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Creating value in infrastructure procurement: a practice-based view

Kirsi Lindfors and Aki Jääskeläinen
Unit of Industrial Engineering and Management, Tampere University, Tampere, Finland, and

Iryna Malacina
Business School, LUT University, Lappeenranta, Finland

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Abstract

Purpose – Public procurement in infrastructure has acute economic, social and environmental impacts. When purchasing and supply management (PSM) practices are understood holistically and implemented effectively, they hold great potential for creating value. This study aims to examine how PSM practices adopted by buyers contribute to multidimensional value creation.

Design/methodology/approach – Using informant data from 20 semi-structured interviews, public buyer and supplier perspectives are incorporated to provide a detailed overview of adopted PSM practices and their links to value creation.

Findings – The in-depth empirical analysis of PSM practice-value connections from a buyer organization perspective expands the fragmented knowledge on individual PSM practices in infrastructure focused on project-level success. Current practices are primarily aimed at improving procurement process effectiveness; the role of these practices in promoting innovation is also acknowledged.

Social implications – The empirical analysis highlights the importance of sharing and harmonizing PSM practices between buyer organizations. This key takeaway encourages buyer organizations, suppliers and policymakers to consider and evaluate the identified practice-value links, enabling improvements in activities, expectations and preconditions for value creation through infrastructure procurement.

Originality/value – Existing infrastructure procurement research emphasizes project-level perspectives but often overlooks enduring PSM practices. To the best of the authors' knowledge, this study is one of the first empirical investigations into value creation through PSM practice adoption in public procurement, advancing practice-based view theory. The findings indicate that PSM practices add organizational value and possess the potential to drive societal benefits, extending impacts beyond the immediate organizational context.

Keywords Public procurement, Price-to-value transformation, Public value, Infrastructure sector, Practice-based view

Paper type Research paper

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1. Introduction

Public procurement plays an integral role in various sectors, especially in health, defense and infrastructure (Georghiou *et al.*, 2014). Remarkably, the infrastructure sector has shown steady growth, even amid the disruptions caused by the COVID-19 pandemic, with an anticipated annual growth rate exceeding 4% between 2021 and 2025 (GlobalData, 2021). Beyond its financial significance, infrastructure increasingly shapes social and ecological outcomes (Organisation for Economic Co-operation and Development, 2019a). Research and policy analyses of infrastructure-specific procurement have highlighted challenges such as prolonged cycles (Soomro and Zhang, 2016; South *et al.*, 2018), increased complexity due to intricate supply networks (Eriksson *et al.*, 2017; Eriksson *et al.*, 2023; Matinheikki *et al.*, 2021) boundaries across procurement ecosystem levels (Liljeroos-Cork and Laitinen, 2024) and a shortage of skilled professionals (Asiedu and Ameyaw, 2021). However, a detailed understanding of the value creation of purchasing and supply management (PSM) activities by public infrastructure buyer organizations seems lacking to date.

Unlike previous procurement research, we aim to study public procurement in infrastructure by shifting the focus to the public buyer organization, which is central to infrastructure projects. Therefore, the primary goal of this study is to answer the following research question: *How do PSM practices adopted by buyers of public infrastructure impact value creation?*

By posing this question, we seek to understand how incorporating specific PSM practices enhances various value benefits. We refer to these benefits as "value components," following Malacina *et al.*'s (2022) classification for public buyer value components, such as procurement process effectiveness and sustainability.

To explore the relationship between practices and these value components effectively, we use the theoretical lens of the practice-based view ([PBV] Bromiley and Rau, 2014, 2016) and its extension—the supply chain practice view ([SCPV] Carter *et al.*, 2017). The PBV defines "practice" as "an activity or set of activities that a variety of firms might execute" (Bromiley and Rau, 2014, p. 1249) and suggests that differences in organizational performance can be explained by the practices they adopt. Our focus is detailed, seeking to understand the various ways in which internal and external PSM practices, described in studies by Zimmermann and Foerstl (2014) and Jääskeläinen and Heikkilä (2019), contribute to value creation in public organizations. PSM practices are internally and externally oriented strategic and operational activities implemented by public buyers to ensure the successful procurement of goods and services to meet organizational objectives and needs. While the value implications of PSM practices can be both positive and negative, this study primarily focuses on their role in value creation rather than value destruction, while acknowledging both potential outcomes. From the PBV perspective, practices are designed to enhance performance. Any negative effects typically stem from the absence or ineffective implementation of such practices, rather than the practices themselves. This makes value creation the natural primary focus of this study.

We view value as a multidimensional phenomenon, building on Meynhardt (2015) and Malacina *et al.* (2022), who propose that public procurement should aim to realize societal benefits beyond mere monetary gains. This approach includes aspects such as procurement process improvement, quality and availability of products/services, a well-functioning supplier market, environmental and social sustainability (e.g. reducing social inequality, enhancing employee safety and working conditions) and fostering innovation. Achieving multidimensional value appears to require transformative shifts in public procurement practices. The inherent complexity of public organizations, observed in a variety of public management research, amplifies this challenge. In this study, public buyer is defined as an

organization funded by the government or other forms of public funding which it uses to procure products or services. In the infrastructure context, a public buyer may procure infrastructure projects, including roads, bridges, public transportation systems or related essential services.

To address our research question, we conducted an interview study aimed at gaining a deeper understanding of PSM practices and their perceived contribution to value creation. Our primary data comprises 20 interviews, encompassing perspectives from both public buyers and suppliers on the research questions under investigation. This diverse collection of insights allowed us to explore public buyer value-creation processes in detail, integrating views on various PSM practices and their relationship to value creation.

The study is conducted in the context of infrastructure public procurement in Finland, a region characterized by a strong commitment to sustainability and innovation in procurement, driven by a substantial national procurement volume of 47bn EUR (Berg *et al.*, 2022). In Finland, government expenditure accounts for a share of gross domestic product (GDP) higher than in most OECD countries (Organisation for Economic Co-operation and Development, 2019b). Infrastructure in Finland is exclusively procured by the central government or municipalities and is publicly funded (Spohr *et al.*, 2022). Despite Finland's progressive stance on developing better value through public procurement, barriers such as a lack of strategic management, prevailing traditional procurement cultures that prioritize short-term gains and limited market dialogue remain, particularly within municipalities (Alhola *et al.*, 2017). Based on above-described characteristics, we consider Finland as an appropriate context for the research of the value benefits of public procurement.

Our findings provide detailed insight into PSM practices and their value implications in infrastructure procurement, making multiple contributions to the existing literature. *First*, the study presents an in-depth empirical investigation of value-creating practices in public procurement organizations. As a result, we further extend the understanding of the application of the PBV, specifically in the context of public procurement. *Second*, this research is the first study to elaborate and apply the multidimensional conceptual value framework developed in previous research (Malacina *et al.*, 2022) in the context of infrastructure procurement. *Finally*, this study adopts a public buyer-supplier perspective to understand the mutual influence and interdependence between value-creation practices from different actors' viewpoints. This addresses the need for a detailed multi-perspective understanding of value creation from both buyer and supplier standpoints. More importantly, the study offers practical and policy implications by providing actionable insights for practitioners in the field of public procurement, thus bridging the gap between theory and practice.

2. Literature review

2.1 Practice-based view

The PBV is a theoretical perspective that examines the impact of various organizational practices on overall organizational performance. Originating from the works of Bromiley and Rau (2014, 2016), this approach posits that differences in the adoption of specific but broadly available practices or activities can account for performance differences among organizations. PBV suggests that managers often fail to implement all potentially advantageous practices due to bounded rationality (Simon, 1990). As a theoretical lens, PBV offers valuable insights into improving organizational performance. It suggests that the key to enhanced outcomes may lie in the thoughtful selection and adoption of practices that are publicly known, easily imitated and transferrable across organizations (Bromiley and Rau, 2014).

The PBV primarily emphasizes practices used by organizations internally. Yet, in the field of supply chain research and operations, such practices frequently transcend individual firm boundaries, encompassing supply chain partners. Recognizing this, Carter *et al.* (2017) extended the PBV into the supply chain practice view (SCPV). This extended perspective emphasizes an inter-organizational level of analysis, focusing on supply network stakeholders. While it broadens the scope, SCPV maintains its focus on practices that explain performance differences between organizations (Carter *et al.*, 2017).

2.2 Infrastructure procurement and purchasing and supply management practices

Many existing studies on public procurement concentrate on broad procurement strategies and general policies, which may not be directly applicable to infrastructure procurement, a field characterized by high complexity (Eriksson *et al.*, 2017; Eriksson *et al.*, 2023; Matinheikki *et al.*, 2021), time pressures (Iimi, 2020), limited repetition opportunities (Larsson *et al.*, 2014), long life cycles (Soomro and Zhang, 2016; South *et al.*, 2018) and other challenges faced by procurement professionals. Additionally, although extensive research on infrastructure sector operations exists, it often adopts a project-level analysis (e.g. South *et al.*, 2018; Eriksson *et al.*, 2017; Basso and Ross, 2018). This approach, while valuable, may be insufficient to fully address the critical role that procurement, as an organizational function or activity, plays in the successful execution of infrastructure projects involving various supply partners. This study shifts the focus to the public buyer, rather than individual projects, to explore infrastructure procurement as a distinct function essential for executing a wide range of long-term infrastructure initiatives that last longer than individual projects.

PSM practices have been previously conceptualized based on private sector literature by Zimmermann and Foerstl (2014). Building on the work of Day and Lichtenstein (2006), the authors categorize PSM practices into two major categories: *internal* practices, which predominantly occur within firm boundaries, and *external* practices, which target supply partners. Zimmermann and Foerstl (2014) further divide internal practices into four distinct subtypes: vertically aligned PSM practices, which focus on aligning the purchasing strategy with the broader organizational strategy; PSM-specific practices, which are concentrated solely within the PSM function; cross-functional practices, which integrate the PSM function with other organizational functions; and enabling practices that foster PSM capability development. Similarly, Zimmermann and Foerstl (2014) identify two distinct types of external PSM practices: relational PSM practices, involving collaboration and resource-sharing among multiple supply chain actors to achieve a common goal; and non-relational PSM practices, where resource deployment and decision-making are confined to the buyer, independent of contributions from other supply actors.

This PSM categorization is relevant for infrastructure procurement, which requires not only internally oriented purchasing practices but also strategies that foster relationships with a diverse array of project partners united by the shared goal of infrastructure development. Prior empirical infrastructure procurement research, while fragmented, identifies some of these PSM practice types (Appendix 1). However, most of the presented studies do not explicitly connect the practices to specific value benefits.

Existing research on PSM practices in infrastructure projects largely focuses on contractual and tendering activities, i.e. practices within the public buyer organization. Given the complexity of infrastructure procurement, contracts must be tailored to each project's unique characteristics (Regan *et al.*, 2015). For example, specific supplier selection practices in infrastructure help maintain competitive environments (Estache and Iimi, 2008) and mitigate collusion (Signor *et al.*, 2021). While these routine administrative tasks are essential

for day-to-day purchasing operations, they are not necessarily designed to develop the procurement function and its wider value-creation potential.

Enabling practices oriented toward developing procurement capabilities within the public buyer remain underrepresented in the existing infrastructure literature. For instance, research addressing enabling PSM practices rarely focus on the individual level (apart from a study by Asiedu and Ameyaw (2021) on individual skills); instead, they typically address strategic practices, for example, those related to effective finance allocation (South *et al.*, 2018). Similarly, literature exploring the impact of cross-functional practices within the buying organization is notably scarce in the context of infrastructure procurement. When vertically aligned practices are discussed, the focus is often on activities targeting environmental sustainability and the life cycle of infrastructure projects (e.g. Sanchez *et al.*, 2013; Karlovsek *et al.*, 2023). These studies examine how such objectives can be integrated into the procurement function, for instance, through the procurement of resources from recovered building materials (Karlovsek *et al.*, 2023).

External PSM practices in infrastructure procurement mostly emphasize relational practices, such as supply chain integration (Eriksson *et al.*, 2019; Larsson *et al.*, 2014) and governance (Chen *et al.*, 2018). Although many existing studies on relational practices address supplier relationship management, other types of stakeholders, like users, are underrepresented in the literature. Nevertheless, several studies emphasize the importance of user engagement in the procurement process (e.g. Gbadegesin *et al.*, 2021). Similarly, the literature on non-relational practices is relatively scarce. Among the few studies addressing non-relational PSM practices, the focus is primarily on supplier financial support mechanisms (e.g. Demirel *et al.*, 2022).

While there is growing scholarly interest in PSM practices (e.g. Carter *et al.*, 2017; Jääskeläinen and Heikkilä, 2019; Malacina *et al.*, 2022; Zimmermann and Foerstl, 2014), empirical research focusing specifically on their role in creating value for infrastructure buyer organizations remains limited. Current knowledge is more related to specific project management practices that support public value goals. This approach emphasizes the temporary nature of value creation by actors involved in projects. However, organizational success tends to have more long-term characteristics compared to project management success (Korhonen *et al.*, 2023). PSM practices bridging value creation in projects and the more permanent activities of a public buyer are rather neglected in prior research. The Organisation for Economic Co-operation and Development (2019a) report underscores the need for improved PSM processes in the infrastructure sector, advocating for a broader approach to value creation that spans economic, environmental and social benefits. Given these gaps, we argue that a detailed investigation of infrastructure PSM practices is required. Such analysis not only elevates the role of the purchasing function in infrastructure procurement but also counters the often adopted "one-size-fits-all" strategies that may be ill-suited for complex, large-scale infrastructure projects (Love *et al.*, 2020).

3. Methodology

To answer our research question, we conducted an interview-based study grounded in abductive logic (Pierce, 1995; Shepherd and Suddaby, 2016). Our aim was to further elaborate on the PBV and its extension, SCPV, specifically within the context of infrastructure procurement. Our conceptual approach was informed by existing conceptual frameworks of PSM practices (Zimmermann and Foerstl, 2014) and public procurement value creation (Malacina *et al.*, 2022).

Our methodology comprised two primary phases. Initially, we engaged in an open-ended exploration of the phenomena under investigation. This was followed by iterative interactions between our observations and established conceptual frameworks (Dubois and Gadde, 2002). This continuous cycle aimed to facilitate robust theoretical development, ensuring that insights remained grounded in the data while advancing existing theories. The adopted qualitative research design, which focused on capturing the complex aspects of infrastructure procurement, proved effective for exploring phenomena specific to this domain (Gummesson, 2000), which is marked by the distinct phases of the infrastructure life cycle and unique procurement challenges.

The unit of analysis in this study was the PSM practices used by public buyers in infrastructure procurement. Notably, we chose to focus on practices initiated at various levels within the public buying buyer rather than limiting our scope to activities at the infrastructure project level. In line with the SCPV framework, our study aimed to explore the impact of PSM practices on value creation for multiple stakeholders (e.g. suppliers) rather than focusing solely on benefits to the public buyer. To avoid potential bias from the public buyer's self-reflection, our sample purposefully included informant representatives from diverse functions on both the buyer and supplier sides involved in infrastructure procurement.

3.1 Informant selection

Informants for this interview-based study were chosen to provide insights from both buyer and supplier perspectives. The selection process began with identifying a range of buyer and supplier organizations involved in infrastructure procurement. Public buyer organizations were purposefully diversified to encompass different types of infrastructure buyers with potentially varied PSM practices, thereby enhancing the external validity of our findings. The study focused on both state and local government organizations from across Finland. An emphasis was placed on local administration municipalities, which tend to use more diversified PSM practices compared to the centralized practices of Finland's single, national-level infrastructure agency. This state infrastructure agency was included to provide a complementary viewpoint. The selected municipalities are large (with populations between 150,000 and 250,000 inhabitants) and are distributed across different regions of Finland, offering a geographically balanced view.

On the supplier side, organizations were chosen based on their existing collaborative engagements with buyers in ongoing infrastructure projects. The chosen suppliers were large firms located in Finland that were experienced in infrastructure development and currently having a collaborative contract with the public buyers.

Within organizations, informants were identified with assistance from representatives, particularly directors overseeing infrastructure services or procurement, at the buyer organizations. Our goal was to assemble a diverse and knowledgeable panel of experts who were familiar not only with the PSM practices under study and their relation to various value creation but also with the way they are allocated to different strategic levels (Flick, 2002). Notably, in the studied buyer organizations, PSM practices are not exclusively carried out by employees with formal purchasing titles; rather, they involve a range of specialists such as work managers, strategic development managers, civil engineers and directors. Consequently, our sample represents a broad yet focused array of perspectives on the topic. A similar approach was used to select informants from the supplier organizations. Table 1 provides an overview of the informants, capturing insights from both buyer and supplier perspectives regarding PSM practices adopted by public buyers.

Table 1. Overview of the informants

Organization role	Interviewee role	Organization	Interviewee code	Interview duration
First sample of interviews – general				
Buyer	Construction manager	Municipality 1	B1	1 h 28 min
	Geospatial engineer	Municipality 2	B2	1 h 27 min
	Development manager	Municipality 3	B3	1 h 24 min
	Procurement director	State infrastructure agency	B4	1 h 16 min
	Work manager	Municipality 4	B5	1 h 3 min
Supplier	Division director	CPC company 1	P1	1 h 25 min
	Head of the department	CPC company 2	P2	47 min
	Unit director	CPC company 3	P3	1 h 51 min
	Project manager	CPC company 4	P4	1 h 26 min
	Project manager	CPC company 5	P5	1 h
	Civil engineer	Construction company 1	C1	1 h 32 min
	Development manager	Construction company 2	C2	1 h 27 min
	Director, technical services	Construction company 3	C3	1 h 44 min
	Head of strategic development	Construction company 4	C4	1 h 24 min
Second sample of interviews – specific infrastructure case				
Buyer	Project manager	Municipality 1	B01	1 h 23 min
	Senior business advisor	Municipality 1	B02	39 min
	Systems manager	Municipality 1	B03	1 h 15 min
Supplier	Product manager	ICT company	I1	1 h 3 min
	Business development director	ICT company	I2	50 min
	Chief executive officer	Lighting technology company	L	45 min

Note(s): CPC – construction planning and consultancy, which involves scheduling, coordination and management of a construction project, along with the delivery of expert advice and guidance to public buyers and other stakeholders; ICT – information communication technology
Source(s): Authors' own work

3.2 Data collection

Primary interview data were collected in two sets of interviews during 2021 and 2022. The objective of the first set of interviews (Interview Study 1) was to approach the research questions regarding the relationship between PSM practices and value creation in infrastructure procurement from a broader standpoint. The interview themes addressed during this data collection included factors affecting performance in the infrastructure sector (inputs, processes, time dimension); components of value (outputs and outcomes); and strategies for value creation in the infrastructure sector (i.e. most essential means to improve

performance). The questions were posed to highlight the informant's perspective in value creation.

The second set of interviews (Interview Study 2) was complementary to the first and aimed to provide a more focused examination of the research question by investigating PSM practices and related value in the context of a specific infrastructure procurement case. The purpose was to identify possible differences or specifics of PSM practices and their value implications when applied to a particular case. In this way, the study complemented the organizational view of PSM practices by focusing on a specific infrastructure project. The specific case involved a smart lighting system for city infrastructure, which used a competitive dialogue approach. The case aimed at achieving innovative and sustainable technological solution.

In the second round of interviews, experts were first asked questions at a general level, such as "How would you describe the benefits of public procurement?", followed by a discussion of the specific infrastructure procurement case to examine how identified value components and practices manifested in that particular context, such as "What are buyer practices that supported meeting the main objectives in this project?" While the interview themes remained consistent from the supplier perspective, the discussions emphasized supplier-oriented PSM practices adopted by public buyers. Additionally, tender documents were used as secondary data to support the findings from the second round of case-focused interviews, providing a deeper pre-understanding of the context in which the procurement process was carried out. All interviews were semi-structured and consisted of open-ended questions (Pagell and Wu, 2009).

3.3 Data analysis

All interviews were recorded and subsequently transcribed before being coded. The coding process was iterative, involving multiple cycles that alternated between the empirical data and the conceptual frameworks derived from existing literature (Dubois and Gadde, 2002). This approach allowed for the identification of relationships between PSM practices and value creation that went beyond existing frameworks. It also facilitated a more nuanced understanding of the unique infrastructure procurement context and the diverse manifestations of practices across buyer organizations.

The analysis used both open and axial coding (Ellram, 1996). Open coding began with an exploration of PSM practices and related value components, focusing on the descriptive aspects of the data. Any segment of the original interviews could be assigned an open code. The identification of codes was driven by recurring observations and explicit or implicitly suggested links between practices and value benefits, as articulated by the interviewees. During the axial coding phase, the initial first-order codes were connected to established research frameworks on PSM practices and value creation in public procurement (specifically, Zimmermann and Foerstl, 2014; Malacina *et al.*, 2022). In this phase, some original codes were consolidated and renamed to achieve a higher-level abstraction. Additionally, new practice sub-types, which did not align precisely with existing theoretical categories, were labeled and categorized as new types under the main PSM practices.

The first author was responsible for coding the entire data set. To assess the reliability of the coding, a co-author independently coded a subset of the interviews. The inter-rater reliability was then calculated and determined to be 0.80, which signifies "substantial agreement" (Landis and Koch, 1977) [1]. The coding structure and representative quotes are presented in Appendix 2.

4. Results

In this section, we provide a detailed overview of the internally and externally oriented PSM practices identified in our analysis of infrastructure procurement. We also discuss the corresponding value these practices generate, following the classification of Malacina *et al.* (2022); the value is categorized into four components: procurement process effectiveness; innovation generation and promotion; a well-functioning supplier market; and sustainable public procurement.

4.1 Internal purchasing and supply management practices

The analysis revealed that the inherent complexity of infrastructure procurement necessitates a diverse array of internal PSM practices, specifically oriented toward improving the internal functioning of the public buyer. While these practices primarily contribute to value creation through enhanced procurement process effectiveness, their impact extends beyond this value component. Table 2 summarizes the identified relationships between internal PSM practices and various components of value. Practices highlighted in italics reflect observations that emerged from the empirical data and fall outside the original PSM classification proposed by Malacina *et al.* (2022). The following sections elaborate on these findings.

4.1.1 Vertically aligned practices. Our findings suggest a strong emphasis on vertically aligned practices within infrastructure procurement, which are designed to align PSM activities with the broader strategic objectives of the public organization. Notably, these practices were most prominently represented internal practices in the data. This observation aligns with expectations, given the critical role that infrastructure projects play in societal functioning, as well as the complexity and long-term nature of the processes required to achieve strategic goals.

Interviewees highlighted that *environmentally oriented demand-side* practices can effectively facilitate sustainable public procurement. As noted by both P1 and B4, suppliers are generally more inclined to offer sustainable solutions when public buyers explicitly articulate their sustainability requirements. However, these demand-side practices could be further enhanced by complementing them with *product life cycle-oriented* practices. For example, interviewee B4 pointed out that in infrastructure procurement, short-term operational practices frequently dominate, relegating long-term objectives—such as environmental sustainability—to the background. Additionally, the involvement of multiple stakeholders can diffuse focus, obscuring a comprehensive view of overarching sustainability aims. Therefore, incorporating product life cycle practices is seen as critical.

Product life cycle-oriented practices can also contribute to procurement process effectiveness. Interviewee P2 underscored the importance of integrative collaboration across the various stages of a multistage infrastructure procurement process. Specifically, P2 advocated for including representatives from subsequent stages at every phase of the project to streamline the workflow. This approach facilitates forward-looking cooperation and ensures smoother transitions between different project phases. Similarly, B4 pointed out that life cycle practices are crucial for aligning the goals of actors responsible for different parts of the project to avoid situation where "everyone focuses on doing their own part as well as possible and moves on to the next site as quickly as possible, regardless of how neighboring activities and contracts are integrated."

Instructive PSM practices were discussed in several interviews, both on the buyer and supplier sides. For instance, P1 suggested that harmonizing procurement practices between buyer organizations by using common framework contract forms could positively impact the effectiveness and agility of the procurement process. Compared to a fragmented approach, where each actor maintains their own unique set of forms, rules and processes that suppliers

Table 2. Links between internal PSM practices and value

Internal PSM practice	Source of observation: Buyer perspective	Source of observation: Supplier perspective	Value component
Vertically aligned PSM practices - Innovation-inducing demand-side practices - *Contract model selection practices*	B01, B02, B03	I1	Innovation generation and promotion
Vertically aligned PSM practices - Product life cycle-oriented procurement practices - Instructive practices for procurement - *Contract model selection practices* - *Target implementing practices*	B03, P3	P2, P3, C2, C4	Procurement process effectiveness
Vertically aligned PSM practices - Environmentally oriented demand-side practices - *Contract model selection practices*	P1, B4	C1	Sustainable public procurement
Enabling PSM practices - Image-building practices	B01	–	Well-functioning supplier market
Enabling PSM practices - Image-building practices - Benchmarking practices - E-procurement practices - Enabling individual-level practices	B01, B3, B5	C2	Procurement process effectiveness
Within PSM practices - Contract management practices - Tender-related practices - *Requirement-defining practices*	B1, B3, B5	C3, P3	Procurement process effectiveness
Cross-functional PSM practices - Cross-functional integration practices - Information-sharing practice	B3	I1	Procurement process effectiveness

Source(s): Authors' own work

must individually adapt to, the implementation of harmonized practices offers distinct advantages. These unified procedures not only simplify the compliance requirements for suppliers but also facilitate easier oversight and management for public procurement officers. Interviewees B01 and B5 similarly highlighted the importance of instructive practices, with B5 noting:

> It is required that there would not be completely unique papers for each procurement that one has to stare at for days, get acquainted with, and try to internalize all the essential fine print. Maybe at the state level, they have more uniform documents across the country, but at the municipal level, it certainly varies greatly. (B5, Work Manager)

Innovation-inducing demand-side practices were also discussed in the context of several infrastructure procurement projects (B01, B03, I1). The interviewees suggested that this type of practice has the potential to trigger innovation, facilitate innovation diffusion and support market growth. For instance, interviewee B01 described a scenario in which an Internet of Things platform developed as part of an infrastructure project was made accessible to other users "so that users can benefit from it without having to build their own platform for that purpose. It already serves as a sort of backbone for implementations."

In our analysis, we identified two new types of practices under the umbrella of vertically aligned practices: *contract model selection* practices and *target implementing* practices. According to interviewees from the supplier side, the selection of certain contract models by public buyers (such as alliances) could signal that the procurement process would be more effective and generate more value through better collaborative goal achievement between suppliers and public buyers (C2, C4), improved risk management and the facilitation of circular economy principles (C1). *Target-implementing practices* refer to those that ensure strategic goals at the executive level are effectively translated into practical actions in projects, thus improving procurement process effectiveness (P3).

4.1.2 Enabling purchasing and supply management practices. Enabling PSM practices focus on developing PSM capabilities in a public organization. These practices aim not only to enhance the attractiveness of the public buyer but also to facilitate managerial support and enable individual growth among procurement personnel. In our analysis, these practices were often discussed from the buyer's perspective.

As previously noted, interviewees emphasized the importance of *risk-reducing* practices. For instance, B3 highlighted the need for accurate project cost estimation and its distribution. Interviewee B3 suggested that procurement officials should ask: "Who bears the risk, and to what extent? Does this allocation generate unnecessary work?" Another interviewee, B4, cautioned against indiscriminate risk outsourcing to suppliers, urging that public buyers consider whether it is reasonable for suppliers to bear such responsibility. The focus on risk mitigation appears to be standard practice for public buyers, but it was not specifically tied to value creation.

Image-building practices were also viewed as important for enhancing the visibility of public buyers and promoting the diffusion of new ideas, especially in the context of innovative infrastructure procurement. The value benefits from these practices include improved status and recognition for the buyer organization. Image-building also contributed to a more dynamic supplier market by attracting international interest among potential suppliers and facilitating market dialogue (B01).

The significance of *benchmarking* practices was emphasized by several interviewees, noting that such practices go beyond comparing best practices within public organizations (B01, B3) to also include examining trends and standards prevalent in the private sector (B4). These practices were regarded as instrumental in enhancing purchasing capabilities and

improving the overall effectiveness of the procurement process. In the context of *e-procurement* practices, interviewees elaborated on the growing trend of using electronic auctions (B05, B3). Specifically, interviewee B5 emphasized the time-saving benefits and corresponding increase in procurement process effectiveness afforded by the implementation of a dynamic purchasing system (DPS). According to Julkisten hankintojen neuvontayksikkö (JHNY) (2022), the DPS is designed for acquiring commonly available goods and is accessible to all suppliers who meet predefined selection criteria.

Enabling individual-level practices were discussed by interviewees from both the supplier and buyer sides. For instance, B3 highlighted that infrastructure procurement projects are often large-scale and infrequent. To retain the expertise gained from these projects, the public buyer should invest in continuous employee training and establish robust information storage systems. On the supplier side, interviewee C2 stated:

> Processes should be uncomplicated and quick. As I understand it, the State infrastructure agency, for example, has solved this problem by granting project managers unlimited decision-making authority over their own projects, eliminating the need to seek permission from higher management. Decision-making power should be where the decisions are made, and that is important.

Delegating decision-making authority to project managers or professionals directly handling procurement is particularly crucial in organizations with rigid hierarchical structures, where delays in decision-making are common.

While *managerial support practices* were not explicitly associated with value creation in the data, the interviewees underscored their importance in large and complex infrastructure procurement. For example, interviewee B3 stressed the necessity for managerial oversight to ensure the proportional allocation of limited human resources across procurement tasks. Likewise, interviewee B2 highlighted the importance of establishing feedback loops to continuously monitor and adjust the procurement process.

4.1.3 Within purchasing and supply management practices. The variety of *within practices* adopted in infrastructure procurement was discussed by our informants. These practices often aim to address the unique challenges associated with this field, such as the impact of time and the complexity of procurement tasks. Interviewees B3 and B5 emphasized the importance of *procurement development* practices, highlighting the effective estimation of human resources and the implementation of existing or new best practices as key elements in successful procurement.

Contract management was another practice type that received significant attention. Interviewees B5 and C3 stressed the necessity for rigorous and clear formulation of agreements. The use of framework agreements was noted by B1 and B5, while C3 mentioned the fair allocation of project-related risks among all parties involved. The interviewees suggested that clear contract terms can substantially improve the effectiveness of the procurement process, affecting not just cost estimations but also the achievement of collaborative goals between buyer and supplier. However, it is worth noting that interviewee B4 cautioned against including every possible detail in the contract. Instead, B4 advocates for a balanced approach that combines thoroughness with common sense:

> [Procurement] involves writing blunt documents that actually span over a thousand pages in total. And I dare say that one would have to be quite dedicated to read all the printed texts related to these contractual documents and their Appendices. So, if we base everything on the need to write contracts that are completely foolproof, we end up in a situation where the understanding disappears, and it is to no one's benefit. (B4, Procurement Director).

Flexibility in contracts may also lead to improved procurement process effectiveness and collaborative goal achievement between suppliers and public buyers. Interviewee B1 illustrated the flexibility between the buyer and a framework agreement company with the following words:

> I ordered a design work from an agency, and there were a few corrections I would have liked to make to the tender text, but as it was just before the holidays, we agreed on the phone with the representative that I would order according to their tender but add the changes to our purchase order as plain text, and that is how it was done. I think it is quite flexible. (B1, Construction Manager).

Contract management practices have also been indirectly linked to improvements in social sustainability. Interviewee B1 illustrated this point by describing a scenario where contract timing was strategically adjusted. This allowed the builder involved in the project to commence work at an optimal time, thereby positively impacting their working conditions and contributing to enhanced social sustainability.

While *supplier-selection* practices were primarily discussed in the context of choosing suppliers who are committed and dedicated to the project, *tender-related* PSM practices were highlighted as extremely important for value creation by informants from both the supplier and buyer sides. A clear definition of objectives was recurrently mentioned (P3, C3) as a practice that is essential and may substantially contribute to value creation in terms of procurement process effectiveness by clarifying the process path and improving the process with respect to time and working hours, as well as proper goal attainment of procurement. Moreover, using general forms to lighten the procurement process (B5) seems to contribute to procurement process effectiveness through increased agility. Scheduling calls for tenders at the beginning of a year (attracting tenders is easier when the beginning of the tendering cycle matches with the beginning of the calendar year) was mentioned by an interviewee as a practice that contributes to process effectiveness through the reduction of uncertainty in the procurement process (B1). Early sharing of tender information was also highlighted by informant B3 as particularly important for suppliers. Given that infrastructure projects are often large-scale, early access to tender documentation allows suppliers to assess their capacity to undertake the project and submit a bid. This, in turn, indirectly contributes to enhanced competitiveness. The practice of unbundling was mentioned by B4 and B5 as important for improving the manageability of large infrastructure projects.

Closely related to target setting, practices associated with the *definition of requirements* were manifested in the interview data. Strictly and clearly defined, well-covered requirements in tendering—although more laborious—were mentioned as improving the engagement of contractors, resulting in procurement process effectiveness (B3). Additionally, the establishment of a deep understanding of the requirements defined in tendering and continuous reflection on them is essential for reaching collaborative goal achievement between suppliers and public buyers (B5).

4.1.4 Cross-functional purchasing and supply management practices. Cross-functional practices were suggested as influential to the effective functioning of infrastructure procurement. *Cross-functional integration* practices were manifested in the data in two ways. First, infrastructure professionals involved in major procurement cases may need support from procurement professionals, for example, to obtain knowledge about infrastructure contracts. This kind of cross-functional cooperation enhances capabilities within the buyer organization, as noted by informant B3, for instance, through procurement process effectiveness. Second, the integration of diverse functional perspectives and competencies helps define procurement objectives more clearly and accurately (B03, I1).

Regarding *information-sharing* practices among buyers, the dissemination of best practices, new ideas and experiences within an organization has the potential to significantly boost procurement effectiveness, as noted by informant B3. Additionally, interviewee B4 emphasized the importance of streamlining internal communication within public procurement entities, referring to this as "removing layers." By reducing organizational layers, essential information can flow more swiftly and effectively, leading to improved responsiveness.

4.2 External purchasing and supply management practices

The analysis reveals that external PSM practices play a significant role in value creation within infrastructure procurement. While external relational practices are most frequently linked to value creation, it is equally vital to recognize that external non-relational practices also hold considerable importance and should not be overlooked. Table 3 provides a summary of the connections between external PSM practices and the various value components identified in the analysis. The succeeding sections further elaborate on the findings related to external PSM practices.

4.2.1 Relational purchasing and supply management practices. Relational PSM practices were frequently highlighted by interviewees as essential for achieving effective infrastructure procurement. These practices, which involve collaboration and engagement between two or more supply chain actors, are critical to achieving a common goal. While most interviews focus on collaboration between public buyers and suppliers, the role of other actors in the supply chain has also been acknowledged.

Several interviewees, particularly those on the buyer side, underscored the importance of *trust-building practices*. For instance, interviewee B1 highlighted the value of informal communication channels between public buyers and suppliers, noting that certain issues can often be addressed more flexibly and effectively through informal means rather than formal communication. This, in turn, contributes to the overall improvement of the procurement process. However, it was also emphasized that such an approach is contingent on built trust and is not universally applicable. Interviewee B3 similarly posited a synergetic relationship between trust-building and risk-reducing PSM practices, suggesting that when trust is established, risks can be more equitably and transparently shared between public buyers and suppliers.

Cooperation-related practices emerged as a prominent theme in our sample. According to the analysis, this type of practices significantly contribute to achieving collaborative goals between suppliers and public buyers, thereby improving the overall effectiveness of the procurement process. B5 highlights the importance of cooperation-related practices with following words:

> The increase in cooperation is evident, especially with the various contract models that include cooperation and target prices. Increasing their use could help produce value in the future.

Interviewee B4 pointed out the complexity of infrastructure procurement, which involves multiple actors, and suggested that procurement teams require practices that facilitate effective synchronization of operational processes and objectives across all involved parties. Additionally, to ensure alignment of interests among vendors, contractors and other stakeholders, interviewee B4 recommended introducing financial incentives or penalties to encourage desired behaviors and cooperation outcomes.

Interviewee C3, representing the supplier perspective, emphasized the importance of knowledge-sharing practices on the buyer's part (referring to both technical and contractual knowledge) as a key factor in boosting cooperation and facilitating

Table 3. Links between external PSM practices and value

External PSM practice	Source of observation: Buyer perspective	Source of observation: Supplier perspective	Value component
Relational PSM practices - Trust-building practices - Cooperation-related practices - Procurement network-building practices - Dialogue facilitation practices	B1, B3, B4, B5, B02	P1, P2, P3, P5, C3, I1	Procurement process effectiveness
Relational PSM practices - Dialogue facilitation practices	B01	–	Innovation generation and promotion
Relational PSM practices - Cooperation-related practices - Procurement network-building practices	B02	P5	Well-functioning supplier market
Non-relational PSM practices - Information-sharing practice by a buyer - *Incentives defined by a buyer*	B4	P1, P2, P3, P4, C2, C3, C4	Procurement process effectiveness

Source(s): Authors' own work

collaborative goal achievement. Similarly, interviewee B02 noted that long-term collaborative relations with suppliers foster a healthy supplier market and contribute to more balanced market competition. Finally, interviewee P1 stressed the significance of public buyers taking a proactive stance to familiarize themselves and establish relationships with other actors involved in the project. By doing so, buyers not only gain market knowledge but also position themselves as central figures in enhancing information sharing and trust among project partners, particularly in connecting otherwise poorly connected partners.

Interviewees B4 and B5 also described procurement *network-building* practices, which are crucial for the efficient functioning of large infrastructure projects. While public buyers might establish direct relationships with suppliers, these suppliers may collaborate with numerous sub-suppliers, making it vital for buyers to adopt PSM practices that support the accurate cascading of project objectives throughout the entire network of suppliers. Furthermore, infrastructure suppliers (e.g. of large- or specific capacity) may represent a niche segment within the potential market. The expert (P3) representing the supplier perspective in our study stressed the high barriers to entry faced by many new suppliers, primarily due to the specific and demanding requirements imposed by public buyers. In response, planning consultant P5 recommended the adoption of the master-apprentice model and related practices that can significantly reduce entry barriers for new suppliers by familiarizing them with performance expectations and requirements while also providing opportunities to participate jointly in projects. Such practices related to procurement network-building have been empirically observed in our sample to foster a well-functioning supplier market.

The role of *dialogue-facilitating* practices in infrastructure procurement also emerged as crucial, particularly for enhancing procurement process effectiveness and fostering a well-functioning supplier market. Interviewee B3 emphasized that these practices should go beyond simple supplier feedback mechanisms, incorporating communication with a broader range of stakeholders involved in infrastructure procurement. Supplier expert P3 specifically pointed out the importance of market dialogue in the pre-tendering phase as a vital tool for refining the specifics of both the tender notice and the call for tenders. Incorporating the perspectives of suppliers through open dialogue can yield substantial improvements in procurement process effectiveness. Specifically, pre-tender discussions allow for more thorough risk assessments and more realistic cost-efficiency considerations (B3, B4). Market dialogue can serve as a catalyst for innovation by enhancing the precise description of requirements (B01). Refining the often general initial requirements based on the insights obtained from market dialogue can further improve the procurement process effectiveness. This iterative process, often referred to as the "funnel model" (P1, P2, P3), allows initial, broad procurement descriptions to be progressively refined through consultative discussions with potential suppliers.

Understanding the market and fostering communication between buyers and suppliers helps both parties speak the same "language" and enhances trust. As a result, dialogue-related practices work synergistically with those focused on cooperation and trust. Moreover, cultivating a culture of open discussion can lead to the realization of more cost-effective solutions, particularly when buyers are receptive to suppliers' input and open to exploring alternative options. Interviewee P3 elaborated on this point:

> When there is an open culture, people dare to say 'let's take another look at that thing; this may not be the smartest solution in the world', and then, in most cases, the smarter solution is found. (P3, Unit Director).

Finally, engaging in *competitive negotiations* may lead to optimizing the supplier selection process and fostering a more competitive market environment. Such negotiations can also facilitate early-stage dialogue and communication with suppliers, subsequently enriching the quality of tender submissions, as pointed out by informant I1. Our analysis indicates a synergetic relationship between competitive negotiations and practices that facilitate dialogue.

4.2.2 Non-relational purchasing and supply management practices. Unlike relational PSM practices, non-relational practices necessitate resource deployments solely from the buyer, without input from other actors in the supply chain. Interviewees attributed these non-relational practices to various types of value creation.

Our data set highlighted the critical role of *information-sharing* practices related to information shared by a buyer to a supplier (C2, C4, P3, B3, B4). Both groups viewed these practices as critical for effective PSM. Public buyer representative B3 asserted that buyers should be prepared and willing to share plans, such as work and traffic management plans, with suppliers as early as the tendering phase to facilitate more effective processes. Interviewee B4 noted that these practices contribute not only to public procurement process effectiveness but also to the creation of social value, such as social cohesion. The interviewee cautioned that unclear communication with suppliers may give rise to perceptions of unfairness, potentially leading to legal disputes that could otherwise have been resolved through transparent information sharing. Effective communication of risk-related information from buyers to suppliers can also improve suppliers' cost-effectiveness. Specifically, when suppliers are well informed about potential risks, they are less likely to incorporate risk premiums into their tender submissions (C2).

Information-sharing practices toward the *network of stakeholders* were further emphasized in interviews with experts B1, B3 and B4. These practices include the regular release of procurement programs, routine meetings and the dissemination of best practices. Conversely, *supplier performance evaluation practices* and *supplier financial support* practices received comparatively less attention in our sample. These latter practices were primarily attributed to efforts aimed at maintaining reasonable pricing.

Incentives defined by a buyer emerged as a key value-creating practice, particularly in supplier interviews, where they were seen as a buyer-driven means to strengthen collaboration. Respondents cited incentives as particularly significant for fostering cooperation (B4, C4, P1, P2, P4). B4 describes it as follows:

> We create incentives for all procurement. Procurement is perhaps the main focus here, and since that is our main task, we create incentives that enable the best possible cooperation.

For example, incentives might be tied to meeting specific infrastructure-building schedules and quality requirements, rewarding all actors with additional financial compensation when common objectives are achieved. This approach holds particular relevance in infrastructure procurement, where such practices are still relatively novel. Additionally, incentives were seen to significantly optimize life cycle management (P4) by paying more attention to life cycle-related targets.

5. Discussion

The results of this study suggest a difference in emphasis within infrastructure procurement compared to the general landscape of public procurement. Unlike Malacina *et al.*'s (2022) broader public procurement framework, which emphasizes innovation and sustainability, our results reveal that infrastructure procurement tends to prioritize process effectiveness over these components. Specially, there seems to be a gap between the expectations of

sustainability present in the literature and policy-making and the perceptions of how PSM practices contribute to the value creation of public organizations in the infrastructure sector. While the promotion of innovation was also less commonly discussed in the interviews, it still emerged as the second most commonly identified value component associated with PSM practices. The promotion of innovation was particularly discussed in the second set of interviews, where the specific infrastructure procurement case was the point of contention. This can be explained by the specific goal of innovative technology solution in the case. This was the only notable difference in the observations between the first (emphasizing public buyer organization) and second (emphasizing infrastructure project) set of interviews.

The findings further indicate that the PSM practices in the field of infrastructure procurement currently prioritize effectiveness in the public procurement process. This particular value component appears to be universally associated with all categories of PSM practices. This may be explained by the notable importance of effective processes for organizational-level success highlighted in this study. When compared to previous infrastructure procurement literature emphasizing infrastructure project-level success, all the examined value components have been associated at least with some individual PSM practices with an emphasis on sustainability (Karlovsek *et al.*, 2023; Sanchez *et al.*, 2013) and innovation (Tawiah and Russell, 2008; Regan *et al.*, 2015; Wondimu *et al.*, 2018). However, most of the reviewed literature (Appendix 1) discusses PSM practices without linking them to specific value benefits, and a complete view has been missing.

Our findings regarding vertically aligned PSM practices largely support the extant literature. For example, we corroborate Asiedu and Ameyaw (2021) emphasis on the importance of product life cycle-oriented procurement practices. Similarly, our results are consistent with the insights of Kadefors *et al.* (2021) and Karlovsek *et al.* (2023), who highlight the necessity of environmentally oriented PSM practices. We extend the current knowledge by finding that the predominant focus of these practices is still on procedural improvements, leaving potentially longer-term value benefits such as environmental sustainability relatively underrepresented, thereby undermining the suggested potential of vertically aligned PSM practices for the life cycle perspective of infrastructure projects (Sanchez *et al.*, 2013; Karlovsek *et al.*, 2023). Interestingly, socially oriented demand-side procurement practices (which Malacina *et al.* (2022, p. 9) define as "practices related to the alteration of public procurement demand to enhance the importance of the social component in product or process offering") were not present in the analyzed data, similar to the prior research. The absence may reflect the high-stakes and large-scale nature of public infrastructure procurement (Eriksson *et al.*, 2023; Matinheikki *et al.*, 2021). Interviewees representing the buyer side frequently emphasized risk aversion as a guiding principle. Consequently, it is plausible that the focus on well-established and "safe" practices may delay the need for socially oriented practices (e.g. procurement practices targeting the improvement of worker safety), which are more commonly seen in general public procurement.

While existing research on enabling practices has primarily focused on project and financial dimensions (e.g. South *et al.*, 2018; Asiedu and Ameyaw, 2021), our analysis underscores the significance of practices at the organizational level of the public buyer, such as image building. Additionally, our findings emphasize the importance of individual-level enabling practices, including the retention of specialized expertise between different infrastructure projects. Overall, internal PSM practices have gained relatively limited attention in infrastructure procurement literature, with a specific focus on practices specifying criteria for innovation or providing flexibility to supplier project execution (Wondimu *et al.*, 2018). This lack of research may be caused by the emphasis on projects'

unique characteristics in previous research (Lædre *et al.*, 2006; Regan *et al.*, 2015), leaving the likely less project-dependent practices internal to the buying organization with less attention. Our research supports and suggests the high importance of within practices, especially contract-related practices, for procurement process effectiveness. For example, performance-based contracts may lead to better engineering design (Iimi, 2020).

Cross-functional practices appear to be significantly underrepresented in the literature on infrastructure procurement. Despite this, the importance of such practices has been well-documented in earlier studies on private-sector PSM (Jääskeläinen and Heikkilä, 2019; Toon *et al.*, 2016). A recent study by Lintukangas *et al.* (2022) also emphasizes the significance of multi-professional collaboration and cross-functional integration in the broader realm of public procurement. In our study, we defined cross-functional collaborative practices as those aimed at fostering effective integration and cooperation among different public procurement departments in infrastructure procurement. We identified the importance of these practices in procurement process effectiveness as they emphasize collaboration among various experts, such as in infrastructure planning, construction, maintenance, procurement and urban area development within public buying organizations.

Our findings concerning relational PSM practices corroborate existing research that emphasizes the necessity of establishing effective collaboration with multiple stakeholders in infrastructure procurement (e.g. Eriksson *et al.*, 2019; Eriksson *et al.*, 2023; Larsson *et al.*, 2014; Gbadegesin *et al.*, 2021; Reeves *et al.*, 2017). In our study, specific relational practices such as open dialogue, trust-building and information-sharing were found to contribute not only to procurement process effectiveness but also to innovation generation and the creation of a well-functioning supplier market. Open dialogue was particularly highlighted and even associated with fostering social cohesion. Given the often large-scale nature of infrastructure projects and the potential transformative impact of winning a contract for some suppliers, infrastructure buyers should prioritize transparency and open communication with suppliers to eliminate misunderstandings and cultivate an image of fairness and transparency (Nabatchi, 2012). In the context of infrastructure procurement, the influence of relational practices on environmental value appears to be less pronounced. This suggests that the operational implementation of infrastructure projects may necessitate a stronger focus on relational practices compared to other procurement contexts. Consequently, more future-oriented value components, such as sustainability, may receive less attention.

Our empirical study reveals a greater emphasis on non-relational PSM practices than prior research has indicated. This observation may be somewhat caused by the location of these practices within a buyer organization (emphasis of this study) instead of project-level analysis emphasized in prior studies. Demirel *et al.* (2022) highlight the importance of securing suppliers' investments in infrastructure projects, which often carry high uncertainty. Private firms may hesitate to participate without assurances that their investments are protected, given the typically long project timelines and substantial capital outlays. To address this, certain PSM practices, such as public grants, subsidies and co-financing, can provide additional financial support, reducing suppliers' perceived risk. Our findings build on this by uncovering an even broader range of supportive practices, including information-sharing, supplier performance evaluations and incentive mechanisms. Such practices enhance procurement effectiveness in infrastructure by providing stability and predictable returns. This broader array may be attributed to our study's organizational-level focus, as non-relational PSM practices support standardized and permanent value-creation strategies, whereas relational practices are likely emphasized in temporary, project-based settings.

6. Conclusions

This study aimed to answer the following research question: How do PSM practices related to infrastructure procurement, when adopted by public buyers, facilitate value creation? To address this query, we conducted an interview-based study in the infrastructure sector, gathering data from 20 informants across supplier and buyer perspectives. Using the theoretical lenses of PBV and SCPV, we identified links between external and internal PSM practices and value created through procurement process improvement, innovation generation, a well-functioning supplier market and sustainable procurement. Our findings highlight the essential role of PSM practices in fostering value in infrastructure procurement, with a significant focus on procurement process effectiveness and notable importance placed on practices that promote innovation.

6.1 Theoretical contribution

The PBV (Bromiley and Rau, 2014, 2016) and its extension SCPV (Carter *et al.*, 2017) are relatively new theoretical approaches gaining traction in PSM (e.g. Broemer *et al.*, 2019; Rehman Khan and Yu, 2021) and public procurement research (e.g. Malacina *et al.*, 2022; Chikwere *et al.*, 2023). This study contributes to this research stream in several ways. First, our paper is one of the first empirical studies to address value creation through practice adoption in public procurement. This contribution aligns with Carter *et al.*'s (2017) call for a better understanding of the impact of imitable and transferable practices on organizational performance. Our research not only supports these theoretical perspectives but also suggests that adopting PSM practices may create value beyond the organizational level, contributing to greater societal benefits.

Second, this study adds to the research stream on infrastructure procurement. The holistic analysis of PSM practice-value connections complements the fragmented knowledge of individual infrastructure PSM practices that emphasize project-level success but give less attention to broader organizational value creation. Based on the empirical analysis, the harmonization of procurement practices between buyer organizations—such as the use of standardized framework contract forms that improve the effectiveness of the procurement process—illustrates the core idea of PBV by showing how easily replicable practices can be adopted by organizations. This finding supports the argument for the applicability of a practice-based approach to public procurement research (Malacina *et al.*, 2022).

Finally, our study makes an additional contribution to the literature by incorporating the less-represented supplier viewpoint into the analysis of PSM practices (Malacina *et al.*, 2022). Our research reveals differences in the perceived importance of certain practices between buyers and suppliers. For example, public buyers may prioritize contract-oriented PSM practices, preferring to clarify contracts to avoid ambiguity rather than engage in more laborious open-dialogue practices. By contrast, suppliers may favor a balanced approach that emphasizes the significance of knowledge exchange and transparency in contract allocation. This discrepancy in preference can lead to missed opportunities for value creation from the perspective of suppliers, illuminating the importance of considering both viewpoints in PSM practices.

6.2 Practical contribution

The managerial implications of this study can be examined from both buyer and supplier perspectives. For public buyers, infrastructure procurement professionals should broaden their focus to include potential long-term value benefits, as they currently often focus on narrow procurement process benefits rather than on benefits such as innovation generation. Future procurement practices should also place greater emphasis on sustainability. This

study explicates a range of practices supportive of different objectives, such as enhancing supplier market performance or fostering innovation. This information can be used in many ways. For example, if procurement objectives are not being met, managers should carefully review and refine relevant practices.

Contract models, while central to the field, are not the sole contributors to value creation. More effective outcomes may be achieved by emphasizing PSM practices broader, such as the dialogue-facilitating practices highlighted in this study. Furthermore, this information may inform strategies for different suppliers or procurement categories. For instance, if cost efficiency is a priority for a particular supplier or category, contract- or tender-related practices should be emphasized. Conversely, if sustainability is prioritized, vertically aligned practices should be implemented, such as those addressing infrastructure procurement regulations, environmental considerations and life cycle-oriented practices. Prioritizing these elements enables public infrastructure buyers to align procurement processes with the organization's long-term sustainability goals.

Managers on the supplier side can also consider the implications of these findings. Depending on the objectives outlined in the call for tenders, suppliers can adjust their expectations regarding potential customer relationships. If a buyer demands innovations but is unwilling to invest in appropriate practices, suppliers may reconsider their interest in the business opportunity. However, some of the PSM practices also raise expectations toward the supplier. For example, dialogue- and collaboration-related practices require active participation not only from the buyer but also from the supplier side, and a lack of commitment could jeopardize the business relationship or lead to customer dissatisfaction.

6.3 Limitations and suggestions for future research

Our research has several limitations. First, this study focused on infrastructure procurement, and due to its field-specific characteristics, the findings should be interpreted cautiously when applied to the broader public procurement context. Additionally, the research is limited to the Finnish infrastructure sector, and there may be location-specific characteristics that are not generalizable to other geographical areas. For example, public procurement in less developed regions may be more oriented toward monetary benefits than in the Finnish context, which emphasizes, for example, the need for environmental sustainability (Alhola *et al.*, 2019).

Second, since the majority of experts providing a public buyer perspective came from the municipal level, our findings primarily reflect organizational activities in infrastructure procurement at the local administration level rather than in mega-project procurement, which has received ample research attention. Nevertheless, it is essential to interpret our findings within the specific context of this study. Future studies could examine state-level infrastructure procurement through cross-country comparisons to identify potential differences in PSM practice–value combinations between countries and highlight state-level infrastructure procurement specifics.

Third, the interviews identified both positive and negative impacts of PSM practices on infrastructure procurement value creation, but this study focused on the positive implications. Future research could differentiate these impacts and potentially identify interconnections between factors of value creation and value destruction.

Fourth, the findings suggest that more strategic value benefits such as sustainability are still not strongly connected to infrastructure PSM practices despite the high emphasis on sustainability in research and policy. There may be many reasons such as limited financial resources and those reasons deserve more attention in future research. On the other hand, the value benefits of infrastructure procurement may be also wider than those identified in this

study. There was some indication in this study on social value implications which could receive more attention in the future research.

Finally, this study aimed to provide a comprehensive overview of practices and their correlated values. Previous research has investigated the various implications of PSM practices different stages of the infrastructure life cycle (e.g. Hoeft *et al.*, 2021; Sun and Carmichael, 2018). While outside the scope of this study, we believe that understanding the implications of each life cycle stage may provide valuable insights that would complement our findings. Therefore, we encourage future research to address this gap.

Furthermore, our results show that certain practices have synergic effects on value creation. Our study touched on this issue by identifying connections between practices, but future research could delve deeper into studying how PSM practices function as a bundle to create performance differences aligned with PBV. Moreover, value is a multifaceted concept and may be viewed differently by different actors. This study examines various perspectives on value creation from both buyers and suppliers, which may introduce potential biases in perception. However, this approach provides a necessary holistic perspective on value creation in answering our research question. Finally, future research could build on our findings by examining internally focused practices in greater detail, especially within PSM practices adopted by the public buyers, and their impact on value creation through more informants from general procurement functions. Our study demonstrates that a qualitative approach is effective for gaining insights into diverse PSM practices.

Note

1. The inter-rater agreement was calculated in R using the *kappa2()* function from the *irr* package.

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Table A1. Overview of existing studies addressing PSM practices in the infrastructure sector

Purchasing and supply chain practices (Zimmermann and Foerstl, 2014)	Examples of PSM practices adopted in infrastructure procurement	Notes	References
Internal practices			
Vertically aligned practices	Practices oriented toward the administration of infrastructure procurement regulations and ethics	Infrastructure projects often carry significant health and safety implications for users and must adhere to all regulations set by public authorities	Asiedu and Ameyaw, 2021
	Environmentally oriented practices	Sustainability rating schemes and carbon reduction practices are essential in complex infrastructure procurement Public procurement of infrastructure practices that encourage procuring resources from recovered building materials	Kadefors *et al*., 2021 Karlovsek *et al* ., 2023
	Life cycle procurement practices	Procurement outcomes in infrastructure projects are sensitive to decisions made during their planning, design and execution and require specific life cycle practices	Asiedu and Ameyaw, 2021
Enabling practices	Long-term governance practices	Due to the long-term horizon of infrastructure, procurement requires practices that consider the differences between project phases	South *et al.*, 2018
	Finance allocation practices	In infrastructure procurement, financial allocation, especially in local municipalities, is essential for successful project execution	Asiedu and Ameyaw, 2021
Within practices	Purchasing capacity-building practices	Sustainable infrastructure requires technical skills, engineering expertise and robust systems for data collection, monitoring and evaluation	Asiedu and Ameyaw, 2021; Manu *et al.*, 2021

(*continued*)

Table A1. Continued

Purchasing and supply chain practices (Zimmermann and Foerstl, 2014)	Examples of PSM practices adopted in infrastructure procurement	Notes	References
	Supplier selection practices	As in infrastructure procurement, several bidders can be considered entrant or fringe bidders; robust supplier selection practices are required to maintain competitive circumstances Practices aimed at collusion detection in the infrastructure tendering process	Estache and Iimi, 2008 Signor *et al.*, 2021
	Contract-model selection practices	The procurement route must be tailored to each project and depends on the characteristics of each project	Lædre *et al.*, 2006; Regan *et al.*, 2015
	Contract management practices	Specific contractual mechanisms, like output- and performance-based infrastructure contracts, enhance the supplier's incentive for better engineering design	Iimi, 2020
	Failure driver awareness practices	Due to the lengthy process involved, infrastructure procurement is more prone to failures than other types of procurement and requires the integration of failure drivers and associated failure mechanisms into the management framework	Soomro and Zhang, 2016
	Contract requirement-definition practices	Instead of detailing the technical specifications, functional specifications allow for using the contractors' competence in the design and planning phase	Bygballe and Swärd, 2019

(*continued*)

Table A1. Continued

Purchasing and supply chain practices (Zimmermann and Foerstl, 2014)	Examples of PSM practices adopted in infrastructure procurement	Notes	References
External practices *Relational practices*	Non-contractual governance practices	As infrastructure procurement is often characterized by high uncertainty, the procurement practices related to non-contractual governance are of particular importance, such as design integration and team workshops	Chen *et al.*, 2018
	Coordinative supply chain integration practices	As infrastructure projects are often complex, supply management practices ensuring coordinative supply chain integration are required	Eriksson *et al.*, 2019; Eriksson *et al.*, 2023; Larsson *et al.*, 2014
	Community-based infrastructure procurement practices	Some infrastructure projects can be initiated for specific reasons for collective action and require a unique set of practices, such as the social practice of participatory design	Gbadegesin *et al.*, 2021
	Network-building practices	Supply management practices targeting the development of interconnections between supply network stakeholders	Badi and Diamantidou (2017) Papadonikolaki *et al.*, 2017
	Open dialogue practices	As infrastructure procurement is often characterized by a lengthy tendering process, competitive dialogue practices are introduced to reduce the number of major changes in the project after the bigger one has been appointed	Reeves *et al.*, 2017

(*continued*)

Table A1. Continued

Purchasing and supply chain practices (Zimmermann and Foerstl, 2014)	Examples of PSM practices adopted in infrastructure procurement	Notes	References
	Trust-building practices	Practices stressing openness and accountability to the needs of customers in infrastructure procurement Team-building activities and informal communication	Manu *et al.*, 2021 Kadefors, 2004
	Information-sharing practices	Building information management practices are essential in effective value-for-money assessment in infrastructure procurement	Ren *et al.*, 2020; van Eldik *et al.*, 2020
	Goal alignment practices	As infrastructure procurement often involves collaboration between many partners with diverse goals, buyers must establish practices ensuring that the partners involved have mutual goals for the collaboration.	Spohr *et al.*, 2022
	Early supplier involvement practices	Practices of early involvement of contractors in more complex infrastructure projects	Wondimu *et al.*, 2018
Non-relational practices	Public grants and/or subsidy allocations	As infrastructure procurement is often characterized by high uncertainty, private firms may feel reluctant to engage and require practices ensuring the security of their investment, such as additional financial support	Demirel *et al.*, 2022

Source(s): Authors' own work

Appendix 2

Table A2. Representative quotes supporting the data structure

Second-Order themes	First-Order concepts	Representative quotes
Vertically aligned PSM practices	Environmentally oriented demand-side practices	"But of course, when you look at this whole process, the lifecycle factors must be taken into account first. In the coming years, environmental issues, carbon emissions, and similar concerns will play an even greater role, as they will also become major requirements in our procurement phase" (B4)
	Product life cycle-oriented procurement practices	"If you think about the earlier planning stages, even something like a master plan or a site plan, it may occur to you that you could already include the next stage. Imagine that the next stage of the lifecycle actor would be involved in the previous stage. In this case, cooperation would already exist, laying a bit of groundwork for the next stage" (P2)
	Instructive practices for procurement	"A kind of unification in the municipal sector would have been good, and the government is moving in the right direction. They have recognized the need to push this forward in the same direction" (P3)
	Innovation-inducing demand-side practices	"The data and the platform are available to companies and the communities, allowing companies to test their sensors and other technologies on this platform, which enables them to make use of it. It serves as an experimentation and development platform" (B01)
	Contract model selection practices	"Whenever you look at the bigger picture, the model should be built on such a sound footing that productivity is secured through it" (C2)
	Target-implementing practices	"There are some fine goals and policies at the top level, with various objectives and means in place. However, there is a huge gap between these and the implementing organizations—the project managers, who are pretty much the majority of this kind of caterpillar department. Effectively guiding these sub-level or project-level actors from the top remains a significant challenge. They have recognized this problem, and there has been a fairly open discussion around the need for a much stronger steering effect from the top level" (P3)

(*continued*)

Table A2. Continued

Second-Order themes	First-Order concepts	Representative quotes
Enabling PSM practices	Image-building practices	"…we went to discuss our procurement. I even went to Barcelona to talk about it. During those market dialogues, companies from all over Europe came to engage in the discussion" (B01)
	Benchmarking practices	"This procurement has drawn attention from many Finnish cities, serving somewhat as a model. We have been a pilot, so now they can leverage the work that we have already done" (B01)
	E-procurement practices	"If we consider how it [time-consuming procurement] could be improved, there are dynamic procurement arrangements and other such options" (B5)
	Enabling individual-level practices within the public buyer	"Processes should be uncomplicated and quick. As I understand it, the State infrastructure agency, for example, has solved this problem by granting project managers unlimited decision-making authority over their own projects, eliminating the need to seek permission from higher management. Decision-making power should be where the decisions are made, and that is important" (C2)
Within PSM practices	Contract management practices	"If things are clearly described, explained, and valued, then there is no problem. However, this is not usually the case. There can be situations wherein certain responsibilities are not defined upfront, and the client or client representative only clarifies their wishes and responsibilities later on. In other words, a careful and clear allocation of responsibilities is essential" (C3)
	Tender-related practices	"Many times, even simple small jobs have to be put out to tender, and then the tender material becomes such an impossible package that I do not know whether it could be simplified, perhaps by providing some basic document forms" (B5)
	Requirement-definition practices	"If work and traffic management plans are already required in the tender phase and are scored and evaluated, then it could make it a little easier to choose a contractor who is truly committed to the issue" (B3)

(*continued*)

Table A2. Continued

Second-Order themes	First-Order concepts	Representative quotes
Cross-functional PSM practices	Cross-functional integration practices	"Centralized procurement is certainly needed to support this. However, it also requires that the centralized procurement has expertise in construction contracts. General procurement expertise alone is not necessarily enough. The construction sector is a field of its own, where knowledge of the market is vital" (B3)
	Information-sharing practices within the buyer	"There should be some kind of specific training to maintain that competence, which could be attended at regular intervals, but it should be targeted specifically at the construction industry, not just general procurement training. And, of course, sharing practices between different buyers is also important" (B3)
Relational PSM practices	Trust-building practices	"It is good when you get to know the other person, especially the client's representative. There is a real trusting relationship both ways" (P5)
	Cooperation-related practices	"The increase in cooperation is evident, especially with the various contract models that include cooperation and target prices. Increasing their use could help produce value in the future" (B5)
	Procurement network-building practices	"As for obtaining a reference, I would still promote the model strongly advocated by the Finnish Public Roads Administration and the ELY, though it has not yet been widely accepted in too many projects. The master-apprentice model could bring younger project managers into projects, allowing them to gain references while also involving the more experienced. This model could address the issue of having too few people in the field" (P5)
	Dialogue facilitation practices	"When there is an open culture, and people are willing to boldly suggest that perhaps something should be re-evaluated, that it is not necessarily the smartest solution in the world, in most cases, a smarter solution in overall economic terms is found" (P3)
Non-relational PSM practices	Information-sharing practices by a buyer	"It definitely helps to identify shortcomings if all the relevant issues are written openly in the tender and contract documents. Nothing should be left unsaid. For instance, if a phase of work usually involves certain tasks, these should be explicitly mentioned. This transparency will certainly increase productivity" (R3)

(*continued*)

Table A2. Continued

Second-Order themes	First-Order concepts	Representative quotes
	Information-sharing practices toward the network of stakeholders	"On the client side, in many cities, much of the work is handled by certain people. However, the coordination between different utilities, such as water or electricity, is not always very strong before a project starts. It typically happens during the project itself, within the context of its steering" (P3)
	Incentives defined by a buyer	"We create incentives for all procurement. Procurement is perhaps the main focus here, and since that is our main task, we create incentives that enable the best possible cooperation" (B4)

Source(s): Authors' own work

Corresponding author
Kirsi Lindfors can be contacted at: kirsi.k.lindfors@tuni.fi