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Review

Time in project portfolio management: Objective, subjective, and contextual

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ABSTRACT

Time has been considered as a key success criterion and a constraint demanding prioritization between projects. It also creates competition among the projects in a portfolio and tensions across time horizons in portfolio decision-making. Thus far, research on project portfolios and their management has treated time only implicitly and secondarily. The purpose of this conceptual study is to investigate the relevance, meaning, and future possibilities of time in project portfolio management research. The relevance and treatment of time is first covered generally in project and management studies, to guide the conceptual analysis of project portfolio management research. Then, the objective, subjective, and contextual considerations of time in project portfolio management are mapped to summarize extant threads of research. The findings offer novel ways to conceptualize project portfolio management and reveal the connectedness of objective, subjective, and contextual views of time as a central driver of dynamics in project portfolio management. This study suggests supplementing and combining the mechanism, practice, and actor-centric project portfolio management studies with those concerned with time. Future research avenues are proposed both combining the objective, subjective, and contextual views as well as treating each view separately.

1. Introduction

When firms conduct research and development (R&D) in the form of projects, they consider multiple time horizons simultaneously. They engage in product modification and version management projects for the short-term future, new product development (NPD) projects for the medium-term future, and technology development and research for the long-term future (Wheelwright and Clark, 1992). Each project has a specific duration (as well as start and end times) (Lundin and Söderholm, 1995), time goal (Atkinson, 1999), and a unique perspective of time in terms of history, current state, and future prospects (Engwall, 2003). Individuals and certain groups of people may have unique perceptions of time and time horizons, which may be reflected in their interaction in shared projects (Korhonen et al., 2014). This study is concerned with time specifically in connection with project portfolios.

Project portfolio management (PPM) deals with handling a firm's projects that serve the same strategy and potentially compete for the same resources (Archer and Ghasemzadeh, 1999; Hansen and Svejvig, 2022; Martinsuo and Geraldi, 2020). It is rather common for firms to organize their R&D projects into project portfolios to ensure maximum value, strategic alignment, and a sufficient balance among different projects (Cooper et al., 1997). Firms may have different project portfolios (or "strategic buckets") for the different levels of newness and time horizons—for example, separate portfolios for incremental improvements, new product development, and platform and breakthrough innovations (Cooper et al., 2002; Englund and Graham, 1999)—or they may also manage projects with different time horizons within the same project portfolio. Firms also have projects that are at different stages within the same portfolio—some are beginning, others are in different stages of implementation, a few are nearing completion (Englund and Graham, 1999)—with each guided by a different idea of when the projects' results will be transferred to operations. PPM research tends to consider time in rather limited and implicit ways and dominantly in cross-sectional settings.

This research is motivated through three problems in previous PPM research. First, time has been considered as one of the core project goals, success criteria, and thereby a measure of project performance (Atkinson, 1999), but at the project portfolio level time is hidden under a general idea of portfolio balancing. Project portfolio decisions always include choices regarding which projects should take place now and within a certain timeframe vs. which projects should be postponed or terminated (Gomes et al., 2023; Unger et al., 2012). While managers

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may also decide to terminate certain projects in a portfolio (Unger et al., 2012), the decisions made today will likely be reflected on various aspects of business throughout multiple time horizons. Due to an inherent path-dependency of portfolio decisions (Aaltonen, 2010), current time investments imply commitment regarding time. Due to the centrality of time for projects' goals and performance and the portfolio-level path--dependency of decisions, there is a need to understand time better also at the level of the project portfolio.

Second, the processing time required by projects causes a need to prioritize the use of equipment, facility, and human resources across the projects and consider projects together (Kavadias and Loch, 2003), but the cross-sectional PPM research does not cover the temporal aspects of sharing resources. While the competition for resources in project portfolios is covered in terms of human resources and their allocation (Patanakul and Milosevic, 2006, 2008, 2009), it would also imply competition for time and a need to understand the temporal arrangement across projects better. Third, PPM research already suggests that turbulence and uncertainty in the business environment are reflected in portfolio-level considerations of pace, speed, and timing (Martinsuo et al., 2014; Voss and Kock, 2013) and project portfolios foster the emergence of new strategies (Kopmann et al., 2017). Awareness has increased on the portfolios' evolution over time (Kock and Gemünden, 2019; Maniak and Midler, 2014; Midler, 2013). There is a need to understand the temporal aspects of project portfolios, so that firms can constantly adjust their projects to attain strategic goals (Martinsuo and Anttila, 2022).

In order for firms to develop their PPM, they need careful consideration of the potential of the project portfolio over time with regard to the strategic aspirations of the firm and in light of the uncertainty of the business environment. The literature review by Hansen and Svejvig (2022) revealed various mechanism, practice, and actor-centric domains prevalent in extant PPM research and drew attention to the increasing focus on dynamic aspects in PPM in terms of agility, adaptability, and strategy emergence, but they did not point out time as a central research concept or stream in PPM literature. There is a need to understand the alternative ways time is treated in PPM research and explore whether and how time could open up a new, powerful research stream for PPM research. The goal of this paper is to reveal the relevance, meaning, and future research potential of time in PPM research, with the intent of mobilizing empirical research on time in project portfolios. The focus is on addressing the following research questions.

1) How is time featured in the research on PPM?
2) Which new research opportunities exist in organizations' management of time in PPM?

This study is conceptual and builds on extant research. The intention is to propose time as an additional research stream for investigating PPM, to complement the dominating mechanism, practice, and actor-centric research streams, and build an agenda for future research on time in PPM. Insights in this study are built through the exploration and interpretation of example studies that demonstrate the prevalence of time-related issues in PPM.

This study continues with an overview of the dominating PPM research streams, namely mechanisms, practices, and actors and how time is treated in management studies. Previous knowledge of time-related considerations at level of single projects is summarized briefly, to understand and consider their potential implications at the level of the project portfolio. This background lays foundations for the analytical categorization employed in the conceptual study. Thereafter, the conceptual approach for treating extant research is introduced. As key results, the implicit treatment of time is reported through previous PPM research from objective, subjective, and contextual viewpoints to reveal the current state of knowledge. These three viewpoints open up ways to conceptualize PPM as a compilation of mechanisms used in time and in a continuum; as a compilation of managers' thinking patterns in and over time; and a dynamic rhythm and pace of responses to environmental events. The time-oriented PPM research stream is central to understanding the dynamics of multi-project organizing and supplementing the present-centric situated views with acknowledgement of the past and future. In addition, a future research agenda is proposed, which encompasses the objective, subjective, and contextual viewpoints and their intersection.

2. Background

2.1. Project portfolio management: mechanisms, practices, and actors

Research on PPM has its roots in project idea generation and prioritization, portfolio optimization and selection, and portfolio decision making (Hansen and Svejvig, 2022). It has more recently moved toward strategic, practice-centric and actor-centric themes, including considerations of inter-organizational relationships (Clegg et al., 2018; Hansen and Svejvig, 2022; Martinsuo, 2013; Martinsuo and Ahola, 2022; Martinsuo and Geraldi, 2020). There are three active, overarching PPM research streams that have somewhat different foundations. They are labeled here simply as mechanism-centric, practice-centric, and actor-centric research streams.

The mechanism-centric research stream has its roots in decision making, optimization techniques, and pursuit of the best possible portfolio performance. PPM research in the early years concentrated on the *mechanisms*, that is, methods and techniques of project evaluation and filtering, portfolio optimization and selection, and related processes and decision making (Hansen and Svejvig, 2022). Plenty of research investigates factors that explain PPM performance (or project portfolio success in light of its strategic goals) in different conditions and in different industries (Bechtel et al., 2023; Jonas et al., 2013; Teller et al., 2012, 2014). However, the rationalistic and mechanism-centric research has been considered as insufficient in explaining what actually happens in project portfolios and how it performs (Clegg et al., 2018; Martinsuo, 2013; Martinsuo and Geraldi, 2020).

Hansen and Svejvig's (2022) review indicates that researchers' attention has later been directed at what actually happens in organizations: the way of using the methods, contextuality, and interrelations of projects and strategy. The practice-centric research stream builds on critical project management and theories of practices and routines. Different mechanisms and practices are used in different organizations, and different combinations of *PPM practices* are useful for different contexts, as suggested in previous literature reviews. The practice-centric studies indicate that managers do not always adhere to the formalized mechanisms suggested in portfolio models and processes, but rather they improvise and act on situation-specific information. Research increasingly suggests incorporating flexibility and agility into PPM as a way to survive in dynamic business environments (Gemünden and Kock, 2025; Kaufmann et al., 2020; Kock and Gemünden, 2016; Stettina and Hörz, 2015).

Practice-centric studies bring in also the question of who manage the portfolios, that is, the project portfolio actors, and related behavioral and psychological phenomena. The actor-centric research stream draws attention to various project portfolio actors. The *actors involved in PPM* have different formal and informal roles and ways of operating, when taking action at the level of project portfolios. Such research covers the role of steering committees (Mosavi, 2014), middle managers (Blomquist and Müller, 2006), and top or senior managers (Unger et al., 2012), and the instances where managers meet each other (Christiansen and Varnes, 2008; Jerbrant and Karrbom Gustavsson, 2013; Martinsuo and Anttila, 2022; Tuominen and Martinsuo, 2025). Some studies point out that also external actors such as consultants may have an influence on project portfolios through being involved in creating and editing the project portfolio (Vedel and Geraldi, 2020). Attention is increasingly directed at broader stakeholder relationships in multi-project organizing (Martinsuo and Ahola, 2022; Martinsuo and Geraldi, 2020). As some

managers need to handle multiple projects in parallel, that is, they engage in multi-project management (Patanakul and Milosevic, 2006, 2008), they may be in quite powerful positions in influencing also PPM.

Mechanisms, practices, and actors have represented powerful research streams for investigating PPM and its performance over the past decades. The majority of extant research, however, covers the implementation of PPM cross-sectionally, at a given moment in time. The treatment of time is implicit and secondary at the project portfolio level, despite the centrality of time and schedule in goal setting at the single-project level and strategic importance of time, for example, in launching new products. Some studies have tackled models including PPM practices at an earlier time and its link with PPM performance at a later point in time (Unger et al., 2012), however, following the researchers' chosen time horizon instead of that of the target organizations. As there is a temporal gap between project selection, PPM actions, and any performance outcomes, there is a need to understand the logic of time also at the level of the project portfolio, not just at the level of projects.

2.2. Time, temporality, and projects

As PPM concerns the handling of projects, developing a time-related research stream requires understanding how time has been covered also at the level of single projects and in their connection with the parent organization. Time has been considered a fundamental concept that defines the action arena of temporary organizations such as projects, which is apparent in the limited duration of projects and projects' specified start and end (Lundin and Söderholm, 1995). While each project has its unique temporal properties—including the start time, end time, and duration—the timing of every project with regard to activities surrounding the project is of significance. Projects should always be considered in relation to previous, present, and future activities, not as isolated entities (Engwall, 2003). The focus of organizational attention is often on the completion deadline of a project, which acts as a mechanism for time-based control and sets a global pace for the project, thereby directing individuals' attention and promoting interactive problem-solving among project actors (Lindkvist et al., 1998; Söderlund, 2002).

Extant research acknowledges that the conception of time may differ between the project and the parent organization or multiple organizations involved in the project. As temporary organizations are embedded in permanent organizations, they may face tensions due to competing temporal structures between them and the requirement of interaction (Söderberg, 2020). These temporal tensions could be related to the time horizon, pacing, or continuity (Stjerne et al., 2019). Timing norms may differ among organizations involved in the projects, and a temporal fit or misfit may be experienced (Dille and Söderlund, 2011). The timing norms may also be institutionally established and more broadly represent the industry context and its pace and rhythm, thereby causing fundamental conflicts regarding the tempo and timing of activities in interorganizational projects (Dille and Söderlund, 2011). Söderberg (2020) indicates different temporal orientations, such as different planning periods, short-term goals and deadlines, and project actors' willingness to be involved in scheduled activities.

Thus, projects need various coordinative activities to resolve temporal tensions and address misfits, and such activities have been covered in several studies. For example, project managers may need to be prepared for and identify possible temporal misfits and identify resolution strategies to handle them in terms of detecting, correcting, and escaping (Dille and Söderlund, 2013). Project participants may need pacing—that is, adjusting the pace or rhythm of activity—to match it with that of another activity (Dahlgren and Söderlund, 2001). Coping with conflicting temporal requirements from participating institutions may require temporal conditioning, such as temporal avoidance, temporal splitting, and temporal matching (Dille et al., 2018). Certain studies draw attention to the temporal boundaries between organizations or between the project and involved organizations (Stjerne et al., 2019; Söderberg, 2020). Stjerne et al. (2019) revealed that project actors utilize framing as a future-oriented attempt to extend or shrink the time horizon and to respond to time-horizon tensions, synchronizing as a present-centric attempt to negotiate the exchange among actors to respond to pacing tensions and hyping as past-oriented staging of the project to highlight the need for change to respond to continuity tensions (Stjerne et al., 2019).

2.3. The objective and subjective conceptions of time

General management studies acknowledge the objective–subjective distinction of time (Reinecke and Ansari, 2015). Objective view or clock time represents a linear, clock-based, and discrete view of time (Kunisch et al., 2017; Reinecke and Ansari, 2015): time is a precious resource or social structure that organizations utilize to regulate operations and humans use and measure in response to external demands (Blagoev et al., 2024). According to the objective view, time can be considered in terms of duration, frequency, timing, and sequence (Aguinis and Bakker, 2021). According to the subjective view—that is, process-based time—the human experience with regard to time is the focus: time is relative, event-based, continuous, and related to human assumptions (Reinecke and Ansari, 2015) and it emerges as temporal work in interactions and discourses of people by bridging past, present, and future (Blagoev et al., 2024).

The subjective view appears as less dominant in management research (Blagoev et al., 2024), and it appears to have two somewhat different interpretations. While it generally could be assumed to reside as a lived experience in the minds of individuals, Reinecke and Ansari (2015) also mentioned that process time is a feature of organizational context. When individuals draw upon the temporal structures of their specific organizations and societal context in their interpretations, they effectively reproduce or also shape and change the temporal structures of their context (Orlikowski and Yates, 2002). This view of time is not objective nor subjective, it is contextual. Further, with regard to strategic change, Kunisch et al. (2017) differentiate between subjective interpretations of time and timing in external events as well as the contextual emergence of events and organizations' responses to them in time. When conceptions and structures of time are socially shared, they facilitate order and control in and between organizations (Blagoev et al., 2024) and in that way become "objective". This indicates that the subjective view of time is closely connected with how time is consumed, and how it emerges and proceeds in the form of events in context, which is highlighted in Fig. 1. The figure illustrates that the objective and subjective views of time complement each other when events occur in a given moment in time and are connected through the contextual consideration of temporally situated events.

While the conceptual interfaces between objective, subjective, and contextual views of time are fluid and contain tensions, they also overlap and need each other. Therefore, Blagoev et al. (2024) suggest acknowledging all the different ways to view time and using time through its different forms as a conceptual mechanism to take the targeted phenomenon into focus. This implies a need to consider time as a central managerial dimension, emphasizing where time matters for management, and identifying such concepts and approaches that are relevant to time-related logics.

So far, project studies dominantly reflect an objective view to time, where time is a resource being consumed or condition being measured. The conception of time in projects tends to be treated linearly (Delisle, 2019) in that it can be split into the past, present and future, with time passing among the periods (Lundin and Söderholm, 1995). Current project management standards tend to portray an objective and quantitative conception of time, where time is a resource and success criterion that can be objectively assessed (Delisle, 2019).

However, research increasingly communicates the need to differentiate between the objective (reflected in breakdown structures and

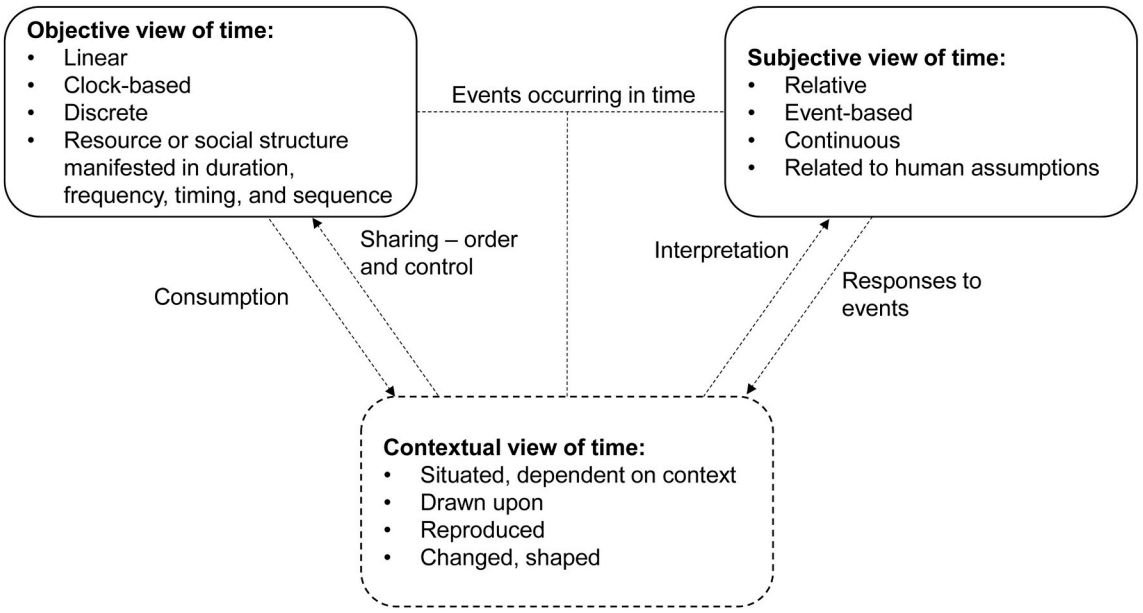

Fig. 1. Nature of the objective, subjective, and contextual views of time (illustration developed based on Aguinis and Bakker, 2021; Blagoev et al., 2024; Kunisch et al., 2017; Reinecke and Ansari, 2015).

official schedules) and subjective (actuality—what really happens) perspectives on time in project organizing (Winch and Sergeeva, 2022). Vaagaasar et al. (2020) proposed a situated temporal view of projects, which implies following actors' progress in time when the project moves forward. Temporal shifts occur over time, and actors need to cope with the changing past and future when time moves forward (Vaagaasar et al., 2020).

While many project-related time and temporality studies treat projects as part of their organizational and interorganizational contexts (Delisle, 2019; Stjerne and Svejenova, 2016; Stjerne et al., 2019; Söderberg, 2020; Winch and Sergeeva, 2022), they rarely explicate the reality that the projects exist simultaneously and in parallel and sequence with each other as part of project portfolios. Project portfolio studies barely explicitly consider time and temporal orientations (cf. Hansen and Svejvig, 2022; Martinsuo and Geraldi, 2020), and time appears merely secondarily in such studies. Due to the centrality of temporal issues at both the project and organizational levels, there is a need to understand these issues at the level of the project portfolio. Delisle (2019) addressed temporal issues in connection with project portfolio standards and clearly invites further research to delve into the practice-based view of time in projects and PPM.

3. Method

This study employs a conceptual approach, with the purpose of understanding how research has featured time in PPM thus far as well as identifying pathways for future research. The task of the conceptual review is to seek knowledge from extant research and group and present it logically, to spot and highlight the gaps, inconsistencies, and new ideas (Hulland, 2020), here specifically with the intent of opening up a completely new way of looking at PPM. More specifically, this conceptual study originally adopts a rather exploratory theory synthesis approach, but eventually also provides a typology (Jaakkola, 2020) specifically regarding the different views for organizations to consider time in their PPM.

I began this research with the observation that time is rarely or even never the explicit main topic in the published PPM papers. However, particularly through readings of project sequences and lineages (Berggren, 2019; Kock and Gemünden, 2019; Midler, 2013; Vedel and Geraldi, 2020), I anticipated that time could be found in various ways within existing research, even if it was not the main topic. Therefore, I adopted a rather exploratory approach and concentrated on a within-article search among extant PPM and multi-project management papers. I followed this with backward and forward searches, with an intent to expand the reading base.

The conceptual study began with focused searches within dozens of published PPM and multi-project management articles. The inclusion of multi-project management research with PPM research was purposive, as it covers cross-project coordination issues that are relevant to time, even if not always representing the portfolio level. The majority of PPM research is conducted in the domains of project management and innovation and product development management, and its content topics moved from optimization toward management in the 1990s (Hansen and Svejvig, 2022). Therefore, the search included project-related journals (International Journal of Project Management, Project Management Journal, International Journal of Managing Projects in Business, and Project Leadership and Society) and innovation management journals where PPM papers are published (e.g., Journal of Product Innovation Management, Research Technology Management, Creativity and Innovation Management, IEEE Transactions on Engineering Management) and covered the period of 1995-2025.

The keyword search concentrated on search words [time] and [temporal]. If the words were used in an article, I first began to sort the studies based on whether the article adopted an objective or subjective view of time and how that view was manifested. I excluded papers in which "time" or "temporal" were not related with PPM or the multi-project management topic of the articles (e.g., when time referred to the timing of the empirical study, duration of interviews, or temporal considerations at the single project level). Through the reading, I began to formulate a more detailed interpretation framework for the objective and subjective main categories, as represented in Tables 1 and 2, and clustered the readings into subcategories. For example, project continuums (sequences, lineages), time horizons (short term, long term), and rhythm of decision making are some of the subcategories identified for the objective considerations of time. Similarly, for subjective considerations, subjective time consumption, competition for time, and splitting of time were revealed to be somewhat different subcategories. This then led to the writing of brief narratives of each subcategory, as reported in section 4.

The third category of contextual considerations emerged and was

Table 1
Objective considerations of time in PPM research.

Conception of time	Description	Example references
Time as a scarce resource	Competition for time across projects in portfolio selection; need for time in managing and changing the project portfolio	Archer and Ghasemzadeh (1999); Blichfeldt and Eskerod (2008); Elonen and Artto (2003)
Time horizon of planning	Planning and selecting projects and allocating resources to achieve short, medium, and long-term outcomes	Abrantes and Figueiredo (2015); Gupta et al. (2022)
Time as part of assessment and selection criteria	Lead time or time to achieving outcomes as an assessment criterion	Christiansen and Varnes (2008): Englund and Graham (1999); Nobeoka and Cusumano (1997)
Timing and temporal lag	Timing of project outcomes in the portfolio; time between actions (e.g., portfolio review) and outcomes	Jonas et al. (2013); Teller et al. (2012, 2014); Teller and Kock (2013); Unger et al. (2012)
Continuum of projects over time, and portfolio evolution over time	Lineage, sequence, or path-dependency of projects over time; phases in the portfolio's lifecycle	Berggren (2019); Kock and Gemünden (2019); Maniak and Midler (2014)); Midler (2013)
Pace and rhythm of the portfolio	Interval of decision making or actions in project portfolios	Tuominen and Martinsuo (2025); Mosavi (2014)

Table 2
Subjective considerations of time in PPM research.

Conception of time	Description	Example references
Perceived consumption of time in PPM	Perceived need or spending of time in portfolio assessment and decision-making	Blichfeldt and Eskerod (2008); Christiansen and Varnes (2008)
Projects and other activities competing for managers' time	Individuals' perceptions of being involved in multiple simultaneous projects; competition for managers time and attention in projects	Colicev et al. (2023); Delisle (2020); Karrbom Gustavsson (2016); Stettina and Hörz (2015); Zika-Viktorsson et al. (2006)
Dividing time between projects; perceived efficiency in time use	Competence and efficiency in dividing the use of time among multiple projects	Patanakul and Milosevic (2006, 2008, 2009)

separately analyzed, initially based on conference participants' feedback and by recognizing the emergence of this category as part of management literature's subjective view (Reinecke and Ansari, 2015). The literature review in section 2.3 indicates that the contextual view connects the subjective view with the objective view, which was roughly summarized in Fig. 1. I began with the contingency theory and uncertainty assumptions explicated in earlier PPM context research (Martinsuo, 2013; Martinsuo and Geraldi, 2020), performed an additional article search [portfolio AND context], and particularly explored a few hypothetic–deductive studies with contextual control variables in terms of whether and how they contained the consideration of time-related issues as well as a few qualitative studies. Again, I clustered the findings into subcategories in terms of organizational external turbulence, time-related complexity, and repeated and continuing external influence; thereafter, I wrote up brief narratives of the subcategories as results.

The three categories of objective, subjective, and contextual effectively provide a typology for time-related studies in PPM that opens up a new research stream for studying the PPM phenomenon, to complement the previous mechanism, practice, and actor-centric studies (as summarized in section 2.1). Viewing time-related PPM research in a comprehensive manner showed compelling evidence of time as an equally potent research stream as mechanisms, practices, and actors: time is embedded in all PPM, and PPM appears differently when viewed from the perspective of a specific category. I will reflect the findings of time-related PPM on the other research streams, to explicate its novel potentials both for research and practice. I will also discuss the various possibilities with the objective, subjective, and contextual dimensions and their interplay as pathways forthcoming PPM research. In the search for future research ideas, I both read through the future research paths proposed in previous research to identify any requests for the additional considerations of time in PPM and thought about the gaps prevalent within and among the objective, subjective, and contextual research streams.

4. Findings

4.1. Objective considerations of time in project portfolio management

The majority of extant PPM research treats time in an objective manner, represented in managers' considerations of cross-project scheduling and resource allocation, anticipation of benefits in future times, and accumulating knowledge from past projects. According to this view, time is manageable, objectively measurable, and represented through clocks and calendars. Table 1 summarizes the objective considerations of time in PPM.

Time is considered a *scarce resource*, in the same manner as people and money, and projects compete for it as part of project portfolios (Archer and Ghasemzadeh, 1999). It is common for organizations to consider the timing of projects in the portfolio and the availability of resources, for example, by mapping multiple projects on the same Gantt chart (Englund and Graham, 1999). This implies avoiding possible gridlocks in the project pipeline and undertaking projects at the right time and in a time-efficient manner in light of available resources (Cooper et al., 1999). Overcommitment of resources to too many projects simultaneously is a common reason for problems at the portfolio level (Blichfeldt and Eskerod, 2008; Elonen and Artto, 2003). As projects may be dependent on each other, the changing plans in one project will affect the schedules of other projects (Jerbrant and Karrbom Gustavsson, 2013). The time-dependency of projects and resource availability is an important consideration in project portfolio selection (Archer and Ghasemzadeh, 1999).

The *time horizon of planning* represents another relevant consideration at the project portfolio level. In R&D (and generally in any project contexts), it is necessary to simultaneously consider multiple time horizons and implement projects that together produce deliverables over the short term, medium term, and long term. Organizations need to allocate resources to activities for all the different time horizons in parallel to ensure desired outcomes at different times (Abrantes and Figueiredo, 2015; Gupta et al., 2022; Hendriks et al., 1999). Moreover, time horizons may be considered regularly as organizations may, for example, follow an annual planning cycle with its routine of portfolio selection. Within such routines they need to consider extant projects and new projects that are beginning at the same time (Archer and Ghasemzadeh, 1999).

Time is also covered in the *assessment and selection criteria* of projects in the portfolio. The timing of technology exploitation resulting from the projects has been considered as a key factor for competitiveness, thereby encouraging rapid technology transfers among projects (Nobeoka and Cusumano, 1997). It is not necessarily a separate criterion, but the timing of the expected returns from the projects may be considered a part of business value-related criteria (Englund and Graham, 1999). Organizations may consider such assessment criteria as readiness or age of the technology, time to completion, extent of product and process change, and novelty (reflected in the time required for development) when they evaluate and compare projects in connection with project portfolio decisions (Cooper et al., 1997; Englund and Graham, 1999). Moreover, lead time and on-time progress of projects have been used as

central assessment criteria when deciding on the project portfolio in management group meetings (Christiansen and Varnes, 2008).

Even if the timing of project outcomes may appear in the portfolio selection criteria, project portfolio success is most often treated in a cross-sectional manner at the same time as its antecedents are considered. Delivering projects on time is occasionally featured as part of the success measure concerning average project success (Teller et al., 2012, 2014; Teller and Kock, 2013). Certain studies suggest the need to separately assess the project portfolio's short-term success and long-term success (Biedenbach and Müller, 2012). Only a few studies acknowledge the *temporal lag between PPM actions and outcomes*. Unger et al. (2012) assessed strategic fit and project termination quality two years after the independent variables. Jonas et al. (2013) assessed project portfolio success two years after the assessment of independent variables. Martinsuo and Geraldi (2020) provided a critique toward the dominant use of the contingency theory in PPM research and the tendency to assess management and contingency factors at the same time as assessing performance. Studies dominantly neglect the time lag between actions and performance. However, in reality, performance at a given time is not the result of the portfolio actions taken at the same time, but the actions taken in the past (Martinsuo and Geraldi, 2020).

While project portfolios are often treated cross-sectionally at a given time, they exist longitudinally over time. As a mode of organizing, a project portfolio is expected to be ongoing, which is in contrast to projects and programs that are temporary (Geraldi et al., 2022). Project portfolios exist and evolve over time, through events in their surroundings and the actions of involved stakeholders (Gomes et al., 2023; Vedel and Geraldi, 2020). *The continuum (sequence, lineage) of projects over time* has received increasing attention in research as a pathway and trajectory of an organization's innovations (Berggren, 2019; Kock and Gemünden, 2019; Maniak and Midler, 2014; Midler, 2013). The lineage of projects represents both continuity from the past (reactive lineage for learning) and a time horizon toward the future (proactive lineage for anticipation) (Kock and Gemünden, 2019). Organizations can use roadmapping in their project portfolio as a method to balance different types (exploration and exploitation) and time horizons of projects (Bengtsson and Lindkvist, 2017). However, the lineage studies tend to focus on a specific product and its evolution and they do not cover the project portfolio and its evolution as a whole.

With regard to the sequence of projects, some research has emphasized the *pace and rhythm of the projects,* both in terms of beginning new projects, transferring results, and the consequent success of the projects on the market (Brown and Eisenhardt, 1997). Brown and Eisenhardt (1997) emphasized that organizations should not merely react and respond to what happens in the business environment; instead, they need to anticipate changes and be prepared for alternative futures in their project investments and even “choreograph” transitions between projects. A few studies have covered the temporal rhythm and routine of the management committees of handling portfolio matters (Mosavi, 2014; Tuominen and Martinsuo, 2025). Tuominen and Martinsuo (2025) indicated that the pace and rhythm of handling portfolio matters is dependent on the type of business and industry in which the organization operates as well as the established culture. Martinsuo and Anttila (2022) indicate the need for repetitiveness and continuity in guaranteeing the strategic alignment of the project portfolio, thereby ensuring that alignment is not assessed only during portfolio selection. Further, certain studies emphasize the need to investigate project portfolio evolution and dynamics over time and in longitudinal settings (Kock and Gemünden, 2016).

4.2. Subjective considerations of time in managing multiple projects

A few studies acknowledge the individuals’ subjective viewpoint, specifically regarding the spending of time in managing multiple (simultaneous) projects. According to this view, time is subjectively experienced and lived in given moments; thus, it is relative to subjective expectations and requirements in the context.

While the practice-oriented view to PPM is increasing in research (Clegg et al., 2018; Martinsuo, 2013), the consideration of time tends to be implicit and secondary to certain other topics. Studies that advocate the subjective view to time do not necessarily directly refer to PPM but rather to the parallel management of multiple simultaneous projects within an organization or a portfolio, representing a view from within the cross-project setting. Moreover, the subjective experience of time may be embedded into other concepts such as simultaneity of multiple projects or competence. The attention is on managers’ subjective view of spending their time in activities related to project portfolios, employees working on multiple simultaneous projects and experiencing overload, and managers leading multiple projects. Table 2 summarizes the most apparent subjective conceptions of time covered in PPM research.

Certain research reveals the managers’ subjective perceptions of *time consumption* in terms of how much they need or spend time on assessing and deciding upon the projects in the portfolio. Managers have limited capacity both in terms of time and to cognitively concentrate on projects (Blichfeldt and Eskerod, 2008). There are indications that managers spend a different amount of time in their meetings on different types of projects: they appear to spend more time on new and delayed projects as compared to well-progressing ongoing projects (Christiansen and Varnes, 2008). Moreover, managers may limit their time consumption in meetings and purposely create slack to make room for concentrated work (Jerbrant and Karrbom Gustavsson, 2013).

Further, subjective perceptions very often deal with individuals' involvement in multiple simultaneous projects and the fact that the *simultaneous projects compete for the persons’ attention and time*. A general assumption is that people should not be participating in too many projects simultaneously (Fricke and Shenhar, 2000). Several studies address such multi-project circumstances and their negative influence on performance (Colicev et al., 2023; Karrbom Gustavsson, 2016; Stettina and Hörz, 2015; Zika-Viktorsson et al., 2006). Individuals may experience project overload if they have to switch between multiple projects and this can disrupt their work; moreover, the insufficiency of time is among the key underlying factors creating overload (Delisle, 2020; Zika--Viktorsson et al., 2006). Switching between different tasks and restarting requires extra time (Karrbom Gustavsson, 2016) as well as recuperation from the previous tasks (Zika-Viktorsson et al., 2006); however, such issues are rarely planned into project schedules, thereby challenging multi-project work. Delisle (2020) draws attention to urgent emergencies calling for task prioritization and the need to negotiate task timing and deadlines between project actors and sponsors, which may eventually also have an effect on the project scope.

For managers, leading multiple simultaneous projects generates requirements for special management competences. Multi-project managers need to be effective in the use of time because they must *divide time among projects* (Patanakul and Milosevic, 2006, 2008, 2009). Specifically, multi-project managers need competences for multitasking and handling interdependencies (Patanakul and Milosevic, 2008), which often implies a need for them to switch among several projects during the same day (Patanakul and Milosevic, 2009). Although this pressure from multiple projects may be reflected as time pressure (hurry), it is not necessarily just a negative feature. Time pressure may also spark improvisational behaviors that could accelerate the implementation of pertinent actions (Leybourne and Sadler-Smith, 2006) and enable managers to create situation-specific action spaces for making decisions beyond the formal management regime (Jerbrant and Karrbom Gustavsson, 2013). Multiple simultaneous projects may create possibilities for efficiencies through synergy and cross-project learning, but also require the skilled synchronization of activities (Nobeoka and Cusumano, 1997; Simon and Tellier, 2016).

4.3. Contextual considerations of time with regard to project portfolios

In contrast with process time featuring both subjective and

contextual time considerations (as expressed by Reinecke and Ansari, 2015), PPM research appears to have a separate thread of discourse on time as part of the organizational and institutional environment of project portfolios. According to this view, time represents the conditions in which project portfolios exist and are managed—for example, in terms of speed, frequency, or rhythm. Therefore, this contextual view of time may be reflected in the subjective considerations of time and generates objective requirements toward PPM.

Again, this thread of research does not explicitly concentrate on time as such, but implicitly touches upon actions and events that occur in the portfolio's context over time and may have implications on the portfolio or its management. The relationship between the project portfolio and its surrounding context evolves over time, and it is important to understand the dynamics of this relationship (Hansen and Svejvig, 2022; Martinsuo and Geraldi, 2020). Table 3 presents the themes in the objective considerations of time in PPM.

Research that seeks to explain PPM success very typically contains specific contextual control variables, a few of which may be related to time. A commonly used construct is *external turbulence*, which represents the pace of change in the surrounding industry (Bechtel et al., 2022, 2023; Kaufmann et al., 2021; Kopmann et al., 2017; Teller et al., 2014). Certain studies differentiate among market turbulence, technological turbulence, and competitive intensity, all of which include time-related items related with changes over time or speed of changes (Kaufmann et al., 2021; Voss and Kock, 2013). Such studies tend to assume that turbulence may have interaction effects with certain independent variables on PPM success. Then, the pace or rhythm of external changes, requires appropriate PPM responses to adapt to the respective pace or rhythm.

Project portfolios face different uncertainties, and a few of them stem from *organizational complexity* regarding the host organization of the project portfolios (Martinsuo et al., 2014). In particular, in the multi-case study by Martinsuo et al. (2014), the interproject relations indicated resource dependencies, scheduling, and prioritization issues at the organizational level as contextual factors that are experienced as time-related uncertainties for PPM. Gomes et al. (2023) drew attention to alternative temporal portfolio regulation approaches (sequential, parallel, contextual), depending on contextual requirements. Consequently, the regulation is reflected on the micro-level practices of PPM.

As product development and delivery projects may involve external stakeholders, the temporal rhythm and pace of different organizations can vary and generate clashes in the joint projects and, consequently, also in the project portfolio (Martinsuo and Ahola, 2022). Therefore, PPM may be susceptible to *repeated or continued external influence*. Some studies consider the speed of handling customer problems and customer relationship duration as relevant aspects related to relationship value that is expected to explain project portfolio success (Voss and Kock, 2013). The repeated use of the same external partners in a portfolio's different projects has been identified as a possible source of synergy and time savings in PPM (Martinsuo and Anttila, 2022). The longitudinal study by Vedel and Geraldi (2020) revealed an external researcher's repeated and continued involvement in PPM, the emergence of temporal ties between the portfolio and the researcher, and the presence of different time horizons in the relationship.

Table 3
Contextual considerations of time in PPM research.

Conception of time	Description	Example references
External turbulence	Rhythm or pace of change in the business environment	Bechtel et al. (2022, 2023); Kaufmann et al. (2021); Teller et al. (2014); Voss and Kock (2013)
Time-related organizational complexity	Uncertainty stemming from inter-project dependencies, such as those concerning resources, scheduling, or prioritization	Gomes et al. (2023); Martinsuo et al. (2014)
Repeated or continued external influences	Rhythm or continuity of customers' and other stakeholders' actions that may have implications on the project portfolio	Martinsuo and Anttila (2022); Vedel and Geraldi (2020); Voss and Kock (2013)

5. Discussion

This conceptual study began with the observation of an implicit and secondary treatment of time in PPM research. This preliminary assumption was largely confirmed by the fact that time is not mentioned explicitly among the main conceptual themes structuring previous PPM research (Hansen and Svejvig, 2022) and was not identified as the primary research topic in the research covered for this study. I will next discuss the key implications of the objective, subjective, and contextual views of time on PPM research. Then, I will reflect the learnings on time as a prospective new research stream that could supplement and support the mechanism, practice, and actor-centric PPM research. Several future avenues are proposed to pave way to enriching time-related PPM research.

5.1. Objective, subjective, and contextual views of time in project portfolio management

The use of extant time-related management and project research offered an informative categorization that yielded a useful typology in response to the research question on how time is featured in the research on PPM. Motivated by earlier time-related general management research (Aguinis and Bakker, 2021; Blagoev et al., 2024; Kunisch et al., 2017; Reinecke and Ansari, 2015) and related research thread at the single project level (Winch and Sergeeva, 2022), I explored objective, subjective, and contextual considerations of time in previous PPM research and revealed a broad coverage of the multi-level, multi-actor, and multi-horizon character of time, when organizations manage their project portfolios. Fig. 2 summarizes the key findings.

The objective time view reveals PPM as a *compilation of mechanisms for managing projects in time and on a certain continuum*. While time causes pressures and scarcity to resources (Kavadias and Loch, 2003), is integral to project assessment and selection criteria (Atkinson, 1999), and defines the pace and tempo in PPM (Martinsuo and Anttila, 2022), it also spans across different temporal horizons, defines lag and waiting between actions and outcomes, and represents continuity and evolution at the level of the project portfolio, as summarized in the findings. Thus, time is represented in many of the mechanisms employed for PPM. When PPM is considered as a compilation of mechanisms for managing projects in time and as a continuum, time could be treated either as a separate concept to be added to the extant concepts (Hansen and Svejvig, 2022) or as a completely different layer or another dimension, through which all the other concepts could be analyzed.

The subjective time view portrays PPM as a *compilation of managers' thinking patterns* when managing the project portfolio *in a specific time and over time*. As summarized in the findings, perceptions of time use, time splitting, temporal efficiency, and competing priorities are central, as managers anticipate and react to situation-specific cues and decide upon portfolios and also when project personnel act on decisions. Considering PPM as managers' thinking patterns could offer a way to explain improvisational behaviors in managing project portfolios (Blichfeldt and Eskerod, 2008; Jerbrant and Karrbom Gustavsson, 2013; Martinsuo et al., 2024), reveal origins of agility and flexibility (Bechtel et al., 2022, 2023; Gemünden and Kock, 2025; Kaufmann et al., 2020; Kock and Gemünden, 2016; Stettina and Hörz, 2015), and map the patterns of conflicts and negotiation in steering committees and meetings (Christiansen and Varnes, 2008; Mosavi, 2014; Tuominen and Martinsuo, 2025). The subjective time view of PPM positions time in the minds of individuals, in their experiences of past, present, and future.

The contextual time view shows PPM as a *dynamic rhythm and pace of*

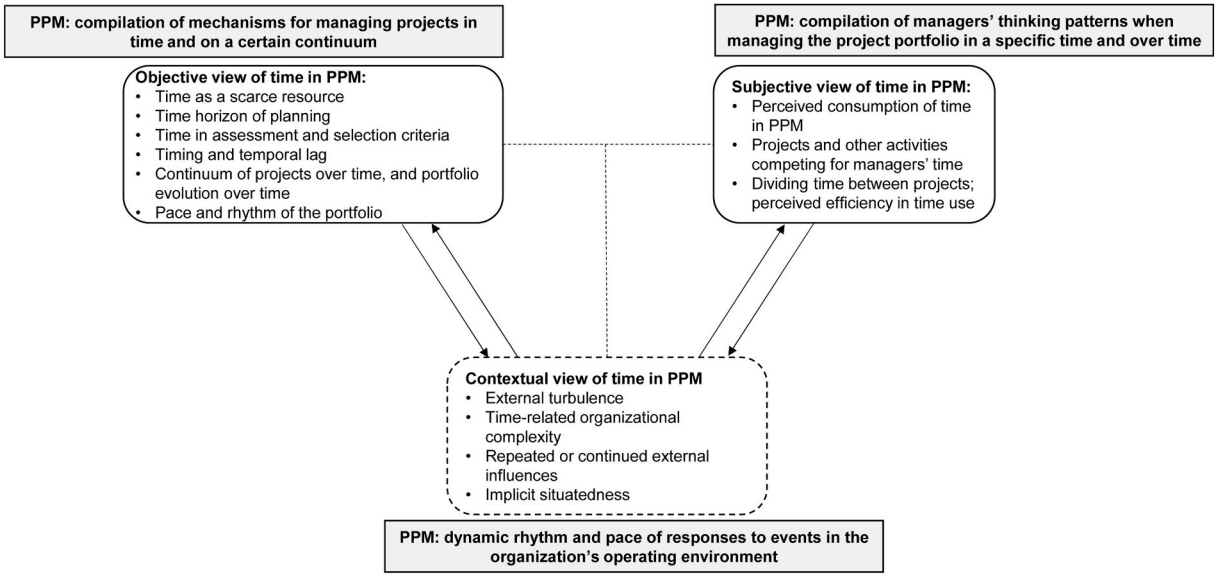

Fig. 2. Summary of the key findings on time in PPM.

responses to events in the organization's operating environment. Where external turbulence, organizational complexity, and stakeholders' influences may frame and restrain PPM in an organization, as summarized in the findings, they also could drive strategic renewal and reconfiguration. Research on project portfolios' agility (Bechtel et al., 2022, 2023; Gemünden and Kock, 2025; Kaufmann et al., 2020; Kock and Gemünden, 2016; Stettina and Hörz, 2015), strategic alignment (Kopmann et al., 2017; Martinsuo and Anttila, 2022), and multi-project lineage (Kock and Gemünden, 2019; Maniak and Midler, 2014; Midler, 2013) already offer rich evidence on rhythms and paces and passing of time when portfolios evolve, but time and temporality could be highlighted even more explicitly. At the moment, the majority of studies take the temporal situatedness of the project portfolios and its specific circumstances in implicit terms, without considering the past, passing of time, or future aspirations. Contextual time namely offers a temporal structure to objective time and becomes a target of interpretation for portfolio personnel. Contextual time, thereby, acts as the bridge between subjective and objective aspects: managers' and personnel's interpretations of external uncertainties, rhythm, and pace may eventually manifest in the situation-specific use of mechanisms that match the temporal requirements of the business environment.

5.2. Time as a new research stream for project portfolio management

This study started with the observation that time and temporal issues are covered rather implicitly and secondarily in PPM research. The above analysis and discussion, however, revealed the versatile ways in which time appears in PPM studies, often in connection with the existing mechanism, practice, and actor-centric studies. While the extant research tends to consider mechanisms, practices, and actors at a given moment in time, cross-sectionally, this conceptual study draws attention to time and temporality as an additional dimension and research stream in PPM effectively complementing mechanism, practice, and actor-centric studies. This adds new knowledge to previous reviews (Clegg et al., 2018; Hansen and Svejvig, 2022; Martinsuo and Geraldi, 2020) that barely touch upon time and temporal issues in PPM.

While the findings reported objective, subjective, and contextual views of time in PPM separately, the complementarity and interconnectedness of these views can also be witnessed, when linking time to mechanisms, practices, and actors. The contextual view reflects the situatedness of all PPM practices, both representing the moment where actors consume time and interpret events and actions in time. As situations move on and contexts evolve, also PPM evolves. The findings offer clear indications that PPM mechanisms are manifested in the objective view to time: scarcity of resources, evaluation criteria, lineage, scheduling. This, in turn, is reflected the subjective interpretations and consumption of time in given situations, that is, actors and their practices. These together build the rhythm and pace giving shape to the contextual view in specific situations.

This dynamic view of PPM is represented in the increasing interest toward project lineages and sequences (Kock and Gemünden, 2019; Maniak and Midler, 2014; Midler, 2013), but the transition logic between temporal contexts, that is, the interplay between objective and subjective views in PPM, will require further consideration. At the single project level, there are indications of the centrality of situated temporal episodes (Vaagaasar et al., 2020) and narrative shaping of project-related futures (Winch and Sergeeva, 2022). There will be a need to investigate how the situated views of the past, present, and future of projects translates to the project portfolio level.

This conceptual review has shown that time matters in PPM in many ways, and PPM approaches could be further developed to emphasize time-related logics and find new explanations to PPM performance and its challenges. As project portfolios are evolving entities and could be even considered modes of organizing (Geraldi et al., 2022), there is a need to move beyond treating them in a cross-sectional manner.

5.3. Future research avenues

Through the revelation of time as an implicit and secondary factor in PPM studies and the need to bring time to the forefront as a research stream supplementing earlier work, this study encourages new PPM research to cover time, its use, interpretation, and influences comprehensively. This study covered the objective, subjective, and contextual considerations of time in PPM studies and thereby followed the conceptualizations expressed in previous project research (Winch and Sergeeva, 2022) and some general management research (Aguinis and Bakker, 2021; Blagoev et al., 2024; Kunisch et al., 2017; Reinecke and Ansari, 2015). Time-related research offers also differently verbalized frameworks that could be useful, and forthcoming research could put targeted effort into studying time as resource, structure, and process (Blagoev et al., 2024) in such project portfolio settings where time is contrasted or combined with other resources, structures, and processes.

This study has offered ideas on how the objective, subjective, and contextual dimensions of time are structured in PPM research. Further

research could utilize the time-related contents for structuring time-specific qualitative and quantitative PPM research. Also, the interdependencies and connections among objective, subjective, and contextual time dimensions deserve further research in and across different project portfolios over time. Theoretically, considering time in PPM implies a need to bring in nuanced knowledge from how time is used in general management studies (Blagoev et al., 2024; Kunisch et al., 2017; Reinecke and Ansari, 2015) and project studies in their contexts (Delisle, 2019; Stjerne and Svejenova, 2016; Stjerne et al., 2019; Söderberg, 2020; Winch and Sergeeva, 2022).

Acknowledging the connectedness among objective, subjective, and contextual time viewpoints will likely provide novel possibilities for explaining PPM performance and its challenges, connecting projects and portfolios with the parent organization, and expanding research from cross-sectional designs to episodic and longitudinal designs. Such a comprehensive view will require understanding both the politicality and materiality of project portfolio decision making (Clegg et al., 2018), acknowledge the contextuality of project portfolios (Martinsuo, 2013; Martinsuo and Ahola, 2022; Martinsuo and Geraldi, 2020), and begin to treat portfolio organizing more as a process of becoming, instead of static state (Geraldi et al., 2022), through understanding the lineages of projects and emergence of the portfolio over time (Kock and Gemünden, 2019; Kopmann et al., 2017; Maniak and Midler, 2014). Various longitudinal and process studies, action research studies, and event history studies will be useful in time-related PPM research.

Many PPM studies already encourage further research, particularly from the objective time viewpoint. They explicate the necessity of investigating how project portfolios evolve over time and, therefore, the need to cover the paths and processes that project portfolios take in organizations (Bechtel et al., 2022; Berggren, 2019; Martinsuo, 2013; Martinsuo and Geraldi, 2020; Vedel and Geraldi, 2020). The need for understanding the dynamics and development of project portfolios over time has also been proposed from the subjective viewpoint through individuals' sensemaking and decisions (following Bredillet et al., 2018; Killen and Hunt, 2013; Vedel and Geraldi, 2020) and related routines and reconfigurations (Martinsuo and Anttila, 2022; Martinsuo et al., 2024). This co-existence of the subjective and objective views will also require acknowledging the contextual view in terms of the pace and rhythm of events and uncertainties as well as the evolving governance of the environment of project portfolios as well as in interorganizational settings (Martinsuo and Ahola, 2022).

Building on the research summarized in the previous sections, additional empirical research is proposed also on each of the three dimensions covered in this paper. For the objective dimension, there is a need to move beyond cross-sectional studies. Some research should explore the temporal lag between portfolio decisions, actions, and outcomes, to discover the mechanisms through which PPM success is actually achieved. Moreover, there is a need to understand the multiple time horizons that are simultaneously evolving in PPM. As project portfolios are established to produce new products and services on the short, medium, and long terms, we need knowledge on how managers handle time horizons in their decision-making and when configuring a portfolio. Additionally, there is a need to find ways to more specifically assess and characterize the portfolios' temporal rhythm. If portfolios should evolve in match with the business environment's clockspeed, managers need ways to understand and alter the portfolio's temporal rhythm in practice.

For the less researched subjective dimension, there is a need to direct attention to managers' and other portfolio actors' perceptions of time at all organizational levels involved in PPM: portfolio governance, portfolio steering and management, project offices, and project management. Future research should more systematically encompass perceived time in all its forms, including the anticipation and consumption of time; splitting of time between different projects and portfolios; sensations of speed, urgency, and scarcity of time; and experiencing the past, present, and future. In particular, there is a need to explore different portfolio actors' views of the timing of actions and decisions in project portfolios and identify possible tensions among different actors' views. As project timing is a central issue in decision-related negotiations, new knowledge on actors' views could help in understanding time-related competition and bargaining as well as potentially explain delays and failures. Furthermore, systematic studies of managers' time consumption in PPM in comparison to their other work-related duties could assist in developing more advanced capabilities for PPM.

Further, the contextual dimension of time in PPM has thus far been treated largely as a contingency factor, represented partially and implicitly in specific measures describing the uncertainty and turbulence of the project portfolio's operating environment. While indeed the duration, frequency, timing, and sequence of events in the environment are relevant for project portfolios, the findings of this study advocate a more explicit and direct treatment of contextual time in future research. There is a need to develop measures other than external turbulence, that more comprehensively cover organizational time-related complexities and uncertainties, and that explore the temporal dependency between external influences and project portfolio decision-making.

6. Conclusion

This study made three main contributions to PPM research in responding to the stated research questions. First, it drew attention to time at the level of the project portfolio as a hidden, implicit, and often-neglected research topic. This study advocates the need to explicitly and deliberately treat time and its management as a unique research stream in forthcoming PPM research. This will be a logical next step in supplementing the mechanism, practice, and actor-centric PPM studies, as time and temporal tensions have become an important topic in project studies generally and many portfolio studies mention time by the side of some other main topic. Second, this paper reported a thematic categorization of how time has been considered from objective, subjective, and contextual perspectives in previous PPM research. Revealing the thematic structure for research on time in PPM also opened up potential novel conceptualizations of PPM as a compilation of mechanisms for managing projects in time and on a continuum, as a compilation of managers' thinking patterns in a given time and over time, and as a dynamic rhythm and pace of responses to events in the organization's operating environment. Third, while supporting the previous call for covering the evolution of PPM over time (Bechtel et al., 2022; Berggren, 2019; Martinsuo, 2013; Martinsuo and Geraldi, 2020; Vedel and Geraldi, 2020), this study proposed a more detailed future research agenda, including several ideas regarding objective, subjective, and contextual views and their interplay.

As practical implications, this study alerts managers to the necessity for time-related attention in PPM and their daily work. Thus far, time does not appear in an evident manner in PPM-related guidelines or bodies of knowledge. In R&D as well as in other project environments, success often implies delivering the appropriate outcomes at the appropriate time, which requires anticipating project work and its timing well in advance. The intertwined nature of human resources and time makes the timing of projects and the use of time in a portfolio extremely sensitive and challenging. Successful PPM demands the skillful optimization of both these scarce resources. The main recommendation of this study is the addition of skilled consideration of time to the frameworks and toolboxes of PPM, both in guidelines and day-to-day practices.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

No data was used for the research described in the article.

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