Cross-boundary tensions between the project owner and project manager in value creation

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Abstract: Project value creation faces tensions between the project owner and the outsourced project manager, particularly in their cross-organizational and cross-temporal interactions. The interplay between cross-organizational and cross-temporal interactions brings significant challenges to value creation. Therefore, this research aims to explore these cross-boundary tensions between the project owner and project manager in value creation. Q methodology was applied, involving 59 interviews for developing Q statements and 20 Q surveys for analyzing tension dimensions. This research identified four dimensions of cross-boundary tension: (1) structural tension between empowerment and control, (2) priority tension between short-term and long-term, (3) communication tension between convergence and divergence, and (4) involvement tension between assistance and intervention. This research could theoretically contribute to value creation from the owner–manager cross-boundary tension perspective and extend the scope of the temporal boundary. Additionally, it provides practical guidance for professionals to understand the implications of tensions and strike the right balance for optimal value creation.

Keywords: Project owner, Project manager, Value creation, Tension, Organizational boundary, Temporal boundary, Q methodology

1. Introduction

A project is regarded as a value-creating process spanning the entire life cycle (Clegg et al., 2020). Project value propositions defined at the front-end stage will guide the project execution, following which project value will be realized during the operation stage (Fuentes et al., 2019). Typically, the project owner is responsible for the front-end and operation stages, whereas the owner's project manager is tasked with daily project management (PM) during the execution stage (Denicol & Davies, 2022). Collaboration between the project owner and the owner's project manager is critical to the value creation (Krystallis et al., 2024).

The owner's project manager, also called the "super project manager", serves as the owner's representative and is responsible for overseeing project execution (Krane et al., 2012). In contrast to project managers employed by the contractor or other specialized disciplines, the owner's project managers act as intermediaries. They are responsible for employing and managing contractors/designers, while also ensuring effective coordination with the owner. While the owner's internal team might serve as the owner's project manager in traditional PM, this role can also be fulfilled by an outsourced project manager, such as an external PM firm like CH2M Hill during the London 2012 Olympics (Denicol et al., 2021). Unlike the in-house project manager, interactions between the project owner and the outsourced project manager face more pronounced challenges in bridging their cross-organizational boundaries. Because of their varying, if not conflicting, interests, objectives, and expectations, cross-organizational negotiations can become more complex, potentially leading to imbalanced value creation (Chi et al., 2022). These issues are exacerbated when both organizations are responsible for distinct yet sequential project stages (Hetemi et al., 2020; Krystallis et al., 2024; Rezaee M.J., 2018). The temporal disconnect and organizing segmentation generate discontinuity in the project value flow (Zerjav, 2021), leading to unmet operational objectives and resource waste (Zhang et al., 2024).

Prior studies tend to address these cross-stage temporal challenges in value creation in the following ways. First, studies focused on transitions between stages—particularly from execution to operation—through mechanisms such as commissioning and readiness (Davies et al., 2009), soft landing and artifacts (Whyte & Nussbaum, 2020), and cross-stage staff overlap (Xu et al., 2022). Value creation can be enhanced, for example, by avoiding failure to meet the basic operation and usage requirements during handover to operations (Brady & Davies, 2010).

Second, studies recommended appointing specific entities, such as project owners, to be responsible for the overall value creation (Meredith & Zwikael, 2020). Project owners are encouraged to develop capabilities of learning from past delivery experiences, adapting to uncertainty, and establishing routines, tests, and guarantees to address cross-stage issues (Zerjav et al., 2018). At the same time, Zwikael et al. (2019) accentuate that project managers can provide significant support through continued involvement in projects after the handover, and that project owners should acknowledge the technical expertise of project managers during the execution stage.

However, less attention has been directed to tensions that arise between the project owner and their outsourced project manager during their cross-organizational and cross-stage value creation. Existing studies primarily examined cross-organizational boundary tensions, including multiple command chains, diverse work routines and values, inconsistent interests (Nicholls & Huybrechts, 2016; Smith, 2016), and heterogeneous knowledge and information (Machiels et al., 2023). Furthermore, studies have recognized that these cross-organizational interactions are further complicated by tensions introduced by the temporal boundaries segmented across different project stages (Locatelli et al., 2020). Nevertheless, cross-stage temporal boundary tensions are often overlooked, with greater focus placed on the temporal boundary between the distinct temporal structures of temporary organizations (specifically projects) and permanent organizations (Stjerne et al., 2019). Therefore, the tensions exacerbated by the interplay of organizational and temporal boundaries remain underexplored, even though such tensions contribute to persistent obstacles to value creation (Denicol et al., 2020).

This presents a significant gap in our understanding of cross-organizational cross-stage tensions in value creation, including those between the project owner and outsourced project manager. To address this gap, this study raises the following research question: *What cross-boundary tensions arise between the project owner and outsourced project manager in value creation, and how do they emerge?* Accordingly, this study aims to identify and analyze tensions in value creation across organizational and temporal boundaries.

First, this study enhances our understanding of project value creation through cross-organizational, cross-stage interactions between project owners and outsourced project managers. This contrasts with existing studies focused on value creation led by project owners (Andersen, 2012) or executed by project managers (Sabini & Alderman, 2021). Second, this

study introduces a temporal boundary by adopting a timeline perspective that highlights interactions across sequential project stages. This extends the conceptual scope of the temporary boundary beyond the traditional focus on the temporal structure (Stjerne et al., 2019). Furthermore, this study explores tensions across temporal and organizational boundaries, complementing studies of tensions between transactional-based organizations (DeFillippi & Sydow, 2016) as well as tensions between temporary and permanent organizations (Geraldi et al., 2020).

The remainder of this paper is structured as follows. Section 2 provides a literature review of cross-stage value creation between the project owner and manager, the organizational boundary and the temporal boundary, and tensions in cross-boundary interactions. This is followed by Section 3, which details the research methodology, specifically the application of Q methodology within the context of China's social infrastructure projects. Section 4 presents the study's findings. The final three sections are dedicated to the discussion, implications, and conclusions, respectively.

2. Theoretical Background

2.1 Project Value Creation between the Project Owner and the Project Manager

2.1.1 The concepts of project value and value creation

The project value is defined as the net worth of a project to its stakeholders, perceived "*as the difference between its benefits, disbenefits and life-cycle cost*" (Zwikael & Huemann, 2023, p. 1). For example, the value created from an infrastructure project is the difference between its benefits (e.g., improved public service quality and user satisfaction), disbenefits (e.g., disruptions to the surrounding environment), and life-cycle costs (e.g., project development and maintenance expenses).

Value creation is a dynamic process where the project value is created for stakeholders across different stages of the project life cycle (Fuentes et al., 2019; Zwikael & Huemann, 2023). It is characterized by multi-dimensional value, subjective multiplicity, diverse stakeholder priorities, and multi-stage dynamics (Martinsuo, 2020). The created project value can be assessed through multiple dimensions, such as economic, environmental, and social; short-term and long-term; individual and collective; and soft and hard (Andersen et al., 2012; Ika & Pinto, 2022). Although some value dimensions support each other, others may be inconsistent, if not

contradictory (Martinsuo, 2020). Given the different priorities of stakeholders, tensions may emerge (Matinheikki et al., 2016). For example, one choice may generate positive value for one stakeholder while causing negative value for another, thereby jeopardizing multi-subjective, multi-dimensional value creation (Lehtinen et al., 2019).

Project value is created over multiple interconnected stages due to the sequential task interdependence (Whyte & Nussbaum, 2020). Value creation progresses from defining value at the front end, through delivering value during execution, to realizing value in operations (Fuentes et al., 2019). However, despite the interconnected nature of these stages, existing studies often examine them in isolation, leaving the vital cross-stage interaction underexplored (Locatelli et al., 2020).

2.1.2 Cross-organizational and Cross-stage Value Creation

Project value creation relies on effective cross-stage cooperation between the project owner and the owner's project manager (Zwikael & Meredith, 2018). The project owner is defined as an organization initiating new projects to expand or upgrade its abilities to deliver service to customers (Winch, 2014). Studies of large-scale projects often highlight strong owners with *in-house project managers* (Winch & Leiringer, 2016). For example, Krystallis et al. (2024) suggest a "continuous" approach to aligning the project execution and operation management parties within the project owner organization through negotiation and knowledge dissemination.

In contrast, those owners lacking such capabilities typically engage *outsourced project managers* (Denicol et al., 2021), understood as organizations acting as the owners' representatives (Yakura, 2002). These outsourced project managers are not just service providers but also assume a governance and oversight role, responsible for employing and managing contractors and designers during the execution stage. They play a crucial role in project value creation during execution while maintaining frequent communication with owners responsible for front-end value propositions and future operations. Unlike typical client-vendor relationships (e.g., owner-contractor), where interactions are often confined to a single project stage, the owner and its project manager in this research share responsibilities across multiple sequential stages, alternating in project control and value creation. This makes their collaboration distinct from a typical client–vendor relationship.

However, challenges arise from cross-organizational and cross-temporal interactions between project owners and outsourced project managers in value creation. These challenges stem from conflicting pressures, divergent interests and norms, clashing professional identities, and incompatible organizational procedures (Dille & Söderlund, 2011; O'Mahony & Bechky, 2008; Stjerne et al., 2019). Self-preservation instincts drive organizations to compete for value, which may lead to skewed or narrowly focused value creation (Chi et al., 2022). Furthermore, interactions across the temporal boundary, such as between project front-end, execution, and operation stages, further complicate these challenges (Addyman et al., 2020; Locatelli et al., 2020). A typical example is the failure during the handover to operations after the project completion, often caused by temporal boundary breakdowns and discontinuity across organizations (Rodrigues et al., 2024). These issues ultimately undermine the longer-term use value.

To address these challenges, transitions between stages—such as from execution to operation—are emphasized (Locatelli et al., 2020; Rodrigues et al., 2024; Whyte & Nussbaum, 2020). Scholars have suggested applying commissioning and readiness (Davies et al., 2009; Zerjav et al., 2018), transition rituals, process models of transitioning, boundary objects, and early involvement of the operation team (Addyman et al., 2020; van den Ende & van Marrewijk, 2014; Whyte & Nussbaum, 2020). These methods are grouped into dimensions of strategy, structure, process, and people (Zhang et al., 2024). Besides, Zwikael et al. (2019) recommended designating specific entities, such as owners, to lead the overall value creation. Conversely, project managers are often deemed less suitable for leading value creation due to their limited capacity, power, and incentive in terms of long-term value creation (Zwikael et al., 2019). Nevertheless, this does not negate the project manager's importance during the execution stage. Zwikael et al. (2019) suggest frequent cross-stage involvement and dialogue between the project manager and the project owner for project value creation.

Despite valuable research on cross-stage transitions, scant attention has been devoted to the cross-organizational and cross-stage tensions between the project owner and the outsourced project manager in value creation. These tensions, intensified by the interplay of organizational and temporal boundaries, can significantly undermine project value creation. Understanding these tensions is essential for analyzing the decision-making dilemma (Çıdık & Bowler, 2022), optimizing cross-stage transition (Locatelli et al., 2020), balancing multi-dimensional value,

and mitigating conflicts and mission drift (Mitzinneck & Besharov, 2019) to enhance project value creation.

2.2 The Organizational Boundary and the Temporal Boundary

A boundary is defined as "*borders or demarcation lines between categories that emerge as a result of subtle and complex actions and activities*" (Stjerne et al., 2019, p. 349). Boundaries can encompass diverse dimensions, including hierarchical, geographical, cultural, and temporal (Comeau-Vallée & Langley, 2020; Hsiao et al., 2012). In project studies, organizational and temporal boundaries are commonly observed (Fellows & Liu, 2012).

The organizational boundary marks the distinctive lines separating the internal components of an organization from the external environment it engages with (Schotter et al., 2017). This leads to the organization's unique competence, identities, autonomy (Santos & Eisenhardt, 2005), and task responsibilities (Lakhani et al., 2013) that differentiate it from others. These cross-boundary differences often lead to discontinuity in actions or interactions, posing challenges to cross-organizational knowledge sharing and cooperation (Oonk et al., 2022).

The temporal boundary can take different forms depending on the project context. The first type, shaped by the organization's temporal structure, emphasizes diverging temporalities and timing norms (Stjerne et al., 2019). For example, in a project case (Yakura, 2002), the project owner prefers a slower pace, whereas the project manager has a faster-paced culture because their performance is evaluated based on billable hours. The second type involves "nonoverlapping work hours", crucial for managing communication in international projects with minimal time overlap (Cummings et al., 2009). The third type applies the terms time boundary or stage (-gate) boundary. It focuses on the objectively defined separation of project stages and tasks, emphasizing the transitions across distinct stages rather than differences in temporal perceptions (Addyman et al., 2020; Locatelli et al., 2020).

Among various types of temporal boundaries, those between different temporal structures have been widely examined, yet the cross-stage temporal boundary has received relatively limited scholarly attention (Locatelli et al., 2020). Some recent exceptions include studies exploring cross-stage transitions as dynamic processes involving multiple organizations with shifting involvement levels, such as contractors and owners (Whyte & Nussbaum, 2020; Zhang et al., 2024). Despite these contributions, the cross-organizational cross-stage tensions throughout the project life cycle still need further exploration.

2.3 Tensions in Cross-organizational and Cross-temporal Interactions

Tension is often conceptualized as the coexistence of contradictory elements (Wang et al., 2021), which manifest in practice as dilemmas or conflicts. Examples include asymmetry-related tensions, such as disparities in knowledge, positions, goals, or culture (Stefan et al., 2021), as well as paradoxical tensions, such as empowerment-control tension (Szentes & Eriksson, 2016). Although tensions can be heuristic in facilitating creative solutions (Pinto, 2019), they may also trigger inter-actor conflicts and require negotiations to reach agreements (Çıdık & Bowler, 2022). Actors may experience stress or anxiety from these tensions under certain conditions, which can then be either intensified or mitigated through practical measures (Lewis, 2000).

In current PM literature, cross-organizational boundary tensions have received considerable attention, while growing interest has also emerged in exploring cross-temporal boundary tensions. Nevertheless, the prevalent tensions arising at the interplay of both organizational and temporal boundaries remain underexplored.

Specifically, various tensions emerge in the cross-organizational interactions in projects, such as megascale or large infrastructure projects (Szentes & Eriksson, 2016; Wiewiora & Desouza, 2022), project networks (DeFillippi & Sydow, 2016), and systems development projects (Iivari, 2021). These tensions include: (1) stakeholder paradox (including versus excluding external stakeholders in decision-making, close versus open collaboration, and relational versus formal governance approach); (2) flexibility paradox (flexibility versus control, flexibility versus standardization, and empowering versus directive leadership style); (3) temporality paradox (shadow of the past versus promise of the future, and long- versus short-term focus); (4) structural paradox (specialization versus breath, autonomy versus embeddedness, outsourced versus in-house, and power-sharing versus power-keeping); (5) learning paradox (knowledge creation versus transfer, and exploration versus exploitation); (6) decision-making paradox (convergent versus divergent approach to decision-making); (7) identity paradox (project versus organizational identity); (8) the difference paradox (standard procedures versus customized solutions); and (9) the performance paradox (different objectives, value, or interests). For example, tensions between flexibility and control, as well as between short-term and long-term objectives, have been observed in the everyday interactions between project owners and project managers (Müller & Turner, 2005; Vlaar et al., 2007).

Despite this increasing focus on tensions in PM studies, one key research gap remains. Although various cross-organizational tensions have been identified—each becoming salient in distinct contexts—their dynamics within the value creation process remain underexplored. Furthermore, existing PM tension studies, primarily based on qualitative case studies and conceptual literature reviews, have focused on how cross-organizational actions shape tensions. However, less is known about how stakeholders perceive and interpret these tensions, especially in the context of value creation. This gap is particularly relevant given that stakeholders perceive both value and the associated tensions subjectively and in context-dependent ways (Toukola et al., 2023).

Furthermore, from the temporal boundary perspective, studies focus on tensions between temporary and permanent organizations across their differing temporal structures. Examples include tensions between long-term and short-term perspectives, urgency and patience, and clock time and event time (Dille et al., 2018; Geraldi et al., 2020; Hilbolling et al., 2022; Söderberg, 2020). Nevertheless, cross-stage tensions are still underexplored. Tensions in cross-organizational, cross-stage interactions may overlap with—but are ultimately distinct from—those arising between temporary and permanent organizations. These tensions primarily arise from interactions at the objectively defined boundaries between different project stages, involving multiple organizations, rather than from subjective differences in temporal perceptions or organizational norms (Locatelli et al., 2020). In addition to the tensions between different subjective temporalities, various boundary conflicts, specification-integration challenges, and communication issues may emerge in cross-stage value creation.

Tensions in value creation, exacerbated by the interplay between organizational and temporal boundaries, merit further investigation. Due to the interdependence of project stages, organizations are often required to participate in phases beyond their primary responsibility—either earlier or later in the life cycle—while ensuring effective communication across organizational boundaries. However, disparities in knowledge and norms, perspectives, and interests across organizations pose challenges in achieving cross-stage consistent value creation (Locatelli et al., 2020). These differences can result in misaligned decision-making, communication gaps, and conflicting priorities across project stages. For example, early-stage value propositions by project owners may misalign with execution-stage constraints faced by outsourced project managers (Mahdavian & Shojaei, 2020). The project owner's limited early involvement during project execution can lead to their future operational needs being

overlooked, potentially resulting in owner-manager tensions and compromising the long-term project value (Krystallis et al., 2024; Zhang et al., 2022). Moreover, the transition from execution to operation often intensifies tensions, as short-term cost constraints can undermine long-term operational efficiency (Nwajei et al., 2022). Adopting an integrative perspective on cross-boundary tensions is essential for deepening the understanding of project value creation complexities and developing more effective strategies for managing cross-organizational and cross-stage dynamics.

In summary, the project life-cycle value creation depends on cross-organizational, cross-stage cooperation between the project owner and its project manager. Examining organizational and temporal boundaries provides an appropriate lens to unpack how stakeholders experience the relevant tensions in value creation. Failure to systematically identify and incorporate these tensions within the PM process may give rise to cross-stage fragmentation, integration deficiencies, and skewed value creation (Y. Li et al., 2024a; Oonk et al., 2022).

3. Research Methodology

3.1 Research Design

3.1.1 Research Context

This study adopts social infrastructure projects in Jiangsu province, China, as its empirical context. Social infrastructure encompasses systems or institutions facilitating social development and public services, such as education, healthcare, culture, and public safety (Hussain et al., 2018). In social infrastructure, permanent project owners, such as government agencies or non-profit organizations, typically do not consider asset construction as part of their core business (Zhang et al., 2024). Instead, their core business is operating public hospitals and schools. In this empirical context, the project owner is responsible for defining requirements at the project front end and managing operations to ensure public service delivery, whereas day-to-day management during the execution stage is outsourced to an appointed project manager. Since 2018, a state-owned project management enterprise has consistently served as the owner's project manager for all local social infrastructure projects. Therefore, two permanent organizations—the project owner and the outsourced project manager—take turns leading project activities and creating value across different stages (Figure 1). The project owners and

the outsourced project manager face various tensions across both the organizational and temporal boundaries.

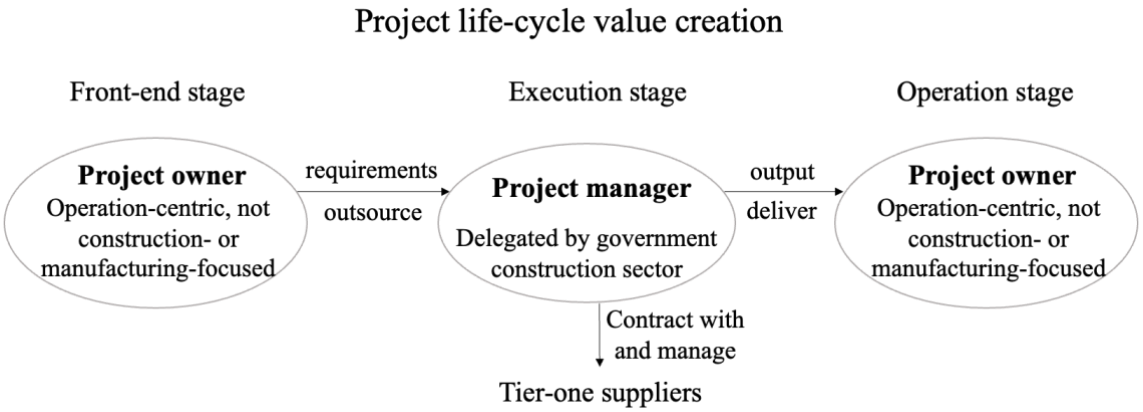

Figure 1. The project owner and project manager involved across project stages.

3.1.2 Q Methodology Research Design

Q methodology is a suitable approach for identifying tensions perceived by practitioners from the project owner and the project manager in their cross-organizational and cross-stage interactions. Q methodology is a mixed-method approach designed to uncover patterns in individual subjectivity (Brown, 1980). First, this methodology has proven effective in investigating various practitioners' subjective perceptions in an unbiased and systematic way in previous PM studies (e.g., Machiels et al., 2023; Silvius et al., 2017). It balances the statistical rigor of quantitative data (from Q sorts and factor analysis) with the depth of qualitative insights (gathered through participant explanations during the Q sorting exercise) (McKeown & Thomas, 2013). Second, it helps structure various tensions into a manageable number of groups without oversimplifying their complexity (Cantarelli et al., 2022; Machiels et al., 2023). Third, the Q methodology is particularly well-suited for exploring complex or controversial issues, such as tensions, due to its focus on participant-led subjectivities grounded in personal perspectives rather than predefined external metrics (Pan & Lei, 2023).

The three key steps of conducting Q methodology, as illustrated in Figure 2, include (1) developing a concourse and constructing a Q set, (2) collecting Q sorts with accompanying participant explanations, and (3) performing Q factor analysis and interpreting the factors (Lundberg et al., 2020). The final factor interpretation follows an abductive process since the authors draw on existing theoretical knowledge to derive meaningful insights (Brown, 1980).

While Q methodology is a powerful tool for capturing and comparing subjectivities, it is not without limitations. Its small sample size limits statistical generalizability, and factor interpretation can be shaped by researcher judgment. To mitigate these limitations, this research grounded the Q set in qualitative interview data and theoretical literature, piloted statements for clarity and neutrality, and also drew on participant explanations to support interpretive validity.

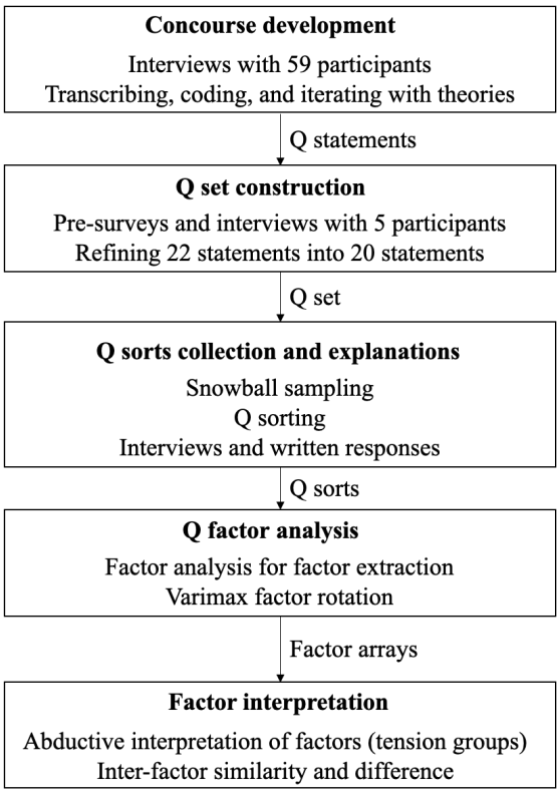

Figure 2. Research design.

3.2 Step 1: Interviews and Q Statements

The goal of developing a Q set is to select a set of Q statements that is representative, though not exhaustive, capturing key ideas, viewpoints, and feelings. Q statements could be developed from naturalistic sources (e.g., interviews or questionnaires) or ready-made sources (e.g., literature review) (McKeown & Thomas, 2013). These statements are not necessarily theory-driven, as Q methodology emphasizes the emergence of ideas over their theoretical constraint. Given the limited attention in existing research to owner–manager interactions across the project life cycle, this study developed its Q statements inductively based on qualitative data from interviews.

This study conducted initial semi-structured interviews with 59 participants (coded as #1 to #59) from 2017 to 2022, including individual and group formats, and covering both general and case-specific contexts. To capture diverse and nuanced perceptions, participants comprised frontline employees and middle managers from the project owners and managers, as well as government officers from multiple cities. The selection of these participants was based on the authors' social networks and the snowball sampling method. They were asked to respond to questions related to cross-boundary tensions, for example: "*What do you believe are the biggest barriers to interaction between project owners and project managers across organizations and stages in the process of achieving project objectives?*" Interviews continued until no new viewpoints or statements could be added to the Q set.

The interviews were conducted and transcribed in Mandarin with participants' consent. All data were coded and analyzed in the original language using NVivo software to preserve contextual meaning. Selected quotations were later translated into English by the researchers for reporting purposes. The coding process first concentrated on descriptions of conflicts or dilemmas between the project owner and the project manager. Recurring themes were considered representative and coded as first-order concepts. These were then iteratively compared with relevant literature on tension, paradox, and project management, and were linked to a series of theoretical dimensions. This forms the conceptual basis for tension types in this study.

Based on this conceptual structure, each representative tension was reformulated into a concise, neutral, and debatable statement suitable for Q sorting. A Q set comprising 22 statements—within the recommended range of 20 to 50 (Donner, 2001)—was ultimately developed. Furthermore, to account for potential interpretation differences between project owners and project managers, parallel statements were crafted with slight variations under the same theme. For example, under the theme "Involvement level of project owners," the statement for project managers reads: "Sometimes, excessive intervention by project owners can disrupt project managers' normal management of the project" while the version for project owners is: "More involvement from project owners is needed to ensure that their functional requirements for the project are better met".

To enhance the clarity and comprehensibility of statements, pilot Q-sort interviews were conducted with three practitioners from the project manager side and two from the project owner side between June and July 2023. The Q set was then adjusted to include 20 refined

statements based on participants' feedback (see Table 1). During the pilot process, interviews on 20 statements typically lasted 45–60 minutes and did not overburden participants. This enabled participants to reflect on their past experiences and provide thoughtful evaluations of the statements, thereby enhancing the study's reliability.

Table 1. Q statements.

Themes	Theoretical dimensions	Statements
Project front-end stage		
1. Cross-stage involvement of project managers	Cross-stage involvement tension	The project manager's late forward cross-stage engagement, typically post-feasibility approval, hinders early communication and detailed development due to the project owner's lack of experience in defining requirements, potentially leading to oversights.
2. Inconsistencies in the project procurement strategy	Cross-organizational information communication tension	Project managers prioritize Engineering, Procurement, and Construction models for streamlined on-site management, while project owners opt for parallel contracting to minimize management chains and introduce professional services.
3. Professional differences disrupting communication	Cross-organizational professional differences	It is challenging for project managers with project management knowledge to comprehend the use requirements proposed by project owners.
4. Persistent communication barriers from limited front-end information	Cross-stage information communication tension	Limited front-end information for project owners leads to an incomplete articulation of project functionalities to project managers, potentially resulting in modifications or additions during design and construction.
5. Outsourcing versus in-house	Empowerment tension in principal-agent relationship	Experienced project owners often maintain robust in-house project management teams and prefer active involvement in decision-making and specific management during projects, rather than relying solely on outsourced project managers.
6. Communication barriers from complex organizational procedure	Cross-organizational information communication tension	Collaboration between project owners and outsourced project managers demands regular cross-organizational communication. The complex internal procedures of project managers might somewhat impede project decision-making progress.
7. Ambiguous task interface	Cross-organizational accountability tension	Task assignment and implementation responsibilities, such as managing approval procedures, are unclear between project managers and project owners, two different organizations responsible for different stages.
Project execution stage		
8. Divergence in priority	Priority tension	Project managers prioritize the iron triangle and safety, while project owners prioritize meeting functional, operational, and customized requirements over the iron triangle. Divergent focuses may lead to differing opinions on project missions.
9. Inconsistent viewpoints on project changes	Priority tension	Changes in project requirements may lead to design modifications and increased investment, resulting in differing opinions between project owners and project managers.
10. Delegation versus control	Empowerment tension in principal-agent relationship	Project managers, delegated for daily management, are monitored by project owners that, despite being responsible for the operation stage, seek to oversee the construction process in advance to ensure smooth future operations.
11. Communication barriers from information asymmetry	Cross-organizational information communication tension	Project managers and owners lack an understanding of each other's information needs, leading owners to blame project managers for delays despite having limited knowledge of the project's status.

12. Involvement level of project owners	Cross-stage involvement tension	More cross-stage involvement from project owners is needed to ensure that their functional requirements for the project are better met. (Sometimes, excessive cross-stage intervention by project owners can disrupt project managers' normal management of the project.)
13. Protection of sensitive information	Cross-organizational information communication tension	Project managers' intra-organizational secrecy about sensitive information, like non-public tender details, makes it harder for project owners to grasp the project's true management status.
14. Increased control due to limited staffing and attention	Lack of competence and trust	(Project owners perceive that) the on-site project manager's staffing is insufficient, resulting in inadequate emphasis and control over the project.
15. Lack of accountability and motivation	Empowerment tension in principal-agent relationship	(Project owners see that) project managers show limited commitment, engaging in perfunctory management and lacking the drive for excellence in projects that they neither fund nor own.
16. Inadequate and unbalanced organizational competence	Lack of competence and trust	Limited on-site staffing hampers project managers' capacity for resource mobilization and optimal management. (Project owners' limited expertise in quality, schedule, and cost management may impact the project's overall progress and quality due to their occasional unreasonable suggestions.)
17. Exploration versus exploitation	Cross-organizational learning tension	Some project owners encourage explorative learning, while others prefer exploitative learning due to organizational culture. Project managers cautiously pursue innovation and prevent overruns, leading to inconsistent viewpoints between owners and managers.
Project operation stage		
18. Professional differences disrupting the operation	Cross-organizational professional differences	Project managers excel in standardized rather than customized project management. Project owners' operational staff are not involved in execution stage. These may promote proposed modifications or additions during operations.
19. Ambiguous maintenance-repair interface	Cross-organizational accountability tension	Maintenance and repair responsibilities are unclearly defined between project owners and project managers.
20. Response to repair	Cross-organizational accountability tension	Slow response and repair progress from the contractors may lead to dissatisfaction with project managers from project owners.

3.3 Step 2: Q Surveys

Participants were selected to form the P-set—Q methodology's term for the sample of individuals whose viewpoints are analyzed—based on their representativeness, comprehensiveness, and diversity (Eden et al., 2005). Five representative practitioners were selected from the initial interviewee pool. Subsequently, 15 additional practitioners with extensive project management experience were identified through snowball sampling. In total, 20 participants were selected, consistent with the suggestion of Brown (1980) that a sample of 20 to 40 individuals provides a solid basis for factor analysis in Q methodology. The final sample included 8 participants from project owner organizations and 12 from project manager organizations (see Table 2), covering diverse demographic and professional characteristics such as gender, age, educational background, work experience, domain expertise, and job position.

Table 2. Characteristic of the P set.

Characteristic		Numbers of participants
Gender	Man	14
	Woman	6
Age	20-30	3
	31-40	12
	41-50	3
	>50	2
Education	Undergraduate	12
	Postgraduate	8
Work experience (years)	3-5	2
	6-10	3
	11-15	8
	>16	7
Number of projects involved in	2-4	5
	5-7	6
	8-10	1
	>10	8
Professional background	Project owner	8
	Project manager	12
Position	Frontline project manager	12
	Middle manager	8

Between July and December 2023, 20 participants were invited to rank-order 20 Q statements, presented on cards, in a quasi-normal distribution (see Figure 3). The purpose of the ranking was to reflect participants' perceived importance of tensions in value creation, rather than simply to confirm their existence, since these tensions had already been identified in initial interviews. Some tensions considered important by participants may have been ranked lower as they made trade-offs within the constraints of the quasi-normal distribution. Specifically, 12 participants were interviewed during or after the Q sorting process. The remaining 8, who were

unable to attend interviews, provided written explanations detailing their perceptions and reasoning for each statement (Watts & Stenner, 2012). These explanations, structured around the 20 statements, were used to enrich the subsequent interpretation of factor arrays. In addition, insights from the initial interviews were incorporated to further support or expand the factor interpretation. Finally, completed Q-sort records were documented, and the data were analyzed using Ken-Q analysis software (available at Ken-Q at shawnbanasick.github.io) (Banasick, 2023).

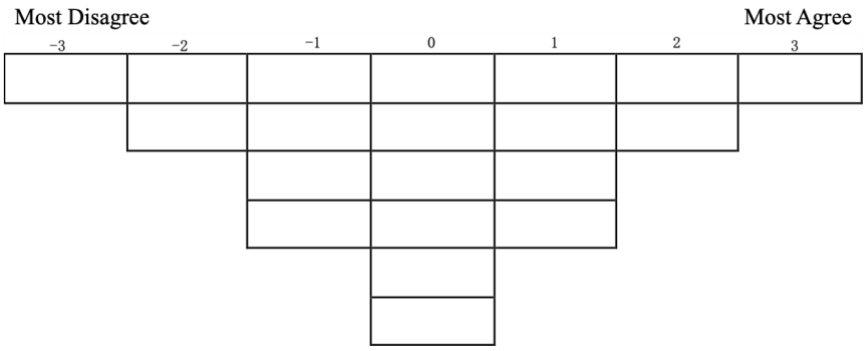

Figure 3. Sample score sheet.

3.4 Step 3: Q Factor Analysis

Using Ken-Q analysis software, factor analysis was conducted to reduce dimensionality and group participants' Q sorts into representative common factors (Brown, 1980). Following the Brown Centroid method for factor extraction, based on repeated practice, Watts and Stenner (2012) suggest that for a Q set containing between 19 and 24 statements, such as the 20-statement set used in this study, a four-factor solution is typically appropriate. Accordingly, a four-factor solution was retained. The four-factor solution explained 60% of the total variance, well above the 35-40% typically considered adequate (Kline, 2014), as detailed in Table 3.

Table 3. The factor-explained variance.

Participant	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalues	3.802	3.2217	2.9841	2.0914
Explained Variance	19%	16%	15%	10%
Cumulative Explained Variance	19%	35%	50%	60%

Subsequently, orthogonal factor rotation was conducted to derive independent and uncorrelated factors. This technique enables a re-examination of relationships between Q sorts from a different perspective, without altering their internal consistency (Watts & Stenner, 2012). Each

factor represents a group of viewpoints, internally coherent yet uncorrelated with the other factors. Accordingly, a varimax rotation was applied to facilitate factor interpretation (see Table 4). Significance was assessed using two criteria (Watts & Stenner, 2012): (1) a factor loading greater than 0.438, corresponding to $p < 0.05$ (calculated as $1.96/\sqrt{20}$); and (2) the squared loading on the target factor exceeding the sum of squared loadings on all other factors. Nineteen out of the twenty Q sorts loaded significantly onto one of the four identified factors. The exception was Q sort F2-7, which failed to meet the second criterion.

Table 4. The factor loadings after factor rotation.

Q sort	Factor Group	Factor 1a	Factor 1b	Factor 2	Factor 3a	Factor 3b	Factor 4
Owner2	F1-1	-0.8682	0.8682**	0.1996	-0.0648	0.0648	0.0989
Owner6	F1-2	0.7876**	-0.7876	0.0239	-0.0053	0.0053	0.2782
Manager12	F1-3	0.7099**	-0.7099	0.4291	0.1600	-0.1600	-0.1798
Owner5	F1-4	-0.6792	0.6792**	0.2830	-0.1577	0.1577	0.0859
Manager5	F1-5	0.6064**	-0.6064	0.2212	-0.3333	0.3333	-0.4162
Manager4	F2-1	0.0079	-0.0079	0.8325**	-0.2203	0.2203	0.2079
Owner7	F2-2	0.3999	-0.3999	0.6451**	0.4023	-0.4023	0.2359
Owner8	F2-3	-0.2487	0.2487	0.6182**	0.2241	-0.2241	-0.0949
Owner1	F2-4	0.3834	-0.3834	0.61**	-0.1626	0.1626	-0.2428
Manager3	F2-5	-0.1616	0.1616	0.589**	-0.0441	0.0441	0.1326
Owner4	F2-6	0.0742	-0.0742	0.5393*	0.1626	-0.1626	-0.2191
Manager2	F2-7	-0.1154	0.1154	0.4514	-0.3313	0.3313	0.3822
Owner3	F2-8	-0.0416	0.0416	0.4455*	-0.0916	0.0916	-0.2211
Manager7	F3-1	0.2034	-0.2034	0.1153	0.8612**	-0.8612	-0.0545
Manager11	F3-2	0.0168	-0.0168	0.1490	-0.8109	0.8109**	0.0083
Manager9	F3-3	0.0763	-0.0763	0.2720	0.8014**	-0.8014	0.1247
Manager6	F3-4	0.0860	-0.0860	0.1743	-0.5666	0.5666*	0.0503
Manager8	F4-1	-0.0253	0.0253	-0.0851	0.0216	-0.0216	0.8096**
Manager10	F4-2	0.3703	-0.3703	-0.2287	-0.3136	0.3136	0.6802**
Manager1	F4-3	-0.2898	0.2898	0.1227	0.1216	-0.1216	0.535*

Note: ** indicates significance at $P < 0.01$ level; * indicates significance at $P < 0.05$ level.

According to Brown (1980) and Watts and Stenner (2012), to ensure adequate reliability, eliminate specificity, and highlight commonality, factor estimates should ideally synthesize data from at least two Q sets. Therefore, the extraction of the four factors is methodologically reliable. Among the four, Factors 1 and 3 exhibited bipolar characteristics. Bipolar factors reflect two different yet interrelated viewpoints within a single factor (e.g., F1a vs. F1b), which may represent two equally positive and acceptable reactions to the same situation, or two highly effective adaptations to a complete system (Watts & Stenner, 2012).

4. Findings

This study identified four distinct factors, each representing a type of tension that negatively affects the cross-stage and cross-organizational value creation between project owners and project managers. Z-scores were calculated for each statement to construct the factor arrays, representing the composite viewpoint of participants defining each factor. The inter-factor correlations are all below 0.3, indicating satisfactory distinctiveness among the four factors. Table 5 presents each factor array in descending order of importance, ranking all 20 statements from the most important to the least important (e.g., statement #10 in F1a; statement #15 in F1a). Interpretation of each factor focuses on statements with relatively high or low rankings (indicated as "statement number, score"), and is further substantiated by the interview data and participants' written explanations.

Table 5. Sorting patterns of tension types for the factor arrays.

Factors	**Structural tension** Empowerment versus control		**Priority tension** Short-term versus long-term	**Communication tension** Convergence versus divergence		**Involvement tension** Assistance versus intervention
	Factor 1a	Factor 1b	Factor 2	Factor 3a	Factor 3b	Factor 4
Statements (from the most important to the least important)	10. Delegation versus control	14. Increased control due to limited staffing and attention	8. Divergence in priority	3. Professional differences disrupting communication	1. Cross-stage involvement of project managers	12. Involvement level of project owners
	5. Outsourcing versus in-house	16. Inadequate and unbalanced organizational competence	14. Increased control due to limited staffing and attention	4. Persistent communication barriers from limited front-end information	2. Inconsistencies in the project procurement strategy	20. Response to project repair
	11. Communication barriers from information asymmetry	15. Lack of accountability and motivation	9. Inconsistent viewpoints on project changes	11. Communication barriers from information asymmetry	18. Professional differences disrupting the operation	9. Inconsistent viewpoints on project changes
	6. Communication barriers from complex organizational procedure	9. Inconsistent viewpoints on project changes	16. Inadequate and unbalanced organizational competence	12. Involvement level of project owners	8. Divergence in priority	18. Professional differences disrupting the operation
	18. Professional differences disrupting the operation	1. Cross-stage involvement of project managers	6. Communication barriers from complex organizational procedure	6. Communication barriers from complex organizational procedure	10. Delegation versus control	16. Inadequate and unbalanced organizational competence
	20. Response to project repair	4. Persistent communication barriers from limited front-end information	10. Delegation versus control	5. Outsourcing versus in-house	7. Ambiguous task interface	8. Divergence in priority
	12. Involvement level of project owners	7. Ambiguous task interface	12. Involvement level of project owners	10. Delegation versus control	20. Response to project repair	1. Cross-stage involvement of project managers
	Note: Above this row, the level of agreement decreases from +3 to +1 from top to bottom; below this row, it increases from -3 to -1 from bottom to top.					
	8. Divergence in priority	12. Involvement level of project owners	4. Persistent communication barriers from	18. Professional differences	13. Protection of sensitive information	11. Communication barriers from

			limited front-end information	disrupting the operation		information asymmetry
	1. Cross-stage involvement of project managers	18. Professional differences disrupting the operation	13. Protection of sensitive information	13. Protection of sensitive information	17. Exploration versus exploitation	3. Professional differences disrupting communication
	19. Ambiguous maintenance-repair interface	13. Protection of sensitive information	2. Inconsistencies in the project procurement strategy	19. Ambiguous maintenance-repair interface	16. Inadequate and unbalanced organizational competence	13. Protection of sensitive information
	2. Inconsistencies in the project procurement strategy	17. Exploration versus exploitation	19. Ambiguous maintenance-repair interface	20. Response to project repair	12. Involvement level of project owners	5. Outsourcing versus in-house
	3. Professional differences disrupting communication	6. Communication barriers from complex organizational procedure	17. Exploration versus exploitation	7. Ambiguous task interface	11. Communication barriers from information asymmetry	10. Delegation versus control
	16. Inadequate and unbalanced organizational competence	5. Outsourcing versus in-house	1. Cross-stage involvement of project managers	1. Cross-stage involvement of project managers	4. Persistent communication barriers from limited front-end information	15. Lack of accountability and motivation
	15. Lack of accountability and motivation	10. Delegation versus control	3. Professional differences disrupting communication	2. Inconsistencies in the project procurement strategy	3. Professional differences disrupting communication	14. Increased control due to limited staffing and attention

4.1 Structural Tension Between Empowerment versus Control

Factor 1 accounts for 19% of the variance, with three participants (Owner 6, Manager 5, Manager 12) loading on Factor 1a and two (Owner 2, Owner 5) on Factor 1b.

In Factor 1a, empowerment versus control (10: +3) emerges as the core tension impeding cross-boundary value creation. This tension stems from project owners' efforts to maintain oversight across stages, often clashing with the autonomy of outsourced project managers. For example, Manager 5 observed, "*Project owners …have not completely shifted their mindset and still desire full control over all aspects*." Owner 6 similarly noted, "*As the owner, we hope to closely oversee the project to ensure its quality and usability. However, our decisions will inevitably impact project managers.*" An example from Interviewee # 51 illustrated this dynamics: "*Although we suggested selecting a general contractor, the project owner's final decision to involve multiple professional subcontractors complicated communication, delayed the schedule, and increased management costs.*" In this case, a fragmented control strategy aimed at improving technical quality inadvertently led to schedule delays and cost overruns, undermining balanced value creation.

A related tension between in-house management and outsourcing (5: +2)—reflecting the divide between retaining control within the project owner's boundary or delegating it externally—intensifies when project owners resist relinquishing decision-making authority. Project owners which historically managed projects internally now face uncertainty and fear loss of influence when authority shifts to outsourced project managers. Respondent #1 from the initial interview observed, "*Owners who previously managed projects in-house fear redundancy as outsourced project managers take over.*" The downsizing of Owner 6's internal PM team from 40 to 13 exemplifies this trend, which in turn reinforces owners' reluctance to cede control. This control orientation is compounded by cross-organizational communication barriers (11: +2, 6: +1), making collaboration more difficult.

Factor 1b, however, presents a contrasting perspective: tensions arise not from excessive owner control but from perceived deficiencies in the project managers' limited capabilities. Key concerns include staffing, attention, commitment, and organizational competence (14: +3, 15: +2, 16: +2). Owner 5 commented, "*This lack of trust in the project managers' capabilities forces us to exert control.*" Here, empowerment versus control (10: -3) and outsourcing versus in-house (5: -2) are not central tensions, but rather downstream effects of foundational distrust. Owner 2 pointed out that "*In certain cases, project owners, whose staff were involved in a project and then remained idle for years before the next one, tend to delegate work duties and risks to outsourced project managers*." Although this delegation might appear to represent empowerment, it often results in reactive and increased oversight once performance issues emerge. This paradox—initial delegation followed by reactive control—demonstrates how tensions evolve dynamically over time rather than remaining static.

In sum, Factor 1 indicates that tensions mainly arise from cross-organizational empowerment issues (i.e., empowerment *versus* control, or in-house versus outsourcing) and distrust issues (distrust in the project managers' competence, staffing, attention, commitment, and motivation). Although practitioners may differ in ranking these two tension groups, both ultimately reflect a struggle over how much empowerment should be granted. Factor 1 is thus labeled "Structural tension between empowerment versus control". Accountability avoidance reinforces owners' authority over project managers, while distrust in project managers' ability increases control. Regardless of which pole of the tension dominates, one organization may capture more value at the expense of the other.

4.2 Priority Tension Between Short-term versus Long-term

Factor 2 accounts for 16% of the explained variance and is defined by a group of participants that includes both owners (Owner 1, 3, 4, 7, 8) and project managers (Manager 3, 4).

In this factor, prioritizing different temporal objectives is regarded as the most influential cross-organizational tension (8: +3) affecting value creation. Project owners prioritize long-term value creation for better operation, followed by budget control and timely handover. In contrast, project managers emphasize short-term value creation during the execution stage, including budget and schedule adherence, quality assurance, and safety. These differing priorities are shaped by their unbalanced competency advantages (16: +1). Furthermore, their respective value creation responsibilities—owners' operational duties and project managers' short-term iron triangle obligations—are further constrained by government and public oversight.

This misalignment in priorities manifests in conflicts over handover timing and functional requirements, which represent different dimensions of project value. Manager 3 explained, "*Usually, in school and hospital projects, project owners push for early handovers (for early use) and functional priorities without considering actual* progress, *requiring us to work unpaid overtime*". However, when project changes affecting functional aspects arise, Owner 3 highlighted: "*While project managers focus on budget and standard procedures, we prioritize usability and are willing to extend timelines. This leads to conflicts at every project stage.*" As a result, tensions shift depending on the situation—between early handover for operation and minimizing short-term project burdens, or between achieving enhanced functionalities and adhering to strict cost and schedule constraints.

At its core, the tension between short-term and long-term priorities is often triggered by project changes (9: +2). Manager 4 noted, "*Changes affecting multiple disciplines are time-consuming, and we try to avoid them*." Conversely, Owner 1 advocated for necessary adjustments, stating, "*New standards during construction might require modifications to ensure optimal project outcomes, even if it means delaying the timeline or undertaking dismantling and rebuilding.*" Thus, trade-offs will inevitably create imbalances between short-term and long-term priorities.

This tension, on the one hand, is further complicated by traditional budgeting methods. As respondent #53 in the initial interviews observed, "*The traditional method of starting with a low budget and later requesting more funds during construction often results in continuous feature additions or changes. Project managers typically deny these if they exceed budget*

estimates, unless owners take on the burden of navigating complex budget adjustment processes." On the other hand, several interviewees (including #52 and #58 in the initial interviews) attributed this tension to inaccurate budget estimates proposed by project owners during the front-end stage, often without sufficient involvement from project managers (1: +1).

In summary, Factor 2 reveals that cross-stage priority divergence is a key source of tension between project owners and project managers. Project managers, benefiting from delivering project outputs during the execution, focus on the project's short-term value. In contrast, project owners, benefiting from providing public services through project outputs during the operation, prioritize long-term value. Factor 2 is thus labeled "Priority tension between short-term versus long-term". Such tension can be traced back to an unreasonable approval process and insufficient cross-stage involvement at the front end, further exacerbated by project changes and trade-offs that result in imbalanced value creation.

4.3 Communication Tension Between Convergence versus Divergence

Factor 3 explains 15% of the study's variance and is significantly associated with four participants: Manager 7 and Manager 9 under Factor 3a, and Manager 11 and Manager 6 under Factor 3b.

Factor 3a highlights that cross-professional communication difficulties at the project front end (3: +3) significantly hinder project managers from accurately understanding project owners' requirements, ultimately obstructing value creation. The root cause lies in the misalignment between project managers' PM expertise and project owners' operational needs. Manager 7 commented, "*Poor front-end communication between project managers' PM teams and project owners' operational teams impedes our understanding of the project's value from owners' perspectives*." This communication gap is further reinforced by the complexity of each organization's internal procedures, impeding efficient communication and convergence (6: +1). Manager 7 highlighted, "*Not only do we, the project managers, face complex decision-making processes for project changes, but project owners also encounter intricate procedures to define project functions and requirements… (all of which) complicate communication.*"

These cross-organizational communication barriers could persist from the project front end to the execution stages, especially when owners lack sufficient PM knowledge, relevant project information, or a clear articulation of requirements (4: +2). The challenge becomes even more pronounced as professional knowledge gaps and information asymmetry between

organizations deepen during the execution stage (11: +2). A lack of proactive knowledge-sharing mechanisms further exacerbates these tensions. In contrast, contributors in Factor 3b, who downplay these tensions (3: -3; 11: -2; 4: -2), do not necessarily deny their existence but instead attribute the communication failures to project owners rather than project managers. As Manager 6 explained, "*Our professionalism as project managers extends beyond project management itself…The problem is that project owners are not conducting thorough front-end investigations*…" Thus, the cross-stage continuity of value creation increases the likelihood of one organization tracing problems back to the faults of the other.

Furthermore, Factor 3b reveals that inadequate cross-professional and cross-stage coordination results in insufficient information and resource exchange, causing deficiencies in functionalities during the operation stage (18: +2). Manager 11 stated, "*Operational teams from project owners lack involvement in the construction process, often requesting changes or additional functions during handover based on operational needs*." This cross-boundary divergence strains delivery timelines and budgets, and causes disputes over scope and responsibility, ultimately impairing value creation. Additionally, Factor 3b accentuates that communication barriers will arise without project managers' early cross-stage involvement at the front-end stage, underscoring its importance (1: +3).

In conclusion, despite variations in their rankings, Factors 3a and 3b consistently show that the main owner-manager communication tensions arise from the challenge of converging divergent professional backgrounds and varying information. These tensions manifest at different project stages and create cascading cross-stage effects from the project front end to execution and operation. The absence of structured coordination mechanisms and proactive knowledge-sharing further compounds these tensions, ultimately leading to multi-dimensional value deficiencies. Therefore, Factor 3 is labeled "Communication tension between convergence versus divergence".

4.4 Involvement Tension Between Assistance versus Intervention

Factor 4 explains 10% of the research variance, contributed by three participants, including Manager 8, Manager 10, and Manager 1.

Project owners, responsible for front end and operations, often extend their influence into the execution stage—typically managed by project managers—thereby creating tensions that hinder value creation (12: +3). The underlying issue is not simply about project owners'

involvement but rather the mismatch between their competencies and the nature of their intervention. Manager 8 stated, "*Project owners sometimes intervene too much, adversely affecting PM."* Manager 10 added, *"Project owners, typically less skilled in PM, should defer to the specialized advice of project managers*." Therefore, when project owners lack PM skills (16: +1) but involve themselves in the execution stage, it leads to tensions between assistance and intervention, often perceived as overstepping the boundaries of their authority. This tension manifests particularly during project changes (9: +2), where project managers require autonomy to adapt while owners seek involvement to minimize uncertainties.

This over-intervention is further evidenced in contributors' disagreement with attributing blame to project managers for limited staffing, lack of attention, poor commitment, and insufficient motivation to value creation (14: -3, 15: -2). Manager 8 emphatically stated, "*The problem lies not with the project managers but with the owners. Project managers face significant responsibility and pressure, and the lack of commitment and motivation does not exist… Conversely, project owners generally avoid key decisions to shirk accountability, while informally stating unreasonable demands and blaming project managers for insufficient capabilities*." This shows that project owners, rather than supporting project managers with structured assistance, may resort to ad-hoc interventions that disrupt workflow and blur decision-making responsibilities. As a result, while owners prioritize safeguarding their expected project benefits, project managers face increased management costs and diminished ability to create project value.

In summary, Factor 4, supported by three contributors from project managers, suggests that tensions stem more from project owners' excessive cross-stage involvement and competence deficiencies, rather than from the project managers' limited staffing, commitment, or motivation. Therefore, Factor 4 is labeled "Involvement tension between assistance versus intervention". Although providing assistance alone may lead to concerns about owners' diminishing control over project value, excessive intervention can further erode project managers' ability to deliver project value.

4.5 Inter-factor Similarity and Difference

This study compares viewpoints across four factors, highlighting that "17. Exploration versus exploitation" is deemed unimportant to project value creation, typically scoring between -2 and 0. Participants, like Managers 8 and 10, noted that most project owners show limited interest

in innovative materials and technologies, supporting them only when funding allows for enhanced quality and efficiency. Similarly, project managers prefer mature technologies due to risk aversion, leading both parties to easily agree on exploitation or incremental innovation.

Furthermore, there is a low consensus among the four factors regarding the empowerment-control tension, much lower than for other statements. Factors 1b and 4 rated it as -3 and -2, respectively, while Factor 1a rated it as +3. When project owners avoid accountability and risk (in Factors 1b and 4), the empowerment-control tension is seen as insignificant by both organizations. Conversely, when owners seek to exert control (in Factor 1a), project managers find this tension important. Interestingly, in contrast to project owners' high expectations for project managers' commitment, project managers prefer that owners assume less responsibility to ensure they are sufficiently empowered.

Besides, there is considerable inconsistency among the factors regarding the issue of "14. Increased control due to limited staffing and attention" of project managers. Notably, Factor 4, contributed by three project manager participants, suggests that this problem is not significant. However, in Factors 1b and 2, contributed by seven project owners and two project managers, it is acknowledged that the current shortage of personnel and attention of project managers exists and leads to negative value creation. This distinctly highlights the tension between the perceptions of project owners and project managers.

5. Discussion

This study applied Q methodology to identify four distinct dimensions of cross-boundary tensions in value creation, i.e., priority tension between short-term versus long-term, structural tension between empowerment versus control, involvement tension between assistance versus intervention, and communication tension between convergence versus divergence. These findings offer a new lens to understand project value creation, complementing the prevailing emphasis on collaboration-led or joint value creation (Toukola et al., 2023).

First, project owners are oriented towards long-term value creation, while project managers focus on achieving short-term objectives. This temporal priority tension leads to trade-offs, for example, between early handover for operation versus minimizing immediate efforts, or between achieving enhanced functionalities versus adhering to short-term cost and schedule constraints. Failure to integrate both poles will result in value creation being confined to a

single stage, rather than unfolding across multiple project stages. These observations in social infrastructure projects align with Iivari (2021), who documented similar value tensions in agile software development projects, such as those between development time and effort, quality and quantity, and efficiency and innovation.

Second, findings indicate that project managers' cross-stage involvement at project owner-led front-end and operation stages—particularly in activities like requirements elicitation and defect repair—positively contributes to value creation. This is consistent with prior studies about the transition (Whyte & Nussbaum, 2020). Conversely, project owners' cross-stage involvement at the execution stage, whether as assistance or intervention towards project managers, is contentious. This difference may stem from project owners' superior power positions and more decision-making rights when two organizations are both involved in projects. Limited to providing assistance, owners may be unable to exercise adequate oversight, potentially jeopardizing their expected value outcomes. Conversely, excessive intervention can undermine the value that project managers believe they are delivering. As a result, balancing multi-subjective value creation becomes increasingly challenging in their cross-stage interactions.

Third, project managers' involvement at the project execution stage is significantly influenced by the degree of empowerment and control exercised by project owners. This tension becomes salient under two conditions: (1) project managers' insufficient competence, attention, motivation, and commitment, and (2) project owners' overactive willingness to involve themselves. Project owners hold negative expectations regarding the project manager's conduct and consequently limit their empowerment (Vlaar et al., 2007). This structural tension is often accompanied by a cross-organizational imbalance between rights and responsibilities. A dilemma arises as both organizations strive for greater rights over value creation while simultaneously deflecting accountability for imbalances in multi-dimensional value creation.

Lastly, the cross-temporal boundary impedes cross-organizational communication by decreasing opportunities for cross-stage engagement and restricting communication when one organization participates in a stage outside its primary responsibility. For example, restricted contact with the operational team of project owners intensifies cross-professional communication barriers and information asymmetry for project managers. This misalignment—emerging from the front end through to execution—can disrupt operational performance and diminish overall project value. Previous studies have widely documented

these cross-organizational asymmetries or disparities (Stjerne et al., 2019), and this study further reveals how they are intensified by cross-stage differences.

Several of the four identified dimensions of tension, if not most, have been individually recognized in PM literature (DeFillippi & Sydow, 2016; Iivari, 2021; Pinto, 2019; Wiewiora & Desouza, 2022). For example, tensions between short-term and long-term priorities, as well as empowerment versus control, are frequently observed in client-vendor relationships, such as those between owners and contractors (Bresnen et al., 2004; DeFillippi & Sydow, 2016; Y. Li et al., 2024b). In contrast, this study advances the field in two key ways.

On the one hand, within the value creation context, it examines how these tensions emerge, are perceived, and impact project value under the compounded influence of cross-organizational and cross-temporal interactions. This, in turn, complements prior research that mainly focuses on tensions across organizational boundaries (Machiels et al., 2023; Nicholls & Huybrechts, 2016; Smith, 2016). This study reveals that tensions arise from the interplay of multiple factors, including information asymmetry, power imbalances, cross-stage involvement, and shifting priorities across project stages. These tensions disrupt the balance of multi-subjective, multi-dimensional, and multi-stage value creation. In doing so, this study provides a more nuanced understanding of the challenges faced by project owners and outsourced project managers in achieving sustained value creation.

On the other hand, this research addresses the theoretical gap concerning how different stakeholders subjectively perceive and interpret tensions related to project value creation. It reveals that these cross-boundary tensions in value creation are inherently shaped by divergent organizational perceptions, further complicating their mitigation. Among the four identified factors, two are unipolar (Factors 2 and 4), while the other two are bipolar (Factors 1 and 3). The inherent dichotomy within the bipolar factors highlights perceptions at opposite extremes, reinforcing the contradictory nature of these tensions. This revelation of conflicting sensemaking processes differs from the traditional focus on unipolar interpretations of tensions in PM research (Cantarelli et al., 2022; Machiels et al., 2023).

A clear example of such contradictory perceptions is that project managers attribute their cross-stage interaction challenges to limited empowerment, whereas owners attribute them to project managers' insufficient capabilities. Conversely, project managers attribute owners' cross-stage interaction challenges to the owners' limited capabilities, while owners attribute these tensions

to project managers' unwillingness to accommodate their involvement. This reciprocal attribution shapes each organization's perceptions, interpretations, and responses to cross-boundary tensions. By highlighting these polarized perceptions in the context of value creation, this research deepens our understanding of value-related conflicts (Stefan et al., 2021) and complements existing action-based tension studies (DeFillippi & Sydow, 2016; Iivari, 2021; Pinto, 2019; Wiewiora & Desouza, 2022).

6. Implications for Research and Practice

6.1 Theoretical Implications

The investigation of four identified tension dimensions could contribute to project value creation by combining the viewpoints of both the project owner and the project manager. Previous studies have typically examined value creation as being led by project owners (Andersen, 2012) or executed by project managers (Sabini & Alderman, 2021). This study unveils novel insights into joint value creation by examining cross-organizational, cross-temporal interactions between project owners and managers. This responds to recent calls for studies on owner-manager cooperation (Meredith & Zwikael, 2020). At the same time, this study enriches PM tension research by examining divergent stakeholder perceptions on tensions, thus extending beyond the traditional focus on action-based studies.

Furthermore, this study introduces the temporal boundary from a timeline-based perspective, differing from the organization's temporal structure perspective (Söderberg, 2020). It emphasizes bidirectional interactions across sequential stages, illustrating how project managers extend support upstream to shape the value proposition and downstream to ensure continuity in operations. It also highlights the controversy surrounding project owners' cross-stage involvement at the execution stage.

Third, this study provides a nuanced depiction of how organizational and temporal boundaries interact and constrain cross-organizational cooperation. These constraints arise from differences in organizational priorities, barriers to cross-stage empowerment and involvement, and divergence in cross-organizational communication. This cross-boundary tension perspective broadens the scope of existing tension research by moving beyond previous emphases on tensions between transactional-based organizations (DeFillippi & Sydow, 2016;

Wiewiora & Desouza, 2022) and between temporary and permanent organizations (Geraldi et al., 2020).

6.2 Managerial Implications

This study practically demonstrates how cross-stage temporal misalignments—such as shifts in priorities, contact constraints, and overlaps or gaps in accountability across project stages—exacerbate cross-organizational tensions.

To mitigate priority and communication tensions, project owners can involve project managers in the project front-end, facilitating communication of requirements to ensure their value propositions are captured. At the same time, project managers can leverage insights from past projects to align project management expertise with owners' operational needs. Along with the proactive and transparent knowledge-sharing mechanisms during the execution stage, both organizations could better integrate cross-organizational differences in priorities, professional knowledge, information asymmetry, and organizational procedures.

The involvement tension—balancing assistance and intervention—underscores the need for owners' comprehensive capabilities and structured cross-stage mentorship mechanisms. For example, owners could integrate both project management and operations management professionals into their project teams and establish a structured milestone management approach. This would help maintain strategic oversight while avoiding arbitrary intervention in daily PM.

Structural tensions, particularly those arising from insufficient competence, motivation, and commitment among project managers, highlight the necessity of strengthening managerial capabilities. This can be achieved by adopting flexible organizational structures for dynamic resource allocation and adequate staffing, introducing project-based incentives to sustain motivation and accountability, and fostering a culture of ownership and responsibility, where employees commit to project outcomes while respecting the owner's strategic involvement. Otherwise, project owners' distrust may increase, leading to reduced empowerment, reputational risks, and jeopardized long-term collaborations.

7. Conclusions

Through this research, we elucidate novel contributions to project value creation by examining it through the perspective of cross-boundary tensions. Utilizing a Q survey with practitioners from both project owners and outsourced project managers in social infrastructure projects, our findings reveal that tensions arise from the interplay of cross-organizational and cross-temporal interactions. In addressing our research question, we identify four key dimensions of tension: structural tension between empowerment versus control, priority tension between short-term versus long-term, communication tension between convergence versus divergence, and involvement tension between assistance versus intervention.

This study presents certain limitations. The application of factor analysis in Q methodology accentuates uncorrelated factor extraction. This restricts the exploration of the interrelationship between different tension dimensions. Insight into such interdependencies is likely to significantly enhance our comprehension of interactions across the temporal and organizational boundaries. Future research could thus investigate the dynamic development of these tensions over the project life cycle, such as becoming salient, intensified, or mitigated under specific conditions.

Furthermore, this research primarily identifies and delineates various tensions. While it highlights practices that provide temporary relief from tensions, developing comprehensive strategies to systematically address these tensions remains future research. For example, how do transition strategies—such as transition rituals and boundary objects—and life-cycle system integration mechanisms—like boundary spanner, shared identity, and technology—address these tensions?

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