern projects by providing a systematic framework. On the other hand, agile methodologies, such as Scrum or Kanban, offer more flexibility and emphasize collaboration, enabling teams to adapt to changing requirements and deliver incremental value. As projects become more complex, the need to leverage the strengths of both approaches arises (Lalmi et al. 2021, p. 924).

Regardless of the methodologies used, effective management, especially in software projects, remains complex. Implementing agile practices in the software development industry questioned the role of traditional project management. However, a lot of companies have issues implementing significant management changes within their established practices. Therefore, hybrid methodologies became increasingly popular because they allow companies to adapt the evolving requirements. Hybrid approaches are often regarded as the optimal combination, leveraging benefits of agile methodologies while maintaining the advantages of traditional management practices (Adelakun et al. 2017).

Hybrid project management combines traditional and agile methodologies to create a customized approach that suits project requirements. It recognizes the need for flexibility while maintaining structure, offering organizations a comprehensive framework to effectively manage their initiatives. As a result, these adaptations should take requirements and specific cultural influences of clients into account to make hybridity a logical choice. This highlights the importance of a project manager's sensitivity in defining the approach as it becomes challenging to identify a universally applicable solution. In hybrid contexts, each project manager possesses their unique set of techniques, methodologies and tools, which can be combined, tested, observed and refined across various project scenarios (Copola Azenha et al. 2021, p. 106).

The objective of this literature review is to delve into the concept of hybrid project management, examining its foundations, benefits, challenges and practical implementation strategies. By studying a wide range of relevant articles, successful case studies and analysing current industry trends, this literature review seeks to provide insights into how organizations can successfully adopt hybrid project management approaches, leading to improved project outcomes and addressing the limitations that arise from only relying on traditional or agile methodologies.

In this literature review, the key components of hybrid project management, including the integration of sequential and iterative approaches, will be examined. Additionally, the advantages and disadvantages of each hybrid project management methodologies will be compared and use cases and success factors will be presented and analysed. The findings of this literature review offer valuable insights into the potential advantages and challenges of implementing a hybrid project management approach. By gaining a deep understanding of the characteristics and recommended practices associated with hybrid methodologies, organizations can make well-informed decisions when choosing and customizing project management practices to optimize project success.

After the introduction, the historical background of hybrid project management is clarified. The evolution and emergence of hybrid project management are addressed. Subsequently, a brief chapter explains the research methodology employed in this literature review. The findings chapter focuses on four different hybrid project management methodologies, identifying and comparing their advantages and disadvantages. The methodologies Water-Scrum-Fall, Waterfall-Agile, Hybrid V-Model such as Agile-stage-Gate (Scrum-Stage-Gate) will be presented. Additionally, the chapter presents use cases and success factors. The following chapter discusses the results of the previous chapters in general, as well as in terms of practical implications and future research and limitations. The final chapter is a conclusion on this literature review.

## 2 Historical Overview

In the following chapter, the historical evolution of hybrid project management methodologies will be explained. Subsequently, the emergence of these methodologies will be presented.

### 2.1 Historical Evolution of Hybrid Project Management Methods

The history of project management can be characterized by a transition from informal or sporadic practices to increasingly formalized and institutionalized approaches. Prior to the 20th century, project management was closely related to the development of techniques and professions. Projects did not have a distinct status or dedicated management practices. However, in the 1950s and 1960s, project management emerged as a distinct management model. It gained independence and standardization, driven by the recognition that common principles for managing engineering projects outweighed sector-specific differences. This standardization of practices and tools was largely driven by major contractors seeking to streamline their efforts and increase efficiency (Garel 2013). According to Seymour and Hussein (2014), the evolution throughout the history of project management can be discerned. This continuous evolution has played an important role in advancing project management to prepare for significant future projects. Despite the existence of numerous substantial projects in history, there are not a lot of documented methodologies or techniques before the 1950s. The progress of project management as a profession has been expedited by advancements in science and technology. It is now widely acknowledged that a project manager needs a distinct skill set. As organizations undergo evolution, the challenges confronting future project managers will also evolve. Nonetheless, even as the future may demand that project managers adapt by developing new specialized skills, certain foundational elements that define an exceptional project manager will remain unchanged, including leadership, pragmatism, decisiveness, communication and foresight among others (Seymour and Hussein 2014).

The characteristic of traditional project management is a waterfall system or more advanced methodologies such as the V-model, which incorporates even more feedback loops (Albrecht and Albrecht 2021). The traditional approach is characterized by several key factors. Firstly, it involves clear initial requirements and a low rate of change, with limited user involvement. Additionally, formal documentation is a requirement and projects typically have larger sizes. The organizational support is based on existing processes and traditional project management is commonly employed in larger organizations. In this approach, team members are not emphasized and there is an expectation of fluctuation and a distributed team. If the system fails, the consequences are significant, indicating a high level of system criticality. The project plan follows a linear path (Špundak 2014).

The question that arose subsequently was whether there are alternatives to traditional project management that can reduce errors and provide better planning certainty. Especially in the context of a rapidly changing and unpredictable environment, known as the VUCA world, with its adverse parameters of volatility, uncertainty, complexity and ambiguity. A need to handle projects in a more flexible and therefore better adapted manner emerged (Albrecht and Albrecht 2021).

The term chosen to distinguish the new approach from the existing one was agility. As stated by Highsmith (2004), agility is defined as the ability to create and respond to change in order to generate value in a turbulent business environment. Agility, like many other research efforts, is grounded in various business principles, such as continuous innovation, product adaptation, shortened delivery times, adjustment of people and processes and the delivery of reliable results (Highsmith 2004). Based on the research of Špundak (2014), agility is also about balancing flexibility and stability. Unlike traditional project management, the requirements of the agile project approach are creative, innovative and unclear. Users are involved and part of a frequent collaboration while knowledge is tacit. Agile project sizes are mostly smaller and the organisational support prepares to embrace the agile approach. Teams are also smaller and the systems of the projects are less critical. The project plan is not linear, it is complex and especially iterative (Špundak 2014).

The research of Adalakun et al. (2017) concludes that not all software development projects can be effectively managed using a single development methodology. Both, agile and traditional approaches, are utilized. It is evident that agile methodologies have not entirely replaced traditional practices. The preference of the customers plays a significant role in determining the chosen approach. The data reveal that for example an increasing number of project managers at IBM are equipped to handle agile projects. However, these project managers do not strictly adhere to any specific agile methodology as described in literature. Instead, they follow a hybrid model known as Agile-with-Discipline. This hybrid-agile approach allows flexibility in accommodating continuous changes to requirements throughout the project development process, while also ensuring the utilization of appropriate tools, techniques and supporting documentation. Contrary to the notion that documentation is deemphasized in agile projects as suggested in the literature, the data highlights the continued importance of proper documentation, especially in external or customer projects. Lastly, the researchers findings do not support the notion that agile teams are entirely self-organized and self-managed (Adalakun et al. 2017).

## 2.2 Emergence of Hybrid Project Management

In order to meet the demands of innovation, modern organizations must strike a balance between the unique characteristics of their environments and projects, while also embracing greater agility (Copola Azenha et al. 2021). In the face of digitization, technological advancements and growing complexity, traditional project management alone is no longer adequate (Reiff and Schlegel 2022).

The agile approach, with its emphasis on flexibility, offers a more suitable project structure where task dependencies can be adaptable and lower-priority tasks can be deferred until the next project (Koszytan et al. 2020). There is no need to delve into a detailed analysis of the reasons for project management failures, as they are evident and have long been recognized (Avots 1969; Haji-Kazemi et al. 2013). The main errors include significant time pressure, distortion of competition, working with incorrect initial data, unrealistic requirements, hasty implementation, lack of cooperation among stakeholders and impoverished risk management (Arashpour et al. 2016). Companies in industries beyond software development have embraced agile methodologies. After more than a decade of dynamic evolution in agile methodologies, the focus has shifted from solely acknowledging their undeniable advantages to also considering their limitations and associated challenges (Wysocki and Orłowski 2019). This has led to the emergence of a relevant topic for managers seeking to enhance project flexibility through agile practices while retaining the structured project control provided by traditional project management methodologies. A hybrid approach to project management has gained significance in this context (Cooper and Sommer 2018).

Despite the considerable benefits offered by traditional and agile project management individually, there is often a need to employ both approaches. The requirement for different project management approaches may arise within an organization at the portfolio level, where various project categories exhibit different characteristics. Additionally, within a single project, specific methods and techniques may be utilized based on the requirements of different project phases (Spundak 2014).

In the context of IT projects, hybrid processes have the potential to integrate techniques and practices from various approaches and software development methodologies. However, selecting the most suitable ones that align with the project's characteristics is a complex undertaking. Therefore, future research aims to explore the use of a multi-criteria decision analysis approach to provide decision-making support for project management in this regard (Wysocki and Orłowski 2019).

The research of Schlegel and Reiff (2022) emphasizes the growing significance of the hybrid approach, which carries important implications for business organizations such as academia. When selecting an appropriate project management approach, organizations should consider the hybrid approach as an additional option alongside traditional and agile project management. Furthermore, there should be increased consideration given to developing new competency profiles for project control and implementation in the education and training of project managers and teams. Schlegel and Reiff recommend that academia should also integrate this topic into their curricula (Reiff and Schlegel 2022).

### 3 Research Methodology

In order to explore and examine existing literature on hybrid project management, a systematic literature review (SLR) was conducted. Literature reviews play an important role in scientific research and SLR is a well-established methodology within the information systems and project management field. An SLR involves a systematic, explicit and reproducible review and analysis of all relevant sources pertaining to the chosen theme. The available knowledge from these sources is collected analysed and critically reviewed (Kitchenham et al. 2009).

For this particular research, the AISEL and Google Scholar databases were used to gather the literature. The scientific guidelines of Webster and Watson (2002) and Kitchenham et al. (2009) were utilized to conduct a systematic literature review. These guidelines ensure a rigorous and systematic approach to reviewing and analysing the collected literature, enhancing the reliability and validity of the research findings.

Webster and Watson (2002) recommend that information for literature reviews should be collected in leading academic journals, as they are likely to contain the most significant contributions. They also emphasize the importance of selecting appropriate sources and critically evaluating the information they provide. The authors point out that literature reviews not only provide an overview of the current state of knowledge but also identify research gaps and provide inspiration for future research efforts. Overall, Webster and Watson (2002) suggest that literature reviews are a valuable tool for tracking research progress, developing theoretical concepts and capturing the current state of knowledge in a specific field of study (Webster and Watson 2002).

The following research questions guided this SLR are:

- What are the key characteristics and definitions of hybrid project management?
- Which hybrid project management methodologies are currently trending?
- What are the advantages and challenges associated with the implementation of hybrid project management approaches?
- What are the use cases and success factors for hybrid project management?
- What are the factors influencing the adoption and success of hybrid project management?

The search strategy for identifying high quality literature will involve using a combination of relevant keywords. These keywords include terms such as "hybrid project management", "combining traditional and agile" and "hybrid project management approaches" or "advantages and disadvantages of hybrid project management". By using these keywords, the aim is to retrieve literature that specifically addresses the topic of hybrid project management and its various approaches. To maintain the quality and reliability of the research, certain criteria will be applied to exclude sources that do not meet the desired standards. Non-peer-reviewed sources, such as blog posts, forum discussions, and opinion pieces, will be excluded. Articles that do not provide substantial insights or empirical evidence on hybrid project management will also be excluded. Additionally, articles that are not accessible or unavailable in full-text format will not be considered. By applying these exclusion criteria, the research will focus on peer-reviewed sources that contribute valuable knowledge and empirical findings to the field of hybrid project management. This approach ensures the inclusion of high-quality sources that enhance the scholarly understanding of the subject matter.

In summary, a total of 23 articles from journals, 3 book chapters and 3 conference papers were included in the present literature review. After providing the search strings, the results were further examined in terms of context and publication date. Articles related to IT project management were given preference over other contexts. Depending on the topic, articles with older publication dates were also excluded to ensure up-to-date findings.

## 4 Findings

In the following chapter, the most common methods of hybrid project management, identified through the literature review, will be presented. Subsequently, their advantages and disadvantages will be compared and contrasted in tabular form. The last part of this chapter will provide researched use cases as well as success factors.

### 4.1 Different Hybrid Methodologies

In this section, the four most relevant hybrid project management methodologies according to the literature will be introduced.

#### 4.1.1 Water-Scrum-Fall

The waterfalls methodology application is stable and predictable while its management is based on document driven communications. The technical implementation is formal and characterized by complex designs, while the team is distributed and thrives on order (Thummadi and Lyytinen 2020).

Dave West et al. (2011) introduced the term "Water-Scrum-Fall" to describe a common scenario in which a programming team, and sometimes the testing team, adopts the agile scrum methodology while the rest of the organization continues to follow the traditional waterfall methodology. This situation is depicted in figure 1.

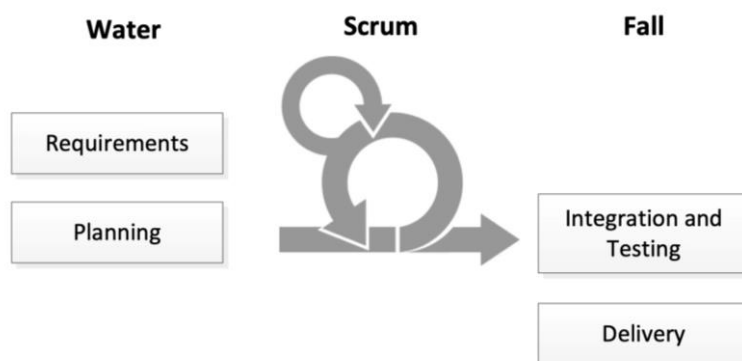


Figure 1: Water-Scrum-Fall (Wysocki and Orłowski 2019)

West et al. (2011) employs the term "water" to capture the initial activities performed by the organization, such as conducting feasibility studies, securing funding and gathering requirements. The term "scrum" is used to represent the middle phase where developers employ the Scrum methodology for actual development and, potentially, testing. Lastly, the term "fall" is utilized to describe the final deployment step, during which the organization follows its existing release policy (West et al. 2011).

At the beginning of a project, in scrum for example, the product backlog is only partially elaborated. However, if the requirements for the implemented solution are only vaguely stated at the start of the project, a reliable effort estimation cannot be made. This makes it difficult to plan or to engage external service providers. For the second phase, the technical implementation of the solution, the benefits of the agile model could be leveraged. Through the modular approach, individual components of the system were available early on for productive use. Agile approaches can also have a positive effect on team motivation, as they allow for involvement in sprint planning and shaping the sprint. A Water-Scrum-Fall methodology allows the project to leverage the benefits of agile implementation while providing better predictability (Schlegel and Willmes 2021).

Theocharis et al. (2015) concluded in their findings, that the Water-Scrum-Fall or similar combinations became reality. They discussed possible reasons and argued that the main driver for this kind of integration is the expectations of different stakeholder groups towards the "optimal" software development approach. Project managers require some stability to perform the usual project management tasks, such as estimation, planning or controlling. Furthermore, project managers also have the responsibility to

align projects with the respective company strategy, for example, projects must interface further (business) processes like human resource management, sales, contracting and so forth. Since agile methodologies usually address only system- or development related tasks, such interfaces are missing often. Hence, traditional approaches are used to provide a basic structure and a framework for project organization and to provide interfaces to the respective company. Then again, developers ask for approaches that - on the one hand - support the development related tasks, but - on the other hand - provide extensive freedom to select the best practices for the respective situation. The hybrid methodology, in which traditional and agile approaches are combined, seemingly provides a “win-win” situation (Theocharis et al. 2015).

#### 4.1.2 Waterfall-Agile

At first sight, the Waterfall-Agile model (figure 2) appears very similar to West's Water-Scrum-Fall methodology (2011). However, these two methodologies are different in their final phase. In West's methodology, the final phase follows a traditional project approach. In contrast, the Waterfall-Agile methodology maintains an agile approach throughout the entire project, including the final phase. The project plan is scoped and the first agile sprint is planned before the project starts (Hassani et al. 2018). This approach involves having a comprehensive project plan but the specific details of each sprint are not determined until the completion of the first sprint. The development, design and implementation phases are based on agile methodologies. During each iteration, the requirements are defined and customer feedback is actively sought. Testing is conducted and adjustments are made to facilitate continuous improvement. The contents of individual project phases are carefully chosen and assigned prior to project initiation, but they can be modified throughout the project based on the specified level of effort (Reiff and Schlegel 2022).

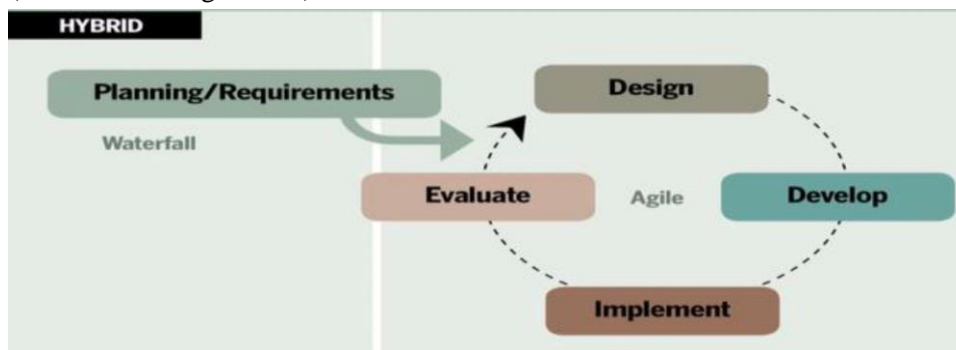


Figure 2: Waterfall-Agile (Hassani et al. 2018)

The initial phase involves a formal and traditional approach to define the desired outcome for each iteration (Hassani et al. 2018). However, the implementation within the individual phases is highly agile. Agile practices, such as the use of short sprints, are employed to expedite delivery and facilitate early-stage feedback collection, thereby improving alignment with customer requirements. The development and testing processes occur through these short and agile sprints, often leveraging the scrum framework (Reiff and Schlegel 2022).

Based on the findings of Hassani et al. (2018), there are various roles in the Waterfall-Agile methodology that are undertaken by the project team. In traditional-shaped projects, the project manager assumes responsibility for planning and managing the project, ensuring its successful completion and the achievement of project objectives. They oversee compliance with defined workflows and the realization of requirements within specified costs and deadlines. Developers handle the processing of individual work packages, while testers are responsible for monitoring quality objectives and conducting product testing. The unique aspect of the Waterfall-Agile methodology is that there is no clear specification about when or how traditional planning transitions into agile methodologies. This determination can be made depending on the project circumstances. It is also possible for a project to be initially defined and planned using an agile approach and subsequently developed and implemented using traditional procedures. The flexible and adaptive way of agile methodologies, along with their undeniable positive impact



on team productivity, have made them highly valuable in the professional environment (Hassani et al. 2018).

#### 4.1.3 Hybrid V-Model

The hybrid V-model (figure 3), which was developed by Hayata & Han (2011), shares similarities with Water-Scrum-Fall in terms of using a traditional approach at the beginning and end, with an agile phase in-between. However, it should be considered as a distinct methodology, as it is not based on the Waterfall methodology but rather on the V-model, which is another traditional type of methodology. In this hybrid approach, scrum is integrated into a traditional software development and IT project management process. The concept behind this methodology is to execute the higher-level phases according to the V-model, while the more detailed phases are carried out using scrum. Scrum is particularly well-suited for this purpose, as it promotes intensive communication within the development team and supports the implementation phase through collaborative iterative thinking (Hayata and Han 2011).

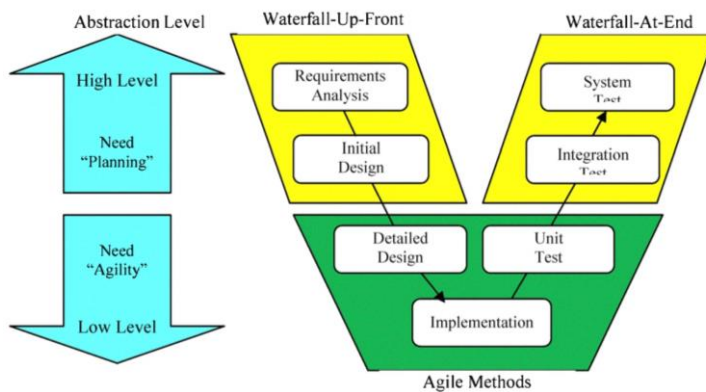


Figure 3: Hybrid V-Model (Hayata and Han 2011)

The traditional V-Model is a software development process model, in which the software development process is organized into phases. In addition to these development phases, the V-model also defines the approach to quality assurance, as in testing, in a phased manner. The V-model is based on the waterfall approach. The phase results serve as binding requirements for the next lower project phase. The left downward branch for the specification phases ends with the implementation phase. An extension compared to the waterfall model is the subsequent testing phases, depicted in the right upward branch. Each specifying phase is accompanied by a corresponding testing phase, resulting in a characteristic "V" shape in the representation, which also gave the model its name. This comparison aims to achieve a high test coverage by using the specifications of each development stage as the basis for the tests and test cases in the respective testing stages (Hayata and Han 2011; Vivenzio and Vivenzio 2013).

According to the authors, Hayata and Han (2011), in the hybrid V-model, the traditional approach is employed during the initial and final phases of the project, where there is a greater emphasis on planning. The agile approach is utilized during the development, implementation and testing phases, where the need for agility is more present. On the left side of the model, user and system requirements are gathered, specified and analyzed at the onset of the development project. This approach aims to minimize potential discrepancies regarding project goals by clearly stating them. At the bottom of the V, the agile approach is applied for design, implementation and unit testing to foster an iterative way of working and mitigating the risk of delays. Subsequently, on the right side of the model, the implemented solution is tested in accordance with the specifications stated on the left side. Through these tests, the V-model ensures a high level of product safety and quality (Hayata and Han 2011; Reiff and Schlegel 2022).

#### 4.1.4 Agile-Stage-Gate (Scrum-Stage-Gate)

Critics argued that the traditional stage-gate process struggles to address the needs of modern, innovative projects. Its linear and rigid structure, coupled with extensive planning, may reduce adaptability and responsiveness to changing circumstances. Furthermore, critics point out that the traditional stage-gate

process lacks the flexibility to accommodate project-specific contexts and can become overly bureaucratic in its implementation (Cooper 2017).

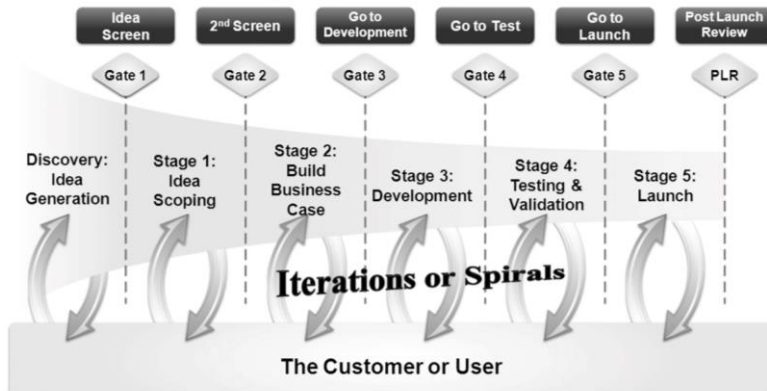


Figure 4: Agile-Stage-Gate (Cooper 2014)

As depicted in figure 4, the project progresses through its stages by simultaneously employing both, a tactical and an operational approach. Strategic decisions are made using the stage-gate process, while the operational level is managed through the agile approach (Reiff and Schlegel 2022). This process follows a hierarchical stage-gate framework consisting of the five standard phases (1. Idea Scoping, 2. Build business case, 3. Development, 4. Testing and Validation, 5. Launch) with the incorporation of multiple Scrum iterations within each stage (Cooper 2014, 2017). The Agile-Stage-Gate methodology is designed to enable one or multiple teams to work concurrently, with their respective work results being consolidated and analyzed collectively at the end of each stage (Reiff and Schlegel 2022).

According to Sommer et al. (2015), the integration of agile and Stage-Gate methodologies creates a dynamic balance between structured planning and iterative problem-solving. Their research demonstrates that industrial companies can achieve significant performance improvements by adopting agile-Stage-Gate hybrid processes for new product development. By leveraging the strengths of both agile and Stage-Gate methodologies, the framework offers a practical and effective solution for driving innovation and enhancing product development outcomes under industrial circumstances. Agile-Stage-Gate presents industrial companies with a compelling alternative to conventional Stage-Gate systems. By embracing the benefits of both Agile and Stage-Gate methodologies, companies can navigate the complexities of new product development with increased flexibility, adaptability, and innovation, leading to enhanced business performance and competitiveness (Sommer et al. 2015).

As concluded by Cooper (2016), for developers of physical products, the Agile-Stage-Gate hybrid model for product development is promising and can lead to positive outcomes. The use of sprints, similar to the IT Agile-Scrum model, can enhance speed and efficiency, although their application is typically limited to the development and testing stages. Adjustments may need to be made to incorporate physical elements and the tangible results of completed tasks into each sprint. Additionally, the integration of spirals, which involve iterative build-test-feedback-revise cycles, enhances adaptability and aligns well with the concept of Agile sprints. At the end of each sprint, a prototype, a version of the product, can be demonstrated to stakeholders such as customers and management. The success of this system relies on dedicated teams, which contribute to project acceleration. While the evidence is limited, initial indications are encouraging. Early adopters of this hybrid model have shown enthusiasm, and the companies involved have expanded its implementation, highlighting the positive outcomes achieved. The integration of Agile-Scrum methodologies into the Stage-Gate framework to create this Agile-Stage-Gate hybrid model represents a significant change in the new-product development process, comparable to the importance of the introduction of gating systems over 30 years ago (Cooper 2016).

## 4.2 Advantages and Disadvantages

In this chapter, the advantages and disadvantages of the four previously introduced hybrid project management methodologies are presented, compared and evaluated. All the advantages and disadvantages listed in the table were identified based on the findings from the literature sources consulted for the research.

Methodology	Advantages	Disadvantages
Water-Scrum-Fall	<ul style="list-style-type: none"> <li>• Flexibility</li> <li>• Improved predictability</li> <li>• Better risk management</li> <li>• Increased team productivity</li> <li>• Increased team motivation</li> <li>• Better collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased responsiveness and adaptability because of limited agile</li> <li>• Reduced customer involvement and less frequent feedback</li> <li>• Increased documentation and bureaucracy</li> <li>• Increased change resistance</li> </ul>
Waterfall-Agile	<ul style="list-style-type: none"> <li>• Clear project structure</li> <li>• Early project planning possible</li> <li>• Improved collaboration</li> <li>• Increased customer satisfaction</li> <li>• Reduced project risk</li> <li>• More flexibility in development</li> </ul>	<ul style="list-style-type: none"> <li>• Limited flexibility compared to agile approach</li> <li>• Increased coordination complexity</li> <li>• Increased overhead in terms of project management and coordination efforts</li> <li>• Skill requirements and expertise in both approaches needed</li> </ul>
Hybrid V-Model	<ul style="list-style-type: none"> <li>• Improved adaptability</li> <li>• Enhanced quality assurance</li> <li>• Increased stakeholder involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Increased complexity</li> <li>• Increased coordination challenges</li> <li>• Potential for conflicts between structured and agile approach</li> <li>• Increased documentation overhead</li> <li>• Diverse skillset required</li> </ul>
Agile-Stage-Gate	<ul style="list-style-type: none"> <li>• Improved adaptability</li> <li>• More frequent feedback loop</li> <li>• Increased flexibility</li> <li>• Improved collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Increased complexity</li> <li>• Diverse skillset required</li> <li>• Potential for conflicts (structured and agile approach)</li> </ul>

Table 1: Advantages and Disadvantages of different hybrid project management approaches (Hayata and Han 2011; Cooper 2014, 2016, 2017; Sommer et al. 2015; Theocharis et al. 2015; Hassani et al. 2018; Thummadi and Lyytinen 2020; Schlegel and Willmes 2021; Reiff and Schlegel 2022)

One of the key advantages of hybrid approaches is their ability to provide a structured framework while allowing adaptability. They enable teams to maintain a clear project plan and defined milestones, ensuring effective resource allocation and risk management. At the same time, they incorporate iterative cycles and feedback loops, promoting continuous improvement and faster delivery of value. Hybrid approaches also facilitate better stakeholder engagement and communication. By incorporating agile practices, such as regular reviews and demonstrations, stakeholders can provide feedback throughout the project, leading to greater alignment and customer satisfaction. However, hybrid project management approaches are not without their challenges. They require a careful balance between structure and flexibility, which can be complex to navigate. It may also require additional effort and coordination to integrate different methodologies and align the team's understanding (Hayata and Han 2011; Cooper 2014, 2016, 2017; Sommer et al. 2015; Theocharis et al. 2015; Hassani et al. 2018; Thummadi and Lyytinen 2020; Schlegel and Willmes 2021; Reiff and Schlegel 2022).

Table 1 presents a range of advantages and disadvantages, some of which can be considered as an advantage and disadvantage at the same time. For example, the diverse skill set required in hybrid approaches, which can potentially give reasons for conflicts. However, it is important to recognize that this diversity also fosters enhanced collaboration and the expansion of knowledge and skills within a team. Furthermore, it is noteworthy that the hybrid project management approaches described in the literature exhibit significant overlap in their advantages and disadvantages.

### 4.3 Success Factors and Use Cases

According to the literature reviewed, there are certain requirements and factors for success when using hybrid project management methodologies. Success factors in the upcoming context are defined as factors that enable an organization to successfully adopt hybrid approaches.

- Clear alignments: To implement a hybrid project management approach, clear alignments between the team and the organization are required (Zasa et al. 2021).
- Clear Goals and Metrics: Establishing clear project goals, objectives and measurable metrics allows for tracking progress, evaluating performance and ensuring project success (Sommer et al. 2015).
- Openness: It is important for employees and team members to be open to new methodologies. Being open-minded allows for the exploration of different perspectives and the integration of traditional and agile practices (Reiff and Schlegel 2022).

In hybrid project management, it is important for all team members to possess a broad understanding of the agile approach, even if they have primarily worked in traditional methodologies before. This knowledge allows team members to effectively collaborate and align their efforts within the hybrid framework. By familiarizing themselves with agile principles, practices and tools, individuals can adapt their working style to embrace the iterative and flexible nature of the hybrid approach. This broad knowledge promotes a shared understanding among team members, facilitating smoother communication, improved decision-making and ultimately, greater project success (Reiff and Schlegel 2022).

Use cases for hybrid project management can be identified in various fields and industries. IT project management: A software development company combines agile methodologies, such as Scrum, for software development and iterative improvement with traditional waterfall project management for requirement specification and quality assurance (Cooper 2017; Kosztyán et al. 2020). Construction industry: A construction project utilizes agile principles, such as regular stand-ups and sprints, to enhance collaboration among different trades and make quick adjustments to changing customer requirements, while simultaneously employing traditional project management techniques for cost and schedule planning (Lalmi et al. 2021). Organization-wide projects: A large organization adopts hybrid project management practices where agile methodologies are applied in some teams, while other teams continue to utilize traditional project management. This allows for flexible collaboration and fast response to changes while ensuring compliance with corporate policies and standards (Cooper 2017).

## 5 Discussion

In complex environments, project management has become increasingly sophisticated, requiring the application of refined techniques and tools that can be adapted to the unique aspects and evolution of each project. To meet customer requirements and accommodate their specific influences and preferences, hybridity has emerged as a suitable solution in project management. Extensive research has identified various hybrid project management methodologies that combine traditional and agile approaches. It is evident that project management will continue to evolve, requiring new system components, methodologies and interfaces. Organizations today must strike a balance between their environment and project characteristics while embracing greater agility to address innovation demands. Traditional project management alone is no longer sufficient, particularly in the face of digitization, technological advancements and increasing complexity that comes along in the VUCA environment. The agile approach emphasizes a flexible project structure, enabling task dependencies to be adjusted and lower-priority tasks to be postponed until future phases. Considering the strengths and weaknesses of both approaches, a combination of the two seems to make sense based on the specific characteristics of the firm and the project. It has been noticed that the advantages and disadvantages of the presented hybrid project management approaches significantly overlap. They differ slightly in their processes, but overall, they all represent a compromise between the agile and traditional management approaches, resulting in similar benefits and conflicts.

### 5.1 Practical Implications

According to Zasa et al. (2021) the following key factors shall be considered to introduce hybrid project management effectively. Integration involves blending agile and traditional practices to create a cohesive framework that aligns with organizational goals. Gradually introducing the hybrid approach helps minimize disruptions and allows team members to adapt effectively. Establishing an agile culture requires fostering a mindset that embraces change, collaboration and continuous improvement through training and workshops. A managerial focus is essential, providing clear guidance, support and resources to facilitate effective communication and promote flexibility. Team involvement encourages active participation, decision-making and ownership among team members. Aligning perceptions and expectations ensures that stakeholders have a shared understanding of the hybrid approach. Organizational focus involves promoting cross-functional collaboration, aligning the entire organization and adapting governance structures. By considering these factors, hybrid project management harnesses the strengths of both approaches to navigate the complexities of modern projects successfully (Zasa et al. 2021).

### 5.2 Future Research and Limitations

It has to be acknowledged that this research may have certain limitations. The most findings are based on research in the specific context of IT, subsequently the generalizability of results can be limited. In addition, it cannot be guaranteed that biases from previous studies were not inherited. Furthermore, the chosen search strings, such as the choice of the database can threaten the validity. In some fields there are also not a lot of authors publishing articles about certain topics, which may lead to a specific bias. This literature research only compares different methodologies in a structured manner but further research needs to validate these approaches. As already stated above, the advantages and disadvantages of the hybrid management approaches overlap. Further research needs to distinguish between the approaches in more detail. It also has to be acknowledged that measuring the success of hybrid approaches is complex but required for an evaluation of management approaches. Only a few papers documented the success of the hybrid approaches systematically and delivered numbers representing performance measurement (Sommer et al. 2015).

Additionally, future research could focus on examining the impact of the hybrid approach on project outcomes, team dynamics and organizational performance. Understanding the specific contexts and conditions in which the hybrid approach is most effective can provide valuable insights for practitioners and decision-makers. Comparative studies that compare the performance of hybrid projects with purely

traditional or agile projects can shed light on the unique benefits and challenges associated with the hybrid approach. Furthermore, it would be beneficial to explore the long-term sustainability and scalability of the hybrid approach. As organizations continue to evolve and adapt to changing market conditions and technological advancements, it is important to assess how the hybrid approach can be effectively applied and maintained over time. This may involve continuous learning, improvement and refinement of the hybrid methodologies to align with evolving project management practices and organizational needs.

## 6 Conclusion

In this literature review, a collection of findings from a systematic literature review offers an overview of different definitions and methodologies in hybrid project management. Various specific methodologies, such as Water-Scrum-Fall, Waterfall-Agile, Hybrid V-Model and Agile-State-Gate were presented and discussed after the historical background and the emergence of hybrid project management were clarified. Four different hybrid project management methodologies were presented and explained. The frameworks of the processes, advantages, disadvantages and suitability of the methodologies were identified. After the presenting the hybrid management methodologies solely, their advantages and disadvantages were compared. It is worth noting, that the hybrid project management approaches described in the literature show substantial overlap in terms of their advantages and disadvantages. This can be attributed to the fact that the individual hybrid management approaches in the literature are not sufficiently differentiated. Additionally, all hybrid management approaches represent a compromise between traditional and agile practices, leading to similar characteristics. Some characteristics can be considered as an advantage or disadvantage at the same time, depending on their perspective and interpretation. One such example is the requirement for a diverse skill set in hybrid approaches, which can lead to conflicts. However, it is important to acknowledge that this diversity also promotes improved collaboration and the development of knowledge and skills within a team.

The literature reviewed highlights several requirements and success factors for implementing hybrid project management approaches. Clear alignments between the team and the organization, establishing clear goals and metrics and fostering openness to new methodologies are key factors for success. Additionally, team members should develop a broad understanding of agile principles, even if they have primarily worked with traditional methodologies before, in order to effectively collaborate within the hybrid framework. The use cases for hybrid project management span across various fields and industries. In IT project management, a combination of agile methods like Scrum with traditional waterfall approaches is commonly employed. In the construction industry, agile principles are used for enhanced collaboration among different trades, while traditional project management techniques are applied for cost and schedule planning. Furthermore, in organization-wide projects, some teams adopt agile methodologies while others continue with traditional project management, allowing for flexibility and compliance with corporate policies. Overall, adopting a hybrid project management approach requires careful consideration of these factors and tailoring the approach to fit the specific needs of the project and organization. By embracing the benefits of both traditional and agile practices, organizations can effectively navigate the complexities of modern project environments and achieve successful project outcomes.

The research findings show the increasing importance of the hybrid approach, which carries significant implications for both businesses and academia. Organizations are encouraged to recognize the hybrid approach as a viable alternative to traditional and agile project management when choosing the most suitable project management approach. In addition, the education and training of project managers and teams should prioritize the development of new competence profiles that align with the requirements of hybrid project control and implementation.

Overall, by addressing these areas of consideration and conducting further research, organizations and academia can continue to enhance their understanding and implementation of hybrid project management, ultimately leading to improved project success and organizational performance.

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