

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Government Information Quarterly

journal homepage: www.elsevier.com/locate/govinf

Public buyer's concerns influencing the early phases of information system acquisition

Elina Riihimäki^{*}, Samuli Pekkola

Tampere University, Faculty of Management and Business, PO Box 541, 33101 Tampere, Finland

ARTICLE INFO

Keywords:

IS acquisition
Vendor selection
Requirement
Concern
Public procurement
Grounded theory study

ABSTRACT

Information system (IS) procurement in the public sector is a strictly legislated process where different worries and concerns emerge already in its early phases. They may later lead to hazardous and unwanted outcomes when procuring, acquiring, or implementing the IS. To reduce unsatisfactory outcomes and fears and improve public IS procurement, we thus need to understand different concerns and their effects. In this paper, we present a qualitative single case study where different concerns emerge in the market consultation documentation of a public IS procurement. We identify and analyze the concerns by using the grounded theory approach. We then reflect them with the public IS procurement challenges and the European Union (EU) procurement legislation to understand their influence in public procurement. This provides twofold outcomes: a list of concerns and a model that illustrates their interrelations and a long impact chain within the procurement documentations. The model underlines the impacts of different concerns on IS procurement in general, and on system requirements and vendor selection in particular. Especially the role of requirement specifications is emphasized as it largely defines the vendor selection and the contract.

This research did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

1. Introduction

Many information systems (IS) projects – including public sector organizations' acquisition and implementation of packaged software – fail to meet expectations (de Boer, 2017; Pekkola, Niemi, Rossi, Ruskamo, & Salmimaa, 2013; Shaul & Tauber, 2013). At the same time, public interest towards public spending is high (EU, 2014; Halonen, 2015; Pekkala, Pohjonen, Huikko, & Ukkola, 2019). For instance, the state of Pennsylvania sued IBM over on a system modernization project that the state stopped after 45 months late and over \$60 million over nearly \$110 budget (Langley, 2017). In Finland, the city of Espoo paid nearly 7 million euros for an enterprise resource planning system that was never taken to use (Kuokkanen, 2018). The agencies faced even more financial losses and operational malfunctioning when developing the old legacy systems during the prolonged problematic projects.

Despite significant financial interest, public IS procurement is surprisingly little studied topic (Flynn & Davis, 2014; Moe, 2014; Patrucco, Luzzini, & Ronchi, 2017). Rare studies focus on its challenges rather than on its success stories (e.g. de Boer, 2017; Moe & Päiväranta, 2013).

The troubled situation and public taxation-based funding makes it evident that public buyers have become alert and more careful in procurements (Dimitri, Dini, & Piga, 2006). The challenges, self-experienced or learnt from media, cause concerns to all parties and influence the procurement process in a way it may hinder the benefits of future IT investments (Moe & Päiväranta, 2013; Pekkola et al., 2013; Willcocks, 2013). A concern refers to “an uneasy state of blended interest, uncertainty, and apprehension” (Merriam-Webster, n.d.) or “a worried or nervous feeling about something, or something that makes you feel worried” (Cambridge, n.d.).

Unresolved concerns from the preliminary market consultation phase (before an agency issues a call for tenders) can partly be blamed for problematic IS projects (Moe & Päiväranta, 2013). Yet the studies have not delved into how such concerns affect projects, although a focus on the earliest steps in software procurement projects have been urged (Hull, Jackson, & Dick, 2011). We seized this absence and conducted a qualitative case study of the preliminary market consultation phase of a European government agency's IS procurement project in 2015.

As the concerns influence IS procurement, the understanding of the

^{*} Corresponding author.

E-mail addresses: elina.riihimaki@tuni.fi (E. Riihimäki), samuli.pekkola@tuni.fi (S. Pekkola).

<https://doi.org/10.1016/j.giq.2021.101595>

Received 12 November 2020; Received in revised form 14 April 2021; Accepted 24 May 2021

Available online 26 June 2021

0740-624X/© 2021 The Authors.

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

procuring agencies' and vendors' concerns and their influences may improve public IS procurement. We thus study the public buyer's in-house stakeholders' – users, business owners and analysts, IT personnel and procurement specialists – concerns in the early phases of IS acquisition. We try to answer *How public buyer's concerns expressed in the preliminary market consultation influence the public IS procurement project?* We analyzed 42 government documents, identify the concerns and propose a model which depicts how they influence the call for tenders and the system requirements, and further, potential vendors' choices of to bid or not, and the buyer's vendor selection. The model illustrates how and why some early concerns lead to problematic requirements, problematic vendor responses, and/or a problematic vendor selection, each having impacts later in the procurement process.

This paper is organized as follows. In Section 2, we introduce prior research. In Section 3, we present our case and research methods. This is followed by our findings, discussion, and conclusion, presented in Sections 4, 5 and 6, respectively.

2. Prior research

Public procurement is about acquiring goods and services for and by government or public organization, often by following a strictly legislated process (Europeans Union [EU], 2014; Hommen & Rolfstam, 2009). Public IS procurement correspondingly refers to the procurement of IS or related services. IS procurement can also be seen as a form of an innovation procurement since a public buyer purchases a system that does not exist at the time but would be developed during the acquisition project and which would need innovative work to fulfill the buyer's demands (Edler et al., 2006; EU, 2014).

Directive 2014/24/EU of the European Parliament and of the Council of 26th February 2014 on public procurement and repealing Directive 2004/18/EC (hereafter, the Directive; EU, 2014) is a reference law for software-related public tenders. The Directive attempts to ensure equal and nondiscriminatory treatment of software vendors, transparency in the vendor selection process, and proportionality in the requirements. It regulates the procurement process and suggests, but not defines, preliminary market consultation before starting a procurement procedure.

Public procurement process has three obligatory phases: the announcement of upcoming tender, tendering, and vendor selection. A preliminary market consultation, taking place before the announcement of upcoming tender, is beneficial for the buyer and possible vendors. The buyer may share its plans and initial requirements with the vendors' experts for discussion and clarification. At a same time, the vendors may enlarge the public buyer's market knowledge. This creates mutual understanding about the market offering and how the call for tenders should be defined. The buyer may freely modify the procurement, call for tenders, and requirements after the preliminary market consultation once they neither distort competition nor violate the principles of non-discrimination and transparency. After the buyer is satisfied with the results of a preliminary market consultation, it can start the actual procurement procedure.

There are several success factors in a preliminary market consultation (Pantilimon Voda & Jobse, 2016). First, the buyer should have a clearly identified, described and (at least partially) verified need. Second, the documents need to be specific enough to highlight specific technologies or other requirements. Third, successful market consultation requires appropriate time and resources.

Several stakeholders influence public procurement. They include the buyer and a set of potential vendors, and their internal groups, such as the people responsible for public finance, functional objectives, and IT systems. The stakeholders have different perceptions on how to define the project success, which may lead to ambiguous goals of a project (Alanne, Hellsten, Pekkola, & Saarenpää, 2015; Boyne, 2002; Rosacker & Olson, 2008). All stakeholders may have differing views and goals on requirements, payment models, contracts, and other procurement

materials, and have a voice on the final call for tenders (Boyne, 2002). Differing priorities and inconsistent definition of needs increase uncertainty and decrease the likelihood of innovation (Uyarra, Edler, Garcia-Estevéz, Georghiou, & Yeow, 2014). This makes the final call for tenders a synthesis of different objectives and expectations, to be aligned with the tendering legislation requirements (Alanne et al., 2015).

The buyer must describe the procurement documents so that they ensure equal opportunities to vendors and do not unjustifiably restrict competition (EU, 2014). The importance of unambiguous and stable requirements is emphasized (Boonstra & van Offenbeek, 2017). System requirements should be objective, coherent, and distributable (EU, 2014). The performance and the technical specifications must be sufficiently precise to allow the vendors to understand about what the buyer intends to purchase (Johansson & Lahtinen, 2012). Yet developing accurate requirements is difficult when the system is complex or when the buyer has vague knowledge about the target software (Moe, Newman, & Sein, 2017). Writing detailed and generic system requirements before knowing the winning vendor is difficult and opposite to the agile or lean ideas of creating new software solutions (Moe & Päiväranta, 2013; Poppendieck & Poppendieck, 2003). The buyer cannot refer to any specific model or origin, trademark, patent, or product that could possibly favor some vendors, but the requirements must be proportionate to the procurement's nature, purpose, and scope (EU, 2014). For example, the buyer cannot restrict the competition with certain certificates or standards but must always use the phrase "or the equivalent." These restrictions make the software acquisition difficult especially if the buyer intends to purchase an extension to its current systems landscape (Pekkala et al., 2019). Increased interaction with vendors is consequently suggested (Moe et al., 2017).

The innovation procurement literature emphasizes the outcome specifications over too rigid and narrow specifications (Uyarra et al., 2014; van Meerveld, Nauta, & Whyles, 2015). The specifications that are phrased in terms of outcomes or performance are more suitable for vendors to propose innovative solutions (Edquist & Zabala-Iturriagoitia, 2012; Uyarra et al., 2014). Design-oriented specifications cannot utilize vendor knowledge (Fisher, Delbridge, & Lambert, 2001). Although agile and lean development methods (Gerster, Dremel, Brenner, & Kelker, 2020; Poppendieck & Poppendieck, 2003) address precisely the issue of rigid predefined requirements, applying them in a regulated public IS procurement is largely unknown (Pries-Heje & Pries-Heje, 2014).

The target of the procurement is defined in the contract. The contract cross-references the project plan, system requirements specifications, vendor requirements, and commercial terms. They all are expected to be followed when the tendering is finished, during the implementation project. As unprepared changes to the contract are prohibited (EU, 2014), later changes are very difficult. On one hand, design failures, unanticipated conditions, or changes in regulatory requirements cause changes to the contract (Jamieson, Vinsen, & Callender, 2005; Tadelis, 2012). On the other hand, an incomplete contract forces the parties to negotiate adaptations to the scope of the project and its compensation. This changes the project significantly from the originally procured project (Bajari, Houghton, & Tadelis, 2014) and emphasizes IS change management (Jamieson et al., 2005).

Acquiring a new IS is often expensive and risky (de Boer, 2017; Moe, Risvand, & Sein, 2006; Pekkola et al., 2013; Shaul & Tauber, 2013). For example, ERP systems are very difficult to implement successfully: with agreed-upon requirements, withing schedule, and within budget (Brown & Vessey, 2003). Severe challenges such as changes in the work processes and benefits realization (Moe & Päiväranta, 2013), with integration and compatibility (Pekkola et al., 2013), or with heavy reliance to consultants (Brown & Vessey, 2003), have been faced.

Highly regulated procurement process controls the vendor selection and causes difficulties (Boonstra & van Offenbeek, 2017; Moe, 2014). Tendering legislation aims to advance the society's economic interests, but neither buyers' nor vendors' interests (Boonstra & van Offenbeek,

2017). This limits the buyer's decision making power, significantly differing from private sector (Halvey & Melby, 2007). The buyer must comply with the legislation when searching an IS from a set of alternatives that are neither comparable nor with easily evaluated differences (Moe & Päiväranta, 2013). This calls for procurement skills and knowledge (Edler, Georghiou, Blind, & Uyarra, 2012; Moe & Päiväranta, 2013; Uyarra, 2010; Uyarra et al., 2014).

The public procurement process, with detailed and complete requirement specifications, prepared contracts, and payment models (often only from a customer's perspective), limit the vendors' interests to bid the tenders (European Commission, 2017). This emphasizes the vendors' incentives to invest in the acquisition and the needed innovative knowledge (Cabral, Cozzi, Denicoló, Spagnolo, & Zanza, 2006). Otherwise competition is reduced and the prices increased (Alanne et al., 2015).

Altogether public procurement research, also called as "a periphery of management science" (Flynn & Davis, 2014) is rather scarce (Arbjorn & Freytag, 2012; Flynn & Davis, 2014; Lange, Telgen, & Schotanus, 2014). Even less research is committed concerning publicly procured IS (Lange et al., 2014; Patrucco et al., 2017). One rare study is Moe and Päiväranta (2013), who listed 96 public IS procurement challenges that procurement managers, CIOs, and vendors prioritized. They grouped them to 19 categories. We further summarized them into six themes (labelled C1-C6 in Table 1) and related them with other studies to gain understanding on how the buyer's concerns may influence IS procurement.

Problems and difficulties in earlier procurement projects create concerns and uncertainties later, in new procurements (Moe & Päiväranta, 2013). At the same time, the first steps in software procurement project are vital for appropriate and cost-effective IS (Hull et al., 2011). Yet they are little studied, even though their importance has been recognized (de Boer, 2017). This motivates our research.

3. Research method

Next, we will introduce the case and the research process.

3.1. Study overview and case selection

A qualitative research approach, that is suitable when studying complex research problems in a human and social context (Creswell, 2013), fits well in our objectives. As there are no extant theories to explain how buyer's concerns influence the following procurement, we decided to use the grounded theory approach (Creswell, 2013; Urquhart, 2013) to identify what concerns emerge from the preliminary market consultation documentation of a public IS procurement. We carried out a single case study as it is able to provide in-depth understanding from real-life setting (Yin, 2014). Grounded theory is "an excellent tool for understanding invisible things" (Star, 2011) – such as concerns. Using grounded theory methodology, we can construct conceptual mid-range theories that explain the empirical phenomena directly from data (Charmaz, 2004). Data collection and data analysis proceed concurrently in an iterative process. This process of moving back and forth between the data and emerging analysis focuses the collected data progressively and helps the theory-building of the analysis (Bryant & Charmaz, 2007).

Grounded theory method is based on an assumption that the theory emerges from data. Although the researcher is expected to familiarize herself with the literature (Giles, King, & De Lacey, 2013; Urquhart, 2013), there is a difference between an "open mind and empty head" (Dey, 2003). We thus developed a theory through unfolding items and relationships that emerged purely from data. Yet the theory emerges only if the researcher is "sensitive enough" (Urquhart, 2013). It is consequently inevitable that our theory relies on our interpretations in respect of our knowledge and praxis (Pekkola, Hekkala, Rossi, & Smolander, 2019). However, as a part of grounded theory research process,

Table 1

Themes of challenges in prior public IS procurement studies.

Themes of challenges
<p><i>Theme C1. Stakeholders influence the process and the outcome</i> Challenges:</p> <ul style="list-style-type: none"> • Cooperation between different stakeholders, in (Moe & Päiväranta, 2013) • Different stakeholders have ambiguous goals, and differing views on procurement, in an analysis of 34 empirical studies of both public agencies and private firms (Boyne, 2002) • Different stakeholders have different priorities and inconsistent definition of needs, in a survey of suppliers to public sector organizations in UK (Uyarra et al., 2014) • Call for tenders is a synthesis of different objectives and expectations, in a single case study of a middle-sized city, the procurement of the ICT solution for a social welfare sector (Alanne et al., 2015)
<p><i>Theme C2. Required, but strictly predefined requirements limit innovation</i> Challenges:</p> <ul style="list-style-type: none"> • Clear requirements specification, in (Moe & Päiväranta, 2013) • Complete requirements, in (Moe & Päiväranta, 2013) • Feasible requirements, in (Moe & Päiväranta, 2013) • Unambiguous and stable system requirements are required, in a single case study of a Danish electronic health record system (Boonstra & van Offenbeek, 2017) • The specifications should be phrased, in terms of outcomes or performance in a study of six public procurement for innovation cases from Sweden, UK and USA (Edquist & Zabala-Iturriagoitia, 2012), and in before mentioned (Uyarra et al., 2014) • Strict and design-oriented specifications miss the vendor knowledge, in a single case study of a library management system in UK (Fisher et al., 2001), in before mentioned (Uyarra et al., 2014), in a multiple case study of forward commitment procurement, three healthcare cases in Netherlands and UK (van Meerveld et al., 2015), and in a case study of public procurement partnerships in USA, cases of a government partner and a private sector partner (Lawther & Martin, 2005) • Especially performance and technical requirements must be clear, in an analysis of 11 IT-related call for tenders in Sweden (Johansson & Lahtinen, 2012) • Difficult to develop the requirements before knowing the possibilities, in a case study of three IS procurements from Norwegian municipalities (Moe et al., 2017)
<p><i>Theme C3. The rigid and detailed contract complicates IS change management</i> Challenges:</p> <ul style="list-style-type: none"> • Frame agreements, in (Moe & Päiväranta, 2013) • Contract parties share the same uncertainty about important design changes, often caused by a failure, happening during the project, in a progress report of recent studies (Tadelis, 2012) • Incomplete contracts force the parties to negotiate adaptations both to the scope and compensation causing significant cost effects, in an empirical analysis of adaptation costs of a construction project in USA (Bajari et al., 2014) • Changes are inevitable and they cause trouble, in too early budgeted contracts in a single case study of agile public procurement in Australia (Jamieson et al., 2005)
<p><i>Theme C4. The benefits of the IS investment are not realized</i> Challenges:</p> <ul style="list-style-type: none"> • Changes of work processes and benefits realization, in (Moe & Päiväranta, 2013) • Integration, compatibility, in (Moe & Päiväranta, 2013) • Large ERP systems have catastrophic risk to fail and while trying to reduce this risk with heavy reliance on consultants the costs overrun, in (Brown & Vessey, 2003)
<p><i>Theme C5. Highly regulated procurement process controls the vendor selection</i> Challenges:</p> <ul style="list-style-type: none"> • Lack of coordination and standardization, in (Moe & Päiväranta, 2013) • Weighing/prioritizing the assessment criteria, in (Moe & Päiväranta, 2013) • Procurement competence, in (Moe & Päiväranta, 2013) • Tendering obligations may conflict with long-term planning, in (Moe & Päiväranta, 2013) • Too much focus on costs, in (Moe & Päiväranta, 2013) • Municipal cooperation is challenging, in (Moe & Päiväranta, 2013) • Finding and using suitable assessment criteria, in (Moe & Päiväranta, 2013) • Complex regulations, in (Moe & Päiväranta, 2013) • The tendering legislation aims to advance the economic interests of society as a whole rather than those of buyers or vendors, in before mentioned study (Boonstra & van Offenbeek, 2017)

(continued on next page)

Table 1 (continued)

Themes of challenges
<ul style="list-style-type: none"> Regulated procurement process requires skills, knowledge, and market expertise, in (Edler et al., 2012) <p>Theme C6. Limited interest from vendors limits competition Challenges:</p> <ul style="list-style-type: none"> Monopoly-resembling vendor conditions, in (Moe & Päivärinta, 2013) Vendors tend to oversell, in (Moe & Päivärinta, 2013) The vendors do not get to show their qualities, in (Moe & Päivärinta, 2013) Use of standard contracts for software acquisitions may limit competing vendors, in a case analysis of two information system acquisitions of a Norwegian municipality (Moe et al., 2006)

the emerged local theory is then reflected with the literature to achieve a more generic mid-range theory.

We study an IS acquisition project, started in 2015, and its preliminary market consultation phase that Finnish governmental agency with 1900 employees (subsequently referred to as the Agency). The Agency facilitates its governmental role nationally and with other EU countries, offers customer-oriented services, and protects society, the environment, and the citizens. The first author was employed as a procurement specialist during the preliminary market consultation phase. This allowed us to gain insights into the IS acquisition process. The procured information system is an enterprise-wide system that supports the Agency's core activities internally and with their customers: that is, with a variety of organizations, firms, citizens, and third party organizations in Finland, in the EU, and internationally. The renewed system replaces a set of information systems, mostly created in the early 2000's.

The Agency granted us access to all project documentation, including the materials from the preparatory work, preliminary market consultation, actual procurement, the contracts, and internal memos and meeting minutes from the project. To make sense of this vast collection, we decided to focus on two areas: the prior information notice with the request for preliminary market consultation, and project documentation about the preliminary market consultation project itself. These included 78 documents and directories containing numerous documents that were sent to potential vendors or were used by the Agency itself.

The concerns tend to change over time and when collaborating with others. As we wanted to study the first notions of the buyer's concerns, not the concerns adopted from the market or influenced by the latter project phases, we focused on the early phases of the acquisition. We also excluded the vendor input and possible interviews at the Agency: altered concerns, opinions and experiences would increase the risk of unreliable data. Instead we focused on preliminary market consultation documentation and the Agency's internal project documents. This allowed us to triangulate official external documentation with informal internal documents.

The document analysis, and the removal of those with no concerns e. g., technical details, budget, etc., resulted our final dataset of 42 documents. The dataset (listed in Appendix) included the documents sent to the registered vendors, questions concerning functional requirements, proof-of-concept scenarios, IT environment issues, process descriptions, technical suitability, the contract template, and security issues. Internal documents consist of the project meeting minutes and memos, internal planning documents, and different procurement documentation drafts.

3.2. The case: An overview

The EU regulation related to the Agency's core operations changed dramatically in 2013. The Agency had to react the essential and obligatory change, so it decided to renew its old IS. The strict timetable of the EU regulation made the update of the current IS technically and cost-effectively impossible. As the EU regulation change inflicted all EU member countries, the Agency representatives decided to visit them and

study their solutions. During these visits, it became clear that there was neither a single solution nor a complete product that would fit the changing legislation. Instead, some prototypes and platforms that might be used as bases for a new IS existed even the Agency acknowledged that it would be less risky to proceed with a vendor familiar with previous legislation. Although the Agency had acquired set of systems serving similar functionality in the beginning of 2000, it lacked up-to-date knowledge about different alternatives. A strong partner was thus seen essential. To find one, the need for preliminary market consultation that would reveal the market situation, provide a basis for budgeting, and ensure equal treatment of the vendors was quickly understood.

In this paper, we focus on the preliminary market consultation that was undertaken as a small separate project in March to July in 2015. The project team comprised 17 members from four groups (members partly overlap in different groups):

- Functionality: six specialists from the responsible business unit, and two domain architects, and one business system specialist from ICT department
- Technical suitability: four architects (including a consultant) from the ICT department, targeted in information security and system architecture
- Procurement and security: procurement specialist, security expert, information security expert, two specialists from finance systems and a procurement consultant
- Deployment: two domain architects, one business specialist, one business system specialist, and a deployment expert

In addition to these people, a business expert, two project managers, a secretary, a director of the responsible business unit and four other business directors participated the vendor meetings. The project team reported to the steering group comprising 9 people from the responsible business unit, ICT department, and other business units.

The project team prepared a set of detailed questions and instructions on how to create a proof of concept to be sent to potential vendors. Then the process continued with a public announcement, that is, an information notice. Six vendors stepped forward to ask for the questions and the instructions. The vendor answered them and prepared a proof of concept. During this preparation process, the vendors and the preliminary market consultation team held numerous meetings to assure their mutual understanding about the vendors' solutions and how they could solve the customer's needs. Finally, the project team recapitulated the vendors' suggestions and presented the summary to the decision-makers with a plan for the actual procurement.

After the preliminary market consultation was finished, the procurement process started at the end of 2015 and lasted for 12 months until the contract with a vendor was signed.

3.3. The analysis procedure

In the open coding phase, we used a bottom-up approach (Urquhart, 2013). First, all references to the customer-vendor cooperation related concerns were identified from the data and gathered for a list of open codes. We refer to these as "concerns in detail". They include direct quotations and their interpretations (Urquhart, 2013). Once new instances were identified, they were added to the list. The first author reviewed the data several times to ensure that they contained all possible instances. Next, all concerns in detail were analyzed and categorized into low-level categories, called as "concerns in short". These low-level categories were then grouped into main categories, called as "concern groups", as our final selective codes (Urquhart, 2013). Table 2 shows an example of the coding process.

Then, the relations between the selective codes were constructed. Four concern themes emerged (labelled T1-T4):

Table 2
Example of coding concerns using the grounded theory method.

In the Requirements for deployment document, the customer asks for preliminary market consultation from the vendors (directly quoted from the document, the concerns are marked in bold):	
“Please present your own view of a realistic phasing of deployment that would suit you. Please describe which phases rely on existing products or product modules. ”	
Open coding:	Concern in detail: What is a realistic and reasonable phasing of deployment? Concern in short: Realistic timetable
Selective coding:	The concern in short was added to the concern group: Forced timetable The concern group was added to the concern theme: T1. Concerns related to the actualization of objectives and drivers

- T1. Concerns related to the actualization of drivers and objectives, representing the project owner’s perspective
- T2. Concerns related to the suitability of the solution, signifying the Agency’s technical desires
- T3. Concerns related to the successful procurement process, representing the commercial and procurement point of view
- T4. Concerns related to the successful delivery, aggregating the concerns for the selected vendor and its ability to successfully deliver the desired solution

The concern themes varied between internal groups. Each group at the Agency: functionality, technical suitability, procurement and security, and delivery, were responsible of documenting their respective questions to the vendors, understanding the vendor responses, attending to the vendors’ proof of concept meetings, and recapitulating the results of the preliminary market consultation from their perspective. This division is apparent on the research data. T1. Concerns related to the actualization of objectives and drivers mostly originate to the business unit and ICT department and T3. Concerns related to the successful procurement process are the procurement and security professionals’ concerns. T2. Concerns related to the suitability of the solution and T4. Concerns related to the successful delivery are common to all stakeholders. This categorization enabled us to go beyond the most self-evident categories (e.g., timetable-related issues, security-related issues) to their actual contexts and meanings.

The public procurement legislation and the Directive stipulates the vendor selection. The legislation defines issues in the call for tenders, that is, the procurement specifications, instructions on how to bid, vendor eligibility conditions, technical specifications, and the comparison of tenders (EU, 2014). Ideally the requirement specifications, the project plan, and a contract draft are attached to the call for tenders (Pekkala et al., 2019). The Agency drafted these documents during the preliminary market consultation process, so we were able to use legislation as a lens to investigate how different concerns influenced the procurement process. Consequently, we inductively analyzed the relations between the procurement documents and the concern themes. Finally, we presented our findings to the Agency representatives (chief procurement officer and project leaders), who participated in the preliminary market consultation phase, to verify that our interpretations corresponded to the reality.

4. Findings

Table 1 earlier summarized the challenges of large, publicly procured, IS projects. Some of these challenges emerged also in our study. In this section, we will first present our findings theme by theme. We then mirror them to earlier identified challenges in Table 1 to see their similarities and differences. Finally, we will create a model of explaining how the concerns influence the requirements and the vendor selection.

4.1. Public buyer’s concerns expressed in the preliminary market consultation

Some concerns were specific to our case Agency. For example, concerns in the theme T1. Concerns related to actualization of objectives and drivers, especially Forced timetables, Cost savings needs, Legislation changes, and Operational objectives are specific to the Agency’s goals. The theme T2. Concerns related to the suitability of the solution contains agency-specific concerns of the solution’s security, possible prototype, and context-specific requirements. For example, the Agency’s inquire: “Please provide us documentation that describes the [system’s] information security controls and practices of the system” (Document: “Questionnaire of technical suitability”) tries to predict the solution’s security (concern System security). Being such important information, the vendor needs to know it as early as possible. In the same document, the Agency asked also “If different procedures are implemented using separate products or [the] product modules use different solutions or are implemented at different levels, please describe these differences as clearly as possible”. This implies that the solution may contain different modules (concern Partially ready functionality). Also, the theme T3. Concerns related to the successful procurement process contains agency-specific concerns in concern groups Procurement security, and Fully responsible vendor.

The Agency described potential IS implementation change as following: “The deployment of the product, its adjustment and the development of new functionalities are substantial effort[s] for [the Agency]. It is also a significant adjustment phase in the [business] operations.” (Document: “Request for information”). This is categorized in T1. Concerns related to actualization of objectives and drivers. The concern Situation of leading the change (in concern group Insufficient internal knowhow) supports Moe and Päiväranta’s (2013) challenge of Changes of work processes and benefits realization in C4. The benefits of the IS investment are not realized.

The theme T2. Concerns related to the suitability of the solution has concerns in Operational appropriateness and Architectural appropriateness that resemble Moe and Päiväranta’s (2013) challenge Integration, compatibility in C4. The benefits of the IS investment are not realized. With a concern Common understanding of needed documentation our case supports the challenges in C2. Required, but strictly predefined requirements limit innovation. Our Agency tries to ensure that the vendors’ specifications meet its’ standards: “What documents can you deliver us now? Please also list documents that you will deliver after signing the contract” (Document: “Questionnaire of technical suitability”).

The theme T3. Concerns related to the successful procurement process contains the concern group Choosing the legitimate vendor that supports the challenges in C5. Highly regulated procurement process controls the vendor selection. The theme also contains the concern group Tendering obstacles, which supports challenges in C2. Required, but strictly predefined requirements limit innovation (concern Loads of documents). These concerns have not been identified earlier. However, more interestingly concerns Uncertain market behavior and Understanding of market solutions (in concern group Delivery), and the concern Procurement scope (in concern group Procurement boundaries), do not have counterparts in previous studies. In the preliminary market consultation phase, the Agency could not foresee the market behavior: “The objective of the [legislation change in the Agency’s field] is to deploy a reliable [information] system that meeting the requirements of the [...] legislation and offering adequate functionalities. The system should harmonize the [...] processes so that they are independent of [the Agency’s] procedures as far as possible” (Document: “Request for information”). Also “the purpose of the procurement related questions is to ensure that [the Agency] and the market operator share a common view on the offering of the market operator” (Document: “Questionnaire of procurement and security issues”). These quotes show the Agency’s limited market knowledge.

The procurement scope is critical in the preliminary market consultation phase. The document “Questionnaire of procurement and security issues” poses several questions attempting to ensure the scope is defined adequately. For example: “The scope [...] describes the preliminary planned procurement objectives. It is therefore important that [the Agency] knows if a market operator does not have some of the required competence in its solution or service operation”. Apparently, the Agency had concerns about the market interest due to their limited market knowledge. They tried to cope this with a concern of scope.

Concerns in the theme T4. Concerns related to the successful delivery focus especially on the vendors (concern groups Multidimensional knowhow, Locality, Commitment, Financial stability, Vendor security, Common ways of working). The concerns circulate around the system features and the vendor’s abilities, and how the vendor establishes its subcontractor chain and cooperation model to be able to deliver the services. For example, a quote: “To support the success of the project, we are primarily looking for a market operator/consortium of operators with a strong deployment competence, in-depth competence related to [domain], product integration competence, special competence in the product, competence regarding the automation of testing as well as the required competence concerning the technical environment of the product” (Document: “Request for information”) reveals the concern Comprehensive knowhow requirements. These concerns are agency-specific, and not seen in the previous studies. However, this theme represents an assumption that the vendor can one day fulfill its requirements: vendor personnel, their skills and motivation, exist and is available throughout the acquisition process as offered in the procurement phase.

4.2. Emerging influences on the public IS procurement project

Table 3 lists the concern themes and the concern groups, and answers the first part of our research question, “What are the public buyer’s concerns expressed in the preliminary market consultation?” The list has 58 individual instances of concerns, categorized into 24 groups and 4 themes. To answer our second research question and understand how these concerns later influence vendor selection and system requirements, further investigation is needed.

The procurement documentation is regulated by the Directive. This makes the Directive useful for analyzing the documents and understanding how the concerns influence the procurement process. We compared the concern themes with the Agency’s procurement documentation drafts, such as the project plan, requirement specifications, contract issues, and the call for tenders, to see their mutual dependencies.

The call for tenders is used only during the vendor selection. However, its attachments include the project plan, requirements specifications, and the contract, which, in turn, are used throughout the forthcoming acquisition project. We thus searched for chains of concerns that strengthened or weakened the relations. Again, through an iterative process, it became evident that the concerns influence the systems requirements (long-term effect) and the vendor selection (short-term effect).

Concerns influence systems requirements, and they remain effective even after the procurement process has finished and the acquisition project has started. These influences inspire the project plan, requirement specifications, and the contract, all evolving during the solution lifecycle. The influences (labelled R1-R7) are described in Table 4.

Concerns influence the vendor selection, and these effects last only to the end of the procurement process. These influences define the procurement project and its actions. These influences (labelled V1-V5) are described in Table 5.

As a result of this iterative process of labeling the relations, we analyzed all concern themes and the concern groups, and their long-term influences on system requirements (R1-R8) and their short-term influences on vendor selection (V1-V4). We then constructed a model

Table 3 From concerns in short to concern themes.

Concerns in short	Concern groups	Concern themes and explanations
Realistic timetable, structure of a project, testing optimization	Forced timetables	T1. Concerns related to actualization of objectives and drivers
Cost savings from other customers, current commitments, references, maintenance optimization	Cost savings needs	These concerns represent the business unit aspirations, and the end-user demands in a changing legislation environment. The business unit is responsible for knowing why the new solution is needed. The concerns form the starting point of the other themes.
Insufficient current IS, legislation changes.	Legislation changes	
Architecture uncertainties, situation of leading the change, need for new skills and competences	Insufficient internal knowhow	
Saving customer work, professionalism in the market, effectivity objectives	Operational objectives	
Personnel insufficiency, testing personnel insufficiency, resource optimization needs	Work-savings needs	
Procurement scope	Procurement boundaries	T3. Concerns related to the successful procurement process
Loads of documents, market obstacles	Market interest	
Negotiation confidentiality	Procurement security	These concerns take the procurement perspective. The concerns focus on how to procure the solution in the frame of the previous concern themes.
Vendor alliances, vendor’s broad responsibilities	Fully responsible vendor	
Ensuring legitimacy, choosing the solution, choosing vendor, risks of market court appeal	Choosing the legitimate winning tender	
Pricing complexity, demanding security requirements, hindering license terms, contractual sanctions	Tendering obstacles	
Uncertain market behavior, understanding of market solutions	Delivery	
Specific national requirements	Context-specific requirements	T2. Concerns related to the suitability of the solution
Partially ready functionality, common understanding of needed documentation	Solution is still a prototype	This theme represents the concerns of how compatible the system is from the technical, operational, architectural and security point of view.
System security	Solution security	
Architecture compatibility, infrastructure suitability, integration abilities, traceability, scalability	Architectural appropriateness	
Maintenance of the current state of action, information usability, product development practices	Operational appropriateness	
Comprehensive knowhow requirements, customer-specific knowhow	Multidimensional knowhow	T4. Concerns related to the successful delivery
Vendors’ local appearance, Finnish-speaking skills	Locality	Here, the concerns synthesize the other concern themes as they represent the concerns regarding the selected vendor and its ability to deliver the project successfully. These emerge after the issues in the previous concern themes transpired.
Long-term commitment, vendor dependency	Commitment	
Vendor’s financial stability	Financial stability	
Subcontractor chain security, geographical restrictions, vendor’s security level, solution security issues	Vendor security	
Cooperation model	Common ways of working	

Table 4
Influences on the system requirements.

Influence	Description
R1. Project focus, timetable, and resources	T1. Concerns related to the actualization of objectives and drivers form the starting point of the system renewal project. They have an impact on the project focus, the timetable, and which resources are available and can be included in the project plan. For example, the timetable from the renewed legislation is straightforwardly transferred into the project plan.
R2. Solution preconditions	T2. Concerns related to the suitability of the solution form the system boundaries. They have a significant influence on project planning. For example, no off-the-shelf solution is available, so the timetable needs to be prolonged.
R4. Requirements for the applicable solution	T2. Concerns related to the suitability of the solution form the system requirements, such as technical and functional requirements.
R3. Project contents	The project plan is included in the contract. The plan defines the acquisition project details, such as the timeline, participants, tasks, reporting, and change management.
R5. Solution contents	The requirement specifications describe the contents of the project and the procured system. The specifications are included in the contract so that these can be used during the procurement and later during the project.
R6. Commercial terms	T3. Concerns related to procurement are the commercial terms of the contract. They include worries, such as both parties' liabilities and approved ways to make changes during the delivery.
R7. Vendor suitability requirements	T4. Concerns related to the successful delivery set the requirements for potential vendors. The contract includes worries, for example, requirements for services and cooperation, from this concern theme.

Table 5
Influences on the vendor selection.

Influence	Description
V1. Procurement process objectives	T1. Concerns related to the actualization of objectives and drivers form the starting point of the system renewal project. They influence the procurement process objectives.
V3. Award criteria	The call for tenders includes the award criteria. There are criteria that must be met, but also criteria that rank the vendors according to qualitative and/or quantitative merits. The most significant issues of the requirement specifications are used as the award criteria. These may contain issues from the requirements for the applicable solution and the vendor eligibility conditions.
V4. Target of the procurement	The contract defines the procurement and the acquisition projects' contents. In the procurement phase, the contract issues are included in the call for tenders.
V2. Procurement process preconditions	T3. Concerns related to the procurement form the procurement preconditions, such as security requirements and appropriate methods and details for the procurement process.
V5. Vendor eligibility conditions	T4. Concerns related to the successful delivery set the requirements for potential vendors. The requirement specifications include worries, for example, locality requirements and financial stability requirements, from this concern theme. These are used as the award criteria in the procurement.

around four key documents framing the acquisition: acquisition project's **project plan**, **requirements specification** of the intended solution, and **contract**, all to be included in the **call for tenders**. The model (illustrated in Fig. 1) answers to our research question as a whole and represents how various concerns expressed in the preliminary market consultation influence public IS procurement project. The influences on the system requirements (R1-R8) are marked with solid arrows and

influences on the vendor selection (V1-V5) are marked with dashed arrows, arrows representing the directions of the influences.

Fig. 1 shows that T1. Concerns related to the actualization of objectives and drivers influence system requirements directly via project plan (R1. Project focus, timetable, and resources) and indirectly via contract (R3. Project contents). They also influence vendor selection via call for tenders (V1. Procurement process preconditions). T2. Concerns related to the suitability of the solution influence system requirements directly via project plan (R2. Solution preconditions) and requirement specifications (R4. Requirements for the applicable solution), and indirectly via contract (R5. Solution contents). These concerns influence the vendor selection indirectly via requirements specifications (V3. Award criteria). T3. Concerns related to the procurement influence system requirements via contract (R6. Commercial terms), and vendor selection via call for tenders (V2. Procurement process preconditions). Similarly, T4. Concerns related to the successful delivery influence system requirements directly via contract (R7. Vendor suitability requirements), and vendor selection via contract (V4. Target of the procurement) and via requirements specifications (V5. Vendor eligibility conditions, V3. Award criteria).

5. Discussion

Our findings are discussed next. First, we reflect the public buyer's concerns to earlier challenges in publicly procured projects in Table 1. Second, we analyze their influences on the public IS procurement project.

5.1. Public buyer's concerns in the early phase of IS acquisition

Some of our concerns emerged as earlier challenges. The theme C1. Stakeholders influence the process and the outcome in Table 1 expresses the stakeholders' influence and respective challenges (Alanne et al., 2015; Boyne, 2002; Moe & Päiväranta, 2013; Uyarra et al., 2014). The stakeholders influence the process, for example, by having unaligned and dissimilar concerns. This was not a problem in our case even numerous stakeholders: from responsible business unit, ICT department, technical and domain experts, delivery experts, security specialists, and procurement experts and supporting consultants participated in the preliminary market consultation. The reasons may be the following. First, the Agency had a hierarchical management culture where the project participants were nominated, and their responsibilities were clarified by a written decision before the project started. Also, they were approved by all related units. The stakeholders' personal influences were consequently at least implicitly acknowledged. Second, because of a slow EU legislation process, the need of renewing the system had been known years before the actual preliminary market consultation. Expectations, attitudes and resistance to change may thus already be settled, and different stakeholders had found their places. Third, our data is mainly about documents sent to the vendors. There internal conflicts may not be that apparent.

When the Agency started the preliminary market consultation project, the T1. Concerns related to actualization of objectives and drivers were raised first. The concern Need for new skills and competences (in the concern group Insufficient internal knowhow) emerged from new technical solution and abilities to lead to change. However, there was no concerns about missing procurement competence. This is contrary to Moe and Päiväranta's (2013) but can be explained that the Agency had increased its Procurement competence by hiring an experienced procurement consultant. This indicates the Agency had acknowledged the challenges in the public sector coordination (compare Moe & Päiväranta, 2013) and tried to cope with it by recruiting trusted consultants before the project.

Some new concerns emerged. These concerns were usually agency-specific and related to its' goals. For example, the concerns Uncertain market behavior and Understanding of market solutions (concern group

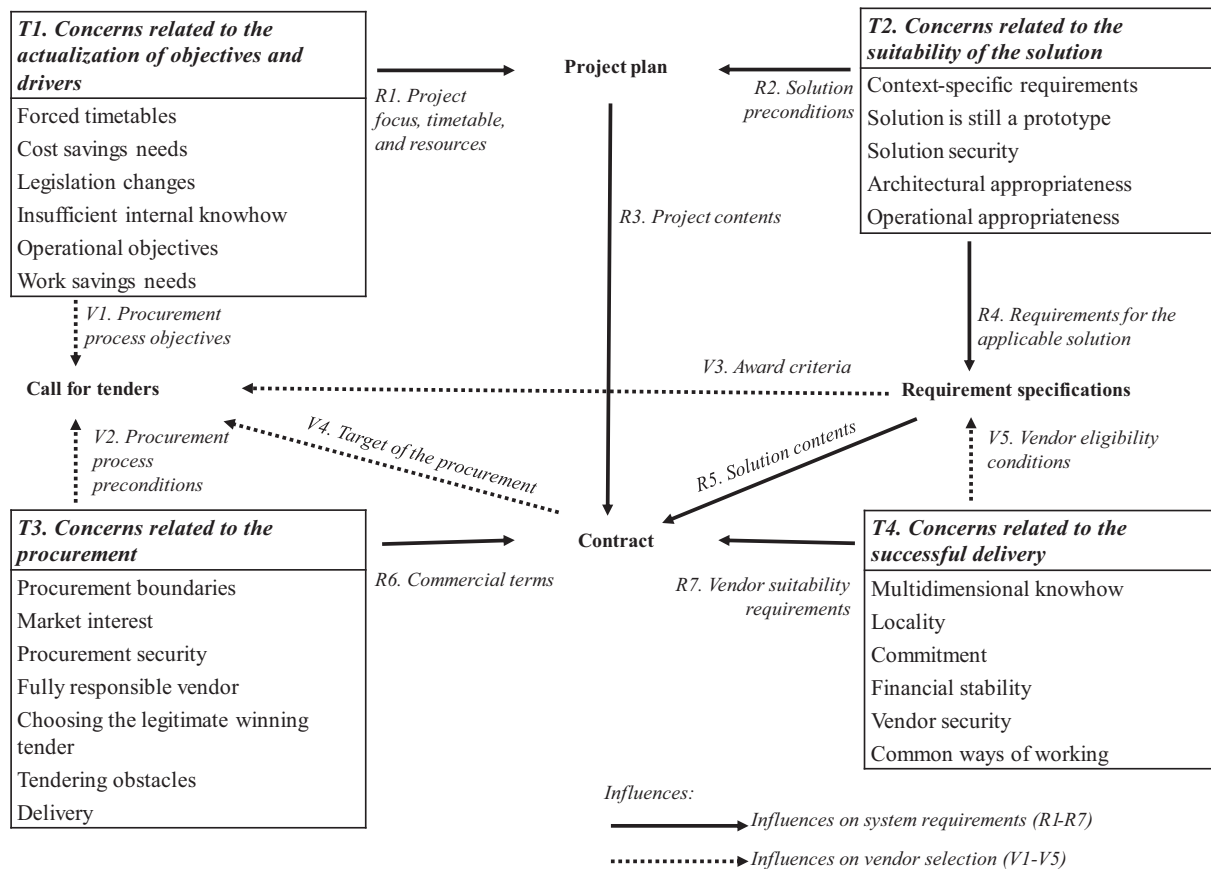


Fig. 1. Model of concerns influencing the public IS procurement project.

Delivery) do not correspond the challenges. The challenge Procurement competence does not have the dimension of market knowledge. Although tendering obstacles are observed, the concerns reach behind them. This is surprising as the practitioners have acknowledged that the procurement specialists need to have a broad market knowledge (Pekkala et al., 2019).

Also concerns regarding to vendor suitability e.g., Cooperation model, Vendor’s financial stability, Vendor’s security level (Theme V4. Concerns related to the successful delivery), are new. Moe and Päivärinta (2013) raise a challenge Cooperation between different stakeholders but comprise different customer stakeholders only from the vendor’s perspective. Instead, our study emphasizes the need for finding a suitable vendor at the beginning, and for keeping it throughout the long project.

5.2. Concerns influencing system requirements

The concerns influence the IS acquisition through the documents that are attached to the call for tenders. Later on in the acquisition project, they steer and influence the process and the outcomes (Jamieson et al., 2005).

The concerns influence the target IS, its requirements and the forthcoming acquisition project in several ways. These requirement-related influences were marked with solid arrows R1-R7 in Fig. 1 and explained in detail in Table 4. For example, management support has an impact R1. Project focus, timetable, and resources on the project plan (see also Atkinson, 1999; Rosacker & Olson, 2008). Similarly, T2. Concerns related to the suitability of the solution influence the project plan (Chin, 2004) as R2. Solution preconditions.

When examining R4. Requirements for the applicable solution in detail, individual concerns, such as Operational appropriateness or

Architectural appropriateness, and Solution security and readiness, as well as their influence on the requirements, become evident. This means coping with the concern for Architectural appropriateness, for example, improves the quality of the requirement specifications through a long chain reaction.¹

In the procurement process, the buyer wants to buy a solution that fits its needs well (Poon & Yu, 2010). The vendor thus needs plans and specifications well in advance to be able to respond those needs (Jamieson et al., 2005; Tadelis, 2012). This relation is presented in Fig. 1 through influences R5. Solution conditions and R3. Project contents to the contract. The contract contains the compensation schemes (price, time, and materials), and is influenced by R6. Commercial terms from T3. Concerns related to the procurement (Bajari & Tadelis, 2001; Tadelis, 2012), and by commitment and financial stability issues, represented with the influence R7. Vendor suitability requirements from T4. Concerns related to the successful delivery. These exist both in traditional and agile contracts (Opelt, Gloger, & Pfarl, 2013).

5.3. Concerns influencing vendor selection

The main document in the vendor selection phase is the call for tenders (EU, 2014). According to the Directive, the call for tenders must include the procurement specification, contract award criteria, procurement process preconditions such as dates and regulations for the bids, and other information that the vendor needs for bidding (Pekkala et al., 2019). The concerns influence the call for tenders in several ways. These influences V1-V5 are marked with dashed arrows in Fig. 1 and explained in detail in Table 5. The procurement specification influences

¹ A similar analysis can be conducted on each concern theme and concern. However, we have excluded this here because of space limitations.

V1. Procurement process objectives, V4. Target of the procurement, and V2. Procurement process preconditions, all leading to the call for tenders. The contract award criteria are formed from the requirement specifications, being influenced by V5. Vendor eligibility conditions from T4. Concerns related to the successful delivery.

The procurement process starts with the call for tenders (EU, 2014). The project mission (i.e., an explicit statement of goals and objectives) is the result of influence V1. Procurement process objectives from T1. Concerns related to the actualization of objectives and drivers (Rosacker & Olson, 2008). By having a straight relation and not only bypassing through the project plan and the contract, it diminishes the IS professionals power to influence the target IS objectives (Howcroft & Light, 2006).

The call for tenders specifies the requirements and the contract terms (EU, 2014). The Directive regulates how the signed contract can be modified (EU, 2014). Basically, it is possible only if the modifications, irrespective of their monetary value, have been stated in the initial procurement documents in precise and unambiguous clauses, with possible price revision clauses or options. This makes the contract rigid (Beuve, Moszoro, & Saussier, 2019; Dawson, Watson, & Boudreau, 2010), although it should be able to evolve according to the changes in the environment (Tadelis, 2012). This relation with contract is marked with an influence V4. Target of the procurement leading to the call for tenders (Fig. 1).

The call for tenders must include all necessary information for the vendors to bid. This ranges from technical data (for example, dates and addresses) to acceptance of alternate or partial bids and procurement process security issues (Pekkala et al., 2019). This relation with T3. Concerns related to the procurement is marked with V2. Procurement process preconditions leading to the call for tenders (Fig. 1).

The procurement is not allowed to restrict competition, but the most economically advantageous tender must be awarded (EU, 2014). The best price-to-quality ratio is assessed based on the predefined criteria, including qualitative merits (for example, technical merits, functional characteristics, trading, and its conditions), organizational merits (the staff's qualifications and experiences to be able to fulfill the contract and delivery conditions and/or perform the process), and quantitative (that is financial) merits. The award criteria contain both the vendor eligibility conditions and the requirements for the applicable solution (EU, 2014). This relation is illustrated by 3. Award criteria leading from requirement specifications to the call for tenders. It combines the influence R4. Requirements for the applicable solution from T2. Concerns related to the suitability of the solution, and V5. Vendor eligibility from T4. Concerns related to successful delivery with the requirement specifications (Fig. 1).

Our insights can be distilled into the form of propositions. They are:

P1. Concerns are feelings, worries, and expectations that something might go wrong. They significantly influence the procurement process and its documents, possibly leading to challenges later in the procurement project.

P2. Concerns influence the procurement process and its documents both directly when their impacts are evident and indirectly through a long chain of actions. This makes their identification and management difficult.

P3. Concerns and their influences are pervasive. For example, the vendor related concerns influence not only the contract but also requirements specification and the call for tenders. Consequently, solving one concern has wide-reaching consequences.

P4. Concerns influence the contract. This means the concerns emerging at the preliminary market consulting phase influence the IS throughout its lifetime, not just during the acquisition project.

6. Conclusion

In this paper, we have presented a study where a public buyer familiarized itself with possible ISs on the market so that it can start the

tendering procedure and ultimately acquire the best alternative. The preliminary market consultation phase allows the public buyer to gather knowledge (that is otherwise unavailable) and use it for writing a better call for tenders (EU, 2014; Pekkala et al., 2019; Uyarra et al., 2014).

We listed the public buyer's concerns in the preliminary market consultation documentation (Table 3) and reflected them the public IS procurement challenges (Table 1). We compared the concerns and the challenges. Two challenges; stakeholders' influences and procurement skills, do not have support in the concerns list. The Agency seems to have dealt both issues before the preliminary market consultation phase. This suggests that the concerns may rise a long before the actual acquisition begins, and they can be tackled with concrete actions: by defining the stakeholders and their responsibilities, by assembling an appropriate team with clear responsibilities (see Section 3.2), and by strengthening the team with trusted and skilled external consultants.

There are severe concerns related to market knowledge and suitability of the vendor. These are not identified earlier. We argue that the project-lasting suitability of the vendor is one of the success factors in large IS acquisitions (see also Moe and Päiväranta's (2013) challenge Cooperation between different stakeholders). The Agency's market knowledge is essential when preparing and committing the procurement process. We suggest that these issues need more research, for example in successful IS projects.

Our model (Fig. 1) presents how the concerns influence the call for tenders and the system requirements. The call for tenders influences the vendors' potential to bid and the buyer's selection among the bidding vendors. The model visualizes the concerns that significantly influence the vendor selection and system requirements, that is, the procurement process and the acquisition project. Our model reveals how some concerns lead to rigid and problematic set of requirements when both T2. Concerns related to the suitability of the solution, and T4. Concerns related to the successful delivery, are combined in requirement specifications. This leads to problematic vendor responses, as they try to innovate in a too tight environment. The vendor selection gets problematic when the V3. Award criteria is influenced by a long list of requirements, which do not correspond the market situation (concerns Uncertain market behavior and Understanding of market solutions). Consequently, to improve public IS procurement, a public buyer should cope with the root causes of the IS procurement challenges. This means acknowledging the concerns and possibly resolving them, both during the procurement and during the actual project. Here our list of concerns (Table 3) and their influences (Fig. 1, Table 4, Table 5) will be helpful.

We contribute to research by illustrating the concerns and emphasizing their relations, especially the relation between the concerns related to successful procurement process and the suitability of the solution. We elucidate the twofold characteristics of the requirement specifications constituting the vendor selection criteria from the solution and the vendor eligibility perspectives, and later formulating the project contract. These issues are scarcely studied in IS research and their technological relations are neglected in the innovation procurement literature. For practitioners, our study provides a hands-on model of how the stakeholders' concerns influence the procurement process. Dealing with them is a management task.

Our study has some limitations. First, we have explored a single case, so the results should be cautiously generalized. Nevertheless, the concerns and their relations with each other and with the procurement documents are aligned with the literature. Second, we have deliberately focused on the preliminary market consultation phase, that is, the public buyer's initial concerns. It is possible that some concerns will emerge later, during the market consultation, or during the procurement process especially if the procurement procedure offers opportunities to alter the requirements (EU, 2014; Moe et al., 2017). Likewise, some concerns may disappear. Nonetheless, considering the small number of studies on the topic, these early phase illustrations are already valuable.

The study opens new research avenues. First, more research on concerns and their relations and instantiations is needed to provide

comprehensive understanding and stronger theoretical basis. Second, it would be interesting to study how these concerns influence (the far too common) IS project failures. For example, would negative experiences, resulting in rigid requirement specifications, lead to change management difficulties during the IS implementation, or would those undesirable experiences be overcome by well-performed change management activities? On the other hand, would the Agency's market knowledge or long-lasting vendor suitability correlate with project success? Third topic would be to study whether the concerns (Table 3)

and their relations (Fig. 1) help procurement projects in handling the stakeholders' various perspectives. Doing so can perhaps reduce the number of worries that public IS buyers constantly face.

Declaration of Competing Interest

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

Appendix A. Documents used as research data

Category	Document	Date
Document sent to vendor	Request for information	25th of March 2015
Document sent to vendor	Description of the scope	25th of March 2015
Document sent to vendor	Non-disclosure agreement	25th of March 2015
Document sent to vendor	Questionnaire of functional requirements	25th of March 2015
Document sent to vendor	Questionnaire of process requirements	25th of March 2015
Document sent to vendor	Questionnaire of user interface requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business A] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business B] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business C] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business D] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business E] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business F] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business G] requirements	25th of March 2015
Document sent to vendor	Questionnaire of [business H] requirements	25th of March 2015
Document sent to vendor	Proof of concept scenarios	25th of March 2015
Document sent to vendor	System environment	25th of March 2015
Document sent to vendor	Target area	25th of March 2015
Document sent to vendor	Integrations	25th of March 2015
Document sent to vendor	Generic process and required functionalities	25th of March 2015
Document sent to vendor	[Business] Concepts	25th of March 2015
Document sent to vendor	Glossary	25th of March 2015
Document sent to vendor	Questionnaire of technical suitability	25th of March 2015
Document sent to vendor	Electronic document management and archiving	25th of March 2015
Document sent to vendor	Questionnaire of procurement and security issues	25th of March 2015
Document sent to vendor	Introduction into security agreement	25th of March 2015
Document sent to vendor	Deployment requirements	25th of March 2015
Meeting minutes	Project meeting	31st of March 2015
Meeting minutes	Project meeting	7th of April 2015
Meeting minutes	Project meeting	21st of April 2015
Meeting minutes	Project meeting	28th of April 2015
Meeting minutes	Project meeting	5th of May 2015
Meeting minutes	Project meeting	12th of May 2015
Meeting minutes	Project meeting	19th of May 2015
Meeting minutes	Project meeting	8th of June 2015
Meeting minutes	Project meeting	8th of June 2015
Meeting minutes	Project meeting	23rd of June 2015
Meeting minutes	Project meeting	30th of June 2015
Planning document	Procurement issues	18th of March 2015
Planning document	Procurement issues	26th of May 2015
Planning document	Tentative procurement plan	4th of April 2015
Planning document	Tentative vendor eligibility conditions and award criteria	15th of April 2015
Project document	Actualized costs and used resources	16th of May 2017

References

- Alanne, A., Hellsten, P., Pekkola, S., & Saarenpää, I. (2015). Three positives make one negative: Public sector IS procurement. In , 9248. *Lecture notes in computer science (Including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics)* (pp. 321–333). https://doi.org/10.1007/978-3-319-22479-4_24.
- Arlbjorn, J. S., & Freytag, P. V. (2012). Public procurement vs private purchasing - is there any foundation for comparing and learning across the sectors? *International Journal of Public Sector Management*, 25(3), 203–220. <https://doi.org/10.1108/09513551211226539>.
- Atkinson, R. (1999). Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6), 337–342. [https://doi.org/10.1016/S0263-7863\(98\)00069-6](https://doi.org/10.1016/S0263-7863(98)00069-6).
- Bajari, P., Houghton, S., & Tadelis, S. (2014). Bidding for incomplete contracts: An empirical analysis of adaptation costs. *American Economic Review*, 104(4), 1288–1319.
- Bajari, P., & Tadelis, S. (2001). Incentives versus transaction costs: A theory of procurement contracts. *The Rand Journal of Economics*, 32(3), 387–407. <https://doi.org/10.2307/2696361>.
- Beuve, J., Moszoro, M. W., & Saussier, S. (2019). Political contestability and public contract rigidity: An analysis of procurement contracts. *Journal of Economics and Management Strategy*, 28(2), 316–335. <https://doi.org/10.1111/jems.12268>.
- de Boer, L. (2017). Procedural rationality in supplier selection: Outlining three heuristics for choosing selection criteria. *Management Decision*, 55(1), 32–56. <https://doi.org/10.1108/MD-08-2015-0373>.
- Boonstra, A., & van Offenbeek, M. A. G. (2017). Shaping a buyer's software selection process through tendering legislation. *Information Systems Journal*, 28(5), 905–928. <https://doi.org/10.1111/isj.12174>.
- Boyer, G. A. (2002). Public and private management: What's the difference? *Journal of Management Studies*, 39(1), 97–122.
- Brown, C. V., & Vessey, I. (2003). Managing the next wave of Enterprise systems: Leveraging lessons from ERP. *MIS Quarterly Executive*, 2(1), 65–77.

- Bryant, A., & Charmaz, K. (2007). The SAGE handbook of grounded theory. In *The Sage handbook of grounded theory*. SAGE Publications Ltd. <https://doi.org/10.4135/9781848607941>.
- Cabral, L., Cozzi, G., Denicolò, V., Spagnolo, G., & Zanza, M. (2006). Procuring innovations. In *Handbook of Procurement* (pp. 483–529). Cambridge University Press. Cambridge. (n.d.). Concern. In *Dictionary.Cambridge.org dictionary*. Accessed 17 October 2019, from <https://dictionary.cambridge.org/dictionary/english/concern>.
- Charmaz, K. (2004). Grounded theory. In M. Lewis-Beck, A. Bryman, & T. Futing Liao (Eds.), *The SAGE Encyclopedia of Social Science Research Methods* (pp. 441–444). SAGE Publications Ltd.. <https://doi.org/10.4135/9781412950589>
- Chin, G. (2004). *Agile project management: How to succeed in the face of changing project requirements*.
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). SAGE Publications Ltd.
- Dawson, G. S., Watson, R. T., & Boudreau, M. C. (2010). Information asymmetry in information systems consulting: Toward a theory of relationship constraints. *Journal of Management Information Systems*, 27(3), 143–178. <https://doi.org/10.2753/MIS0742-1222270306>.
- Dey, I. (2003). *Qualitative data analysis: A user friendly guide for social scientists*. Routledge.
- Dimitri, N., Dini, F., & Piga, G. (2006). When should procurement be centralized? In D. Dimitri, G. Piga, & G. Spagnolo (Eds.), *Handbook of Procurement* (pp. 47–81). Cambridge University Press.
- Edler, J., Georghiou, L., Blind, K., & Uyarra, E. (2012). Evaluating the demand side: New challenges for evaluation. *Research Evaluation*, 21(1), 33–47. <https://doi.org/10.1093/reseval/rvr002>.
- Edler, J., Ruhland, S., Hafner, S., Rigby, J., Georghiou, L., Hommen, L., ... Papadakou, M. (2006). Innovation and public procurement. Review of issues at stake. Study for the European Commission (no ENTR/03/24). In *Systems and innovation*.
- Edquist, C., & Zabala-Iturrigagoitia, J. M. (2012). Public procurement for innovation as mission-oriented innovation policy. *Research Policy*, 41(10), 1757–1769. <https://doi.org/10.1016/j.respol.2012.04.022>.
- EU. (2014). Directive 2014/24/EU of the European Parliament and of the Council of 26th February 2014 on public procurement and repealing Directive 2004/18/EC. In *Official Journal of European Union*.
- European Commission. (2017). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions. In *Making Public Procurement work in and for Europe. COM/2017/0572 final*.
- Fisher, S., Delbridge, R., & Lambert, S. (2001). Towards a model system specification for the procurement of library management systems: Results of a feasibility study. *Program*, 35(4), 339–354. <https://doi.org/10.1108/EUM000000006952>.
- Flynn, A., & Davis, P. (2014). Theory in public procurement research. *Journal of Public Procurement*, 14(2), 139–180. <https://doi.org/10.1108/jopp-14-02-2014-b001>.
- Gerster, D., Dremel, C., Brenner, W., & Kelker, P. (2020). How enterprises adopt agile forms of organizational design: A multiple-case study. *Data Base for Advances in Information Systems*, 51(1), 84–103. <https://doi.org/10.1145/3380799.3380807>.
- Giles, T., King, L., & De Lacey, S. (2013). The timing of the literature review in grounded theory research: An open mind versus an empty head. *Advances in Nursing Science*, 36(2), E29–E40. <https://doi.org/10.1097/ANS.0b013e3182902035>.
- Halonen, K.-M. (2015). Finland: Is the remedy of contractual ineffectiveness truly effective in Finland? *European Procurement & Public Private Partnership Law Review*, 10(4), 310–315.
- Halvey, J. K., & Melby, B. M. (2007). *Business process outsourcing: process, strategies and contracts* (2nd ed.). Wiley. Issue June 1997.
- Hommen, L., & Rolfstam, M. (2009). Public procurement and innovation: Towards a taxonomy. *Journal of Public Procurement*, 2009(1), 17–56.
- Howcroft, D., & Light, B. (2006). Reflections on issues of power in packaged software selection. *Information Systems Journal*, 2006(16), 215–235. <https://doi.org/10.1108/00346659410055093>.
- Hull, E., Jackson, K., & Dick, J. (2011). Introduction. In *Requirements engineering* (3rd ed., pp. 1–207). Springer-Verlag. <https://doi.org/10.1007/978-1-84996-405-0>.
- Jamieson, D., Vinsen, K., & Callender, G. (2005). Agile procurement to support agile software development. In *2005 3rd IEEE international conference on industrial informatics, INDIN, 2005* (pp. 419–424). <https://doi.org/10.1109/INDIN.2005.1560413>.
- Johansson, B., & Lahtinen, M. (2012). Requirement specification in government IT procurement. *Procedia Technology*, 5(0), 369–377. <https://doi.org/10.1016/j.protcy.2012.09.041>.
- Kuokkanen, K. (2018, October 24). *Espoo on uottanut miljoonia euroja kelvottomaan tietojärjestelmään – Rahoitus johtajalla kaksoisrooli järjestelmän myyneessä yhtiössä [the Finnish city of Espoo has invested millions into a unfitted information system - the CFO has a dual role]* (Helsingin Sanomat).
- Lange, S., Telgen, J., & Schotanus, F. (2014). Systematic review of 15 years of scientific literature on public procurement. In *6th International Public Procurement Conference (IPPC6): 14th-16th August 2014, Dublin* (pp. 407–418).
- Langley, K. (2017, March 9). *State sues IBM over upgrade of unemployment compensation system*. Pittsburgh Post-Gazette.
- Lawther, W. C., & Martin, L. L. (2005). Innovative practices in public procurement partnerships: The case of the United States. *Journal of Purchasing and Supply Management*, 11, 212–220. <https://doi.org/10.1016/j.pursup.2005.12.003>.
- van Meerveld, H., Nauta, J., & Whyles, G. (2015). Forward commitment procurement and its effect on perceived risks in PPI projects. In C. Edquist, N. S. Vonortas, J. M. Zabala-Iturrigagoitia, & J. Edler (Eds.), *Public procurement for innovation* (pp. 110–145). Edward Elgar Publishing Limited.
- Merriam-Webster. (n.d.). Concern. In Merriam-Webster.com dictionary. Accessed 17 October 2019, from <https://www.merriam-webster.com/dictionary/concern>.
- Moe, C. E. (2014). Research on public procurement of information systems: The need for a process approach. In , 34. *Communications of the Association for Information Systems*. <https://doi.org/10.17705/1CAIS.03478>, 1391–1335.
- Moe, C. E., Newman, M., & Sein, M. K. (2017). The public procurement of information systems: Dialectics in requirements specification. *European Journal of Information Systems*, 26(2), 143–163.
- Moe, C. E., & Päiväranta, T. (2013). Challenges in information systems procurement in the public sector. *Electronic Journal of E-Government*, 11(2), 308–323.
- Moe, C. E., Risvand, A. C., & Sein, M. K. (2006). Limits of public procurement: Information systems acquisition. In *Lecture notes in computer science (Including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics)*, 4084 LNCS (pp. 281–292). https://doi.org/10.1007/11823100_25.
- Opelt, A., Gloger, B., & Pfarl, W. (2013). Agility: What is that? In A. Opelt, B. Gloger, W. Pfarl, & R. Mittermayr (Eds.), *Agile contracts: Creating and managing successful projects with scrum* (1st ed., pp. 1–5). Incorporated: John Wiley & Sons.
- Pantilimon Voda, O., & Jobse, C. (2016). Rules and boundaries surrounding market consultations in innovation procurement: Understanding and addressing the legal risks. *European Procurement & Public Private Partnership Law Review*, 2016(3), 179–193. <https://doi.org/10.21552/epppl/2016/3/7>.
- Patrucco, A. S., Luzzini, D., & Ronchi, S. (2017). Research perspectives on public procurement: Content analysis of 14 years of publications in the journal of public procurement. *Journal of Public Procurement*, 17(2), 229–269. <https://doi.org/10.1108/JOPP-17-02-2017-B003>.
- Pekkala, E., Pohjonen, M., Huikko, K., & Ukkola, M. (2019). *Hankintojen kilpailuttaminen ja sopimusehdot [arranging competitive tendering of procurements and contract terms]* (Tietosanoma Oy).
- Pekkola, S., Hekkala, R., Rossi, M., & Smolander, K. (2019). The magical “we”: Enhancing collaboration transparency in grounded theory method in information systems research. *Communications of the Association for Information Systems*, 45(1), 251–259. <https://doi.org/10.17705/1CAIS.04516>.
- Pekkola, S., Niemi, E., Rossi, M., Ruskamo, M., & Salmimaa, T. (2013). ERP research at ECIS and ICIS: A fashion wave calming down?. In *ECIS 2013 Completed Research* (pp. 1–12).
- Poon, P. L., & Yu, Y. T. (2010). Investigating ERP systems procurement practice: Hong Kong and Australian experiences. *Information and Software Technology*, 52(10), 1011–1022. <https://doi.org/10.1016/j.infsof.2010.04.003>.
- Poppendieck, M., & Poppendieck, T. (2003). *Lean software development: An agile toolkit*. Addison-Wesley Professional.
- Pries-Heje, L., & Pries-Heje, J. (2014). Agile contracts: Designing an agile team selection guideline. *Selected Papers of the IRIS*, 5, 34–49.
- Rosacker, K. M., & Olson, D. L. (2008). Public sector information system critical success factors. *Transforming Government: People, Process and Policy*, 2(1), 60–70. <https://doi.org/10.1108/17506160810862955>.
- Shaul, L., & Tauber, D. (2013). Critical success factors in enterprise resource planning systems: Review of the last decade. *ACM Computing Surveys*, 45(4). <https://doi.org/10.1145/2501654.2501669>.
- Star, S. L. (2011). Living grounded theory: Cognitive and emotional forms of pragmatism. In A. Bryant, & K. Charmaz (Eds.), *The SAGE Handbook of Grounded Theory* (pp. 75–93). SAGE Publications Ltd.. <https://doi.org/10.4135/9781848607941.n3>
- Tadelis, S. (2012). Public procurement design: Lessons from the private sector. *International Journal of Industrial Organization*, 30(3), 297–302. <https://doi.org/10.1016/j.ijindorg.2012.02.002>.
- Urquhart, C. (2013). In J. Seaman (Ed.), *Grounded theory for qualitative research: A practical guide*. SAGE Publications Ltd. <https://doi.org/10.4135/9781526402196>.
- Uyarra, E. (2010). *Opportunities for innovation through local government procurement*. London: NESTA, May.
- Uyarra, E., Edler, J., Garcia-Estevéz, J., Georghiou, L., & Yeow, J. (2014). Barriers to innovation through public procurement: A supplier perspective. *Technovation*, 34(10), 631–645. <https://doi.org/10.1016/j.technovation.2014.04.003>.
- Willcocks, L. (2013). *Information management: The evaluation of information systems investments* (1st ed.). Springer US.
- Yin, R. K. (2014). *Case Study Research Design and Methods* (5th ed.). SAGE Publications Ltd.