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On Public Procurement of ICT Systems: Stakeholder Views and Emerging Tensions

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Abstract. The public sector is a significant consumer of ICT systems. In countries like Finland, where openness, objectivity, and fairness in public acquisitions are deemed essential, public ICT procurement is based on tenders initiated by public sector organizations. The tendering process is regulated by laws that aim to eliminate unfair advantages and provide all potential stakeholders with similar opportunities to participate. However, depending on the stakeholders' perspectives, they may interpret the tendering process differently, leading to tensions among them. In this paper, we examine Finland's public procurement of ICT systems using semi-structured interviews as our data collection method and analyze the results thematically. The interviewees include individuals familiar with tendering and acquisition processes in public organizations and those involved in delivering systems as vendors, representing two different perspectives on the tendering process. The results indicate that although there are significant differences in maturity among public sector organizations participating in procurement, several common themes emerged from nearly all the interviews. Furthermore, in light of contrasting views between public organizations and vendors, recurring tensions arise due to different interpretations of acquisition laws.

Keywords: Public Procurement · Public Sector Software · ICT Procurement · Software Acquisition

1 Introduction

Increasingly, the digital society has led to a growing demand for a wide range of public digital services. For example, Finland has initiated a program with the goal of creating Digital Twins for citizens to improve the targeting of services precisely when they are needed most [11]. This signifies that society is becoming progressively more reliant on Information and Communication Technology (ICT) in general, and software in particular.

The public sector acquires software for public use, a process mandated by EU and national procurement legislation within the EU [1]. The EU and national legislations governing this procurement process aim to ensure equality, transparency, and the consideration of both price and quality with relative weights

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[17]. In this context, a public organization initiates the procurement process by issuing a call for tenders. During this tendering process, information system providers compete to offer software solutions that best meet the specified requirements.

Despite procurement laws and national standards, much human judgment plays a role. Consequently, it is not uncommon for disputes related to public procurement, including differing perspectives on the tendering process, specifications, and deals, to end up in court.

In this paper, we investigate stakeholder perspectives regarding the public procurement of ICT systems in Finland. We employed semi-structured interviews, targeting individuals with knowledge of the tendering and acquisition processes within public organizations. We conducted a total of 12 interviews, involving representatives from five public organizations and four vendors engaged in ICT procurement. While some stakeholders share certain projects, not all stakeholders are involved in every project. This work extends a previous Master's thesis on Economics [5], which explored various aspects of public procurement in Finland. In this paper, we focus on stakeholder viewpoints and the tensions that arise from them, with the technical findings falling outside the scope of this study.

The rest of this paper is structured as follows. In Sect. 2, we provide the necessary background for the paper. In Sect. 3, we introduce the applied research approach. In Sect. 4, we present the results of the work, and in Sect. 5, we provide an extended discussion of the results, together with some remarks on the study's limitations. Finally, in Sect. 6, we draw some final conclusions.

2 Background and Motivation

Public agencies that acquire information systems typically expect the system to serve the agency without significant changes for an extended period [12]. This long-term stability often leads to collaborative relationships between public agencies and ICT vendors. Various forms of collaboration exist (e.g., [6]), and public procurement processes define how software systems are acquired. These regulated public procurement procedures aim for non-discriminatory treatment of vendors [8]. However, ICT procurement projects frequently exceed their original schedules and budgets, and planned systems may even be abandoned before project completion [19].

Tendering is the process where an agency in need of a software system solicits bids for projects with fixed or nearly fixed deadlines [12]. The process commences with a description of the problem the acquiring agency faces and the creation of a project proposal to address the issue, often in the form of a Request for Information (RFI). An RFI is a formal method for collecting information from potential suppliers of goods or services. Following an RFI, the next step is the Request for Proposal (RFP), which asks vendors to propose solutions to the customer's problems or business requirements. An RFP is a comprehensive, detailed document that contains all the necessary information for an informed purchasing

decision. Finally, a Request for Quotation (RFQ) can be used to invite suppliers or contractors to submit price bids for standardized products or services produced in repetitive quantities.

Like any software specification, tendering-especially RFP, but to some extent, RFI and RFQ-forms the fundamental description of the resulting IT project. However, public ICT procurement is often challenging due to the specific parameters set for public procurement [16]. Strict control practices and the current methods of procurement units can hinder innovation and cost-effectiveness in public procurement [3].

In particular, it has been argued that EU and national regulations in Finland can impede the effective procurement process [10]. However, strict parameters in public procurement exist for valid reasons. The public sector and the government play multiple roles in society and the economy. They act as buyers of goods and services, suppliers of services, and regulators [2]. Public agencies provide the services and infrastructure necessary to sustain the social and economic structures in society.

Public procurement is typically divided into three phases-pre-tender, tender, and post-tender actions [8]. While a more detailed analysis recognizes six phases: (i) specification of needs, (ii) vendor selection, (iii) conclusion of contracts, (iv) ordering, (v) expediting, and (vi) evaluation and follow-up [20], we find the coarser-grained approach better suited for studying the state of practice in Finland. This preference is because the finer-grained phases are often internal to purchasing organizations, whereas our focus is on studying the tensions arising from stakeholder interactions overall.

There are several ways in which public procurement can occur. Firstly, before actual procurement, public agencies can collaborate with consulting vendors to prepare the tender, sometimes requiring a separate tendering process for this phase. The cooperation aims to establish a coherent view of the market, inform the market about the upcoming procurement, and communicate the requirements to the vendors participating in the tender. This collaboration is essential to plan and execute the process in a way that upholds the principles of non-discrimination and transparency [1].

Secondly, a supplier relationship is established through public procurement, mandated by legislation such as the Act on Public Procurement and Concession Contracts [13]. This relationship includes all vendors participating in public procurement, often forming a comprehensive ecosystem of companies. Finally, public agencies can purchase from in-house organizations, which the Public Procurement Act does not mandate. In-house procurement has unique characteristics because the procurement unit is not required to follow public procurement procedures, a significant deviation from the Public Procurement Act. However, in-house companies typically rely on public procurement when acquiring ICT services. Therefore, in-house companies have two roles as both a procurement unit and a service provider for public organizations.

Table 1. Interview Data

Organization	Id	Position	Field	Interview Duration
Procurement Unit 1	PU1	Chief position	ICT	47 min
Procurement Unit 2	PU2a	Manager position	ICT	48 min
Procurement Unit 2	PU2b	Senior Specialist	ICT	62 min
Procurement Unit 3	PU3a	Head of procurement	Procurement	63 min
Procurement Unit 3	PU3b	Manager position	ICT	49 min
Procurement Unit 4	PU4	Chief position	ICT	58 min
Procurement Unit 5	PU5	Manager position	ICT	56 min
Vendor 1	V1	Senior Principal	ICT	50 min
Vendor 2	V2a	Head of Department	ICT	49 min
Vendor 2	V2b	Specialist	ICT Procurement	49 min
Vendor 3	V3	Chief Position	ICT	45 min
Vendor 4	V4	Vice President	ICT Sales	56 min

3 Research Approach

Overall, ICT procurement as a human activity has received relatively little attention from researchers. Hence, the research questions we seek to answer are:

How do different stakeholder interpretations of public procurement regulation affect the ICT procurement?

We seek an answer via semi-structured interviews targeted at public organizations and vendors participating in public tendering. The semi-structured interview was the data collection method because it gives the best parts of structured and non-structured interviews [14]. The predefined structure guides the interviews with pre-formulated questions or themes, and all the interviews start with the same set of questions while allowing improvisation when needed.

Interviews were carried out and recorded between November 2021 and May 2022, and the details of individual interviews are listed in Table 1. The interview duration varied from 45 min to 63 min. The average duration was 51 min. Thematic analysis of the interviews revealed four themes related to public procurement norms, information systems, competence, and communication.

Procurement Unit 1 (PU1) is a government-owned enterprise (GOA), and its turnover is approximately EUR 140 million. Procurement Unit 2 (PU2) is a public administration with a budget of EUR 110 million. In the PU2, two interviews took place. In quotations, the separation between the two is marked with code PU2a and PU2b if necessary. Procurement Unit 3 (PU3) is a municipality with a yearly budget of EUR 740 million. PU3 had two interviewees, separated with abbreviations PU3a and PU3b if necessary. Procurement Unit 4 (PU4) is a city with a yearly budget of EUR 140 million. Procurement Unit 5 (PU5) has a

Table 2. Tensions in different ICT procurement phases summarized.

Pre-tender findings
Tension 1: Communication Between the Stakeholders.
Tension 2: Issues in Consulting the Vendors During the Process.
Tension 3: The Choice of ICT Procurement Opportunities and Resources
Tension 4: Invitation to Tender Has a High Impact on ICT Procurement.
Tension 5: Different Views on the Public Procurement Act.
Tension 6: Different Perceptions of the Suitable Solutions.
Tension 7: Attitudes Towards the Change.
Tension 8: Differences in Management Practices.
Tender findings
Tension 9: Most Advantageous Offer.
Tension 10: Purchasing Vast Systems Versus Purchasing Small Entities.
Tension 11: EA Management via Public Procurement.
Post-tender findings
Tension 12: Legislation Interfering with Stakeholder Relationships and Joint Roadmap.
Tension 13: Varying Methods to Manage Stakeholder Relationships.

yearly operating budget of EUR 375 million. PU5 is a joint municipal authority in the healthcare field.

Vendor 1 (V1) is an international ICT company. V1's turnover is approximately EUR 300 million, and V1 has 1100 employees in Finland. Vendor (V2) is an international ICT company with a turnover worth EUR 112 million and over 800 employees in Finland. Vendor 3 (V3) is a Finnish ICT company with a turnover worth EUR 42 million and approximately 500 employees. Vendor 4 (V4) is a Finnish ICT company. V4's turnover is EUR 2,7 million, and it has 23 employees.

4 Results

We have categorized the results to pre-tender, tender, and post-tender findings. These are summarized in Table 2.

4.1 Pre-tender Findings

Tension 1: Communication Between the Stakeholders. All the procurement units in this study employ preliminary market consultations with vendors and communicate with them during the pre-tender phase. These preliminary market consultations can take various forms. PU1, PU2, PU3, and PU4 consistently explore the market possibilities. Communication goes beyond formal connections with vendors via RFIs, although sometimes RFIs can be an excellent way to initiate a market dialogue with vendors. An RFI provides vendors

with an opportunity to inform the procurement unit about building new systems with modern technologies. For instance, as shown by V1, if the procurement unit is open to change and not overly tied to how the previous system functioned, an RFI can be a valuable tool for generating new ideas.

Another avenue for procurement units to familiarize themselves with market options is through everyday conversations and networking events with vendors. Vendors appreciate informal discussions because a better understanding of the procurement unit's needs often emerges from these interactions. PU1 and V2 highlight that when the procurement unit and vendor communicate openly, ICT procurement tends to be more successful. Similarly, V1 and PU1 emphasize that one of the least effective methods for acquiring an ICT system is to skip preliminary discussions with vendors and simply issue an RFQ. However, due to constraints like limited resources, time, and personnel, there are instances where ICT procurement may begin without prior communication.

Tension 2: Issues in Consulting the Vendors. Vendors believe that the procurement unit benefits the most from consultants' help if it can effectively communicate how it operates and what it aims to achieve. This allows the consulting vendor to understand the requirements for the new system better. V1 illustrates that some procurement units actively discuss options with other procurement units. For example, PU4 benchmarks and shares information with other municipalities about problems and solutions to find the most suitable option.

PU2 has had discussions within the organization about whether seeking consultation to prepare the RFP or RFQ is a part of the procurement process. Indeed, the Procurement Act [13] mandates preliminary market consultation, which is interpreted as a regulation for the pre-tender phase [8]. The Finnish Procurement Act states that preliminary market consultation with the vendor participating in the tender should not compromise the fairness of competition [13]. In the interviews, PU2a describes the approach as follows:

> *"Always before the tender phase, we review the familiar vendors, and, at the latest in the tender phase, we provide the opportunity for other vendors."*

Procurement units PU1, PU2a, PU2b, and PU3 acknowledge that in tendering, they need a clear understanding of procurement practices, and, as PU2a phrases it, "the game the vendors play." It seems that this setting creates tensions regarding whether to trust that vendors prioritize the interests of the procurement unit or whether their incentives are misaligned.

Tension 3: The Choice of ICT Procurement Opportunities and Resources. In the pre-tender phase, public agencies also decide which opportunity to use for tendering. During the interviews, procurement units mentioned open, restricted, and competitive negotiated procedure opportunities for ICT procurement. When purchasing complex systems or something entirely new,

the competitive negotiated procedure often leads to the best outcomes. This procedure allows procurement units and vendors to communicate openly and comprehensively map out the system's long-term needs. For example, PU1 and PU2 use competitive negotiated procedures, typically resulting in favorable outcomes. However, PU2a believes that the competitive negotiated procedure can be demanding for the procurement unit, requiring resources such as expertise, time, and funds.

All procurement units agreed that direct awards are emergency solutions, often used in tandem with in-house purchases. PU3a and PU4 indicate that direct awards usually occur in vendor lock-in situations or when time is limited.

PU1 and PU3a emphasize that sometimes the legacy system must be replaced and included in the public procurement process, regardless of the high migration costs. PU2 believes that, in addition, the purpose is to respond to change proactively; sometimes, vendor lock-in can be calculated to be more beneficial for the procurement unit.

Tension 4: Invitation to Tender has a High Impact on ICT Procurement. Procurement units agree that the tender must be well-defined before publication and that errors are difficult to fix after the tender is public. PU3b says:

> *"Legal practice has proven that modifications are not allowed (in the tender), even if they are allowed in the law."*

Therefore, PU3b believes that the procurement practice needs revision. Before publishing the tender, the procurement unit should have a precise understanding of the expected outcome, even if it doesn't yet exist. The preliminary requirements must be adequate and precise because when the procurement unit receives bids from vendors, it needs to select the most suitable vendor based on the published criteria. In this phase, it doesn't matter if the procurement unit discovers flaws in the originally published tender because it cannot be modified. PU1 shares a similar perspective. PU1 criticizes the regulations for encouraging public organizations to rigidly follow procurement processes in environments that should be more adaptable towards agile methods.

Tension 5: Different views on Public Procurement Act. PU2b believes the procurement act enables free communication and agile development when used correctly. However, in Finland, the Procurement Act can be cumbersome for those who need to learn how to use it. On the other hand, PU1 suggests that the Procurement Act [13] encourages procurement units and vendors to engage in *"procurement theater"* where the procurement unit publicly carries out its legislative tasks, publishes RFP and RFQ, and receives bids from vendors. However, before this, the procurement unit has already selected the solution and the vendor. All the procurement units in this research acknowledge that there are occasions when they specifically require a certain product from the market. In practice, procurement units then define the requirements to align with only one vendor's solution or opt for in-house procurement.

Tension 6: Different Perceptions of the Suitable Solutions. The interviews revealed that vendors and procurement units want different things to some extent. As an example, procurement units in this research need ready-made systems. Purchasing Saas solutions would be ideal. In addition, the Finnish government has given public organizations recommendations for cloud-computing systems.

In PU2, the organization's strategic objectives guide the planning of the software requirements in the tender phase. The top management has set the objective to refrain from purchasing customized products. In PU2, the minimum criteria for the software is that it has ready-made components and the user interface is modifiable. PU2a recons that the organization's IT landscape is complex and demands skillful personnel to manage it, and many times, the strategic skills to manage ICT procurement are missing.

In contrast, vendors' incentive is to offer tailored solutions for the procurement units, even if they can technically produce and deliver whatever is needed. V2, V3, and V4 all have similar messages on tailored systems, even though V4 plans to answer the market call in the future with a ready-made solution for case management.

PU5 recons that it is understandable if the procurement unit sometimes wants to acquire a tailored solution because the initial price is often tempting. However, tailored solutions carry great maintenance risks and may lead to vendor lock-in. In this research, procurement units and V1 depict that purchasing ready-made solutions is faster, easier, and more affordable than tailoring to procurement units' needs.

Tension 7: Attitudes Towards the Change. V1 and V4 point out that shifting the mindset in procurement units to adopt new systems and processes can be challenging. Many of these units have tailored their procedures to match the old system's performance, making it difficult to embrace change. For example, PU5 reveals that some Request for Proposals (RFPs) describe only the existing system's functions, limiting innovation. This rigidness in public organizations, as discussed by PU1, is often attributed to a lack of ambition to explore alternative work methods. V1 also suggests that public sector employees should take a more proactive role in implementing minor changes that can lead to significant improvements.

V1 and V2 highlight the presence of competent and innovative personnel in Finnish public organizations. However, their expertise remains underutilized due to daily job demands, leading to missed opportunities for enhancing processes and systems.

V4 emphasizes the success of small ICT entities, crediting innovative public sector leaders who have taken risks and embraced highly automated systems. The recurring message is that public organizations possess internal competence, which is not always harnessed optimally. The challenges of changing attitudes toward new systems and processes stress the importance of mindset shifts, leveraging existing competence, and fostering innovation.

Tension 8: Centralized Management Versus Decentralized Management. All public agencies in this study have multi-professional personnel responsible for publishing the RFIs, RFQs, and RFPs. The practicalities to take care of the procurement processes are centralized.

The procurement unit draws the initial requirements for the information system. Some procurement units, PU1, PU2, and PU3, have a project management office (PMO). In PMO, procurement units map out whether separate units in the organization have similar projects, if combining the resources is possible, and whether they have the resources to initiate the project. PU2 and PU3a depict that, at best, PMO processes enhance efficiency. PU1 has reduced all the duplicate ICT systems and vendors due to PMO functions.

PU1, PU2, and PU3 depict specialists from different units (business, ea, IT, procurement) evaluating their territory in PMO. Initially, the PMO scans the resources and determines whether the business case exists or initiates the project because the law mandates it. Naturally, the emphasis is on well-prepared projects and literature findings reveal that the RFQ requirements need to be carefully prepared because otherwise, the project may be prolonged, the budget may be exceeded, or the system may fail before production [4,7–10]. Alarmingly, half of the procurement units in this research do not engage PMO practices and suffer from overlapping projects and systems.

4.2 Tender-Time Findings

Tension 9: The Most Advantageous Offer. The public procurement act in Finland [13] guides choosing the most advantageous offer, which often means the price has a heavy emphasis. PU1 says that the principle of enhancing the quality and lowering the price is flawed and unrealistic. PU1 has a strategy to set high basic requirements, ensuring that the participants' quality is good throughout the tender phase, and V2 has a similar idea. PU2a recons that the price is relatively demanding to erase from the selection criteria even if they have tried. Many vendors can meet the initial criteria; only price matters after that.

PU2a depicts that for some, it is demanding to calculate the most advantageous offer. PU2 has learned from experience how to calculate and estimate lifespan costs. PU4 depicts similarly; experience helps to scan the apparent pitfalls in planning the system, procurement, criteria, and vendor selection. PU1, PU2, and PU4 are wise to interview the vendor's team and set soft criteria such as the team's vision, competence, and ambition to make the best vendor decision. Thus, more than merely defining software requirements and the price is required in ICT procurement. However, procurement units need help to implement soft criteria in the selection criteria because the overall price for a good team is demanding to evaluate.

Tension 10: Purchasing Vast Systems Versus Purchasing Small Entities. PU3a recognizes two main methods to build the tender. Sometimes, PU3 purchases the platform and the development in one RFQ, and sometimes, everything is purchased separately: platform, development, and maintenance. PU1

and PU2 emphasize that the entities they wish to purchase need to be appropriately sized - the too vast a system is demanding to manage and causes vendor lock-in. However, all the procurement units recognize that stakeholder management becomes complex if the number of vendors rises, and procurement units hope for top-down support. V4 depicts that the requirements are the same for small and large public organizations because they are under the same legislation. For example, small and larger municipalities need similar governance and case management accuracy. V1 thinks similarly that public organizations waste resources to define requirements for the new ICT system because other public organizations have usually tackled the same issue.

Tension 11: EA Management via Public Procurement. Enterprise architecture (EA) management via public procurement is challenging. PU1 and PU2 reckon that vendors may not be interested in planning the solutions to fit the existing EA. PU1 hopes the vendors will adopt a holistic view of the buyer's EA when the same vendor provides different solutions to different procurement units in the same public organization.

Currently, procurement units depict that the vendors are only sometimes invested in taking the time to familiarize themselves with public organizations' existing operations and systems. PU2 reckons that smaller vendors are more interested in delivering easily deployable and manageable solutions and are more flexible than the larger vendors. Migration costs can increase if the existing EA is outside the selection criteria. PU2a thinks that PU2 is a more significant customer to the small vendors than to the large vendors. As a small business, V4 agrees with the view.

The procurement unit's EA has varying ways to emerge in the tender phase. PU1 field of business is mission-critical; software-wise, everything they purchase must go through many official checks. PU1 manages the tendering practices top-down; procurement units cannot solely purchase something that fits their purposes. The purchasing practices support standardized technology solutions and sustainable software lifespan management.

PU2 uses the JHS-179 standard to define the target architecture to avoid surprises in the implementation [18]. Furthermore, in PU2, IT governance sets objectives for the tender. In the tender phase, PU4 describes the current state of EA. In addition, PA4 describes the target stage EA in advantaged ICT procurement. Like PU4, PU3 uses the current state EA descriptions in the tender phase. PU5 depicts that the organization's EA does not show in the tender. Usually, EA is examined after the vendor selection in the post-tender phase, which is costly, complex, and prolongs the project. PU5 describes that the current EA initiatives exist but do not show in practice.

4.3 Post-tender Findings

Tension 12: Legislation May Interfere with Stakeholder Relationships. Public procurement legislation may interfere with prosperous stakeholder relationships, so procurement units reckon it would be convenient to predict future needs in the tender phase. Essential changes are impossible during the contract

and may lead to vendor change. PU1 depicts that sometimes they have flourishing cooperation with the vendor, but the law causes unnecessary vendor changes. For example, the original software works well, but a new need emerges near the original solution. It could be effortlessly developed with the existing vendor, but the public procurement act in Finland does not allow essential changes in the contract period [13]. As a consequence, new procurement needs to be initiated.

PU2a says that sometimes they try to include consulting services in the RFQ and demand that the solution be used in all procurement units to avoid the abovementioned issue. However, PU3b sees pitfalls in this approach. Even if the solution could be used in the other procurement units, the price is considered an essential change, which usually demands the beginning of the new procurement process. In addition, PU2a realizes that the tactic is only sometimes successful because future needs are almost impossible to predict.

PU1 and PU2b emphasize that the more important thing is to keep an excellent record of stages, development, and tasks if the vendor changes due to legislative or other reasons. When the existing system works well and the stakeholder relationship is good, changing the vendor and system wastes resources for the procurement units. In this research, V4 depicts that they wish to produce their services so that the procurement unit never suffers vendor lock-in with them. Instead, they wish to continue cooperation because it has been successful.

Tension 13: Methods to Manage Stakeholder Relationships Vary. Traditionally, public agencies have paid the vendors in installments, and if they disagree with the performance, they may refuse to pay the installment. Another way to manage the contract period is to set vendor fines. Furthermore, some agencies use the option to continue the vendor contract for the next period as a carrot. PU1, PU2, and PU3 reckon these methods encourage rigid and waterfall-like software development. Furthermore, PU1, PU2, and PU3 reckon that the vendor should be ambitious to produce its services with quality rather than be pressured with installments and fines to produce barely acceptable services and products. PU2b thinks it is within the procurement unit's management culture whether they can motivate vendors without using ramifications. V1 and V4 depict similarly but from different points of view: attitude and ambition need to be towards solving problems together and offering the best possible solutions for the procurement units.

In Finland, in-house procurement is a rather significant phenomenon. In in-house purchases, PU4 thinks the installment with-holding is the only option to receive acceptable solutions. In-house procurement is considered a part of the procurement unit's internal production even if the decision-making and governance are separate, which may cause an issue in quality control. PU3b thinks the permanent contract motivates the vendors compared to the temporary contract with the option for the second contract period. The assumption is that the vendor appreciates continuous and good business relationships as much as the procurement unit. PU1 depicts that they use service level agreements (SLAs) in the contract period, which could be better. All-in-all, procurement units in this study agree that the public sector uses far more sticks than carrots in vendor relationships, which does not work.

	Public Sector	Vendors
Public Sector	• Procurement units have varying perceptions of norms **(Tension 5)**: i. Norms do not obstruct the tender phase, but the ability to leverage legislation differs. **(Tension 7).** ii. Norms steer towards a waterfall system development and impede innovation**. (Tension 3 and 4.)** • The principle of reducing costs while enhancing quality is flawed **(Tension 9).** • Some procurement units utilize software reusability contracts and decentralized PMO. **(Tension 8)** • Purchasing practices vary between large systems and small entities **(Tension 10)**. • Drafting tenders carefully is crucial because they have a significant impact on ICT procurement outcomes **(Tension 4)**.	• Norms result in unnecessary vendor changes during the post-tender phase **(Tension 12).** • Direct awards and in-house procurement lead to extended projects and high migration costs **(Tension 5, Tension 9)**. • There is an incentive to acquire ready-made solutions **(Tension 6, Tension 11)**. • Vendors often show little interest in the existing enterprise architecture and system interoperability of public organizations during the tender phase **(Tension 11).** • Including soft criteria in the selection process can be challenging **(Tension 4, Tension 5).** • Unofficial communication sometimes results in vendor selection before the tender phase, which may lead to legal consequences **(Tension 1 and 5)**.
Vendors	• Norms do not impede effective practices **(Tension 7)**. • The choice of ICT opportunities impacts efficiency, vendor selection, and the success of ICT procurement **(Tension 2, Tension 4)**. • The public sector lacks ambition in developing practices **(Tension 7, Tension 8, Tension 13)**. • Procurement units are slow to change ideas, processes, and practices **(Tension 7, Tension 8)**.	• Vendors have different approaches to what they offer (**Tension 1 and 6**): • Tailored systems to secure an irreplaceable position. • Easily deployable and replaceable entities.

Fig. 1. Public Sector and Vendor Relationships

5 Discussion

5.1 Research Questions Revisited

This research studies how different interpretations of regulatory aspects affect public ICT procurement. We identified 13 tensions in ICT procurement, which fit into four categories. Figure 1 summarizes public sector and vendor relationships in detail and describes where the tensions arise. Below, we list some differences in interpretations that contribute to the tensions.

- *Public Procurement Norms*: Public ICT procurement is highly regulated and normative. However, while the norms set the field for the processes and stakeholders, the human aspect is vital. The perception of public procurement norms raises tensions.
- *System*: In ICT procurement, the system or service is at the center of the acquisition. However, interestingly, the procurement units and vendors depict that the technology does not hinder finding efficient and well-functioning solutions. Different intentions, ideas, and ambitions are the most significant obstacles. Vendors and procurement units want to acquire and provide different solutions, and procurement units prefer ready-made solutions, whereas vendors are incentivized to offer tailored systems.
- *Competence*: In some procurement units, the quality aspect is strong, and these public agencies aim to reduce the price's effect on the selection criteria. Pre-tender phase and preliminary market consultation are critical in such evaluation. Furthermore, certain aspects, such as the vendor's ambition, the team's competence, and vision, are challenging to put in the selection criteria. Therefore, suppose the preliminary market consultation reveals the most suitable option, which is not the cheapest.

– *Communication*: Communication with vendors – unofficial conversations, preliminary market consultation, and bench-marking – is vital for the procurement units before publishing the tender. The tender has a high impact on ICT procurement because it affects vendor selection, system requirements, and interoperability, duration of the project, and efficient use of resources. In addition, carelessly drafted RFP or RFQ may lead to legal ramifications. Drafting the tender is particularly demanding for the procurement units because errors are almost impossible to correct after publication. System requirements and interoperability must be included in the tender because the vendor is selected against these criteria.
However, in practice, all procurement units recognize that sometimes vendor selection happens before the tender phase, even if the incentive in law is to ensure fair and equal competition. The communication between the procurement unit and vendor is regulated, especially in the tender phase and preliminary market consultation [13]. Both parties, procurement units, and vendors realize that the Public Procurement Act guides communication for a reason. However, the balance between open communication and favoring should be found simultaneously.

5.2 Threats to Validity

In this paper, five procurement units and four vendors participated, and twelve interviews were done. The research method, semi-structured interviews, allowed the interviewees to depict what was significant to them. However, this might be a weakness as well. Semi-structured interviews combine parts from structured and non-structured interviews [14], and eventual consistency comes from the preselected themes and the freedom to specify and elaborate on subjects that emerge during the interviews. Hence, the research method fits the study, contributing to the research approach's validity.

Data is collected and analyzed systematically, in an iterative way, and rigorously, which increases reliability. However, the sample size introduces some issues of generalisability [15]. Another issue related to the sample is that they all are from Finland, so results cannot be generalized to other countries due to differences in national legislation. However, the procurement units and vendors in this research cooperate and, in some cases, depict their relationship. Therefore, the consistency in results and similar findings in the literature reveal that the study has validity even if the sample size is small [15]. Hence, even if the sample size prevents the final conclusion on the subject, the results are significant to share with the research community.

Finally, inner validity could be improved with triangulation or multiple researcher evaluation [14]. Here, the authors directly make deductions that may infer the inner validity. However, the results and the deductions have been reviewed and accepted by independent inspectors in the thesis process; this work is based on [omitted-for-blind-review].

5.3 Future Work

Public procurement issues are recognized in literature and practice. However, public procurement is a separate regulated process in literature rather than a part of the communication and cooperation of humans, which will be fundamentally required to complete a procurement. Closing this research gap is a part of our future work, even if this research is a significant initial step. Hence, holistic exploration of ICT procurement is a vital topic to cover.

Procurement units in this study recon that it is almost impossible to predict all future needs, and they prefer exit points if the vendor relationship becomes challenging. Hence, the post-tender phase concerning the agility to change vendors would be interesting to cover. In some interviews carried out in this research, the in-house purchases caused issues. In-house procurement is not within the procurement regulation, which for the cooperation does not follow the standard practices that apply to vendors. The regulatory aim is to enhance efficiency in public procurement. These two aspects hinder effective practices in this study.

6 Conclusions

In this paper, we studied how procurement units acquire software. Based on semi-structured interviews, it was found that the agencies have different interpretations of the Public Procurement Act [13]. In light of the Public Procurement Act, a durable vendor relationship is challenging to establish. Hence, careful project preparation is vital in public procurement; considering the entire software lifespan needs in one tender could be helpful in practice. Moreover, decisions on how and what entities to purchase must be well thought through. Procurement units and vendors recommend tracking the ICT procurement process and system development to facilitate vendor change if it is needed when something essential changes.

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