

LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT

School of Business and Management

Master's Degree Program in Supply Management

Jarkko Leino

**Critical Success Factors Regarding Innovative Technology
Procurement in the Finnish Public Sector**

1st Supervisor: Professor Veli Matti Virolainen

2nd Supervisor: Professor Katrina Lintukangas

ABSTRACT

Author: Jarkko Leino

Title: Critical Success Factors Regarding Innovative Technology Procurement in the Finnish Public Sector

Faculty: School of Business and Management

Master's Program: Supply Management

Year: 2020

Master's thesis: Lappeenranta-Lahti University of Technology LUT

79 pages, 3 figures, 3 tables, 1 appendix

Examiners: Professor Veli Matti Virolainen & Professor Katrina Lintukangas

Keywords: Innovative technology, public procurement, procurement development, procurement process

The public sector in Finland has a significant role within the innovative technology domain from the procurement perspective. Especially during the past decade, the technological development has exponentially accelerated and therefore also put more pressure on departments responsible for purchasing and developing new technological services in the public sector. The key challenges is that the more traditional ways of procurement are being challenged when the object of the complex technology solution to be purchased might not even exist today. The aim of this study is to understand key critical success factors of innovative technology procurement in the public sector and how could the procurement processes improve towards more efficient and value-seeking. The research was conducted using qualitative case study as research method by interviewing professionals in different roles working with public technology procurement.

The research showed that there are plenty of similarities in the way procurement professionals are seeing the critical success factors, however, there seems to be clear gaps in the overall understanding and also lack of best practices. The future successfulness based on the research findings requires strong alignment and implementation of new ways of working from the government level to the individual organizations.

TIIVISTELMÄ

Tekijä: Jarkko Leino

Otsikko: Kriittiset menestystekijät innovatiivissa teknologiahankinnoissa Suomen julkisella sektorilla

Tiedekunta: School of Business and Management

Maisteriohjelma: Supply Management

Vuosi: 2020

Pro Gradu-tutkielma: Lappeenranta-Lahti Teknillinen Yliopisto LUT

79 sivua, 3 kuvaa, 3 taulukkoa, 1 liite

Tarkastajat: Professori Veli Matti Virolainen & Professori Katrina Lintukangas

Hakusanat: Innovatiivinen teknologia, julkiset hankinnat, hankintojen kehittäminen, hankintaprosessi

Suomen julkisella sektorilla on hankinnan näkökulmasta merkittävä rooli innovatiivisen teknologian kentällä. Etenkin viimeisen vuosikymmenen aikana teknologinen kehitys on kiihtynyt eksponentiaalisesti ja täten luonut enemmän painetta yksiköille, jotka ovat vastuussa uusien teknologiapalveluiden hankinnasta ja kehittämisestä. Keskeinen ongelma on perinteisten hankintakäytäntöjen kohtaamat haasteet, kun hankinnan kohteena olevat monimutkaiset teknologiaratkaisut eivät ole välttämättä edes ennalta olemassa. Tämän tutkimuksen tavoite on ymmärtää kriittiset menestystekijät innovatiivisen julkisten hankintojen kohdalla ja miten hankinnan prosesseja voitaisiin parantaa tehokkaammiksi ja arvoa luoviksi. Tämä tutkimus toteutettiin käyttäen kvalitatiivista case-tutkimusta tutkimusmenetelmänä haastatellen ammattilaisia, jotka työskentelevät erilaisissa rooleissa julkisen teknologiahankinnan parissa.

Tutkimus osoitti olemassa olevan yhtäläisyyksiä tekijöissä, jotka hankinnan ammattilaiset mieltävät kriittisiksi menestystekijöiksi, mutta havaittavissa oli selkeitä aukkoja kokonaisuymmärryksessä sekä parhaiden käytänteiden puutteessa. Tulevaisuuden menestys tutkimuksen löydösten mukaan vaatii vahvaa linjausta ja täytäntöönpanoa uusien toimintatapojen osalta aina hallituksen tasolta yksittäisiin organisaatioihin.

TABLE OF CONTENTS

1 INTRODUCTION.....	6
1.1 Research Problem & Background	6
1.2 Research Questions	8
1.3 Structure of the thesis.....	9
1.4 Key concepts & definitions	10
2 Literature review.....	12
2.1 Characteristics of Public Procurement	13
2.1.1 Public Procurement.....	14
2.1.2 Public Procurement Process.....	19
2.1.3 Information Technology for the Public Sector	21
2.1.4 Innovative Procurement	24
2.1.5 Innovative Technology Procurement in the Public Sector	26
2.1.6 Public Procurement in Finland	28
3 Methodology.....	33
3.1 Research Philosophy.....	33
3.2 Research Strategy.....	34
3.3 Data Collection	35
3.4 Interviews	36
3.5 Research Analysis.....	39
4 Findings.....	43
4.1 Procurement Process	45
4.1.1 Tendering and Regulations.....	45
4.1.2 Centralized vs Decentralized	48
4.2 Skills and Competence.....	50
4.2.1 Defining Requirements	52

4.2.2 Industry and Substance Competence	54
4.3 Time and Resources	55
4.3.1 Speed of Development	55
4.3.2 Budget versus expectations	56
4.4 Management Support and Strategy	58
4.4.1 IT and Procurement Strategies	59
4.4.2 Risks Assessment.....	61
4.5 Summary of the findings	63
5 Discussion	68
5.1 Conclusions	68
5.2 Theoretical Implications	69
5.3 Credibility	70
References	72
Appendices	79

LIST OF TABLES AND FIGURES

Figure 1: A Systems Perspective of Public Procurement
 Figure 2: Best practices regarding the creation of an “RPF”
 Figure 3: Theme map of the critical success factors related to innovative public technology procurement in Finland.

Table 1: The application of National Thresholds in the Finnish Act on Public Contracts.
 Table 2: List of interviewed participants.
 Table 3: Summary of the findings.

1 INTRODUCTION

1.1 Research Problem & Background

The development regarding digital transformation has provided disruptive technology and provided means to increase productivity, generation of value as well as social welfare all around us (Ebert & Duarte, 2018). As a result of this, during the past years almost all industries have been finding ways to exploit the potential benefits of digital technologies through different development initiatives conducted (Matt et al., 2015). When analyzing the digital transformation goals the public-sector perspective Ebert & Duarte (2018) have divided these in the following objectives from the social perspective. 1) *“Foster the development of a more innovative and collaborative culture in industry and society.”* 2) *“Change the education system to provide new skills and future orientation so that they can achieve excellence in digital work and society.”* 3) *“Create and maintain digital-communication infrastructures, and ensure their governance, accessibility, quality of service, and affordability.”* 4) *“Strengthen digital-data protection, transparency, autonomy, and trust.”* 5) *“Improve the accessibility and quality of digital services offered to the population.”*

Along with the potential benefits brought to the society by the digital transformation opportunities have also challenged the organizations. As the pace ‘has grown, the amount of software and information systems related specification, development, modification and eventually deployment have been pushed forward, while operating within strict requirements in terms costs, maintenance and modifiability of the software (Koski, 2019). The challenge for public organizations is that the regulations towards public procurement are tied to legislation and formalized processes, which are restricting some of the flexibility elements compared to private sector (Pekkola & Päivärinta, 2016). In order to succeed in the procurement process, the purchasing organization must operate effectively within the boundaries of the legislation and evaluate carefully the desired outcomes the purchase. The underlying the problem in information systems procurement is that the development of the systems has remained largely human intellectual activity and the need for effectively communicate the system requirements are defined by human beings and based on

their capability to coordinate complex issue (Koski, 2019). The way organizational systems are acquired today consists of multiple means, including cloud computing (as a service), packaged software, configured enterprise systems and through dedicated development (Pekkola & Päivärinta, 2016). When then combining the innovative nature of the information systems in this mixture, the level of challenge increases even further. Knutsson & Thomasson (2014) discusses the innovation as a part of the public procurement process and the challenges of acquiring something which doesn't necessarily exist yet nor is there any pre-defined solution for it. The difficult environment which procurement professionals are operating can mislead individuals into behavior which is not desirable for creating innovations, such as unnecessary risk avoidance or preferring to continue the "right behavior" (Erridge and Greer 2002).

If the public sector desires to achieve digital transformation goals the public-sector perspective that e.g. Ebert & Duarte (2018) stated earlier, it is also vital for public sector organizations to effectively coordinate the complex processes related to technology procurement that earlier academics are seeing issues in effectively coordinating (Koski, 2019; Pekkola & Päivärinta, 2016; Erridge Greer, 2002; Knutsson & Thomasson, 2014).

The aim of this thesis is to understand what kind of critical factors should be considered when coordinating technology procurement successfully in the innovative context in the Finnish public sector. When looking at the change also from the supply management perspective, there are visible development occurring in the traditional supplier and buyer collaboration. Traditionally supply management and purchasing has been seen more of a support function in the organization, focused more on transactional purchasing, short-term supplier relationships. However due to the growing demand-level from end-customers, supplier relationship management and buying activities have attracted development focus and earned its place as a more strategic function. (Kähkönen & Lintukangas, 2012)

As the research topic is multi-dimensional and could be analyzed from various different angles the scope of this research is limited to research questions listed in

Section 1.2. The scope of the research is to focus on large scale public tenders with multimillion total costs over multiple years. The following chapter will outline the research questions along with containing a description of the different research methodologies used during this research.

1.2 Research Questions

When assessing the current situation of the innovative technology procurement in the Finnish public sector, it is vital to review the existing competencies of the procurement organizations to coordinate procurement practices and tendering processes today. In order to analyze the topic, which holds many variables, the research is supported by three research questions (RQ) that all have dedicated focus areas.

- RQ1: What are the critical success factors of the innovative technology procurement in the Finnish public sector?

The logic for selecting this particular research question is set to find critical factors that public organizations should consider when acquiring innovative technology in general. The question is set to uncover characteristics established in the different departments of the public organization to acquire new services that might not be familiar to the wider organization. These are the tools, approaches and capabilities that organizations should consider to successfully manage the end-to-end procurement process successfully. The research will not focus on any specific organization instead the idea is to seek findings from different perspectives within Finnish public sector. As the legislation and strict regulations are placed in the public procurement landscape the second research question is dedicated to seeking solutions how to best manage the end-to-end public tendering process:

- RQ2: How to coordinate the end-to-end procurement process when purchasing innovative technology?

RQ2 focuses on how to coordinate the actual tendering process to meet the requirements defined in the initial scope of the defined innovative technology needed to acquire. The process of acquiring innovative technology in the public sector has many process related steps and this RQ is set to uncover pitfalls and success factors of needed to execute in each stage of the procurement process. The earlier literature suggests that there are gaps in the way public organizations are coordinating the technology procurement (Koski, 2019) and that might result in less optimal outcomes. The objective is to gain understanding through the research if there are clear connections between more successful innovative technology procurement and ways of coordinating the end-to-end procurement process.

- RQ3: What kind of future development initiatives are beneficial for the innovative technology procurement in the Finnish public sector?

The RQ3 focuses on the future development and finding views on how to manage the innovative technology procurement in the public context going forward. The objective is to understand how the procurement practices and approaches should be optimized considering the speed of change and development in the world of technology. By understanding first, the current issues and pitfalls this research question is set to offer new approaches for better outcomes. Ultimately the research question should collect ideas from the respondents operating in the different fields of technology procurement and based on their experiences formulate future hypotheses for developing the processes.

1.3 Structure of the thesis

The structure of this thesis consists of five separate parts. The following part of the thesis presents the outcomes related to the literature review and explains key definitions. After the literature review has been completed follows the methodology part reporting the ways the research has been conducted. The methodology starts by explaining the philosophical approach to the research approach. The section

continues to break-down the data collection method from the case study organizations consisting of multiple public institutions. Eventually the section explains in detail manner the analysis approaches applied to the data set collected.

Following the literature and methodology, the fourth part of the thesis is reporting the findings arising from the interview process and mapping the key findings using thematic approach. With the help of thematic mapping the part focuses on findings answers to the research questions around the critical success factors of innovative public technology procurement. In the final part of the thesis the focus is on concluding the research findings and formulating connections to the previously discovered literature.

1.4 Key concepts & definitions

The foundation on top of which this research is built around are explained in this part of the thesis. Most of the key concepts and definitions connected to this research are not necessarily defined exactly in similar ways in the earlier literature, despite the similarities visible in the many aspects connected to them.

Innovative public technology procurement is defined by Hommen & Rolfstad (2009) in their definition *“innovative public technology procurement occurs when a public agency acts to purchase, or place an order for, a product – service, good, or system – that does not yet exist, but which could probably be developed within a reasonable period of time, based on additional or new development work.”*

Public procurement has been defined by Moe & Päivärinta (2013) as *“acquisition (through buying or purchasing) of goods and services by government or public organizations. It involves significant investments and plays a major role in the marketplace. “*

Public procurement process has been best defined by Dough (2016) as *“standard practice refers to widely accepted and core activity, technique, principle, method or*

process that is regarded as effective to achieve certain goals in a sector or sphere of business. “

Innovative procurement has been defined by European Union in their Public Procurement Directive 2014/24/EU (2014) as *“means the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth.”*

Information technology for the public sector There are variety of definitions for the public sector specific technology procurement but most accurate definition by Alanne, Hellsten, Pekkola and Saarenpää (2015) as *“public sector organizations differ fundamentally from private organizations: they have to simultaneously acquire the best possible information systems and comply with public procurement regulations.”*

2 Literature review

There are different types of approaches to literature reviews. These can be categorized as 1) narrative literature review, 2) systematic literature review and 3) meta-analysis. (Salminen, 2011) Out of the three approaches to literature reviews, this part of the thesis focuses on describing the systematic literature review as it is the guiding research method for this thesis.

Literature review is a research method, which serves a purpose to combine the previously existing information related to certain area of interest. With the help of literature review the researcher is looking for answer to a specific question or in other words, to the research problem. (Leino-Kilpi, 2007) The purpose of the literature review is to formulate a complete picture of the research topic by utilizing different viewpoints based on the previously published literature. By utilizing these different previously published literatures, the literature review is allowing the researcher to divide and evaluate the existing information the evaluation can also enable researcher to find different opinions, misalignment and gaps in the previous literature. (Hirsjärvi, Remes & Sajavaara 2007) In a nutshell, a literature review is a method which is focused on researching the previous research work by other academics. (Salminen, 2011)

As mentioned previously, the selected research method for this thesis is systematic literature review. Systematic literature review aims to collect information and formulate a synthesis as comprehensive as possible based on the earlier research regarding the selected topic. (Axelin & Pudas-Tähkä, 2007) The key steps of systematic literature review can be divided in three main categories; planning the review, conducting the review search, analyzing and creating synthesis based on which the review can be reported. (Johansson, 2007) In terms of the key elements regarding the systematic literature review Kitchenham & Charters (2007) discusses these as;

- The creation of protocol related to the literature review process. The literature review protocol is specifying the research questions, which are addressed as well as the methods to be used for undertaking the review.
- The definition of the search strategy to be used in order to conduct the review. The key objective is to discover as many relevant literatures as possible.
- The strategy related to the search process needs to be documented for future reference.

The systematic literature review allows the researcher to screen the most interesting and timely relevant research results and discover the related discussions related to these. The overall objective for the research method is to create as comprehensive and broad overview as possible regarding the topic. (Salminen, 2011)

2.1 Characteristics of Public Procurement

The public sector is a significant buyer of large range of goods and services (Knutsson & Thomasson, 2014) and accounts for significant portion of the overall demand regarding goods and services offered in the markets (Uyarra & Flanagan, 2009). Due to the large market presence of the public procurement, it is also seeing the significant amounts of spend on public resources and therefore also high emphasis is also put on the cost-effectiveness of usage of public resources (Magnusson and Nilsson, 2011). Therefore, also the expectations towards public procurement are to address large scope of different social goals (Uyarra & Flanagan, 2009). The key characteristics of public procurement also include regulations, e.g. in form of non-discrimination policies. In addition to the regulations and previously listed characteristics might resolve in facing dilemmas and conflicting goals in the procurement processes. (Moe & Sein, 2014) Although the public procurement has key characteristics that are differentiating itself from the private counterpart, the differences are not always radical. The ownership stake (e.g. social

communities vs private investors) and funding of the organizations in the public procurement side are the main characteristics that differ from the private side. (Alanne et al., 2015) In order to create sustainable strategies for public procurement the organization must first recognize its conflicting goals and develop appropriate strategies to find optimal short-term and long-term processes for public procurement. (Moe & Sein, 2014)

2.1.1 Public Procurement

Public procurement as a concept refers to acquisition of goods and services by a public organization (Moe and Päivärinta, 2013). The key role of public procurement is to secure well justified use of public resources in regulatory compliant manner to deliver contracted 3rd party goods and services (Russell and Meehan, 2014). Wider perspective to public procurement involves also legal authorities assigned to certain processes among procurement process. These processes include; planning, advising, obtaining, delivering and obtaining government expenditure on goods and services to match the desired objectives and outcomes of the purchase (Prier & McCue, 2009).

In Finland, the Ministry of Finance (shortened as; VM) is serving as the guiding body of public procurement. VM's definition of public procurement, captured from their "Handbook of Government Procurement" (2017), refers public procurement as, when buying or renting goods or services, contractual work with costs associated to these, such as; planning, preparation, decision-making and follow-up related costs. VM involvement is a good demonstration on how public organizations are under control of the political jurisdiction (Alanne et al. 2015). Additionally, one element that is unique to the public procurement organizations is the decentralization of the organizations itself, huge budgets and large number of employees (Burden, 2001). All these characteristics combined some researchers (Thai, 2001; Moe & Päivärinta, 2013) have presented a view where public procurement is more of a system of action. This view includes setting policies & regulations and managing them as well as operative procurement functions.

The first signs of public procurement were visible as early as in the early 20th century. One of the earliest examples of modern procurement was established by the City of Chicago's "degree of central purchasing" across all their departments since 1898. (Thai, 2001) Despite public procurement being a major function within government, academic research has not focused on public procurement significantly (Thai, 2001). An initial movement in public procurement towards more strategic approach occurred in the 1990's United Kingdom (UK) as UK government realized it's major role as a part of supply chains in the local commerce and a major buyer (Lyne, 1996). Similar movement occurred in the 1990's United States (US) as their then Vice President Al Gore launched several reform efforts to decrease the amount of red tape involved and streamline public procurement (Thai, 2001). During this same timeframe, the role of procurement started to develop the emphasis was to develop a more tactical function in the history to a strategic one. The role of procurement was not seen any more solely as a support service, instead the possibilities to optimize processes and receive more value for the money while eventually contributing to bottom line of the organizations, also in public organizations. (Lyne, 1996) The different roles are mentioned in the literature, involved in the procurement process, such as commercial (procurement) manager, who is responsible of securing value and quality through performance monitoring (Lyne, 1996). Along with this technical expertise in terms of looking after the risk assessments, lifetime costs and supplier development is needed to guarantee the quality of services provided. The centralization movement of public procurement that started in the early 1900's has faced criticism. The argument constitutes views both from practitioners and researchers, that in order to be more responsive and end-user friendly in procurement, organizations must decrease the amount of bureaucracy and increase the level of coordination between departments. (Thai, 2001)

Public procurement has many fundamental differences compared to procurement in the private companies, although the differences are not always necessarily drastic. The major differences lie in the ownership structures, as the public organizations are owned publicly by the society and political community, whereas private sector

ownership is distributed among entrepreneurs and shareholders. Some additional differentiators compared to private sector is the public sector is funded via taxation and it is less affected by market forces. In a nutshell, when the dominant control-mechanism in the private sector is economic system, the public sector is relying on laws and regulations. (Alanne et al. 2015) The high importance of the public procurement in the markets is due to size of the public investments in general (Moe and Päiväranta, 2013). Due to the high importance, the public procurement is therefore carefully guided by authorities such as European Union (EU). The tight regulations in most of the countries is one significant differentiation among public and private procurement. Few examples from these regulations are two directives set for public procurement by EU to secure transparency and non-discrimination principles in the competition. (Moe & Sein, 2014) The EU level legislation article number 49 called the "Treaty of Rome", was set to guarantee the freedom of movement of goods by i.e. by demanding transparency in the tendering processes (Burden, 2001). As the regulatory and policy aspects are heavily present in the public procurement, the definitions of public procurement also include actions that "consists of policy making, procurement regulations, authorization, appropriations and procurement functions in operations" (Moe and Päiväranta, 2013)

Due to the uniqueness of the public procurement, i.e. high market size, certain common procurement practices are often visible. The high purchase volume is naturally helping public organizations to achieve economies of scale through procurement standardization. For example, with the help of framework agreements with standardized product specifications. The benefits of framework agreements provide public sector authorities the ability to place orders using different quantities to different locations using different contract management mechanisms. (Meehan, 2017) One approach to this in the academic literature is called "cooperative procurement". The definition of cooperative procurement includes elements of two or more parties joining forces in one or more steps of the purchasing process to either share information, share resources and bundle purchase demand or all these elements together. Particularly this is an interesting model for public organizations as there are usually no competition among the organizations, existing high-level of trust among the parties, similar environment and mutual end-goal of maximizing the

benefit of tax-money (Schotanus and Telgen, 2007). Through cooperative procurement, organizations can achieve lower prices and higher quality but also reduce overall transaction costs and supply risks involved. This approach is already in a major role in the UK as a policy instrument and across the Europe there seems to be movement towards aggregating purchase demand of the public sector (Meehan, 2017). On the other hand, although it seems in many ways very logical to support cooperative procurement and standardized procurement practices, there are also some issues. For instance, some of the major disadvantages of the cooperative procurement include high initial costs associated setting the model and losing control and flexibility (Schotanus and Telgen, 2007). In addition to that, in order to achieve the benefits of economics of scale the standardization requires standardized, products, contracts and lower heterogeneous in the demand in order to achieve the potential (Albano and Sparro, 2010). Other approaches to the public procurement were endorsed in the UK in order to meet the demands from the declining financial markets. Meehan et al. (2017) distinguishes an approach that was in these given circumstances pushed by the UK government, where solutions were to be packaged as “collaborate more”, “standardize products” and “leverage spend”. The idea behind this approach was to seek reductions in the pricing through “collaborative scale of product prices”.

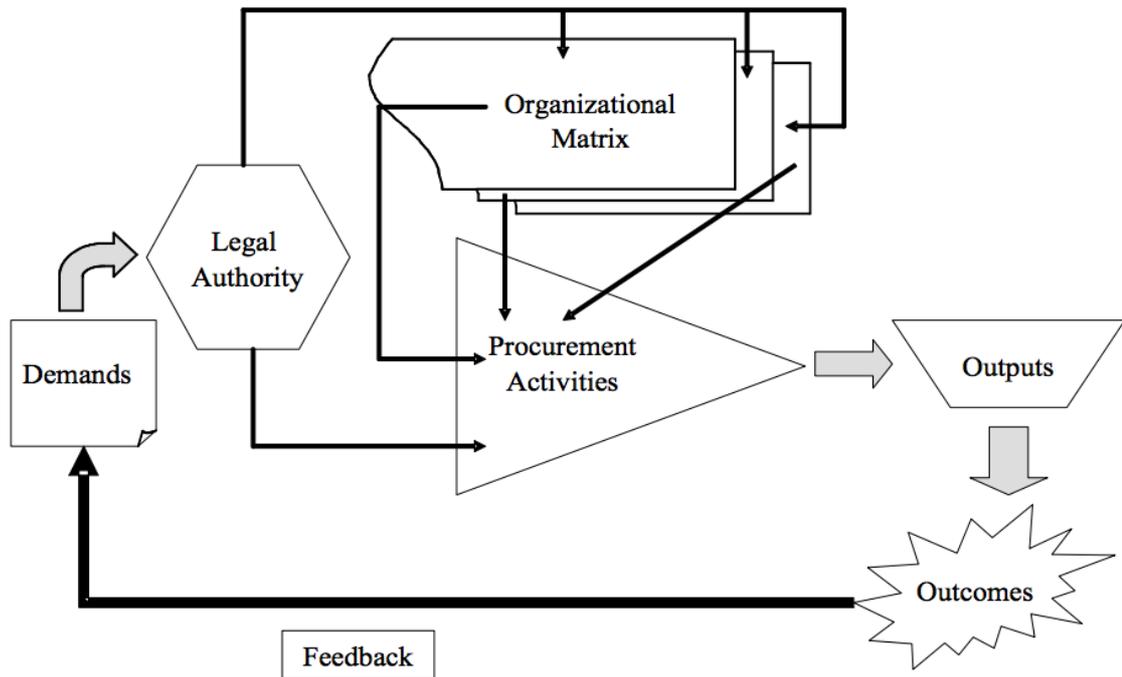


Figure 1. A Systems Perspective of Public Procurement (Prier & McCue, 2009)

In order to understand how public procurement process is operating and how it can be analyzed (Prier & McCue, 2009) have conceptualized the public procurement from an end-to-end process perspective using a systems perspective approach (see figure 2). Their model summarizes the loop where the process begins by a response to demands placed by certain interest groups, then they flow through the repository of legal authority to the more functional procurement activities, which consists of practices created under the legal mandate. According to the Prier & McCue (2009) the Figure 1 describes the three most relevant attributes of any public procurement system and can be therefore also utilized in assessing the challenges of the public procurement. The three attributes are categorized as a) legal basis for securing the compliancy based on the legislations and regulations, b) organizational level boundaries in forms of structural challenges and operative level activities and c) functional activities and intended outcomes.

2.1.2 Public Procurement Process

An important part of the public procurement is actual processes towards finally establishing a contract with a vendor. In the public procurement, the competitive tendering is most widely regarded procurement mechanism as its main benefits of competitive tendering include cost reduction and effective utilization of limited resources (Dough, 2016). A typical aim for the tendering process is to standardize the key practices to allow effective, easy to implement and generalizable process practices. Although there can be differences in the public procurement process, the typical format consists of five main tendering phases 1) Planning, 2) Documentation, 3) Solicitation, 4) Evaluation and 5) Awarding. (Dough, 2016) In the figure 2. the overall process has been divided into the following steps four steps; study, RFI, RFQ/RFP and project. The ultimate goal of the tendering process utilizing the RFx-steps is to make sure all the potential suppliers have all the needed information regarding the need along with all the necessary enablers to respond to the request based on factually correct requirements with their solution (Koski, 2019).

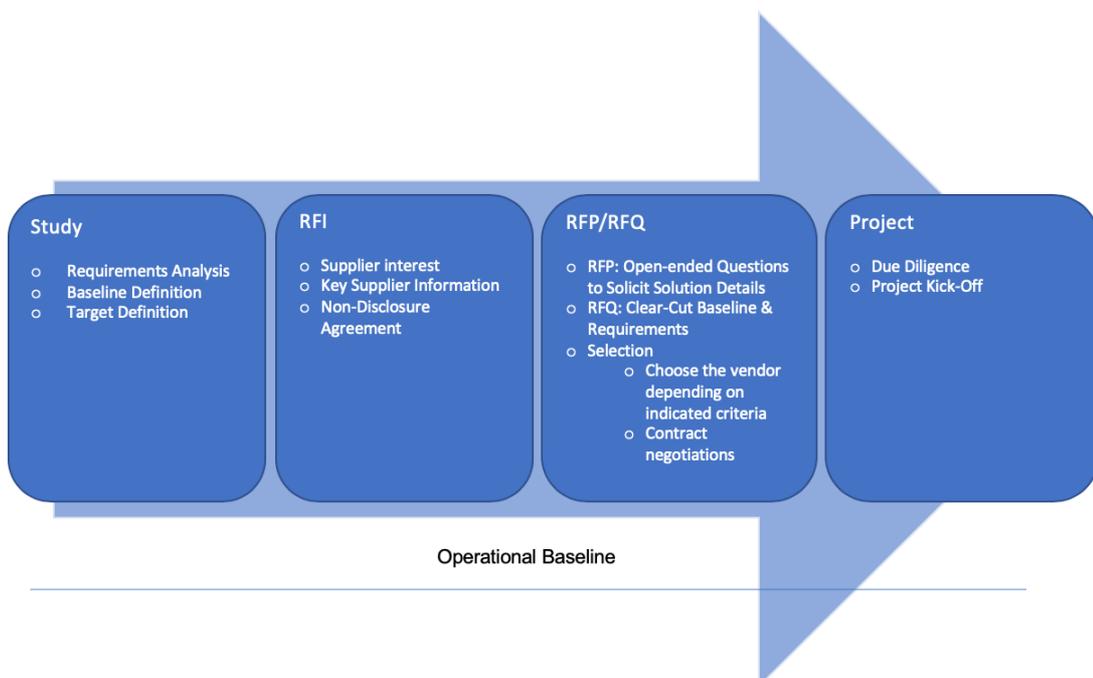


Figure 2. Best practices regarding the creation of an “RPF” (AKA “Request For Proposal”) (Vaes, 2014)

In the research literature, there are plenty of “RFx” acronyms visible, which can be defined (Mhay & Coburn, 2018) as follows:

- **Request for Information (RFI)** is an open request for the market in order to seek broad data and understanding. RFI is usually in the early stages of the procurement including the other RFx in the later stages. An RFI’s main purpose is to gather vast number of data from the board supplier base in order to gain knowledge on trends, supplier strategies, market dynamics and competition. Pricing might be included as a part of RFI inquiry.
- **Request for Proposal (RFP)** is an inquiry to solve sourcing problem for a specific solution driven by business needs. RFP can be based on information gathered in a prior RFI responses. The format of RFP can often be more creative from the vendors perspective, which allows vendors to differentiate from each other. Despite the creativity, good RFP’s will need to gain specific data, solution offerings and quotations.
- **Request for Quotation (RFQ)** is a final opportunity for potential suppliers to price their offered solution. RFQ is more commonly used and suitable for commodities and more standardized solution offerings. The main idea of RFQs is to align quotes from the chosen vendors comparable for procurement organization to complete the intended purchase. RFQs should include all relevant parameters in detail.
- **Request for Tender (RFT)** is an open invitation for potential suppliers to offer their services against detailed and defined need. RFT are used opposite to more vaguely defined requests. RFTs need to be very clearly defined or otherwise vendors have difficulties drafting a solution that fits requested needs. Unfortunately, often RFQs might be issued by the buying organization when they are really RFTs from content perspective.

Although the tendering process is strictly tied to the legislative landscape in the public procurement, the literature highlights some challenges in the process. According to Greer and Erridge (2002) the common difficulties include the highly regulated and bureaucratic nature of them. The strict tendering procedures are seen as potential reasons for more restricted competition (Uyarra and Flanagan 2010). Additionally, to Greer and Erridge (2002) pinpoints the limited interaction and lack of long-term relationship emphasis causing inefficiencies in building trust among suppliers and procurement departments. In order to the highly regulated process tendering process to work, the requirements of the scoped tender must be specified and defined before-hand to the suppliers. Literature has challenged the procurement organizations capabilities and their abilities to formulate the requirements and correct scope well enough with potentially limited information the procurement organization currently have at disposal. (Alanne et al., 2015) Alongside according to Koski (2019) with the pre-defined requirements, also the expectation of the value has to defined. The return-on-investment (ROI) calculations must be based the expected value that can be potentially extracted from the system. Eventually the selected vendor with the lowest price might not be the most valuable for the customer and therefore the competitive tendering comparison when analyzing the monetary values might be misleading (Koski, 2019). Furthermore, the impact of the tendering processes can overload the procurement organizations by pushing their emphasis more towards the administrative tasks and formalized tendering procedures (Greer and Erridge, 2002). In order to move away from the more traditional competitive tendering processes the more recent literature suggest utilization of approaches that rely more on the partnership and how these could generate “social capital” through networks (Greer and Erridge, 2002).

2.1.3 Information Technology for the Public Sector

Throughout the history public organizations have been major IT purchasers, as it involves major investments and public procurement organizations have had a central role in the marketplace. (Moe and Päivärinta, 2013) Simultaneously managing the information systems have seen as a difficult and multidimensional

task, as Dickey (1966) underlines the importance of coordination among the people involved in the development of the information systems. What is causing the challenges in the information systems procurement is the complexity and unknown factors of the technology, while still having large importance for many stakeholders in the purchasing organization (Moe and Päivärinta, 2013). For instance, today there are different ways for organization to purchase information systems; as a service (e.g. cloud computing, packaged software and custom development (Pekkola and Päivärinta, 2016). The different options to acquire information systems are challenging procurement strategies. Transaction cost economics can be used to identify what type of strategy to use in different cases, as for instance developing organization specific systems involve higher uncertainty due to the special knowledge and interactions required within the organization. Therefore, the most efficient procurement strategy for organizations is to purchase packaged solutions instead of in-house developed. (Saarinen & Vepsäläinen, 1994) To address this the popularity among information system vendors today is to deliver the software as a service (SaaS), which means that software is centrally hosted as a service through subscription service business model. SaaS model has been seen as a lucrative alternative by customers as a more flexible, scalable and cost-effective solution. When software is acquired as a service the costs of running, maintaining and upgrading are lower as well as the development can be seen more customer centric. (Koski, 2019) Despite the modern development in the delivery model of the information systems, literature also suggests that standard systems rarely fit to the public organizations without any customizations and this makes it more difficult to compare alternatives (Alanne et al., 2015).

When all these complicating factors are combined with the reality of increasing demands from the users to update, enhance and replace older applications with new ones, the challenge for Information Systems managers increases (Saarinen & Vepsäläinen, 1994). Due to the complexity, the major challenge to successfully conduct Information Systems procurement in the public seems to be lack of knowledge in the acquisition process. The procurement process is specifically challenging in information systems procurement as the purchase decisions have to be in an early stage of the procurement process when the requirements are not

necessarily fully known. When the organizations are looking for packaged solutions to meet their needs, the capability to map the requirements becomes essential. (Saarinen & Vepsäläinen, 1994) The most efficient way of drafting the requirements is challenging as there seems to be often a knowledge gap between the customer (in this case public organization) and the vendor. The failure to match the offering from the vendor's side to the desired needs and requirements crafted by incompetent or inexperienced counterpart will most likely lead to negative end-results of tendering and procurement. (Moe & Sein, 2014) As the technology is developing quickly many promising and innovative systems are having considerable delay when the applications are actually available in the market (Saarinen & Vepsäläinen, 1994) and therefore procurement organizations must be able to consider this in the ultimate purchase decisions. When the issue of the knowledge gap is observed from the suppliers' point of view, the vaguely defined requirements additionally allow the supplier to make their own conclusions and interpretation of those will naturally lead to misaligned proposals which are not necessarily based on facts (Koski, 2019). The misalignments in the specifications of the requirements can hold conflicting elements among the involved parties, in an example scenario procurement side prefers clear and complete specifications but the vendor would prefer more freedom in order to position their qualities as well as propose options not included in the specifications (Alanne et al., 2015).

Research also identifies that regulations and contractual restrictions in the public-sector information systems procurement, i.e. usage of standard government contract templates, might decrease the number of possible vendors to participate in the tendering process and therefore limiting options, competition as well as bargaining power (Moe & Päivärinta, 2013). The disinterest of potential vendors to participate in the tendering process has an impact on achieving the optimal price or quality (Alanne et al., 2015) which highlights obviously a huge inefficiency in the tendering process. As the new models of delivering service such as SaaS emerges this puts also more pressure to public procurement organizations. Lack of know-how has been seen as a major steppingstone in the successful information system procurement in the public sector. The knowledge gap between customer and the vendor is an example of risk involved. If both parties are not in alignment with wants

and needs, many assumptions might risk the trust among the parties through solution proposals not meeting the demands. Lack of competence, preparation, experience and inability to construct requirements will with a good likelihood lead to risky procurement process. (Moe & Sein, 2014)

Despite the observations in certain instances that shows the parties involved in the public procurement are not always in alignment with each other, the process of public tendering is continuing to have a strong foothold in the public information systems procurement (Koski. 2019). Koski (2019) identifies few interesting points regarding the public tendering process and why has it remained as it is today even when issues have been detected. These characteristics include “we have always done it this way”-attitude, meaning that established model is not challenged due to the easiness of using it. Additionally, attitudes that the legal aspects of the public procurement are restraining the process from improvement and the high stakes of the large-scale plus million euro are seen as negative factors demotivating improvements developing.

2.1.4 Innovative Procurement

EU has set in its 2020 strategy as an important area of development concerning the research and innovation capabilities and financing. By doing this EU wants to secure innovative ideas generating and transforming new products and services, which are creating growth and job opportunities. (Pesu, 2018) The different views related to innovation has certain implications on innovation in the context of public procurement. From the demand-side perspective, public procurement can be seen as tool for simulation of innovation but in order to facilitate the generation of innovation, the procurement process needs to contribute to the innovation creation. (Knutsson & Thomasson, 2014)

In order to create foundation to the innovative procurement EU has set Public Procurement Directive 2014/24/EU (2014). In EU's procurement directive the concept of 'innovation' has been as *“means the implementation of a new or*

significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth.” With the definition of innovation being included in the procurement directive, it has been able to clarify the role of innovation in the procurement context. The directive is essentially demystifying the innovation related regulations, which are containing the term innovation in them. (Pesu, 2018)

Essentially the procurement legislation is regulation of the procurement procedures, which results that innovation has procurement procedure related impacts. (Pesu, 2018). In the innovative procurement process the process is therefore slightly different compared to more traditional procurement process. Innovative procurement process is changing how the suppliers are being asked to provide solutions in the market. This process is opening the bidding process and allowing new potential vendors to take part in the process. (Knutsson & Thomasson, 2014)

Raunio, Nordling, Ketola, Saarinen & Heinikangas (2016) sees innovative procurement has a fundamental tool using city and urban development as example. They see that innovative procurement is creating more economical potential in them by opening up procurement processes to co-develop in the guidance overseeing by the city. According to them, there are multiple ways of categorizing the innovative procurement procedures based on the viewpoints. These can be for instance;

- Creating new models for acquiring services and products from the market as well as facilitate co-operations among the public and private organizations in order to improve the effectiveness of the procurement and increase new business models for private organizations.
- Create new products and services to market through R&D projects
- Formulate procurement contracts to encourage vendors to innovate by setting clauses and incentives for innovating new services as well as re-developing existing products and services.

- Procurement seen as a tool for innovation politics to actively seek companies to develop their operations according to the innovation politics.

The innovative procurement is visible in the innovation partnerships, negotiation procedures as well as competitive tendering precondition. Both of the competitive tendering and negotiation procedures and the appropriate ways to implement them in certain procurement processes are set in the procurement law. (Pesu, 2018)

2.1.5 Innovative Technology Procurement in the Public Sector

Public procurement can have an impact on innovation by influencing the change of the technological direction and/or rate of it. By affecting the rate of the change, the aim could be for instance to raise or increase research and development (R&D) related investments. (Hommen & Rolfstad, 2009) The way innovation is occurring can be seen as a part of a process where the companies push back towards the frontiers of technology providers to meet user needs along with a procurement policy clearly expressing the demand for new services outside of the current capability offering is then likely to stimulate the development of those capabilities (Geroski, 1990). As a concept “innovations are creations of economic societal significance” that are carried out often by firms and not in isolation. The variety what is produced varies from new products, new processes, material goods to intangible services depending on what is actually being produced. (Edquist & Zabala, 2012)

Hommen & Rolfstad (2009) distinguishes a contrast between “regular public procurement” and “innovative public technology procurement” by dividing the starting point of the purchases. Whereas in the “regular public procurement” the public-sector organization is acquiring ready made products from the market, the “innovative public technology procurement” process could initiate without existing technology but there is a reasonable timeline for developing it with right resources. Additional definitions for innovative procurement, without being linked to public

sector specifically, include following characteristics such as “goods and/or services to contracted do not exist and may therefore not be pre-defined” or alternatively “the way which procurement process is executed, i.e. the process is new in one or more parts” (Knutsson & Thomasson, 2014). In short, public organizations may place an order to acquire certain systems or products that are not available in the market, which then requires suppliers’ effort to develop such services and in order to deliver these innovations is required (Edquist & Zabala, 2012).

As discussed earlier, the pace of software development driven by digital transformation agendas, and the emphasis on how information systems will have to be specified, modified and developed while maintaining the cost-efficiency and easiness in the basic medication and maintaining requirements (Koski, 2019). This scenario will then formulate the interesting dilemma on how public organizations can develop their procurement processes. In both of the definitions provided by Knutsson & Thomasson (2014) the potential suppliers are facing also more challenging situations. Their concept of “procurement for innovation” involves suppliers to provide new offerings while in the “innovative procurement” they argue changes in the way suppliers are being asked to provide already existing solutions in a new improved way. It is important to highlight that in both of these scenarios provided by Knutsson & Thomasson (2014) suppliers are forced to respond in the demands in a new way and this can lead to bidding process to new potential parties. This leads to a situation where the organizations acquiring the information systems are forced to compare alternative solutions in situations where the differences are not easily comparable (Alanne et al., 2015). The commonly used definitions “the purchase of goods or services that do not exist yet” related to the innovative procurement have seen excluding many innovation categories and might not be too relevant in the public procurement context. The gap in the definitions seems to be excluding the utilization of existing goods and services, innovation related to processes and innovative delivery of existing services (Uyarra and Flanagan 2010). An extension to the set of definitions considers also the usage of terms “innovation” and “technology” in the similar contexts, where the term [public] “technology” [procurement] has been replaced by “innovation” during the past decade to highlight the notion of public demand triggering innovation required (Edquist & Zabala, 2012).

The procurement of innovative technology in the public sector is a relatively complex matter. The literature discusses the following factors included. As the first challenging factor the EU set directives as being seen as too complex and difficult to understand (Nielsen and Hansen 2001) which can mislead people in to behavior which is not desirable for creating innovations, such as unnecessary risk avoidance or preferring to continue the “right behavior” (Erridge and Greer 2002). The research done by Greer and Erridge (2002) evaluates public sector of the United Kingdom (UK) and their efforts to develop more strategic approaches to public procurement in an environment where power is shared and “no-one is in charge”. As a summary, these kinds of aspects only increase the likelihood for the procurement organization to avoid risks and “play it safe” as the public tenders might even lead to court level appealing processes. The likelihood for innovation to flourish in this kind of environment is difficult. (Knutsson & Thomasson, 2014) Aside from these, lack of collaboration among and between the public organizations is seen as one source of lost potential (Knutsson & Thomasson, 2014) as well as inability to manage efficient governance on all levels of the different public authorities (Uyarra and Flanagan 2010). Both lack of collaboration and governance lead to misaligned targets and failures to meet them.

Finally, the challenge in the public procurement and innovation lies in the heart of the complex procurement process itself, which leads to different overlapping motivations, expectations and goals when different individuals have the power to influence parts of the evaluations often even with limited competencies. (Knutsson & Thomasson, 2014). As a conclusion, the earlier research points out different characteristics commonly associated to public sector behavior, which are not generating an ideal platform for innovative mindset to develop.

2.1.6 Public Procurement in Finland

In Finland, Public Procurement is controlled by the government in accordance both with national procurement laws and European Union’s (EU) procurement directives

(Ministry of Economic Affairs and Employment, 2019). The main ideology behind the control is to guarantee the most efficient use of public funds and secure the competitiveness for both EU and Finnish organizations. The two basic principles of the procurement directives are;

- 1) transparent and efficient tendering process and
- 2) promote equality and prevent discrimination

(Ministry of Economic Affairs and Employment, 2019)

In accordance to the Finnish Procurement Law sections 58§ and 62§, public Finnish organizations are required to inform their purchases to the procurement unit. The procurement law is concerning:

- a) State and municipal authorities and joint municipal authorities
- b) The Evangelic Lutheran Church and the Orthodox Church and parishes and other authorities thereof
- c) State enterprises and bodies governed by public law
- d) Any purchaser if it has received more than half of the value of the contract in aid for the award of the contract from the contracting authorities referred to above

(Ministry of Economic Affairs and Employment, 2019)

A widely used concept of transparency is a fundamental element of the Finnish public procurement and it requires sufficient publishes of public contracts. The aim for transparent and equal tendering is to secure the most efficient competition and open up equal opportunities for the supplying tenders. The basic principles of Finnish public procurement states that public contracts must be awarded based on two criteria; “the most economically advantageous tender or the lowest price”. The criteria are further explained as if the “most economically advantageous tender” is selected as the supplier for the public contract, the tenders must be measured against comparison criteria indicated earlier. (Ministry of Economic Affairs and Employment, 2019)

In order to achieve compliancy in the eyes of the Finnish public contract law, the EU has set certain thresholds to control the contract advertisements. Originally these thresholds are based on the World Trade Organization's (WTO) Agreement on Government Procurement (GPA). (Ministry of Economic Affairs and Employment, 2019) Alongside with EU's public procurement law there are also National Thresholds to comply with the Finnish Act on Public Contracts. The threshold consists of monetary contract value with different sub-categories (see the table 2.) The obligation of the advertisement of the public contracts below the threshold value is not mandatory to publish, but these can be published.

Contract type	Contracting authority
	Threshold (euro)
Supply and Service Contracts	60 000
Concessions / Services	500 000
Health care and social services contracts	400 000
Public works contracts	150 000
Concessions	500 000
Design contests	60 000
Other special service contracts	300 000

Table 1. The application of National Thresholds in the Finnish Act on Public Contracts. (Ministry of Economic Affairs and Employment, 2019)

In order to fulfil the obligation to advertise the public contracts in Finland, the contracting party shall publish a notice in HILMA. In a nutshell, HILMA is a free electronic forum maintained by the Finnish Ministry of Economic Affairs and Employment in order to provide a forum for contract notices (Ministry of Economic Affairs and Employment, 2019). HILMA is a real-time hub for procurement information can be easily accessed over the internet. It contains all the relevant information regarding forth-coming, current and past public contract advertisements. The HILMA advertisements are mandatory for public contracts exceeding the EU and National thresholds and the notices can be published using the two main languages of Finland; Finnish and Swedish. (Ministry of Economic Affairs and Employment, 2019).

According to the Ministry of Economic Affairs and Employment (2019) the key operators in the Finnish public procurement include the following organizations:

The Ministry of Economic Affairs and Employment (MEAE) is acting as the principal governing body, which is responsible for drafting the national level legislation, providing status information, following necessary reforms and any additional matters related to the public procurement. Their ultimate responsibility is to ensure the mechanisms around public procurement are well-orchestrated. In addition to the previously mentioned tasks, MEAE has a role when it comes to influencing EU-level as well as World Trade Organization (WTO) level decisions in the public procurement landscape. More administrative tasks such as communicating the thresholds (Table 1) and maintaining HILMA are also responsibilities of MEAE. Another important unit which is maintained under MEAE's supervision along with Association of Finnish Local and Regional Authorities is called **Public Procurement Advisory Unit**. The responsibilities of this unit include providing authorities important information and advice when it comes the application of procurement legislation. The service operates using online service as a channel, but the experts can also be reached via email or calling.

The different ministries in Finland are responsible for their own dedicated duties within public procurement. **Ministry of Finance** has a role in advising the central

government regarding general guidance and activities, i.e. defining the general principles to be followed in the central government strategy and developing the overall practices and methods of public procurement. This ministry is also responsible in decisions related to which contracts are subject to the centralized tendering process in the central government. Different ministries have also their individual responsibilities in the public procurement. The **Ministry of Defense** is having the responsibility of preparing the defense procurement and then again, the **Ministry of Environment** is providing insight when it comes to environmental aspects in the public procurement.

Operating under the Ministry of Finance guidance, fully state-owned **Hansel Ltd** acts as a central government purchasing body. The main responsibilities of Hansel include, maintain services, invitation of tenders to suppliers as well as maintaining and establishing framework agreements regarding tendered items on behalf of central government. Hansel also provides additional support for contracting authorities through their expert services which specializes on the public procurement practices and contractual aspects. The method for appealing against the decisions made in the public tendering process can be assigned in written format to the **Market Court**. Tenderers can appeal on different matter concerning the public contracts when they have witnessed or experienced mistreatment or conduct in the process. One thing that is reflecting the difficult nature of the public procurement is the number of different appeals assigned to Market Court, especially when benchmarking to numbers related to their other duties such as IPR and trademark related matters. The number of these public procurement appeals according Markkinaoikeus (2019) in year 2018 was over 400. The same statistics also reveal that the average processing time for an appeal is 7,5 months. When considering high-tech and innovative solutions this type of processing period can also have an impact on the proposed solutions, as Koski (2019) argues in this research that many mission critical solutions in the public sector are already outdated when finally implemented. In situations where the Market Court's decision is not sufficient for the appealing party the appeal can be lodged to the **Supreme Administrative Court**.

3 Methodology

This chapter includes the overview of the methodical approaches regarding the research. The objective is to cover the different evaluation approaches when it comes to analysing the collected data. By analysing the research findings, more clarity is created and therefore more credible assumptions can be made based on it (Eskola & Suoranta, 2014) Furthermore, this part of the thesis will eventually evaluate the credibility and validity of the research outcomes to ensure certain level of quality.

3.1 Research Philosophy

When it comes to defining research philosophy the research in this area offers variety in terms of definitions. What makes it difficult to conduct research in today's academic world is the large variety of incoherent classifications of the research philosophies (Mkansi & Edwin, 2012). Large quantity of studies is using different ways of defining the research philosophies and paradigms with relatively high overlap when it comes to meanings and emphasis in methodology (Mkansi & Edwin, 2012). In terms of terminology, research philosophy is referring to a system which combines beliefs and assumptions regarding the development of the knowledge (Saunders, 2016).

When making distinguishes between the different research philosophies, there are three main research assumptions according to Saunders (2016) and these are ontological, epistemological and axiological. According to Saunders' (2016) definitions the ontological assumptions referring to ones based on the "nature of reality". Epistemological on the other hand concerns the knowledge side of assumptions and what is "accepted" as valid knowledge. Lastly, the axiological assumptions constitute of the values and ethics shaping the research process, which are arguably formulating our point of views and therefore has to be considered when analysing credibility of the findings.

The research philosophies Saunders (2016) has divided in five different approaches, positivism, critical realism, interpretivism, postmodernism and pragmatism. For the guiding research philosophy in this research the best relevant is interpretivism as it fits well when analysing complex and multiple meaning interpretations of the matter studied. The philosophy is leaving responsibility for the researcher to formulate interpretations and often times the philosophy is being utilized when existing theories and concepts are too simplistic (Saunders, 2016). The subjective perspective is at the core of this research as the understandings and interpretations made in this research are solely contributed by the researcher himself. The subjectivism of the research philosophy has encountered criticism by some scholars over the years. Critics have raised issues in the interpretation process as it is depending on the researchers underlying philosophical assumptions, hence “Qualitative is not a synonym for interpretive” (Goldkuhl, 2011).

According to Saunders (2016) small sample, more in-depth type of investigation and qualitative approach is the typical method in interpretivism. The argument for interpretivism as a guiding philosophy is the belief that if rich and complex insights are scoped to smaller entities or the complexity is reduced the insights into humanity is lost. Interpretivism underlines the importance of studying the social world and human beings with a different approach to natural sciences. (Saunders, 2006) The complexity and human behaviour have been widely highlighted in the research theory as an important matter in the studied field. Goldkuhl (2011) concludes that the interpretive paradigm constitutes of the aim of understanding the subjective meanings of persons in studied domains.

3.2 Research Strategy

This qualitative research consists of findings gathered by interviewing 11 technology and procurement professionals working in various roles around the research topic. The qualitative research can be described as a process as the qualitative data collection has humanistic elements therefore the different interpretations and angles on how the researcher may approach the research topic may evolve and develop

(Aaltola & Valli, 2007). As the nature of this study aims to uncover human intellectual behaviour and enlighten very complex end-to-end procurement processes the qualitative study is the best fit for this purpose.

The qualitative research data is gathered through multiple-case studies. Since human and social systems are complex in nature, in order to understand phenomena related to such systems requires holistic approach. Case method is considered to be an appropriate approach to describe, explain, predict and control processes related to multiple aspects to the phenomena and organizational levels. (Gagnon, 2010). As a research method, multiple-case studies as an approach is offering more credibility compared to the single-case research method, where the focus is solely on one case. The importance of conducting the multiple-case study research with the same detailed focus and scientific standards in mind as the quantitative researches are conducted is crucial for the research method credibility. (Yin, 2003)

Often times qualitative research has a connection to interpretive philosophy, and it is seen interpretive as the researchers need work with subjective and constructed meanings regarding the studied phenomena (Saunders, 2016). Often when analysing the outcomes of the large-scale procurement process the individual variations can't be isolated from the wider context, instead the research must evaluate vast amount of leads in order to base conclusions. For this purpose, this research is an explanatory by its nature, as the study aims to seek valuable insight using open questions starting i.e. with "how" and "what". (Saunders, 2016)

3.3 Data Collection

In terms of data collection, qualitative studies may use few primary strategies when it comes to techniques. Data for this research will be gathered using theme interviews as collection method. The explanatory studies are often utilizing expert interviews as a part of the data collection process due to nature of the studied topic.

(Saunders, 2016) The reason for this is quite simple; in order to understand what the other party is thinking about a specific matter, by far the most efficient way of collecting this information is directly asking the interviewees their viewpoint regarding certain topic (Eskola & Vastamäki, 2010). The ways extend alternative situations when direct question is not appropriate there is a possibility to additionally draw conclusions of the matter using different signs or leads. The exploratory nature of the research is usually utilizing less structured approaches when it comes to interviewing experts as those rely on the quality of the input received from the interviewee (Saunders, 2016).

By the nature the theme interview is a discussion, although initiated by the interviewer, where the aim is to seek interesting aspects concerning the research in a form of social interaction. (Eskola & Vastamäki, 2010) The target for the data collection exercise is to facilitate a sort of generic discussion to uncover interesting angles from the procurement process and allow the interviewees also to express their personal opinions about the topics as definition of theme interviews of Eskola & Vastamäki (2010) point out as an advantage of theme interviews. As the nature of this research includes certain confidential topics, offering interviewees to discuss freely and think outside of the current environment is a good opportunity to even potentially seek improvements to the current situation.

3.4 Interviews

Interviews are set of social interactions where individuals co-operative sharing their past acts or reflections these acts, experiences and thoughts (Rapley, 2004). The research content of this research consists of 7 different narrative interviews with 11 different professionals representing 7 different organization all together. In the qualitative studies, the chosen interviewees are selected with targeted approach, instead of random sampling (Hirsjärvi et al., 2007). This is due to reason that usually it is impossible to collect and analyse all the possible data related to the research topic, the use of sampling is often required for narrowing the scope of data collection (Saunders, 2016). The chosen sample group interviewees were selected based on

different roles within the procurement process, ranging from procurement to IT Managers, in order to collect as many viewpoints for the research as possible. The guiding research philosophy, interpretivism, suggests business and management researchers to include variety of roles from different parts of the organizations to enrich the perspectives as the ways of approaching the topic might differ from the executive level to the more operational level. (Saunders, 2016). Every interviewee was set to have different level of expertise, experience and role within the pool of participants in order to provide valuable insights from their side of the procurement process. Saunders (2016) points out that the research should not focus on understanding experiences that are common for all, since richness and difference among the individual circumstances will be lost.

In order to analyse the findings related to the interaction as a source of information and not as an error, Alasuutari (1999) suggests that in preparation for the interviews certain hypotheses and explanation models should be defined. The idea behind Alasuutari's (1999) argument is based on the fact that every individual has certain own interpretations of the situations. The in-person interviews can additionally bring valuable data for the researcher as humans tend to jump into the conclusions after the first questions, which allows the social interaction to reveal potentially more information outside of the interview questions (Alasuutari, 1999). The table 1. summarizes the different profiles of the interviewees along with basic details of the conducted interview sessions.

	Title	Main role & objectives of the interviewee
1	Senior Scientist	Researcher background related to procurement and published also innovative technology related studies in the procurement area. Combination of research and first-hand experience.
2	Sourcing Manager	As a professional in the procurement this interviewee offers the sourcing perspective and know-how to the research.
3	CIO	The highest ranking IT professional is targeted to offer view points to the topic from the upper management level.
4	CPO	CPO's role is similar to CIO manage the process on executive level and the view-points from this perspective are interesting to the research.
5	Chief of Digital Services	Development responsible in the public sector organization has the need to digitalize processes and respond to citizen's expectations.
6	Chief Advistor, Innovative Public Procurements	This role would offer external views on how several organizations are conducting innovative technology procurement. Acting as professional advisor for multiple organizations.
7	Business Manager Procurement Services	In this role the responsibilities and company offering focused on helping public institutions manage public IT procurement.
8	Procurement Manager	Managing multiple procurement processes on annual basis as an external expert for public organizations. Procurement competence is high and very experienced professional in the public sector procurement landscape.
9	Retired CIO/Procurement expert	Long and extensive IT background. Expertise that this interviewee provides is the overall responsibility for delivering end-to-end solutions to public organizations. Also researching the innovative procurement field.
10	CPO, Lawyer	The CPO of an centralizd ICT services provider in the public sector. Has a strong understanding in addition to procurement also the legislative aspects having served as a lawyer for many years.

Table 2. List of interviewed participants.

Each interview was conducted either in-person or alternatively using online-meeting applications. The length of the interviews was 30-55 minutes, depending on the willingness and openness to discuss certain topics in more detailed level. One of the interviews were held with two interviewees and one among three people based on the request from the interviewees side. By recording the interviews, the interaction level during the interviews increases as the time is not wasted on taking notes. The recordings are also allowing researcher to listen the conversation multiple times and allowing more detailed information gathering. (Rapley, 2004) The interactive approach allows the researcher to notice important matters while conducting the data collection which can also help when re-organizing the way research is conducted (Saunders, 2016). As the interaction is in a key role, the analysis phase should be undertaken already during the data collection phase and not just after the process (Saunders, 2016). In order to facilitate confidential exchange of information, the decision for this research was to hold the interviews anonymously (Nikander, 2010).

3.5 Research Analysis

In the qualitative research the starting point is to portray what we know as real life. The research has to therefore recognize the manifoldness of the reality and conduct most comprehensive analysis of the research in question. (Hirsijärvi et al., 2007) The objective for the research analysis in qualitative research is to formulate summarized description of the research data. By clarifying and decoding the research data we are able to create new information about the topic (Eskola & Suoranta, 2014) Ruusuvuori, Nikander and Hyvärinen (2010) have distinguished general guidelines for the interview analysis. The analysis of the data begins usually already in parallel with the data collection phase and in addition connects strongly with the setting of the research problem & question. It is important to examine and familiarize the research results already during the data collection as well as transcribing processes. After these steps, the research data is categorized,

analyzed and decoded. These three steps different from each but yet pivotally connected to each other regarding the research analysis. (Ruusuvuori et al., 2010)

For research analysis method the selection for this research was thematic analysis as it matched with the quality of the research data as well as the objectives of the research. Thematic analysis is an analysis-model which aims to identify, analyze and report the data. This method allows the research data to be organized, described and decoded from different point of views. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data. (Braun & Clarke, 2006) The thematic analysis according to Braun & Clarke (2006) can be roughly divided into six separate steps. It is important to distinguish these separate steps as clarity around the process and practices are vital parts of the thematic analysis (Braun & Clarke, 2006). These steps are familiarizing the data, coding the data, developing themes, analyze themes, naming as well as defining themes and finally writing the report.

The analysis process in this research started with transcribing the collected interviews. The next step after the transcription process followed Braun & Clarke's (2006) guidelines and the interview findings were read and analyzed multiple times to understand them in a most detailed manner. During this phase of the research several notes were taken from the transcribed data and certain insightful findings started to emerge. The transcription process should be relatively detailed and include elements such as long pauses, changes in the tone of voice and other emotional expressions (Nikander, 2010).

Based on initial scanning of the data the next phase of the analysis process focused on the initial coding the data. According to Braun & Clarke (2006) in this phase the researcher should categorize data into meaningful groups based on the interesting attributes highlighted in the data. During this phase the objective was to have as diversified outlook on the data in order to include as many alternative viewpoints based on the interview responses as possible. According to Braun & Clarke (2006) the researcher is not limited by the number of coded themes, instead there is a possibility to have as many themes that naturally emerges.

The third step of the analysis process consist of analyzing and categorizing the coded data into different developed themes (Braun & Clarke, 2006). This phase in the research was done using thematic maps, dividing the themes into multiple theme groups. The objective in the third phase of the thematic analysis according to Braun & Clarke (2006) also includes dividing and analyzing the codes based on the already established themes. During this phase of the research analysis it is important to identify those interesting themes that are relevant in the context of the research questions. The researcher itself has a significant role in diving the themes into certain categories and possibly consider using potential sub-categories connected to the themes. (Braun & Clarke, 2006) Some researchers such as Jolanki & Karhunen (2010) point out that the coding process is not completely objective itself as the researcher is always deciding on the relevant content based on their own judgement and categorizing the results accordingly. The primary purpose for coding the research findings is to have the data in more understandable and manageable format (Ruusuvuori, et al., 2010).

The fourth part of the analysis according to Braun & Clarke (2006) consist of analyzing the themes and developing more unified view of the research findings. The objective is to seek synergies among the codes and themes to see if these fit together or should someone of the codes be placed under different themes. Unless there is not a unified theme to be formulated based on the data, the theme itself might be problematic and possible it needs to be removed from the overall entity. This same process of harmonizing has to be done also to the overall analysis content after reviewing each theme. The objective for the research at this point was to look at formulated themes, is there overlap among them and is the overall entity logical. For this step PowerPoint was used to map elements and to visualize the initial findings.

The PowerPoint used in the mapping exercise would also be the basis for the visual thematic map visualizing the themes (Braun & Clarke, 2006). The visualization exercise and fifth step of the analysis process according to Braun & Clarke (2006) aims to define and name the themes visualized. What is meant by the definition is

to analyze in which theme is most concerned with it as well as how is it connected to the overall research content. Based on this the final, and sixth part of the research analysis is to write the analysis and report the findings. In this section the primary purpose is to present the findings as clearly and comprehensively as possible to convince the reader of the proficiency level of the research. (Braun & Clarke, 2006)

The visual theme map presented in the Figure 3 is used according to Braun & Clarke (2006) to visualize findings in order to illustrate the interview data in a structured way. A part of the theme mapping process is to identify themes that are in order defined to analyze the data. When defining the themes, the researcher is evaluating what kind of themes are arising from the findings and how these are representing the collected set of data. The relationship among the main themes that were highlighted most often in the interview and the sub-themes connected to these main themes should be carefully assessed. The main themes that have been selected to be included in the map are also in-line with literature review findings and those findings have been utilized to draft the theme map.

4 Findings

This chapter focuses on reviewing the research findings divided in four sub-headings based on the main themes and research questions. The sub-headings will be divided further based on the themes reflected in this analysis phase. As in the thematic research, there will also be thematic maps visible in the sections, to help identify and illustrate the findings of the research questions. The approach utilized in this analysis follows the interpretivist approach where the purpose is to create new or enrich the understandings as well as interpretations of social worlds and context (Saunders, 2016). The ultimate target for the analysis stage is to respond the RQ1: What are the critical success factors of the innovative technology procurement in the Finnish public sector? In order to support the analysis and interpretations made in different contexts, parts of the research content e.g. in the form of direct quotations will be visible in the analysis.

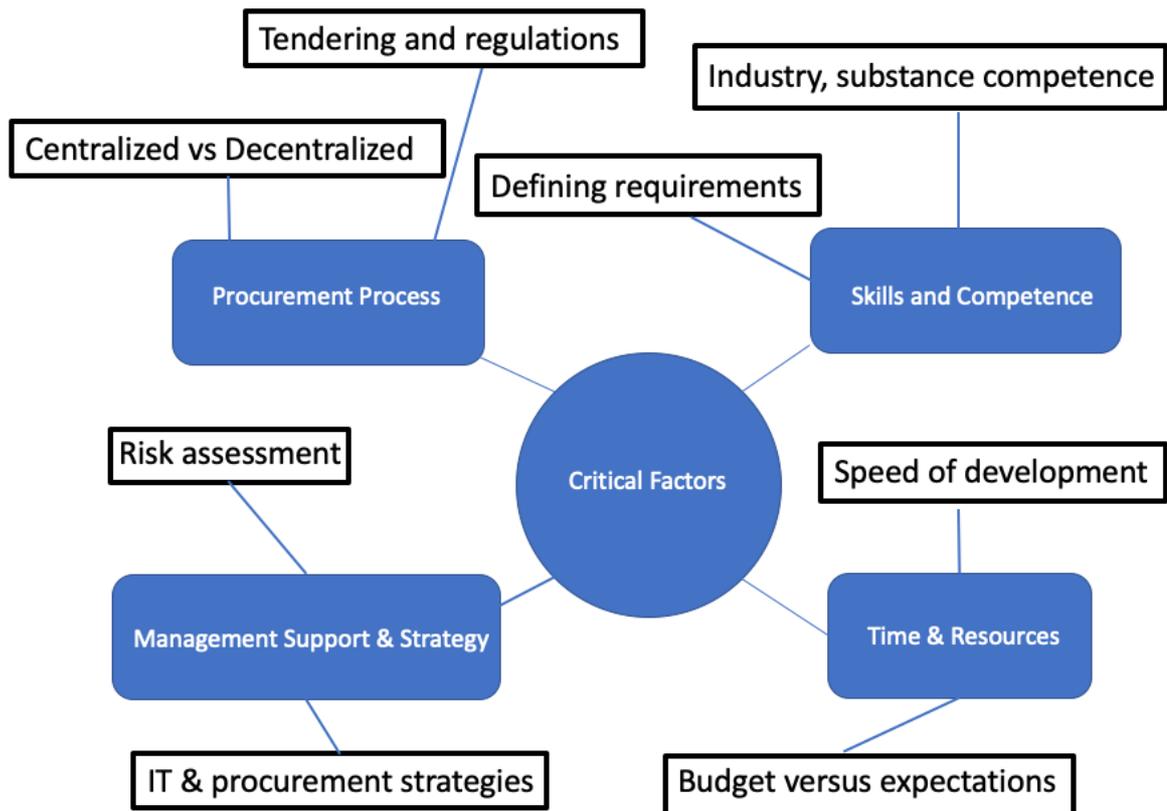


Figure 3. Theme map of the critical success factors related to innovative public technology procurement in Finland.

The visual theme map in Figure 3 illustrates the data gathered in through the expert interviews. At the core of everything lies the key critical factors related to the successful innovative technology procurement. Around the core success factors, there are number of themes, which are all also represented in the literature, to construct as comprehensive point of view of the key ingredients of the innovative technology procurement from variety of angles. It is important to highlight that the themes around to the critical success factors are also connected to each other on different levels and therefore the Figure 3 has connecting lines between each theme and sub-theme. The underlying objective of the Figure 3 is to formulate an overview to analyze the larger picture and find common concepts but also to simplify and aim for conclusive findings results. The following sub-headings will discuss the key findings connected to the visual theme map and their relevance to the research.

4.1 Procurement Process

In this chapter of the analysis the aim is to find answers to the second research question of this thesis: How do you coordinate the end-to-end procurement process when purchasing innovative technology? The analysis findings have been divided into sub-categories based on the relevant categorization.

Public procurement includes variety of different processes. These processes can be divided as planning, advising, obtaining, delivering and obtaining government expenditure on goods and services to match the desired objectives and outcomes of the purchase. (Prier & McCue, 2009) Earlier research highlights the importance of the process itself potentially impacting motivations, expectations and goals when different individuals have the power to influence parts of the evaluations often even with limited competencies. (Knutsson & Thomasson, 2014). Based on the research data, most of the interviewees raised the process as one of key components of the successful innovative technology procurement.

4.1.1 Tendering and Regulations

As a first procurement process related sub-theme tendering and regulations were clearly raised due the visibility in the findings related to multiple interviews conducted and analyzed. When interviewees were asked to describe different challenges and success factors in the innovative technology procurement, the process elements were often highlighted. From the higher-level, the process and organizational structures were introduced in interesting light. Two interviewees 2 & 6 pointed out that for some (procurement departments) the whole procedure of tendering is not perceived as an enabler for successful utilization of technology, instead it is put on the center of everything.

“The procedure (referring to tendering) is for many procurement departments the perceived absolute value itself, because it is just something necessary evil to publish a tendering request and receive proposals.”

Interviewee 8

“The problem, if you ask me is that we have the procurement departments in the government organizations with procurement experts who are running the process. They want to play it like a public officer, safe and sound, meaning that they only want to protect the process for running correctly.”

Interviewee 2

In these above findings it seems that process is at times raised above all other elements. Potentially due to this statement and based on other interview findings, the role of procurement experts and departments is seemingly large in the innovative technology procurement. One of the reasons for this is that certain insecurity was visible towards the whole tendering process. Interviewee 8 pointed out this in his statement.

“When you look at it (referring to the overall tendering procedure) from an outsider’s perspective, it only looks at jungle of regulations.”

Interviewee 8

Other interviewees also point out that the responsibility due to the complexity and perceived difficulty is leading to the situation where the non-procurement experts leading the initiatives push the procurement responsibility to the departments.

“Unfortunately, often the reaction regarding the division of the work is that, let’s just hand it over to the procurement experts’ task to figure out how can we execute this?”

Interviewee 6

An important topic related to the innovativeness was that the tendering process seemingly had a negative impact on how the interviewees had experience it affecting the innovativeness. The findings from multiple interviews found that the process had limited the level of innovation when executed according to the regulations. Based on the findings the experiences regarding the process is described as “bottleneck” and “having your hands tied” where the room for more innovative solutions is disappearing along the process as it progresses.

“When applying the public procurement law, by creating tenders, defining specs and deciding the criteria for the evaluation and so forth, the process becomes such a bottleneck. Something went wrong.”

Interviewee 2

“After the criteria is set your hands are kind of tied. You can’t really do much more after that.”

Interviewee 10

“Because you have to listen to everybody and no one can be excluded, it may have a negative impact on the innovativeness in the larger picture, which is a shame as you would need to encourage to it rather.

Interviewee 4

“Once the desired features and functionalities with certain value drivers are pushed to the procurement process and buying process, the output of that then is not innovative or cutting-edge at all, instead we end up in the more traditional solution.

Interviewee 6

Similar themes regarding the common difficulties including the highly regulated and bureaucratic nature of public procurement have been identified by other academics, such as Greer and Erridge (2002). Process related complexity is challenging the innovative nature and causing overlapping motivations, expectations and goals (Knutsson & Thomasson, 2014). Based on the literature and research findings there seems to be a clear gap of what experts see beneficial for the innovative technology procurement and what tools are provided by the regulations. One interviewee noted on his statement the lack of certain guidelines or best practices.

“If we look at procurement practices, procurement law and processes, there is no clear “patent solution” for more experimental approaches in the public procurement context.”

Interviewee 6

However not all the respondents had similar, difficult experiences when it comes to the tendering process and regulations. For some the regulations and provided frameworks were clear and they had accepted them as a way of working. An interesting finding that the interviewee 3 was one of the few who didn’t have any negative comments from the tendering and regulations perspective is representing the business development function.

“I don’t see any problem with legislative directives of public procurement. They are what they are. The results are based on what has been decided to include in the description”

Interviewee 3

“The current procurement law provides opportunities (to have innovation included in the procurement process) and it even mentions innovative procurement.”

Interviewee 2

In addition to this, other respondent also pointed out that current legislation already provides solutions for conducting innovative procurement, which in an example of legislators’ proactive measures towards providing more flexibility in the procurement process.

4.1.2 Centralized vs Decentralized

In terms of processes related to managing innovative technology procurement, centralization and decentralization in terms of managing overall IT development and procurement were often distinguished as common themes visible in the research findings. Earlier academic research has discussed the development of centralized procurement over the past decades and it has been facing certain criticism (Thai, 2001). In addition, in the context of the Finnish public procurement Ministry of Finance has for instance established central procurement bodies, such as Hansel for helping public organizations to manage the process of public procurement. Nearly all of the respondents had personal experiences and opinions about the centralization movement. The centralization and the use of combined resources was visible in almost all the interview discussions.

“We have centralized ICT-provider for the regions public organizations... We used to have someone we could personally just call but now everything is behind organized ticketing with Service Level Agreements based on written contracts ... We use quite a lot of third-party expertise”

Interviewee 3

“Hansel is providing us the tendering services and we happy with Hansel’s work ... We don’t have the resources and skills for investigating things more, so it is better if the requirement is already figured out. They should provide us the technical expertise.”

Interviewee 4

Findings related to the associated benefits in addition to the interviewee 4's statement earlier consists of combining smaller initiatives to larger ones in order to utilize the resources and to be able to execute development programs more efficiently. Resources in terms of money and needed workforce was seen problematic in terms of generating impactful innovation with the help of technology larger scale.

"There has been a justified movement towards larger concepts The smaller the units are divided, the more difficult it will be (to execute innovative public procurement) ... Seldom is radically impactful innovation being created by smaller units."

Interviewee 10

"Initiatives, such as "Smart Cities", we don't have the capacity to involve ourselves. Then you have to buy expertise which leads to the time, money and expertise dilemma. And as a fourth elements the collaboration."

Interviewee 3

On the contrary when looking at the potential benefits, the interview findings revealed some more negative experiences when moving towards centralization. The centralization movement of public procurement that started in the early 1900's has faced criticism. The argument constitutes views both from practitioners and researchers, that in order to be more responsive and end-user friendly in procurement, organizations must decrease the amount of bureaucracy and increase the level of coordination between departments. (Thai, 2001) Examples of these consist of for instance in basic challenges of siloed organization structure where information is not flowing across all the relevant stakeholders and lack of customer-centricity. The economies of scale benefits that were mentioned in the previous part are bringing side effects to the equation in form of less targeted solutions and therefore more dissatisfaction.

"It is pretty siloed (centralized procurement) where the procurement experts are responsible for the process but kind of lacking the more strategic end-to-end approach."

Interviewee 2

“We are running into structural issue. When government has centralized ICT-services to service centers, the customer has distanced from the overall service delivery. The original customer point of view is vanishing to the background and the IT experts start to proactively build things based on their way of thinking.”

Interviewee 1

“It’s not hard to imagine that if you have 300 hundred different organizations, who should reach a consensus or if you have five of them, then which of these is taking more time and what the result is?”

Interviewee 10

The overall size of the IT projects is connected to the centralization/decentralization topic. An interesting comment from one of the respondents described that when the objective of the IT project grows significantly, the complexities associated are also increasing.

“Sometimes we have tried to build too large systems.”

Interviewee 10

“It was poor initiative as such to have 10 municipalities developing solutions with similar needs. The timeline and budget exploded and all the sudden the whole project stopped.”

Interviewee 3

However, some organizations have been establishing more internal expertise in-house in the public organizations and that has been seen beneficial. Based on the interview findings often the centralization and decentralization decisions are based on resources, monetary and skills, which will have separate sub-themes in the further analysis. Despite the fact there are few examples in Finland that can be raised where the decision to have more resources locally have enabled more agile development of IT services and potentially more innovative technology solutions.

“The City of Pori is a good example. They talk quite a lot about agile IT development. They have quite a large IT department, more than ten at least... Maybe even 30?”

Interviewee 3

4.2 Skills and Competence

According to many respondents, skills and overall of competence of the organizations and individuals were noted as an important success factor within the innovative technology procurement in the public sector. The earlier academic research also has identified the relevance of the knowledge within the organizations in relation to managing successful technology procurement (Moe & Sein, 2012; Saarinen & Vepsäläinen, 1994). Term “knowledge gap” is used in the literature to explain common challenges when organizations are trying to reach conclusions and interpretations based on misaligned facts (Koski, 2019). Multiple respondents raised the skills, competence or knowledge as a critical factor in order to create more impactful solutions to the public organizations with the help of innovative technology.

“This (competence) is a major problem, that the expertise, especially substance expertise when it comes to new technology is not nearly there I want to emphasize that it is a critical topic ... It’s not so much about procurement expertise, it’s more about subject matter and technological expertise and understanding these.”

Interviewee 10

“Often things don’t progress as we don’t have money nor the skilled resources.”

Interviewee 3

An important finding regarding the competence within public organizations is that often it is a matter of only few people internally having certain level of expertise in the more innovative technology. What makes the situation quite difficult for many organizations, that you have limited number of skilled resources, yet you would ideally have to make educated decisions looking quite far into the future.

“It is quite extensively matter of few individual’s know-how and competence.”

Interviewee 3

“One should be in the forefront of the opportunities provided by the technology to see what the every-day life is all about in 5-10 years into the future.”

Interviewee 1

Some of the examples related to the topical problems identified in the analysis based on the experiences of the respondents were causing negative end-results in the end. From procurement perspective lack of competence might lead to a situation where the vendor or vendors are having extensive bargaining power towards the customers if their role becomes significant enough within the organization.

“When there are no capabilities to master the topic at the required level, we often end up in situations where large end-to-end solutions are bought with turnkey mentality, leading into vendor-lock for instance.”

Interviewee 10

The competence is also linked with results and impact that innovative technology might have for the organizations. Respondents in the research generally stated the urgent need for more skilled resources internally and most of them had certain ideas how to develop this front. A paradox of having expertise in how to develop internal expertise is clearly a demand for the future.

“We just made an initiative in the town council to map out our intangible intellectual capital. Word vision was highlighted there ... Many things don't progress as we don't the money nor the expertise, so let's just let it go.”

Interviewee 3

4.2.1 Defining Requirements

As discussed in the earlier academic literature, the underlying the problem in information systems procurement is that the development of the systems has remained largely human intellectual activity and the need for effectively communicate the system requirements are defined by human beings and based on their capability to coordinate complex issue (Koski, 2019). Misalignments in the specifications of the requirements can hold conflicting elements among the involved parties (Alanne et al., 2015). The findings in this research revealed similar experiences among the respondents. As the group of respondents consist of professionals working in different roles and levels of the organization the importance of having expertise in managing successful innovative technology procurement.

“Well, what else can you say except you are making sure of it in the defining stage of the project (that we select the optimal solution to us).”

Interviewee 3

If we look at similarities in the respondent’s ways of initiating the whole procurement process, it often followed similar logic where the development idea or need is initiated in by an individual or group individuals and then pushed to the IT or procurement. In terms of the needed capabilities, these were originated from the operational side directly, which could be seen beneficial in order to have relevant solutions in place based on required capabilities from the field.

“Now the need for some new solution is arising from the service operations itself, meaning that buying new software is not the absolute value itself, instead it’s based on an idea to do something better, efficiently.”

Interviewee 6

The need is coming from the customer, they tell us what they need, what is the ambition level, maybe what could be there. It may be that they have barely any substance competence.

Interviewee 7

However, the respondents also highlighted several common challenges in their experiences with requirements definitions. Topics such as too excessive requirements, lack of architecture understanding, lack of user perspective and lack of understanding regarding options in the market, are all highlighted as common challenges in the requirement definition process. These are the type of challenges when it comes to misalignment in specifications that Alanne et al. (2015) mentioned, are then potentially leading to less optimal end-results in the innovative technology acquisition.

“If you need Toyota Avensis, don’t define specs for Tesla.”

Interviewee 8

“We didn’t really have system planning competence, architecture understanding.”

Interviewee 2

4.2.2 Industry and Substance Competence

What was mentioned already regarding the requirement definitions by our respondents, the needs for new solutions are often arising from the end-users in different operative roles. Interestingly, our respondents pointed out few examples of public organizations lacking cross-industry competence and understanding how certain solutions could help in certain industry verticals such as in education or in healthcare. Siloes within public organizations was seen limiting the capabilities to develop strategic initiatives.

The paradigm based the findings seems to be that the organization that is responsible for purchasing and developing the solution, e.g. IT and/or procurement, is not the end-user for the solution, instead it is someone in the specific industry. The findings indicated that there should be more information exchange between these two groups in order to achieve the optimal end-result.

“If we think of the situation that the IT department usually is not the party who needs the solution, instead it is some substance industry operators ... Unfortunately, of the situation is that no one really knows how to start solving the need.”

Interviewee 6

It would require breaking down the industry silos, which is the inflexibility in the public sector that you would need to break.

Interviewee 10

To summarize, the research findings noticed a clear gap in the general competence levels of the public organizations, which were reflected in the findings based on the interview results. Lot of the organizations also had ideas and existing processes on how acquire new knowledge and stay up to date of all the development that is happening in the innovative technology side, but lot more concrete steps are to be further established here.

4.3 Time and Resources

In the theme mapping exercise in the search of critical success factors regarding innovative technology procurement in the public sector, time and resources in general were often visible in the respondent's comments. In order to analyze the findings concerning in more detailed level this theme was divided into two sub-themes; speed of development and budget versus expectations.

4.3.1 Speed of Development

As mentioned, the earlier literature has distinguished how the technology is developing quickly many promising and innovative systems are having considerable delay when the applications are actually available in the market (Saarinen & Vepsäläinen, 1994). These similar topics were also reflected in the findings based on the interviews and often the time elements have seen challenging from multiple perspectives.

One of the issues that was mentioned in few interviews, was concerning the expected delivery speed of the desired solutions. One interviewee mentioned an example were the end-users wanted to initiate a new development for certain innovative solution, but the timeline was unrealistic. In addition, the initial starting point to get processes moving some respondents felt frustrated by.

“It's not happening May or April (when requested in March the same year) because it takes time. One big challenge for us is the time. And time window.”

Interviewee 3

“To get things going can take a while.”

Interviewee 10

The realism when it comes to timelines is also connected to the earlier discussed skills and competence topic. One the respondents pointed out very well the underlying issue leading to misalignment in expected lead times for outcomes in the

innovative public technology procurement, is longer than what most of the organizations and individuals think.

“Based on our experience, procurement department is not often aware of how long the innovative sourcing process is ... In general IT procurement takes a bit longer due to the negotiation procedure.”

Interviewee 8

The research findings revealed few points regarding the optimization of the time horizon being one success factor. An example on how time factor may impact the successfulness of the technology procurement is when timelines are too narrow and that leads to sloppiness. On the contrary, when timelines are carefully planned and the solution needs are addressed early enough, this will lead to more successful results.

“In rush people make mistakes. When you have sensible timeline, the customer is approaching us early enough, there is time to prepare and so on, it leads to better end-results.”

Interviewee 7

In general findings reveal that often the public sector technology procurement is seen as slow-moving process. The speed of development among the IT industry and the renewal timelines of the public technology infrastructures were seen based on one respondent, as a source of potential tensions between buyers (public organization) and suppliers (technology providers).

“How this clock speed of the digital industry is then fitting in to these more traditional and industries in the physical infrastructure. There is an interesting tension then on how suppliers are operating with a quick cycle and then again the renewal cycle of the physical infra industries is maybe 100, 50 or 25 years as life-cycle.”

Interviewee 6

4.3.2 Budget versus expectations

Public sector has the constant pressure to deliver information systems specified, modified and developed while maintaining the cost-efficiency (Koski, 2019) with the

mutual end-goal of maximizing the benefit of tax-money (Schotanus and Telgen, 2007). The connection to these literature findings is clearly visible in the research findings based on the respondent's personal experiences. The findings related to monetary success factors of the innovative public technology procurement based on the interview results can be divided in roughly in two categories; ambition levels for the solutions versus available funds and the amount of budget in general. The ambition level basically means what kind of solutions are desired and how expensive these are. One respondent used a car-related comparison again by saying that:

"If you want Mercedes but you have money for the Lada... Constant battle with the financial planning."

Interviewee 3

"There is a financial challenge connected here (in the innovative technology procurement in the public sector)."

Interviewee 10

When turning the perspective again towards the suppliers, the available funds of the public organization are also connected to the potential number of vendors interested in offering their solutions to them. Although public procurement is a significant market due to size of the public investments (Moe and Päiväranta, 2013) the research findings also revealed angles where public tendering would not be as attractive to all of the vendors after all. This kind of development is leading to inefficiencies in the market and potentially then less optimal solutions with higher price tag.

"If public market is not interesting to the supplying companies, the solutions offered to them are not as good or they are expensive. The more solutions scale the cheaper it gets for the public sector as well."

Interviewee 10

From the budget perspective as well as from the procurement negotiation perspective the efficiency in the market might be also affected by the larger global vendors. It is an interesting dilemma of as the respondent 10 mentioned

lucrative nature of the public market along with having larger global players with bargaining power over the public sector customers.

“Global companies often are in the dominating market position in many areas and they are setting the direction then.”

Interviewee 1

In summary, the financial resources associated to the pressure of delivering outputs that are expected of them is a topic which contains critical success factors connected to the innovative technology procurement in the public-sector. The findings also reveal that finding optimal efficiency in the financial areas of the public procurement is also connected to the other critical factors of successful technology procurement. Economies of scale for instance is linked to the centralization vs decentralization discussion. Time related critical factors have as well similar potential benefits if optimal balance is found in terms of scaling the scarce resources to produce most optimal outputs in as agile timeline as possible.

4.4 Management Support and Strategy

As the fourth and final main theme distinguished based on the interview findings is connected to the overall strategies of the public organizations in association to technology procurement. As reflected in the literature, the public procurement of the IT systems in general is far from straight-forward process. There are several different options to acquire information systems, which is challenging procurement strategies of the organizations. (Saarinen & Vepsäläinen, 1994) In connection to this, the positive development towards seeing procurement as more strategic function part of the organization delivering long-term value, instead of seen as a support function (Kähkönen & Lintukangas, 2012), is visible also in the findings related to this research.

This theme is having a significant importance across many of the critical success factors mentioned in this findings section. Management decisions ultimately are

guiding the organizations in securing well justified use of public resources in regulatory compliant manner to deliver contracted 3rd party goods and services (Russell and Meehan, 2014).

4.4.1 IT and Procurement Strategies

An interesting finding related to the overall management of the public sector innovative technology procurement is that many respondents highlighted the importance of having their organization and upper management to support different new innovative initiatives. It appears that often the underlying motives or sources of new initiatives are not necessarily aligned with the organizational strategy and therefore misalignment is causing issues to procurement departments. Seemingly the respondents' results reveal that not always are the organizations fully aligned on why they are embarking on a development journey and what kind of results should be expected as a result of them.

“Users often have these kinds of ideas [for development] but they are lacking the capability to proceed with them and the management support so that they could move forward with them ... Strong commitment from the management is required for the development or the project”

Interviewee 10

“It is a quite boring starting point [in managing successful innovative technology procurement] to have the organization to understand its own critical success factors in their own strategy.”

Interviewee 1

“I see it so that the needs [for new technology] should be originated from strategical targets and operative needs.”

Interviewee 2

The findings reveal connections to the competence topic discussed in the section 4.2 as example in a form of being able to define needed solutions according to the strategy set by the upper management and in the public sector also the central government. The impact of political decision-making was clearly impacting the public IT and development initiatives. The findings reveal both that the e.g. the municipal level strategy decision flow all the way to the operative level and that the

directions of the then leading political movement will cause sometimes even drastic turnarounds to on-going development projects and procurement.

"In today's world It is actually quite a major topic, that when we have a new municipal strategy, then everything we do is based on that particular strategy."

Interviewee 3

"My role is a CPO but the organization got merged with another organization starting 1st Feb 2020. The role of the organization and my role is still a bit unclear. The organization is founded during the previous Finnish government based on the regional and social welfare acts."

Interviewee 1

The previously discussed misaligned expectations will put more pressure towards the procurement process, which is leading to inefficiencies and less optimal end-solutions. Based on the findings the lack of support and connection to the overall need for a technology solution arising from the organizational strategy generates only fulfills the potential of the solution partially. In few occasions revealed in the interviews also the role of external service providers and their role where highlighted in terms of their sales efforts. These sales efforts had been seen impacting the decision-making on starting a new project or procurement process of new piece of technology.

"The experts visits directors multiple times, back and forth, to justify why new technology solution is needed and eventually the leadership team is convinced that yes, we needed it and asks the procurement team to purchase such a system."

Interviewee 2

The results indicate that often these public organizations are facing pressure to deliver new innovations under misaligned objectives set by the management or central government. In order to improve this area both management of the end-to-end process, starting from the clear definitions of what are the organization actually about to develop and buy and to what purpose it is then utilized. On top of this the management of the different steps in the phases starting from the supplier selection (e.g. regarding the right system integrator or technology platform) to the rollout phase of the solution needs to be successful. When managing all these steps the

respondents highlighted importance in combining pieces of organizational internal departments to be better aligned in order to achieve the best results. As an example, when seeking solutions that are related to very specific needs of certain group of end-users, these stakeholders need to be very much in harmony with the IT management and procurement management. A good example of this is provided by one respondent below:

“If we think of for instance a hospital, which needs some new health tech or ICT solution to be used, then they need to engage doctors and hospital staff who know what they need, then they need to have the needed technological expertise and of course procurement expertise. Sort of a holy three-way alliance and on top of this the support from the top management to seek something new and take some risks associated.”

Interviewee 6

4.4.2 Risks Assessment

Risks and management of these was identified as an interesting sub-theme regarding the management support and strategy theme during the research analysis. The topic of managing risk and how does it potentially affect public technology procurement has been also highlighted in the earlier academic papers. Knutsson and Thomasson (2014) pointed out that there can be a tendency in the public sector to “play it safe” and avoid unnecessary risks as the legal threats and appealing processes are present in the domain. These academics also pointed out these fears leading to difficulties in the promoting innovation in this area. When analyzing the respondents’ results, there were quite often common view points on regarding the risk factors. In addition to the potential legal issues caused by the regulations, the respondents highlighted risks that are personified to the individuals behind the initiatives. The findings indicate that there is a clear worry of potentially losing jobs if the risks are actualized.

“Many will give up (on innovative technology procurement) ... as they are fearing the market court ... unfortunately when the risks occur, they often are personified – “this person has done a mistake here.””

Interviewee 6

*Are they firing me if I'll start doing somethings like this (innovative technology procurement)?"

Interviewee 2

These findings have a direct connection to the previous theme of management support and IT strategies. The dilemma on harnessing technology innovation is seemingly generated by smaller group of individuals in the public organizations, yet the risks seem to be personified and as Erridge and Greer (2002) discuss this leads to preferably continuing to work in "right behavior".

When analyzing the results around this theme, another angle to this topic was also discovered. These findings highlight some of the incoherencies in the public procurement caused by the regulations and politics. These findings argue that the public officers in general have quite a poor level of carrying risk. The pressure is created through incoherencies in the target set by the government, timeline and budget to achieve these.

"What is challenging in the innovative procurement is the risk management. Public officers have a poor capability to manage risk when the contracts have set certain targets for them and that in given timeline you must produce this and this information system and here you have the money."

Interviewee 1

In addition to this an interesting finding in the analysis concerning risk was the procurement policies around new technology. As Knutsson & Thomasson (2014) discusses challenges of acquiring something which doesn't necessarily exist yet nor is there any pre-defined solution for it in the market, someone always has to be the first one to implement a new solution. In the interview the findings reveal issues when public organizations are pushed to absorb risk when piloting new technology and it seems there is not a clear answer on how to tackle this.

"Many organizations don't want to be the first ones to move. They want to first see that the thing actually works and then after few years move towards it ... It is a risk because things don't always work from the beginning as they should and then you are forced to be the pilot customer in many areas and suffer for it."

Interviewee 5

Although there is not seemingly a clear solution to the dilemma of managing risks while innovating around new technology in the public sector the respondents mentioned the need for more courage within public organizations. By trying out new ways of delivering innovative solutions and with the help of this spread knowledge and learnings around the organization, the success can be achieved.

“Just have more courage, new experiments, new purchases – and by doing these spread the knowledge. At the end of the day it is not rocket science.”

Interviewee 6

4.5 Summary of the findings

Based on the analysis of the thematic research of the primary interview data of the interviews working in different areas around the innovative technology procurement in the Finnish public sector it has been possible to summarize the key findings of the research. The findings are reflected using the thematic framework as a basis and therefore the outcomes of the research are categorized using the themes and sub-themes discovered in the research process and divided based on them into four main categories.

The findings are presented in a table 3 with the purpose of developing a holistic view of the key success factors of the innovative technology procurement in the Finnish public sector. The summary table 3 follows the structure of the Figure 3 used in as analysis method for the research, including the main themes around the critical success factors. The purpose of the table 3 is to highlight the research outcomes in a nutshell and enable development of a holistic overview in order to support the answering to the research questions of this study.

Critical Success Factors	Procurement Process	Skills and Competence	Time and Resources	Management Support & Strategy
Overview of the key findings	<p>Managing the complexity of public procurement while not allowing innovativeness to be lost in the process.</p> <ul style="list-style-type: none"> - Laws and regulations causing complexity - Lack of clear best practices <p>More strategic approach to procurement needed.</p> <p>Centralization vs decentralization have both disadvantages and advantages.</p> <ul style="list-style-type: none"> - Centralization can help smaller municipalities achieve more impactful results - Centralization on the other hand might reduce the innovation by being too distant from the end-user - Too large systems built might be eventually impossible to implement 	<p>Competence in general seen as a major critical success factor.</p> <p>Expertise is generally in the hands of few individuals.</p> <p>Lack of resources causes the lack of skilled resources.</p> <p>Competence is defining requirements formulates the foundation for successful procurement.</p> <p>Lack of IT related understanding, available options in the market and being able to specify the type of solution is need is (not too cheap to too expensive) is important.</p> <p>Industry relevant competence is seen essential (e.g. health professionals)</p>	<p>Time and resources are in general scarce resources in this domain.</p> <p>Expectations are often unrealistic e.g. sourcing process generally takes longer than expected.</p> <p>IT industry is developing faster than what the public organizations are able to adapt to.</p> <p>Budget is often not enough to buy the premium solution.</p> <p>Public organizations often have to balance the market lucrativeness and bargaining power with global technology providers.</p>	<p>Management support seen as extremely important but often lacking.</p> <p>Successfulness depends on the linkage to the overall strategy.</p> <p>Political decisions and government strategies causes misalignment.</p> <p>Good alignment required between end users, management, IT and procurement.</p> <p>Risk is seen as major blocker for innovation in this domain. These often:</p> <ul style="list-style-type: none"> - Lead to a situation were losing occupation is seen as a risk - Personified to specific individuals responsible - Acting as a pilot customer, purchasing new technology as a first customer is not a desired situation.

Table 3. Summary of the findings.

From **procurement process** perspective the findings reveal that many respondents saw managing the complexity of public procurement while not allowing innovativeness to be lost in the process. One aspect of this were the laws and regulations associated with the public procurement. Often the respondents were seeing good and innovative ideas to be lost in the process and therefore saw improvement needed. As one of the leading causes for misaligned in managing the innovativeness of the technology procurement was also the lack of best practices or guidance. These findings address both the RQ1 as critical success factors do

include the end-to-end process management of the procurement process as well RQ2 regarding the coordination of the process.

The process related theme analysis revealed also good findings but in favor and against centralization regarding procurement process in this context. The respondents seemingly had experienced both disadvantages and advantages. The key findings in this area were that centralization can help smaller municipalities achieve more impactful results than applying more decentralized and local level initiatives. The more negative impact then again concerning centralization was the reduced the innovation by being too distant from the end-user. From the technical level the experiences had also variances as some of them saw too large systems to be implemented eventually impossible but then on the other hand that smaller initiatives were seen less impactful.

Based on research findings **skills and competence** are having a major impact on the successfulness of the innovative technology procurement. The findings regarding this theme were highlighted in the results most commonly amongst the respondents as almost all of them listed it as a major critical success factor. As a summary, the expertise in the organizations seem to be quite narrow in terms of number of skilled individuals. The skills are seen essential from the perspective of managing the overall procurement, from defining the requirements to the implementation and coordination of the solution lifecycle. In addition to the solely technology related competencies, the competencies concerning different industries that the technology should eventually serve was seen a difficult task. An example of this was for instance health care related industry solutions. In the previously published literature both Knutsson and Thomasson (2014) as well as Edquist and Zabala (2012) raised similar concerns around skills and competence being a critical factor in the innovative technology procurement, when the solutions that organizations might be ordering do not exist yet and how difficult it might be then to manage the procurement successfully. Knutsson and Thomasson (2014) are in addition to this discussing the misalignment of the expectations and goals of the procurement versus the competencies of the organizations.

In addition to the criticalness of the skills and competence around the research topic, another quite unanimously flagged critical success factor was **time and resources** of the public organizations. As mentioned already in the literature, the technology is developing extensively and with such a fast pace that this puts a lot of pressure on many organizations. What was clear in the analysis that the scarce resources in the public sector caused misalignment within the public organizations in terms of on which timeline can the procurement process be executed according to the policies and how big is the budget in general. The findings also noted that often times the most premium solutions of vendors might not be possible partners for the public organizations due to the lack of monetary resources, however there were respondents who mentioned the premium not necessarily being the sole source of optimal solution and organizations can achieve good results with less expensive technology.

From the procurement perspective the comments respondents had around market lucrateness and bargaining power were interesting as these will potentially put more pressure on the procurement organizations. The market lucrateness and potential vendors having interest to innovate solutions to the public market can be quite essential as Geroski (1990) points out the importance of organizations pressuring the technology front-runners to provide capabilities and solutions to meet the demands of the public institutions. Lack of this joint effort might lead to inefficient innovativeness generated towards the public sector technology.

Findings around the last theme distinguished in the research analysis, **management support & strategy** was something multiple respondents emphasized and what should be reviewed on regular basis to guarantee most successful innovative technology public procurement. An interesting finding was that, yet this topic was raised quite often, still the respondents were able to provide very little explanations on why the management support is lacking. Linkages to overall strategy of the organization and misalignment caused by the government level expectations appointed to certain public institutions have been leading to failures. The alignment within internal organization, from the procurement all the way to the end-users were noted as one source of improving the situation.

Findings related to managing and tolerating risk were quite similar to the earlier findings the academics. As Erridge and Greer (2002) discusses the issue of balancing risk leading to preferably continuing to work in “right behavior”, the respondents expressed issues in the way organizations are holding individuals responsible and the risks do interfere with the level of innovation can be harnessed in the public technology procurement context.

5 Discussion

This chapter is set to review the conclusions based on the research findings, in combination with the outcomes from the literature review and finally leading to the answer on the research questions. The objective for this research has been to identify the critical success factors of the public procurement in Finnish public sector. The aim has been to identify elements, which are currently seen most impactful to manage the overall process and identify areas where further development could be required.

As highlighted earlier in this research, the Innovative technology has become an important topic for many public institutions all over the world. However, the currently available academic research has not focused on analyzing the success factors of the procurement of these new technologies very extensively. There are few previous studies in the Nordic level which are either very much focused on certain dedicated industry but not many including the innovative technology side to their academic researches. In addition to the lack of academic studies in this domain, what has become visible through the research process of this dissertation is that not many public servants either have a clear vision or instructions on how to coordinate such a process.

5.1 Conclusions

As mentioned earlier, the underlying the problem in information systems procurement is that the development of the systems has remained largely human intellectual activity and the need for effectively communicate the system requirements are defined by human beings and based on their capability to coordinate complex issue (Koski, 2019). In the case of this research the argument was proven to be correct based on the respondents' personal experiences. The overall complexity of the public procurement is not always allowing innovativeness to be visible due to the laws and regulations and lack of clear best practices. Similarly, the competencies both from the individual as well as from the

organizational perspective are challenging the procurement processes and therefore acting as major critical success factor. There seems to be a clear gap in the public sector organizations regarding understanding the complete potential that technology holds. This is leading to unrealistic expectations and poor overall execution of the process of acquiring and implementing new innovative technology. The only way to develop this area is to educate and develop internal capabilities of the public organizations.

Based on the findings, it was clear that more strategic approach to procurement needed are needed in the critical success factors of RQ1 and process coordination of the procurement RQ2 can be successfully achieved. The way innovation can be achieved in the public technology procurement context has to be well supported by the government-level, supporting the public organizations to have more courage in terms of seeking new ways to innovate. Regarding the RQ3 the future development initiatives based on the findings indicate that merging the competencies and economies of scale by collaborating more with similar organizations in the field may be a source for more efficient and innovative procurement processes. The balance must be sought between the centralized procurement and the capability to execute the process in a way where the level of innovation is not lost along the process.

5.2 Theoretical Implications

When reflecting the findings of this research to the previous studies around the topic, there are clearly elements which contribute to the extent of the available literature. Based on the previous literature the conclusions of the research findings also confirm the findings regarding the earlier research. In particular, this study offers tools and ideas for the public organizations to consider the different critical success factors in a relatively broad context and therefore allow organizations to better prepare for the public procurement processes.

Very similar research findings by other academics are available in many different publications. Knutsson and Thomasson (2014) stated in their finding's similar topics

such as the importance of local authorities' market knowledge concerning technology and how the ambition of even one person can make the difference. Both of these themes were listed as key findings in this research and can be confirmed based on the earlier literature. Other relevant academic findings in the previously published articles indicate that the conflicting stakeholder demands on the municipal co-operation are hindering the innovation capability of the public organizations (Moe & Päivärinta, 2013), which confirms the research findings around similar issues noted as key themes in this research. In addition, this research mentioned the importance of avoiding the misleading sales activities of the technology vendors and these findings are also confirmed in the previous research which discusses the information asymmetry and vendors overselling their services (Moe & Päivärinta, 2013). The results of the research around policies around innovative public technology procurement can be confirmed by other academics. Uyarra & Flanagan (2010) pointed out similarly in their research the weaknesses of the public policies supporting the matter. These findings are also underlining the need for innovation-friendly policies to be promoted across all levels of the procurement governance and point out weaknesses in the way current policies are limiting the innovation.

The strength of this research compared to the previous studies is that it approaches the matter in relatively broad and yet practical manner. The contributions of this research will fill in the gaps in connecting multiple areas of critical success factors in managing the end-to-end procurement process. The methodology adopted in this research, enabled by interviews of multiple public organizations provided important visibility to the validity and reliability of the study.

5.3 Credibility

As in any thesis, it is important to distinguish the number of limitations. In this part of the research, there will be an assessment of the credibility regarding the research process and findings based on it. A research should always be analyzed based on its credibility as it is a vital part of the research (Metsämuuronen, 2011). The credibility of the research is completely based what is the level of information

provided regarding the matter on which the researcher is seeking an answer to (Puolimatka, 2002). The objective is to analyze the different stages of the research as extensively as possible. The outcome of this analysis is to seek areas of improvement where the research could have been done in more credible manner.

The primary data for this research was gathered by interviewing 10 professionals who are in different levels involved in innovative public procurement. The interviews were conducted in very similar manner each time and the interviewees all had the same questions. However, the interviews do have certain level of credibility concerns in the academic literature. In the interview situations the individuals might have the tendency of provide answers that they are expecting the researcher to wish for or answers that they feel are appropriate. These factors might be affecting the credibility of the interview method negatively. (Hirsjärvi et al., 2007) There is a likelihood that some of the participants of the research were seemingly interested in the topic and might have been also providing answers that are favoring their desired outcomes regarding the future of the innovative technology procurement in the public sector.

In addition to the interview process, it is extremely important from the credibility perspective that the researcher is able to demonstrate to the reader, how was the analysis conducted and indicate the coherent ways working (Nowell, Norris, White & Moules, 2017). For this purpose, this research focused on explaining the methods utilized in the research process as detailed as possible. Based on this coherent methodology the objective was to discuss the findings around the themes as objectively as possible. However, in the qualitative research the research itself is always acting as the key research method. The interpretations that the researcher decide to make are always the sole viewpoint to the studied data (Eskola & Suoranta, 2014). This same issue is obviously present when analyzing the credibility of this research.

References

Aaltola, J. & Valli, R. (2007). Ikkunoita tutkimusmetodeihin: 2, Näkökulmia aloittelevalle tutkijalle tutkimuksen teoreettisiin lähtökohtiin ja analyysimenetelmiin (2. uud. ja täyd. p.). Jyväskylä: PS-kustannus.

Alanne, A., Hellsten, P., Pekkola, S. & Saarenpää, I. (2015). Three Positives Make One Negative: Public Sector IS Procurement.

Alasuutari, P. (1994). Laadullinen tutkimus (3., uud. p.). Tampere: Vastapaino.

Albano, G. L. & Sparro, M. (2010). Flexible Strategies for Centralized Public Procurement. *Review of Economics and Institutions*, 1(2)

Axelin, A. & Pudas-Tähkä, S-M. (2007). Systemaattisen kirjallisuuskatsauksen aiheen rajausta, hakutermit ja abstraktien arviointi. Teoksessa Ääri, R-L. (toim.). Systemaattinen kirjallisuuskatsaus ja sen tekeminen. Turun Yliopisto. Hoitotieteen laitoksen julkaisuja. Tutkimuksia ja raportteja. Sarja A51. 2007. 46-57

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Burden, K. (2001). PUBLIC SECTOR IT PROCUREMENT: IT PROJECTS FOR PUBLIC BODIES; PROCURING TROUBLE? *Computer Law and Security Review: The International Journal of Technology and Practice*, 17(3), pp. 186-188.

Dickey, R. (1966). How to Organize Information Systems. *Journal of Accountancy* (pre-1986), 121(000002), p. 87.

Dough, S. (2016). Standard Practices for an Effective Competitive Tendering Process for Public Works Procurement. *Civil Engineering and Architecture*, 4(5), pp. 193-200. doi:10.13189/cea.2016.040503

Ebert, C. & Duarte, C. H. C. (2018). Digital Transformation. *IEEE Software*, 35(4), pp. 16-21. doi:10.1109/MS.2018.2801537

Edquist, C. & Zabala-Iturriagagoitia, J. M. (2012). Public Procurement for Innovation as mission-oriented innovation policy. *Research Policy*, 41(10), pp. 1757-1769. doi:10.1016/j.respol.2012.04.022

Erridge, A., & Greer, J. (2002). Partnerships and public procurement: building social capital through supply relations. *Public Administration (London)*, 80(3), 503–522. <https://doi.org/10.1111/1467-9299.00315>

Eskola, J. & Suoranta, J. (2014). *Johdatus laadulliseen tutkimukseen*. Tampere: Vastapaino.

Eskola, J. & Vastamäki, J. (1999) *Teemahaastattelu: Opit ja Opetukset*.

Euroopan parlamentin ja neuvoston direktiivi 2014/24/EU, annettu 26 päivänä helmikuuta 2014 , julkisista hankinnoista ja direktiivin 2004/18/EY kumoamisesta ETA:n kannalta merkityksellinen teksti. Available at:

<https://eur-lex.europa.eu/legal-content/FI/TXT/?uri=celex%3A32014L0024>

Gagnon, Y.C. (2010). *The Case Study As Research Method : A Practical Handbook*. Les Presses de l'Université du Québec.

Geroski, P. (1990). Procurement policy as a tool of industrial policy. *International Review of Applied Economics*, 4(2), pp. 182-198. doi:10.1080/758523673

Goldkuhl, G. (2011). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, 21(2), p. 135. doi:10.1057/ejis.2011.54

Hans Knutsson & Anna Thomasson (2014) Innovation in the Public Procurement Process: A study of the creation of innovation-friendly public procurement, *Public Management Review*, 16:2, 242-255, DOI: 10.1080/14719037.2013.806574

Hirsjärvi, S., Remes, P. & Sajavaara, P. (2007). Tutki ja kirjoita. Helsinki: Tammi.

Hommen, L., & Rolfstam, M. (2009). Public procurement and innovation: towards a taxonomy. *Journal of Public Procurement*, 8(3), 17–56. <https://doi.org/10.1108/jopp-08-03-2008-b001>

Johansson, K. (2007). Kirjallisuuskatsaukset – Huomio systemaattiseen kirjallisuuskatsaukseen. Teoksessa Ääri, R-L. (toim.) Systemaattinen kirjallisuuskatsaus ja sen tekeminen. Turun yliopisto. Hoitotieteen laitoksen julkaisuja. Tutkimuksia ja raportteja. Sarja A51. Turku. 3-9.

Jolanki, O. & Karhunen, S. (2010). Renki vai isäntä? Analyysiohjelmat laadullisessa tutkimuksessa. Teoksessa J. Ruusuvuori, P. Nikander & M. Hyvärinen (toim.), *Haastattelun analyysi*. 395–410. Tampere: Vasta-paino.

Kitchenham, B. and Charters, S. (2007). Guidelines for performing Systematic Literature Reviews in software engineering; Keele University and Durham University joint report.

Koski, A. (2019). On the Provisioning of Mission Critical Information Systems based on Public Tenders.

Kähkönen, A., & Lintukangas, K. (2012). The underlying potential of supply management in value creation. *Journal of Purchasing and Supply Management*, 18(2), 68–75. <https://doi.org/10.1016/j.pursup.2012.04.006>

Leino-Kilpi, H. (2007). Kirjallisuuskatsaus- tärkeää tiedon siirtoa. Teoksessa Johansson, K., Axelin, A., Stolt, M. & Ääri, R. (toim.) 2007. Systemaattinen

kirjallisuuskatsaus ja sen tekeminen. Turun yliopisto. Hoitotieteen julkaisuja. Tutkimuksia ja raportteja A:51/2007. Turku: Digipaino – Turun yliopisto, 2.

Ljungquist, U. (2014). Unbalanced dynamic capabilities as obstacles of organisational efficiency: Implementation issues in innovative technology adoption. *Innovation : Management, Policy & Practice*, 16(1), 82-95. Retrieved from <https://ezproxy.cc.lut.fi/docview/1524722328?accountid=27292>

Lyne, C. (1996). Strategic procurement in the new local government. *European Journal of Purchasing and Supply Management*, 2(1), pp. 1-6.

Markkinaoikeus (2019). Vuositilastot Markkinaoikeus. URL: <https://www.markkinaoikeus.fi/fi/index/markkinaoikeus/tilastojajakasittelyajat.html>

Magnusson, J. & Nilsson, A. (2011). Exploring public IT procurement: Switching Costs in the wake of a turn-to-services.

Matt, C., Hess, T. & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, 57(5), pp. 339-343. doi:10.1007/s12599-015-0401-5

Meehan, J. (2017). The long shadow of public policy; Barriers to a value-based approach in healthcare procurement. *Journal of Purchasing and Supply Management*, 23(4), pp. 229-241.

Metsämuuronen, J. (2011). Laadullisen tutkimuksen perusteet. Teoksessa J. Metsämuuronen (toim.), *Laadullisen tutkimuksen käsikirja*. 84–154. Helsinki: International Methelp Oy.

Metsämuuronen, J. (2011). Metodologian perusteet ihmistieteissä. Teoksessa J. Metsämuuronen (toim.), *Laadullisen tutkimuksen käsikirja*. 18–83. Helsinki: International Methelp Oy.

Mhay, S., & Coburn, C. (2018). What's the difference between contract RFT RFQ RFP RFI? Retrieved 2019-08-10, from <https://www.negotiations.com/articles/procurement-terms/>

Ministry of Economic Affairs and Employment, (2019) <https://tem.fi/julkiset-hankinnat> Ministry of Economic Affairs and Employment: <https://tem.fi/en/publication-of-contracts-and-thresholds>

Mkansi, M. (2012). Research Philosophy Debates and Classifications: Students' Dilemma. *Electronic Journal of Business Research Methods*, 10(2), pp. 132-140.

Moe, C. E. & Sein, M. K. (2014). Dialectics and contradictions in public procurement of information systems.

Moe, C. E. & Päivärinta, T (2013). Challenges in information systems procurement in the public sector. *Electronic Journal of e-Government*, 11(1), pp. 307-322.

Nielsen, J. & Hansen, L. (2001). The EU public procurement regime— Does it work? *Intereconomics*, 36(5), pp. 255-263. doi:10.1007/BF02928979

Nikander, P. (2010). Laadullisten aineistojen litterointi, kääntäminen ja validiteetti. Teoksessa J. Ruusuvuori, P. Nikander & M. Hyvärinen (toim.), *Haastattelun analyysi*. 432–445. Tampere: Vastapaino

Nowell, L., Norris, J., White, D. & Moules, N. (2017). Thematic analysis: Thriving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1–13.

Pekkola, S. & Päivärinta, T (2016). Introduction to the Information Systems Procurement and Benefits Realization Minitrack. *System Sciences (HICSS)*, 2016 49th Hawaii International Conference on, 2016-, p. 4859

Pesu, J. (2018). INNOVAATION KÄSITE HANKINTALAINSAÄDÄNNÖSSÄ JA VALTIONTUKISÄÄNNÖKSISSÄ. Published: 18.4.2018:
www.edilex.fi/artikkelit/18627

Prier, E., & McCue, C. P. (2009). THE IMPLICATIONS OF A MUDDLED DEFINITION OF PUBLIC PROCUREMENT. *Journal of Public Procurement*, 9(3), 326-370.

Puolimatka, T. (2002). Kvalitatiivisen tutkimuksen luotettavuus ja totuusteorioiden.

Rapley, T. (2004). Interviews. Teoksessa Seale, C., Gobo, G., Gubrium, J.F. & Silverman D. (toim.) *Qualitative Research Practice*. London & Thousand Oaks: Sage

Raunio, M., Nordling, N., Saarinen, J.P. & Heinikangas, A. 2016. Avoin innovaatioalusta kaupunkikehittämisen lähestymistapa. Käsikirja kehittäjille. 6Aika. https://citybusiness.fi/wp-content/uploads/2018/08/AIA-k%C3%A4sikirja_web-2.pdf

Ruusuvuori, J., Nikander, P. & Hyvärinen, M. (2010). Haastattelun analyysin vaiheet. Teoksessa J. Ruusuvuori, P. Nikander & M. Hyvärinen (toim.), *Haastattelun analyysi*. 9–38. Tampere: Vastapaino.

Saarinen, Timo; Vepsäläinen, Ari P J. *Journal of Management Information Systems: JMIS; Armonk Vol. 11, Iss. 2, (Fall 1994): 187.*

Salminen, A. 2011. Mikä kirjallisuuskatsaus? Johdatus kirjallisuuskatsauksen tyypeihin ja hallintotieteellisiin sovelluksiin. Vaasan yliopiston julkaisuja. Opetusjulkaisuja 62.

Saunders, M. (2016). *Research methods for business students (Seventh edition.)*. Harlow, Essex: Pearson Education.

Schotanus, F. & Telgen, J., (2007). Developing a typology of organisational forms of cooperative purchasing. *Journal of Purchasing and Supply Management*, 13(1), pp. 53-68.

Uyarra, E. (2010). Understanding the Innovation Impacts of Public Procurement. *European Planning Studies*, 18(1), p. 123. doi:10.1080/09654310903343567

Vaes, K. (2014). Best practices regarding the creation of an "RFP" (aka "Request For Proposal"), from <https://kvaes.wordpress.com/2014/11/07/best-practices-regarding-the-creation-of-an-rfp-aka-request-for-proposal/> (Retrieved 9.10.2019)

Valtiovarainministeriö (2017). Valtion hankintakäsikirja. URL: <https://vm.fi/documents/10623/4040240/Valtion+hankintak%C3%A4sikirja+2017/868b80fa-c2de-4328-ae93-36b17968f780/Valtion+hankintak%C3%A4sikirja+2017.pdf?version=1.0>

Yin, R.K., 2003. *Case Study Research: Design and Methods*, 3rd edition. Thousand Oaks

Zhao, H., Tong, X., Wong, P. K. & Zhu, J. (2005). Types of technology sourcing and innovative capability: An exploratory study of Singapore manufacturing firms. *Journal of High Technology Management Research*, 16(2), pp. 209-224. doi:10.1016/j.hitech.2005.10.004

Appendices

Appendix 1. Interview questions and justifications.

	Question(s)	Justification for the Question
1-3	Background questions	The objective for these questions is to understand the organization and possible special characteristics involved in their operations.
4	What is the typical process in your organization when acquiring innovative information technology?	Objective to understand the end-to-end procurement process of the organization.
5	What kind of main challenges have you witnessed in managing the overall acquisition process?	This question highlights the development areas of the overall process, which gives an opportunity for the research to compare different findings to other organization in the research as well as to the literature.
6	What kind of special characteristics do you see in this area of procurement compared to more established technology procurement?	The role of this question is to seek elements of unique characteristics of the innovative technology procurement and how organization can ramp up their expertise in this area.
7	What have been the characteristics of a successful acquisition and implementation of innovative technology in your past experience?	This section aims to provide insight on the success factors of previously conducted procurement processes.
8	What were the success criteria you have for innovative technology procurement and implementation – how did you measure the success?	This part focuses on the how does the interviewee view the value gained from the successful procurement and implementation.
9	Looking ahead, how do you foresee the acquisition of innovative information technology developing going forward?	Shows and indicates the upcoming actions and insights for the future development of the procurement process.