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RESEARCH ARTICLE

Designing a fitting hybrid project management approach: a contingency perspective

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Abstract
The hybrid approach in project management is now considered as a leading project management approach, that is applied in the majority of projects. However, the hybrid approach, which is defined as the combination of the predictive and adaptive approaches, is also still emerging, with several challenges and issues showing from literature. One of these issues is that the definition of hybrid as a combination of adaptive and predictive approaches leaves room for interpretation and variation. Hybrid is a spectrum of different ways of planning, controlling, organizing, leading and performing a project, that needs to be tailored to the situational circumstances. It is this tailoring process that the study focuses on. Based on the criteria for assessing the fit of an approach, the study identified the following six hybrid approaches, 'Flexible predictive'; ''Tolerant predictive'; 'Predictable adaptive'; 'Adaptive light'; 'Integrated hybrid' and 'Facilitated adaptive'. By applying a contingency approach to the design of a hybrid approach, the study aims to contribute to the further development of the understanding of hybrid project management.

Keywords
hybrid project management; project management approach; adaptive; predictive; agile.

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1. Introduction

The publication of the Agile Manifesto (Beck et al., 2001) provides a milestone in the development of more adaptive approaches to software development, compared with the structured sequential methodologies of the 1980's and 1990's, which are now considered a 'waterfall', or predictive, approach (Gemino et al., 2021). In the adaptive approach, the product or system is developed in short iterative development cycles, thereby reducing the need for a complete and detailed description of the user's requirements, at the start of the development process (Reiff & Schlegel, 2022). Adaptive methodologies allow for a 'just-in-time' freezing of requirements during the development process (Timinger, 2017), which allows for an easier absorption of changes in these requirements, leading to an increased satisfaction of future users, project sponsors and other stakeholders (State of Agile, 2022). Other aspects of these methodologies, such as increased transparency and intensified communication, also contribute to the perceived success of agile methodologies.

However, with the wide adoption of the adaptive approach and agile methodologies, also their disadvantages appeared (Reiff & Schlegel, 2022). For example, a lower level of predictability of what output will exactly be delivered, at which moment in time, and against which costs (Laux & Kranz, 2019). In order to overcome these disadvantages, but to keep the advantages of adaptiveness, the approaches got mixed into what is considered a 'hybrid' approach (Cooper & Sommer, 2018). Hybrid refers to "*a combination of adaptive and predictive approaches*" (Project Management Institute, 2021:36), which implies that some elements from a predictive approach are used and some from an adaptive approach are used. A recent study showed that "*hybrid is a leading project management approach*" (Gemino et al., 2021; Kuhrmann et al., 2022), that is used in "*by far, the majority of projects*" (Serrador & Pinto, 2015).

Despite this apparent popularity, the "*ideal*" structure of hybrid projects remains underexplored (Karvonen et al., 2018; Bianchi et al., 2020). The hybrid approach is still an emerging approach (Gemino et al., 2021) that "*should be further investigated*" (Serrador & Pinto, 2015). Most existing literature concentrates on the characteristics, advantages, and disadvantages of specific hybrid models (Krupa & Hájek, 2024) or offers general overviews of the hybrid approach (Reiff & Schlegel, 2022; Zasa et al., 2021), yet they leave unexplored how organizations use this approach (Krupa et al., 2024). The definition of hybrid as a combination of adaptive and predictive approaches (Project Management Institute, 2021:36) leaves room for interpretation and variation. In the latest "*Pulse of the Profession*" report, PMI positions the hybrid approach as a spectrum of different ways of working (Project Management Institute, 2024). From a primarily predictive approach that utilizes some agile practices, to a primarily adaptive approach, that uses planning to improve the predictability of deliverables, budgets and timelines. And despite the growing number of studies on hybrid and hybrid methodologies, the issue of how organizations can overcome the challenges arising from the coexistence of the adaptive and predictive approaches remains an open issue (Zasa et al., 2021).

Hybrid is not a clearly defined methodology, but a combination of approaches that require tailoring to the situational circumstances of a specific project (Lalmi et al., 2021). This presents a challenge for organizations that seek 'the best of both worlds' in hybrid (Reiff & Schlegel, 2022) but lack insights and guidance from literature to choose or design a form of hybrid that fits the project at hand. It is this gap in the literature that the study reported in this paper focuses on. Based on the criteria that determine the suitability of the predictive, adaptive or hybrid approach, the study aims to develop a typology of scenarios in which a hybrid approach would be called for, and to design a form of hybrid that fits each scenario. The research question of the study is formulated as *Which design choices in a hybrid approach fit the situational characteristics of the project and its environment?* The study aims to contribute to the further understanding of hybrid project management, by applying a contingency approach to the design of a 'fitting' hybrid approach.

The remainder of the paper is structured as follows. The following section will provide a compact overview of the different approaches to project management, predictive-adaptive, and will identify the design elements of an approach that can be mixed into a hybrid approach. The section will also discuss the criteria for assessing the applicability of the approaches, as summarized by Silvius-Zuchi and Silvius (2024b). Based on the model that this study developed for assessing the

suitability of the approaches, six scenarios in which a combination of the predictive and adaptive approaches would be most fitting, will be identified. These six scenarios that would call for some kind of hybrid approach are then further developed in a study, in which six different hybrid approaches are designed. The paper will be concluded with a discussion and suggestions for further work on this topic.

2. Literature review

For the literature review, we used Google Scholar, as "*researchers should consult Google Scholar ..., especially for a relatively recent article, author or subject area.*" (Bauer & Bakkelbasi, 2005). And although there is a debate in the scientific community on the use of Google Scholar as an academic database (Henderson, 2005), it is also considered to provide "*unique options*" (Falagas et al, 2008: 342) to the academic community. Search strings used were based on the keywords "hybrid project management", "agile project management", "adaptive project management", "predictive project management", as well as their combinations. We followed Clark et al. (2019) in applying the inclusion and exclusion criteria summarized in Table 1.

Table 1. Literature Inclusion and Exclusion Criteria

Inclusion criterion	Description
Primary source	Literature collated and interpreted directly
Relevant topic	Direct reference to research area
Literature hypothesis / proposition quality	Testable hypothesis or demonstrable proposition, which can be evaluated
Methodology quality	Research methodology included and applied
Data quality	Data is relevant and sources are traceable
Outcome quality	Evidence between gathered data and analysis results is transparent
Exclusion criterion	**Description**
Secondary source	Information can distort analysis
Irrelevant topic	Literature focuses on another topic or utilizes the key words with another intention
Inadmissible quality	Untestable information and/or inadequate documentation
Unavailability	Literature was/is not available in data sources
Language duplication	Literature is a duplicate of other used literature

2.1. Project management approaches

In general, an approach stands for "*a way of dealing with a situation or problem*" (Cambridge dictionary, 2024). When applied to project management, an approach is the highest level of concepts used "*when describing how a project will be designed and governed*" (Gemino et al., 2021). It suggests "*a set of principles and guidelines which define the way a specific project is managed*" (Špundak, 2014). An approach should not be confused with a specific methodology for project management, or a method/technique, such as a Kanban board or planning poker. An approach provides directions for methodologies and/or methods that can be developed to fit within the principles of the approach.

The predictive and adaptive approaches have been characterized and contrasted by several authors (For example Thesing et al., 2020; Silvius-Zuchi & Silvius, 2024a). Table 2 summarizes this characterization of the approaches. The hybrid approach is not included in this table, as this approach is in general defined as the combination of the two abovementioned approaches (Project Management Institute, 2021), and it is the aim of our study to provide more specific insights into the potential combinations.

The variables that are used in Table 2 to characterize the approaches, can be considered as the elements by which an approach can be designed. Based on the literature (For example Kanski et al., 2023; Thesing et al., 2020; Zasa et al., 2021; Silvius-Zuchi & Silvius, 2024a), we identified six 'design elements' of an approach: Development process, Planning philosophy, Controlling philosophy, Leadership style, Communication style, and Team organization. In the following section, the characterization of the predictive and adaptive approaches on the six design elements is further clarified.

- Characteristic of the adaptive approach is the organization of the *development process* in multiple, even many, development cycles (Beck et al., 2001). The predictive approach is based on a single development cycle, although multiple development cycles can also appear in case the developed product has a modular architecture. As in the adaptive approach, the requirements of the product are detailed and 'frozen' just-in-time before the development of that part or function of the product (Smith, 2008), the adaptive approach is less vulnerable for changes in requirements. Distinguishing between minimal and optional requirements for the products is also an essential practice in the adaptive approach (Smith, 2008).
- In the adaptive approach, the *planning and controlling philosophy* is product oriented, with the product backlog as a central method (Reynisdottir, 2013). This contrasts the more activity oriented planning and controlling philosophy of the predictive approach, in which the Work Breakdown Structure plays a central role (Silvius-Zuchi & Silvius, 2024a). In the adaptive approach, controlling of the social aspects of the project is integrated in the development process, by organizing regular reflections in order to stimulate learning (Paasivaara et al., 2008). In the predictive approach, the controlling of the social aspects of the project is very much depending on the leadership style of the project manager.
- *Leadership* in the adaptive approach is often characterized as humanistic in that it regards people as skilled and valuable stakeholders in the management of a team (Parker et al., 2015). An agile leader can cope with not knowing the detail (McPherson, 2016), and can quickly get to grips with complex issues and ask the right questions. In the adaptive approach the leadership style can be characterized as transformational, participative and servant, whereas the predictive approach is often expected to have a more planning and control oriented transactional leadership style (Parker et al., 2015). Although the leadership style of 'predictive' project managers should not be generalized as being just task-oriented, as the results of several studies show that managers of projects showed both task-oriented leadership and relationship-oriented leadership behaviors (Henkel et al., 2019).
- In the adaptive approach, the preferred *mode of communication* is face-to-face, with if possible co-location of teams (Beck et al., 2001). This also applies to the communication between developers and (future) users, with when possible the inclusion of user representatives in the development team (Burns & Evans, 2000; Reynisdottir, 2013). Resulted from the methodologies of software development developed in the last decades of last century, the predictive approach relies on documented descriptions of user requirements, that emerge throughout the development process. The intensive communication in the adaptive approach also contributes to the transparency of the development process and progress (Ahmad et al., 2013), which in the predictive approach is less eminent.
- The adaptive approach allows for some level of self-*organization* in (sub-)teams within the project organization (Ovesen, 2012), with dedicated roles to support this self-organization (For example, a Scrum master or Agile coach), and to make sure that the team is working on the 'right' things (For example, a Product owner). This last role, the Product Owner, is also empowered to make decisions about the priorities of requirements, thereby

increasing the efficiency of the development process. In the predictive approach, decisions about requirements and changes often require project sponsor or board approval, making the process less effective.

Table 2. Overview of the design elements of the predictive and adaptive approaches in project management

Design element	Predictive approach	Adaptive approach	References
Development process	One, or a few, development cycles	Many short development cycles	Aram & Salipante (2003); Carroll et al. (2013); Henkel et al. (2019);
	Defining the total set of requirements at the start of each development cycle	Defining and prioritizing requirements as late as possible in the development process	Burns & Evans (2000); Cannella & Paetzold (1994); Carroll et al. (2013)
	Inspection of quality primarily at the end of the cycle	Continuous inspections of quality	Carroll et al. (2013); Henkel et al. (2019)
Planning philosophy	Detailed upfront planning, activity based	High level planning, output based	Aram & Salipante (2003); Carroll et al. (2013); Henkel et al. (2019)
	Upfront estimation of budget and duration	High level estimation of budget and duration	Cannella & Paetzold (1994); Carroll et al. (2013); Henkel et al. (2019)
Controlling philosophy	Upfront decision making on budget and duration	Rolling decision making on budget and duration	Aram & Salipante (2003); Carroll et al. (2013); Henkel et al. (2019)
	Controlling of budget and duration	Controlling of output	Cannella & Paetzold (1994);Burns & Evans (2000);
	Possibly also 'social' controlling to facilitate team development and learning	Frequent reflection moments ("retrospectives") to facilitate team development and learning	Cannella & Paetzold (1994)
Leadership style	Transactional and/or Servant	Transformational, Participative and Servant	Ahmad et al. (2013); Burns & Evans (2000); Cannella & Paetzold (1994)
Communication style	Primarily documentation based	Primarily conversation based	Aram & Salipante (2003); Burns & Evans (2000);
	Limited level of transparency	High level of transparency	Cannella & Paetzold (1994); Henkel et al. (2019)
			Cannella & Paetzold (1994); Carroll et al. (2013)
Team organization	Functional-hierarchical	Self-organization	Ahmad et al. (2013); Aram & Salipante (2003); Cannella &
	Strategic level decision making on requirements and changes	Operational level decision making on requirements and changes	Paetzold (1994); Henkel et al. (2019)
	Support of the team depending on leadership style	Inclusion of a coaching role supporting the team	Cannella & Paetzold (1994); Carroll et al. (2013
			Ahmad et al. (2013); Cannella & Paetzold (1994); Henkel et al. (2019)

By considering an approach as something that should be situationally designed, we underline the active role of the project manager in the project management approach (Silvius-Zuchi & Silvius, 2024b). A project management approach should not be something that 'happens' to the project manager, but a deliberate design choice (Gemino et al., 2021). As a hybrid approach combines the predictive and adaptive approaches, it will inevitably mix up the design choices on the elements described above. Designing a hybrid approach is therefore about making choices on the different design elements above (Marnewick & Marnewick, 2023). And as a project manager should design an effective approach for the project at hand (Gemino et al., 2021), the project manager should make an adequate set of design decisions on these elements, taking into account the situational circumstances of the project.

2.2. Situational criteria

The situational criteria that should be considered when selecting or designing the most suitable approach for a project, have been the subject of several publications (For example Thesing et al., 2021; Zasa et al., 2021; Silvius-Zuchi & Silvius, 2024b). And although these publications differ slightly in the criteria they identify, a common denominator can be found in three categories of criteria: Product-related criteria, Organization-related criteria and Team-related criteria. Product-related criteria refer to the characteristics of the deliverable that the project should realize. For example the definition and stability of the requirements, the coherence of its overall design, and whether the development methods are known. Organization-related criteria refer to the environment or organizational context of the project, such as the requirements for the governance of the project, and the organizational culture. Team-related criteria refer to the team members and organization. For example their experience and maturity in self-organization. Silvius-Zuchi & Silvius (2024b) summarize these criteria in a model that project owners and managers can use by assessing their project (Figure 1). Based upon the assessment of a project, project owners and managers can determine the appropriateness of the predictive or adaptive approaches.

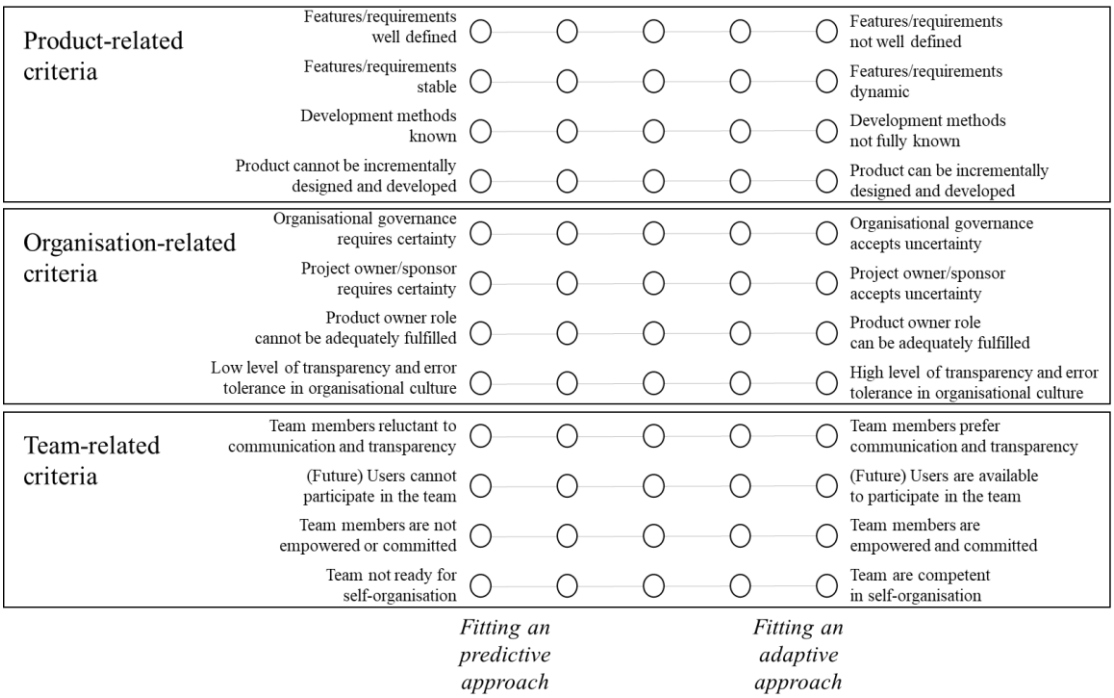

Fig. 1. Overview of criteria for assessing the applicability of the predictive and adaptive approaches (Silvius-Zuchi & Silvius, 2024b).

The model in Figure 1 suggests that when a project scores predominantly on the left side, a predictive approach is fitting, whereas when a project scores predominantly on the right side, an adaptive approach is fitting. When a project, however, shows a mixed score on the left and right sides on the model, a fitting hybrid approach should be designed.

2.3. The hybrid approach

Hybrid project management is an emerging approach in project management practice and literature (Gemino et al., 2021). In a recent overview of the literature on the hybrid approach, Reiff & Schlegel (2022) selected 34 papers for their structured analysis of what defines hybrid project management, its benefits and challenges, and the factors that influence its suitability. Their findings indicate that hybrid is understood in different ways. In the introduction, we have referred to the Project Management Institute's definition of hybrid: "*a combination of adaptive and predictive approaches*" (Project Management Institute, 2021). This combination of the predictive and adaptive approaches can take many shapes and forms. And, as already mentioned in the introduction, the ideal form of hybrid is not developed yet (Karvonen et al., 2018; Bianchi et al., 2020), and the hybrid approach "*should be further investigated*" (Serrador & Pinto, 2015).

In an attempt to provide a typology of hybrid approaches, Timinger (2017) distinguishes a sequential hybrid approach, a parallel hybrid approach and an integrated hybrid approach. In a sequential hybrid approach, one or more phases in the project are performed in an adaptive approach, while the other phases are performed with a predictive one (Silvius-Zuchi & Silvius, 2024b). Examples of this approach are the "*Water-Scrum-Fall*" (West et al., 2011) and "*Waterfall-Agile*" (Hassani et al., 2018) methodologies. In a parallel hybrid approach, some of the project's deliverables are developed with a predictive approach, and in parallel other parts are developed with an adaptive approach (Timinger, 2017). An integrated hybrid approach would be one in which "*the development team works in an adaptive way, but with defined results that need to be realized on scheduled milestones in a predictive planning*" (Silvius-Zuchi & Silvius, 2024b). This form of hybrid can be found in the proposed "*Agile-Stage-Gate*" methodology (Sommer et al., 2015; Conforto & Amaral, 2018; Žužek et al., 2020). And although this typology provides a first understanding of different forms of hybrid, the variety of hybrid needs further development in order to provide effective guidance on the applicability of the different forms.

2.4. Scenarios fitting a hybrid approach

A hybrid approach should be tailored to the situational circumstances of a specific project (Lalmi et al., 2021). The criteria model of Silvius-Zuchi & Silvius (2024b), as shown in Figure 1, can be used to identify different situational scenarios, in which a hybrid approach would be most fitting. For example, for a specific project, the product-related and team related criteria might score more on the right side of the model, indicating that an adaptive approach would fit, but the organization related criteria might score mostly on the left side, indicating that a predictive approach would fit. So, this would be a situation where an adaptive approach would fit, however, combined with practices that improve the predictability of the project for the governing organization. A typical 'integrated' hybrid approach (Timinger, 2017).

By combining different left-right scores for the three categories of criteria, in total eight hypothetical situational scenarios can be identified. Two of them, all three categories left and all three categories right, would call for a fully predictive, respectively a fully adaptive approach, but six scenarios would show a mixed left-right score on the categories of criteria, and therefore call for a hybrid approach. Figure 2 illustrates these six scenarios on the model of Silvius-Zuchi & Silvius (2024b).

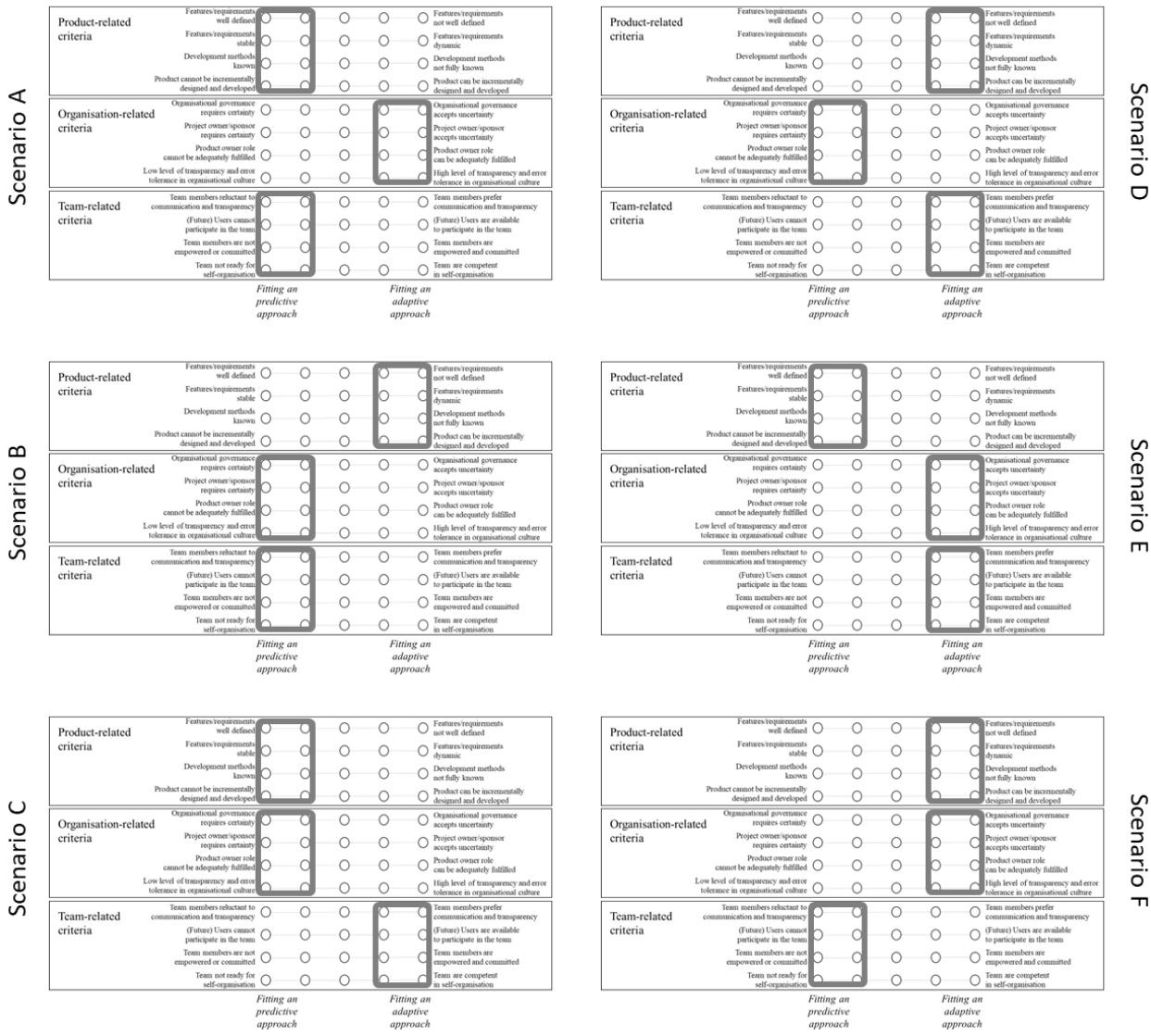

Fig. 2. Overview of hybrid situational scenarios, based on the applicability assessment of the predictive and adaptive approaches.

Figure 2 shows six possible situational scenarios of mixed left-right scores, with the highlighted blocks indicating the predominant scoring pattern of each scenario, indicating situations in which a hybrid approach would be fitting. These scenarios are described below.

- Scenario A can be characterized as a situation in which the organization and the project owner are quite flexible and open in their governance of the project, although the deliverable of the project can be well-defined, with stable requirements. The team also needs a 'predictive' specification of deliverables, timelines and budgets, with clear tasks for each team member. In this scenario, there seems to be a disconnect in the acceptance of transparency and uncertainty between the operational level of project team and future users, and the management and governance levels in the organization. At first sight, it can be thought that this situation simply calls for a predictive approach in which the project owner demonstrates a certain level of acceptance of issues

and exceptions that may occur during the project. However, the disconnect in the acceptance of transparency and uncertainty between the different level in the organization, may be a symptom of a larger issue within the organization, which may hinder its ability to change (Bennebroek Gravenhorst et al., 2003).

- Scenario B can be characterized as a situation in which the organization, project owner and the team require clarity and a well-defined 'predictive' specification of deliverables, timelines and budgets. This predictability, however, gets challenged by a dynamic or unclear set of requirements for the deliverable. This type of project would call for a hybrid approach with design elements and practices that make a predictive approach more adaptive.
- In scenario C, there appears to be a desire within the team to work in a more adaptive way, although the organization and the product do not really call for it. And although this scenario seems unlikely as it appears not really feasible to work adaptive, the scenario is not uncommon form, as the change to an adaptive way of working was frequently 'pushed' or driven by the development team and their organizations. Sometimes this happened transparently, but often also 'stealth', meaning unknown to the organization, project owner and future users. A challenge arising in this situation is logically the predictability of project outputs, timelines and budgets, and how to 'manage' the development team that thrives with self-organization. This scenario would call for a hybrid approach with practices that make an adaptive development more predictive.
- Scenario D can be characterized as a situation that basically would call for an adaptive approach, however, the organization and the project owner require more predictability of deliverables, timelines and budget. It is this scenario that was described in the example earlier. This scenario would call for an integrated hybrid approach, in which the development team works in an adaptive way, while committing itself to delivering defined (partial) results on scheduled milestones in a predictive planning (Silvius-Zuchi & Silvius, 2024). It might be argued that in this way of working some of the advantages of the adaptive approach get lost, but that is probably inevitable. The internal and external governance of organizations requires a certain level of predictability of project budgets, outputs and outcomes in order to evaluate investments and managerial decisions.
- In scenario E, the organization and the team appear to be well suited for an adaptive approach, although the deliverable of the project is well-defined, with stable requirements. In this situation, the approach can be designed as adaptive, although it can be questioned whether the essence of the adaptive approach can be effectively utilized. The essence of the adaptive approach is the reduction of the need for a complete and detailed description of the user's requirements at the start of the development process, as requirements are only detailed and defined 'just-in-time' during the development process. When the deliverable is completely defined upfront, one of the most important benefits of the adaptive approach falls away. In this scenario it may therefore be recommendable to investigate why the deliverable is already defined completely at the start of the development process, and whether a more adaptive approach to the requirements of the deliverable would still be beneficial.
- In scenario F, the dynamic or unclear set of requirements for the deliverable of the project would call for an adaptive approach, and the organization and project owner also accept the uncertainty that comes with this. However, in this situation, the team and the future users are not ready for an adaptive approach, and need a clear specification of deliverables, timelines and budgets, with clear tasks for each team member. This situation can appear for example when the user organization has gone through a painstaking negotiation process in order to come up with a defined set of requirements for the deliverable, and does not accept that this discussion is reopened. In a situation like this, it will also be quite hard to fulfil the product owner role. Another example of this scenario is when the members in the project team do not feel comfortable with the transparent, communicative and self-organizing way of working, that is characteristic in the adaptive approach. A situation like this may therefore call for a more intense coaching and facilitation of the development team, for them to work in a more adaptive way.

The six situational scenarios identified above require different hybrid practices in order to fit the characteristics of the project's product, team and governing organization. Some scenarios call for design choices that make predictive projects more adaptive, whereas other scenarios call for choices that make adaptive practices more predictive. The specification, per scenario, of these design choices, is the core contribution the study reported in this paper aims to make. By combining the six identified situational scenarios above with the design elements of an approach, a typology of hybrid approaches can be developed. For the design choices, the earlier identified set of design elements (Table 2) will be used. The specification of the design choices per scenario, and the resulting hybrid typology, will be reported in the results section of the paper.

3. Methodology

3.1. Research approach

Considering the practical orientation of the aim of the study, we approached the study from a pragmatic perspective. The outputs of our study should therefore be judged on their "fit" with their purpose (Von Glasersfeld, 2001), and not on their "truth" or "true explanation" as is common in studies using a positivist paradigm (Avenier, 2010). In this we followed the scholars, for example Cannella and Paetzold (1994), that pointed out the inadequacy of the positivist paradigm as a model for organization research.

The study aims to help bridge the "*relevance gap*" between researchers and practitioners (Aram & Salipante 2003; Tranfield & Starkey 1998), by developing a typology of design choices that can be used to solve the practical issue of how to apply predictive practices in adaptively approached projects, and vice versa. This aim positions the study as a design science research (DSR) study. DSR can be seen as a paradigm "*rather than a discrete research methodology*" (Baskerville et al., 2009). In DSR, methodological rigor is balanced with the demands of practical utility (Wieringa, 2010). From a design science perspective, the main purpose of academic management research is to develop practical knowledge to support organizational problem solving in the field (Saunders et al. 2015). That support can be direct, instrumental or more indirect, giving general enlightenment on the type of problem at hand.

Pragmatism and organizational design science developed in parallel as alternative models of science well suited to the study of organizational phenomena (Avenier, 2010). In the pragmatic research paradigm, acceptable knowledge can be derived from either or both observable phenomena and subjective meanings (Saunders et al. 2015). The study at hand used insights from DSR to develop practically usable project management artefacts.

3.2. Research process

The research process followed a structured process that was loosely based on Brown (2008). The following steps were performed:

- Based on the literature on the criteria for selecting a fitting approach for a project, six scenarios were identified, in which a 'pure' predictive or a 'pure' adaptive approach would not be adequate, and therefore a hybrid approach needs to be designed. This step was reported in the background section.
- Based on the literature on what characterizes the predictive and adaptive approaches to project management, six design elements were identified that operationalize the design choices in a hybrid approach. This step was also reported in the background section.
- Based upon the results of the two steps described above, Figure 3 depicts the design logic of the study.
- Per type of hybrid scenario, a fitting hybrid project management design was developed, based on the practices of the predictive and adaptive approaches, as shown in Table 2. This part of the study is reported in the results section of the paper.

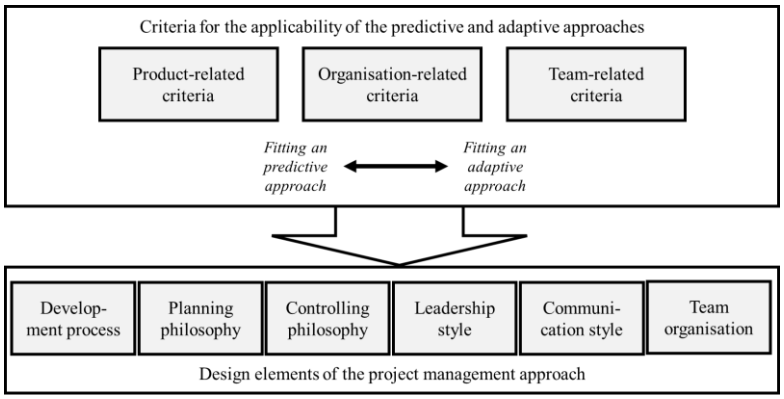

Fig. 3. Overview of the design logic of the study

3.3. Design logic

The 'design logic' of coupling the design choices with the six different situational scenarios was based on their expected 'fit' with the situational characteristics of the specific scenario. This 'fit' was assessed based on the characteristics of the design choice in the predictive and adaptive approaches found in literature and described in section 2.1.

The concept of 'fit' comes from contingency theory, and can be defined as the consistency or coherence between different attributes of the organization, together forming its configuration (based on Drazin & Van de Ven, 1985; Klaas, 2004). The design of a 'fit' synthesis requires the identification of relevant frameworks (Carroll et al., 2013) as described above, the identification of potential relationships between the different elements of components of the frameworks, and the analysis of the degree of 'fit' of these relationships, based on an understandable logic. In the study presented here, the assumed 'fit' of the relationships between project management design choices and types of hybrid represent the views and expectations of the research team which, given the pragmatic approach of the study, is considered acceptable. Critical in the approach of the study is that the artefacts are designed according to an imperative or prescriptive logic. In this, as stated earlier, methodological rigor is balanced with the demands of practical utility (Wieringa 2010).

3.4. Testing the model

A final step in DSR is preferably the testing of the designed artefact (Brown, 2008). In the study reported in this paper, this testing is planned for further research. This provides a limitation to the study, however, the developed model still fulfills the aim of the study and represents a contribution to the much-needed understanding of hybrid project management.

4. Results

4.1. Situational hybrid approaches

In this section, six different hybrid project management approaches will be designed, based on their expected fit with the six situational scenarios discussed earlier. The six hybrid approaches are summarized in Table 3, and discussed below.

- Hybrid approach A 'Tolerant predictive', is basically a predictive approach, but with a tolerant governance by the project owner and the organization. This removes the need for a detailed upfront planning of budget and schedule, although the activities still need to be detailed for internal control purposes. It is advisable to be transparent about the tolerances that the governance allows for.

- Hybrid approach B 'Flexible predictive', is primarily predictive, but with more flexibility for changes of the requirements of the deliverable. This is realized by splitting up the development process in multiple development cycles. Not to the degree that the adaptive approach does that, but sufficient to handle at least some of the changes in an adaptive manner. A role of product owner is established for organizing (changes) in user requirements.
  A condition for this 'Flexible predictive' hybrid approach, is that the user organization can make a distinction between minimal and optional requirements of the deliverable.

- Hybrid approach C, 'Predictable adaptive', is a frequently found hybrid approach, in which the team works primarily adaptive, but within a governance structure that is predictive. This would require that the team, although working adaptively, still commits to a final deliverable. In this approach, there is upfront decision making on budget and duration, which can only work if there is a certain level of flexibility with regards to the requirements of the deliverable. Also in this approach it is advisable to establish a 'Product Owner' role for organizing user communication on requirements, although it may not be possible to have the user organization fulfil this role. The 'stealth' mode of this approach, in which the project owner and the user organization may not be aware that the project team works adaptively, should be avoided.

- Hybrid approach D, 'Integrated hybrid', is an approach that fits the frequently heard desire to make adaptive projects more predictable in terms of deliverables, timelines and costs. In this approach, the process is organized as an adaptive approach, with frequent short development cycles, but milestones are defined that correspond with a predicted delivery of (partial) deliverables. The milestones should not be scheduled after a single development cycle, but after a reasonable number of short cycles. Probably 6 – 20. Also in this approach it is a condition that the user organization can make a distinction between minimal and optional requirements of the partial deliverables. The controlling in this approach is primarily product oriented, but with an additional orientation on realizing the agreed milestones. Also in this approach, a product owner role is established.

- Hybrid approach E, 'Adaptive light', is an approach that is primarily adaptive. However, one key-characteristic of the adaptive approach, defining and prioritizing requirements 'just-in-time' at the start of each development cycle, is in this hybrid approach not really functional, as the requirements for the deliverable can be defined in total upfront. Nevertheless, it is still advisable to establish a product owner role also in this approach, as this is an indispensable role in the adaptive approach.

- Hybrid approach F, 'Facilitated adaptive', is primarily an adaptive approach, but with additional elements to facilitate and coach the team in this approach. These elements include a planning of activities, in addition to a product backlog. And as the team is not ready for the self-organization that is characteristic for the adaptive approach, the leadership style within the project should be adapted with situational choice of transactional and servant leadership styles. In this approach, also more emphasis is on a coaching role for supporting and facilitating the team.

The six hybrid approaches described above can be seen as a situational typology of hybrid approaches. With this typology, the different forms and interpretations of the hybrid approach can be characterized, thereby contributing to the further development of the understanding of hybrid project management.

Table 3. Overview of the six hybrid approach designs, fitting the six identified situational scenarios

More Predictive ⟷ *More Adaptive*

Design element	**Hybrid approach A fitting scenario A** *'Tolerant predictive'*	**Hybrid approach B fitting scenario B** *'Flexible predictive'*	**Hybrid approach C fitting scenario C** *'Predictable adaptive'*	**Hybrid approach D fitting scenario D** *'Integrated hybrid'*	**Hybrid approach E fitting scenario E** *'Adaptive light'*	**Hybrid approach F fitting scenario F** *'Facilitated adaptive'*
Development approach	Primarily predictive: One, or a few, development cycles Define the total set of requirements at the start of each development cycle Inspection of quality primarily at the end of the cycles, but also continuous if possible	Primarily predictive, but splitting up the development process in multiple development cycles Define the requirements at the start of each development cycle Inspection of quality primarily at the end of the cycles, but also continuous if possible	Primarily adaptive, splitting up the development process in short frequent development cycles, but with a defined final deliverable Defining and prioritizing requirements at the start of the development process, but with the option to change requirements as late as possible in the process Inspection of quality primarily at the end of the development process, but also continuous if possible	Primarily adaptive, splitting up the development process in short frequent development cycles, but with defined periodical milestones that are (partial) deliverables or releases Define the requirements for the partial deliverable at the start of each development cycle Inspection of quality primarily at the end of the cycles, but also continuous if possible	Adaptive, with many short development cycles Defining and prioritizing requirements at the start of the development process, but with the option to change requirements as late as possible in the process Continuous inspections of quality	Adaptive, with many short development cycles Defining and prioritizing requirements at the start of each development cycle Continuous inspections of quality
Planning & Controlling philosophy	Product oriented upfront planning, distinguishing between minimal and optional requirements, with detailing of activities High level upfront estimation of budget and duration Clarity about tolerances Product oriented controlling Include social controlling to facilitate team development and learning	Distinguish between minimal and optional requirements Implement a flexible change management process Include product oriented control variables in planning & control, next to time and budget Include social controlling to facilitate team development and learning	Distinguish between minimal and optional requirements Upfront decision making on budget and duration, with some flexibility in the requirements of the deliverable Include product oriented control variables in planning & control, next to time and budget Frequent reflection moments to facilitate team development and learning	Distinguish between minimal and optional requirements for partial deliverable milestones Product oriented upfront planning, with a product backlog per partial deliverable milestone Upfront decision making on budget and duration, with some flexibility in the requirements of the deliverable Product and milestone oriented controlling	Product oriented upfront planning, distinguishing between minimal and optional requirements High level estimation of budget and duration Rolling decision making on budget and duration Product oriented controlling Frequent reflection moments to facilitate team development and learning	Product oriented upfront planning, distinguishing between minimal and optional requirements, with detailing of activities High level estimation of budget and duration Rolling decision making on budget and duration Product oriented controlling Frequent social controlling to facilitate team development and learning
Leadership style	Situational choice of transactional and servant styles	Situational choice of transactional and servant styles	Transformational, Participative and Servant	Transformational, Participative and Servant	Transformational, Participative and Servant	Situational choice of transactional and servant styles
Communication style	Conversation based High level of transparency within the team and between the team and future users	Document user requirements and changes High level of transparency within the team and between the team and future users	Conversation based High level of transparency within the team and between the team and future users	Conversation based High level of transparency within the team and between the team and future users	Conversation based High level of transparency within the team and between the team and future users	As much as possible conversation based, but with documented user requirements Considerable level of transparency within the team and between the team and future users
Team organization	Functional-hierarchical Operational level decision making on requirements Support of the team depending on leadership style	Functional-hierarchical Strategic level decision making on requirements Establish a 'Product Owner' role for organizing (changes) in user requirements	High level of self-organization, but with commitment to the timeline of the deliverable Strategic level decision making on requirements and changes Establish an internal 'Product Owner' role for organizing user communication	High level of self-organization, but with commitment to milestones that are partial deliverables Operational level decision making on requirements and changes Establish a 'Product Owner' role for organizing user requirements	High level of self-organization Strategic level decision making on requirements Establish a 'Product Owner' role for organizing user requirements	Functional-hierarchical Operational level decision making on requirements Establish a coaching role for supporting and facilitating the team

4.2. Discussion

The hybrid approach to project management is still an emerging field of study, with many unknowns. Hybrid is not a single methodology (Lalmi et al., 2021), but stands for an spectrum of approaches that all combine elements and practices from the predictive and adaptive approaches. The study reported in this paper, identified six different hybrid approaches, in Table 3 ordered from 'more predictive' (left in the table) to 'more adaptive' (right in the table). As such it can be concluded that the hybrid approaches C 'Predictable adaptive', and D 'Integrated hybrid' are the two approaches in which there is most integration of the predictive and adaptive approaches. Whereas in the approaches A and B are predominantly predictive in nature, and the approaches E and F predominantly adaptive. This typology provides a framework for positioning hybrid methodologies, such as the ones proposed by Sommer et al. (2015), Adelakun et al. (2017), Conforto & Amaral (2018), Žužek et al. (2020), Lalmi et al. (2021) and Azenha et al. (2021). As such it contributes to the theoretical understanding of hybrid project management. In fact, the framework reveals a gap in the literature. Most published hybrid methodologies, such as the ones referenced above, focus on designing a methodology that contributes to the predictability of adaptive, or agile, projects. In this context, for example Adelakun et al. (2017) talk about "*Agile with discipline*". These hybrid methodologies can be categorized as the approaches C 'Predictable adaptive', or D 'Integrated hybrid'. The literature, however, lacks developed methodologies that are more to the sides of the typology of Table 3.

The contribution that the typology of six different hybrid approaches makes, is strengthened by its fit with six situational scenarios. This contingency approach provides a further contribution to the literature and understanding of hybrid. In their literature review on hybrid project management, Reiff & Schlegel (2022) concluded that while the various proposed hybrid methodologies "*are interesting and have advanced the discussion in the field, a general procedure to develop a hybrid approach or criteria to guide a meaningful combination of traditional and agile elements are still missing*" (Reiff & Schlegel, 2022: 59). They recommend that future research should "*develop procedures, criteria or frameworks that help organizations to select appropriate methods and design bespoke hybrid methodologies that are tailored to the specific project and organizational context*". The study reported in this paper can be seen as replying to this call. And as the study was designed to provide practical guidance, its contribution goes beyond a further developed conceptual understanding of the hybrid approach. The frameworks of situational scenarios and corresponding fitting hybrid design choices, provide practical guidance to project managers that need to design the approach for a specific project and want to base that design on the situational circumstances of the project.

The contingency approach proposed in this paper aims to enable the project owner and manager to design a fitting hybrid approach for a specific project. As selecting the right approach may influence the success of a project (Chin & Spowage, 2010; Špundak, 2014), understanding the fit of the project management approach with the situational circumstances is important for project managers and project owners/sponsors. Earlier studies found a positive impact of the hybrid approach on project success (Gemino et al., 2021), however, these studies did not distinguish different types of hybrid approaches. Further empirical research is needed to investigate this, and we hope that the typology developed in this study will provide a basis for this.

Another point of discussion is the question whether the predictive and adaptive approaches can be effectively combined in a single approach, given the differences in their design and philosophy. Zasa et al. (2021) raise this question and for good reasons. As the discussion of the two approaches in section 2.1 shows, some differences between the approached, such as the philosophy of planning and controlling a project are so different that they should be considered mutually exclusive. In the design of a hybrid approach it is therefore important to evaluate the overall consistency of the design choices in a hybrid approach. In the hybrid approaches presented in Table 3, this overall consistency has been considered. A further direction of research may also be the appearance of the different hybrid approaches, as not all of them seems to have a clear rationale. For example approach C 'Predictable adaptive' may seem irrational, as the project team should logically align its approach with the characteristics of the product and the organization. However, the research team has

come across various cases that matched C, leaving the project manager with the issue of designing an effective approach for this scenario.

5. Conclusion

The study reported in this paper set out to answer the question Which design choices in a hybrid approach fit the situational characteristics of the project and its environment? Based on the criteria for assessing the fit of an predictive or an adaptive approach found in literature, the study identified six situational scenarios in which a combination of predictive and adaptive, a hybrid approach, would be most fitting. The descriptions of the approaches found in literature also provided the basis for the identification of a set of design elements, through which an approach can be designed.

When matching the design elements to the situational circumstances of the six identified scenarios, the study applied a pragmatism approach combined with a design science process to develop a typology of six hybrid approaches: 'Flexible predictive'; ''Tolerant predictive'; 'Predictable adaptive'; 'Adaptive light'; 'Integrated hybrid' and 'Facilitated adaptive'. These six hybrid approaches, that fit the six identified situational scenarios. provide a contingency perspective on the hybrid approach in project management, thereby contributing to the further development and understanding of this approach.

The study bears implications of project management professionals, business organizations and academia. Project management professionals should understand that the hybrid approach is not a single defined way of working, but a spectrum of design choices, that together form an approach. Professionals should also develop their competence in assessing a project's situational circumstances and designing an approach that fits these circumstances. And although this may provide an infinite number of hybrid approaches, the typology of six approaches developed in this study, provides a supporting framework for the design decisions these professionals need to make. By analyzing the characteristics of the project's intended deliverable, governing environment and team, the project management professional can now characterize the situational scenario and use the typology of hybrid approaches to find suggestions for fitting design choices.

To organizations a hybrid approach may sound like an attractive 'best of both worlds' approach in project management, however, they should understand that the characteristics of the predictive and adaptive approaches are as such that it may not always be possible to combine both approaches effectively. A consistent hybrid approach therefore requires a thorough consideration of several design choices, that should fit the characteristics of the project and the organization. Hybrid is not a defined methodology, but an approach that comes in a spectrum of variations. For many projects a complete integration of the predictive and adaptive approaches may not be required, and it may suffice to implement practices that make a predictive project a bit more adaptive, or an adaptive project a bit more predictive. The six hybrid approaches developed in this study provide guidance for this.

For the academic community, the typology of six hybrid approaches provides several opportunities for further research, as are mentioned in the discussion section. With regards to project management curricula in higher education, the framework presented in this paper can be used to provide more insight in the variety of approaches that fall under the label hybrid.

A limitation of the study is that the 'fit' between the different hybrid approaches and their situational scenarios, is not empirically tested. As discussed in section 3.4, the study presented in this paper did not include a test or evaluation phase. This would provide an opportunity for follow-up research in the future, although such a study would need to develop a procedure in order to establish the 'fit' of an approach. Mere empirical existence of a certain scenario would not provide sufficient proof for its fit with the situational circumstances.

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