RISK MANAGEMENT IN PUBLIC PROCUREMENT

Lappeenranta–Lahti University of Technology LUT

Supply Management Master’s thesis

2023

Veikko Repo

Examiners: Professor Jukka Hallikas

Junior Researcher Aleksi Harju
ABSTRACT

Lappeenranta–Lahti University of Technology LUT
LUT Business School
Master’s Degree Programme in Supply Management

Veikko Repo

Risk management in public procurement

Master’s thesis
2023
61 pages, 4 figures, 9 tables and 1 appendix
Examiner(s): Professor Jukka Hallikas and Junior Researcher Aleksi Harju

Keywords: procurement, public procurement, risk management, procurement risks.

Risk management is increasingly gaining attention in supply chain management. The purpose of this thesis is to raise awareness of risk management and examine how risks can be managed in public procurement. This study examines common risks in public procurement, concrete risk management means to mitigate risks, benefits that can be gained from procurement risk management and challenges related to procurement risk management. The research was conducted as a qualitative case study. Primary data was collected by interviewing employees working in different positions in the case organization. The research found that there are many considerable risks associated with public procurement and therefore, procurement risk management should be one of the focus points for public organizations. For managing those risks, correct risk management means need to be applied. Procurement risk management brings benefits, but also includes challenges. Challenges need to be identified and considered as part of the risk management strategy to develop risk management further. In addition, benefits gained by procurement risk management can motivate organizations to develop their risk management further.
TIIVISTELMÄ

Lappeenrannan–Lahden teknillinen yliopisto LUT
LUT Kauppakorkeakoulu
Hankintojen johtamisen maisteriohjelma

Veikko Repo

Riskien hallinta julkisissa hankinnoissa

Kauppatieteiden pro gradu -tutkielma
61 sivua, 4 kuvaa, 9 taulukkoa ja 1 liite
Tarkastaja(t): Professori Jukka Hallikas ja Nuorempi tutkija Aleksi Harju

Avainsanat: hankinta, julkinen hankinta, riskienhallinta, hankintariskit

# Table of contents

1. Introduction ......................................................................................................................................... 1
   1.1. Research objectives and questions .............................................................................................. 2
   1.2. Framework of the study and limitations ....................................................................................... 4
   1.3. Thesis structure and key concepts ............................................................................................... 5

2. Literature review: risk management in public procurement .......................................................... 7
   2.1 Principles of public procurement ................................................................................................... 7
      2.1.1 Public procurement process .................................................................................................... 10
      2.1.2 Legislation of public procurement .......................................................................................... 12
   2.2 Procurement risk management ...................................................................................................... 13
      2.2.1 Risk identification ................................................................................................................... 15
      2.2.2 Risk assessment ...................................................................................................................... 16
      2.2.3 Risk mitigation ........................................................................................................................ 17
      2.2.4 Risk monitoring and control ................................................................................................... 17
      2.3 Procurement risks ....................................................................................................................... 18
   2.4 Mitigation means of procurement risk management ................................................................. 25
      2.5.1 Benefits and drivers of procurement risk management .......................................................... 28
      2.5.2 Challenges and barriers of procurement risk management ................................................ 30

3. Research methodology and data collection ....................................................................................... 32

4. Risk management in HUS Procurements ......................................................................................... 34
   4.1 Case organization .......................................................................................................................... 34
   4.2 Interviewees .................................................................................................................................... 35
   4.3 Current state of risk management in HUS Procurements ............................................................ 36
   4.4 Significance of procurement risk management in HUS Procurements ....................................... 38
   4.5 Identified procurement risks in the case organization ................................................................ 40
   4.6 Means for managing risks in HUS Procurements ...................................................................... 43
   4.7 Benefits of PRM ............................................................................................................................ 45
   4.8 Challenges of PRM ....................................................................................................................... 47
   4.9 Development ideas found from the interviews .......................................................................... 48

5. Discussion ............................................................................................................................................ 51

6. Conclusions ........................................................................................................................................ 56
   6.1 Answers to the research questions ............................................................................................... 56
   6.2 Managerial implications ............................................................................................................... 59
6.3 Limitations and future research propositions ................................................................. 59
References ............................................................................................................................. 62
Appendices ............................................................................................................................ 68
1. Introduction

Risk management is increasingly gaining attention in supply chain management, as uncertainties in any function of a supply chain can cause a chain of negative effects in the supply chain network. In addition, if organizations do not have knowledge of the impact of possible risks, there might be bigger negative consequences of the risks. (Hong, Lee, & Zhang 2018) In the last decades, purchasing and supply management has seen increased attention overall from business managers and researchers. It can be explained by the amount of money usually involved in preparation and execution of supply management and purchasing, as well as the contribution of those activities in overall results. (van Weele 2014, 23) Supply chain operations have been affected negatively by different risk factors for years and when these risks materialise, there will be impact on short- and long-term performance of organizations (Tang 2006). The changed nature of current supply chain management in recent years has made risk management an important issue, as product lifecycles are shorter, supply chain networks have extended, and organizations have a larger number of suppliers. (Tang & Musa 2011)

Procurement risks are becoming increasingly high profile and history has shown that there is a wide scale of global organizations affected heavily by those risks in public and private sectors. (Murray 2013) The importance of risk management in public procurement highlights the fact, that public organization’s procurements are mostly large totalities, which mostly cost a lot and affect to the society. Public procurement is one of the biggest priorities to reform in many countries. With high-risk situations increasing, procurement risk assessment has been gaining focus, as well as development of risk management tools (Pontré, Welter, Veiga Malta, Faria & Chernyshova 2011) There is no question that procurement risk management has an important role in reducing negative consequences caused by actualised risks and allowing organizations to continue their action on more stable manners.

Although, risk management is a popular topic of research and it has been highlighted in research in recent years, research of risk management in the public sector has gained limited interest in studies. (Kalvet & Lember 2010) In addition, Murray (2013) wrote an article to raise awareness on procurement risk management, which had gotten little attention on research. Overall, most studies on supply risk management focus on private sector
companies. Even though public and private sectors’ procurement does not differ a lot, there is still considerable differences between them. Therefore, there is a gap in research, which this study tries to fill by examining risk management in the public sector. This study takes principles of public procurement and risk management in public procurement under the scope in addition to overall procurement risk management.

1.1. Research objectives and questions

Risk management in public procurement should be studied because procurement process includes several different risks, that should be managed for them to work effectively. Risks in public sector can be more serious compared to private sector, because of the societal significance of public procurement. Objective of this study is to identify risks, means of managing those risks in public procurement, as well as find drivers and barriers for risk management activities. Aim of this study is to provide development ideas for procurement risk management of the case organization, as well as other public organizations. In addition, the aim is to raise procurement risks into the thoughts of managers of public organisations, as well as the importance of risk management in procurement. Hence, public organizations, including the case organization, can improve their risk management and mitigate or avoid major risks, making their procurement processes more proficient and secure. In addition, when risk management in public procurement is efficient, the procurement processes are more efficient, which leads to ensuring better quality and cost effectiveness while managing operations better by having stronger risk management.

This study takes most common procurement risks into account and presents risk management in public procurement from the perspective of the identified risks. The baseline of risk management processes of a large public organization is presented to provide development ideas on procurement risk management and help on mitigating major procurement risks.

The main research question of the study is:

*How can public organizations manage risks in procurement?*
This research question guides on identifying practical risk management means to improve on the current risk management practises and to find out more effective ways along with working current parts of the used practises. The aim is to focus on managing the risks, that can have a major role in affecting negatively to procurement operations, and which can be reduced by using correct risk management strategies. In addition, this research question aims to create a vision of what is needed to include in procurement risk management with help of the sub-research questions below.

The first sub-question of the study is:

**What are the means to manage risks in public procurement?**

To manage risks effectively, the means for it are important to identify. This sub-question aims to provide practical risk management means that can be used in daily procurement work.

The second sub-question is:

**What are the benefits and challenges of risk management in public procurement?**

Analysing benefits and challenges of risk management is important for organizations to have a clear view on the big picture and therefore, manage risks more efficiently in the big picture view. Having knowledge on benefits of risk management is likely to increase motivation on focusing on it. Identifying challenges helps organizations on creating realistic expectations, as well as on doing correct moves to manage risks more efficiently.

The third sub-question is:

**How can risk management be improved in public procurement?**

There is always room for improvement and this sub-question aims to find out what factors might be lacking related to case organization’s procurement risk management and provide development ideas regarding the topic.
1.2. Framework of the study and limitations

Background of the study is comprised of public procurement process, legislation concerning public procurement and risk management in procurement. These above-mentioned subjects are presented in chapter 2. In order to understand the opportunities and challenges with risk management in public procurement, as well as making it possible to develop risk management, these subjects are important to understand. These subjects form a framework, which is used as the base of this study. The framework is presented below:

![Diagram](image)

*Figure 1. Theoretical framework of the study*

This study is limited to research risk management in public sector procurement. Therefore, companies operating in the private sector are excluded from the research. There are some
identified differences between public and private sector procurement. For example, legislation is concerning public procurement heavily, whereas procurement in the private sector is more open. Limiting the research on risk management in public sector helps on focusing finding development ideas for the public sector more efficiently. Even though this study focuses on public procurement, private companies can also benefit, because there are still considerable similarities between private and public sectors’ procurement. Most of the common procurement risks identified apply to both, public and private sector. Therefore, firms in the private sector, as well as other public procurement entities can use the findings of the research. The case organization is a large operator and there are resources to focus on researched issues based on this study.

1.3. Thesis structure and key concepts

This study consists of theoretical and empirical parts. Overall, there are six main chapters. Theoretical part includes presenting public procurement, legislation concerning public procurement, risk management and common risks identified in procurement. Theory in this study deepens into examining risk management strategies, the drivers, and barriers of risk management in procurement. In addition, key concepts related to risk management and public procurement are explained and a model for risk management in public procurement is presented.

After the theoretical part, empirical part is presented. Empirical part consists of presenting the case company, interviewees, the current state of risk management in the case company and the results of the interviews. In addition, the means of the case organization’s risks management is examined, as well as the benefits and challenges of risk management found from the interviews.

The empirical part is followed by presenting the results of the study. The results consist of presenting case company’s means to risk management in procurement, benefits, drivers, challenges, and barriers for risk management in procurement and comparing findings to earlier research. The study ends in a discussion chapter, where research questions are answered, limitations are presented. Ideas on possible future research surrounding the topic are discussed. Finally, the study ends by presenting conclusions.
Below key concepts of the study are presented and defined compactly. These key concepts are in centre of the study and are reviewed in a broader manner in the literature review section.

**Risk** = ‘‘Risk can be broadly defined as a change of danger, damage, loss, injury or any other undesired consequences.’’ (Harland et al. 2003)

**Procurement risk** = Procurement risk is associated with the inability of the purchasing firm to fulfil customer demand and threats caused to the process in operation, which supply disruption might cause. (Hong, Lee & Zhang 2018, 1550)

**Risk management** = Risk management is identifying and assessing the likelihood for risks to realise and identifying consequences from the risks. In addition, planning on proper strategies to reduce likelihood of the adverse event and losses associated with the risks is part of risk management. (Manuj & Mentzer 2008, 141)

**Procurement risk management** = Procurement risk management, PRM, can be outlined with supply chain risk management, which is defined as ensuring profitability and continuity by managing supply risks through coordinating and collaborating with supply chain partners. (Hong, Lee & Zhang 2018) More specifically, procurement risk management focuses on controlling procurement risks by controlling uncertainties in demand, prices, and delivery times (Zsidisin 2003).
2. Literature review: risk management in public procurement

This section is a literature review which consists of research of public procurement, the main principals of it and legislation concerning public procurement. Since this study focuses on risk management in public procurement, earlier literature of risk management is examined and most notable risks in public procurement are identified. In addition, risk mitigation means in public procurement, as well as benefits and challenges of procurement risk management are scoped from earlier research. The literature is also reviewed from risk management in private sector to discover similarities and differences in between private and public sectors’ risk management activities.

2.1 Principles of public procurement

Public sector management has seen increased attention from public and academics in the last decade (Arlbjorn & Freytag 2012). Public procurement covers procurement of goods, services and construction contracting, that the government, municipalities, public utilities, and other procurement departments specified by procurement legislation do. (Työ- ja elinkeinoministeriö 2023a) As the public sector provides essential services it can benefit from supply chain management approaches, that focus on service improvements and cost minimization, because entities in the public sector are part of supply chains, engaging with both suppliers and “customers”. Public procurement amounts to a significant share of the public sector’s total budget. Purchasing volumes and value often surpass private sector counterparts or at least, are at the same level. (Arlbjorn & Freytag 20212)

Public organizations must follow the principles of treating tenders equally and not discriminating against them when sourcing. The main idea behind following procurement directives and principles is to open competition between tenders, optimize the use of public funds and strengthen the competitiveness of firms. (Työ- ja elinkeinoministeriö 2023a) Public procurement systems are based on seven globally accepted principles in most countries: value for money, economy, integrity, fit for purpose, efficiency, transparency, and fairness. Even though all these principles must be always followed, there might be difficulties to achieve economy and efficiency simultaneously in public procurement. For
example, in emergency situations or disasters, there can be rush to obtain required items or services, which leads to compromising economy for efficiency. (Khan 2018)

There are multidisciplinary characteristics in public procurement since it involves economics, public administration, public finance, and law. For tendering to be successful, it is required to understand all the mentioned aspects. (van Weele 2014, 375)

Public procurement plays a significant role in promoting economic growth by creating jobs and accelerating investments. A working society consists of physical and social infrastructures, such as electricity, hospitals, drainage and highways, that are produced by the government and therefore, public procurement is an important factor for a working society. (Satish & Shah 2009) Public procurement is also important for the balance of social equality between social classes. In addition, it enables execution of large projects, that the private sector could not realise due to the amount of investment required. (Yescombe 2007)

Public authorities’ procurement does not work under the rules of free markets. It means that they get funded by taxpayers’ tax income, whereas companies in the private sector get their income from markets and customers. (van Weele 2014, 375) In addition, in comparison to private sector, creating long-term partnerships with suppliers is more difficult due to legislation and principles of public procurement, which can result in longer processes. Private sector companies can enter contracts more freely without lengthy procedures and they are able to have long-term relationships with suppliers they prefer. (Wontner, Walker, Harris & Lynch 2020)

Creating long-term partnerships with suppliers is especially difficult in procurements that are put into effect repeatedly in short-term (Holma & Sammalmaa 2018). Strengthening collaboration and increasing communication with companies is still wanted in the public sector, because thus public sector is capable to gain benefits from the knowledge of private sector’s companies and make their procurement processes more effective. (Padovani & Young 2008; Holma & Sammalmaa 2018) Public procurement is increasingly carried out through collaborations with other public and private sector entities and managing partnerships and complex supply chains is a key strategical approach (European Commission Expert Group 2010).

In addition to the principle of equal treatment of tenders, principle of transparency is one of the two main principles. Transparency in procurement means that procurement units must
inform tenders extensively about their procurement. Giving information widely and equally helps on accomplishing proper competition. Treating tenders equally enables more open competition between tenders, which helps procurement departments on gaining financial benefits through their procurement. (Työ- ja elinkeinoministeriö 2023a)

In last decade, a vision of basic cost saving function in procurement has shifted more into an increased recognition of strategic role of public procurement (Arlbjorn & Freytag 20212). In order for procurement to be successful, it should be getting value for money by buying products that are considered by the whole-life cost and are fitting for the procurement purposes, process is efficient and serves all parties well and is making positive impact for the public, businesses supplying government and for taxpayers. (van Weele 2014, 374)

While procurement process is not unequivocal, there is some general principles identified to help on most cases. Procurement authorities should be clear of procurement objectives from the beginning of the process and have awareness on external factors that can impact on the process. Communication with the potential suppliers in the early stages of the process is important because information on delivery abilities and exploring possible solutions is prolific in the beginning of the process. (van Weele 2014, 374, 375) There are several ways to communicate with the potential suppliers in terms of mapping the market, such as market dialogue, proposal for information and technical dialogue. (JHNY 2023) The purpose of mapping the market is to examine companies working in the market and their option of solutions, prices and motivation on participating to procurement to get clear and comparable tenders in the actual tendering phase (Valtiovarainministeriö 2023).

One important aspect of good procurement is to give suppliers more scope to provide solutions on the problem the procurement is circling. It can be done by using outcome or output based specifications to suppliers. Procurement authorities should be transparent and fair on the process. When suppliers are on the map about the outset, it will be easier for them to make a valid bid, which leads to increasing competition in form of more bids from different suppliers. Being clear and open about affordability is also one cornerstone of good procurement. If more than the planned amount of money is spent on one procurement, there can be seen a snowball effect of adjusting smaller budgets than planned on the other projects. Adding to these aspects, contract management is essential to ensure good supplier performance for the time being of the contract. (van Weele 2014, 375)
There is a ‘‘conflict’’ between getting value for money and integrity in public procurement. Integrity is about compliance, transparency, governance and has the idea of less discretion for procurement professionals, whereas value for money provides for the opposite. Historically, public procurement has been more about focusing on integrity, while in current world procurement tries to consider also value for money. (Khan 2018) In addition to principles of public procurement, public organizations must follow procurement law when procuring goods and services. Legislation of public procurement is presented more specifically later in the literature review. In the next subchapter, public procurement process and the different phases of it are examined.

2.1.1 Public procurement process

![Figure 2. Phases of public procurement process. (Adapted from European Commission Expert Group. 2010. p. 37.)](image-url)
Public procurement process consists of multiple phases. Figure 2. above presents the phases of public procurement process. The process starts with gearing up for procurement. Planning and preparation phase consists of establishing need, market consultation, gathering people and partnerships needed for managing the process, definition of project, selection of procurement procedure and determination of contract award criteria. (European Commission Expert Group 2010) Laws and regulations are not as strict in the planning and preparation phase compared to tendering phase. Therefore, procuring units have possibility to interact more open-ended with potential companies participating in tendering. (Holma & Sammalmaa 2018) According to law on public procurement, procurement unit can give information to suppliers about their plans and requirements concerning upcoming procurement. There are several ways for procurement units to examine companies working in the markets and their selection of supply: searching for information on different companies and their selection of supply and statistics from the internet, visit fairs and press conferences, reading releases concerning area of work, cooperating with colleagues and other procurement units, arranging information events on upcoming procurement and discussing there with companies and their deputies, asking tenders to participate in tendering by publishing advance notifications, arranging market dialogues with potential tenderers, attaching questions in terms of information notice on the market mapping notification and asking tenders to answer the questions, and arranging commentating round with potential tenderers for invitation for tenders. (Valtionvarainministeriö 2023)

Preparation for tendering is important for the success of the procurement process because clear goals are set and possible problems are identified, which procuring unit can prepare for during the process (Nieminen 2016). Second phase, if applied, procuring unit can do initial advertisement and contract notice to invite expressions of interest. (European Commission Expert Group 2010)

In tendering phase, a formal procurement document, invitation for tenders, is formed and published by the buying organization to invite suppliers to bid for the designated contract of works the buying organization is looking to put into effect. Bidders can make clarification requests on the invitation for tenders in a certain time span defined by the buying organization. Clarification requests are usually done, if the document is unclear or the bidders ask to make changes to it. Finally, the buying organization accepts the tenders that were received before deadline. Tendering phase is the strictest phase from the regulations
aspect and procuring organizations can not affect the tendering process inside the organization (Valtiovarainministeriö 2017) Tendering plays an important role on public procurement process as it is the main way of purchasing goods and services in public sector (Arlbjorn & Freytag 2012).

Evaluation phase includes opening tenders and checking compliance with requirements set in invitation for tenders. Tenders are evaluated of quality and price and in some cases, the buying organization arranges tender presentations to ensure quality of bids. (European Commission Expert Group 2010) Tender presentations can include testing for products in practise to ensure specific requirements are fulfilled. Buying organization then selects the most advantageous tender, based on economic advantage or combined advantage in price and quality. In some procurements, multiple tenders are selected.

When evaluation is completed, successful tenderer is notified, and contracts are signed. Contracts are managed by monitoring deliveries meeting specifications throughout the duration of the contract. (European Commission Expert Group 2010) When contracts are close on expiring, the buying organization starts the procurement process from the beginning to get new contracts for the procured products or services. From each procurement, the procuring unit should evaluate the process and draw lessons to improve on future procurement projects (European Commission Expert Group 2010).

2.1.2 Legislation of public procurement

In this subsection, legislation and directives of EU Public procurement are presented, because the legislation is in centre of public procurement operations and conducts on how public organizations are sourcing goods and services.

Legitimacy is in centre of public procurement. Private companies can sue public authorities if they are not compliant with the laws and directives of public procurement. In addition, because they can be sued publicly, public organizations prefer legitimacy over efficiency in their procurement decisions. (van Weele 2014, 375) Governance is a system that consists of rules, procedures and practices and that controls and directs procuring entities. The main principle of good governance is to continuously improve the lives of the people by ensuring
mutual benefits and accountability, as well as ensuring timely delivery and quality of services to the people. (Khan 2018)

In Finland, public procurement is conducted by law of public procurement and licence contracts. According to the law, authorities of the government and other procurement entities must publicly ask for bids on the sourced goods, services, and license contracts. The objective of law of public procurement and license contracts is to enhance use of public funds, improve on quality, innovativeness, and sustainability in procurement. In addition, the law provides equivalent opportunities for companies to make offers in competitive bidding. (Finlex 29.12.2016/1397) Finnish procurement units must follow World Trade Organization’s GPA-contract in their procurement in addition to national legislation and EU-directives. (Työ ja elinkeinoministeriö 2023b)

The value of the procurement objective dictates on which specific part of the rules of procurement law the procurement unit needs to follow in tendering. Public procurements are divided by their values in procurements surpassing European Union’s threshold (EU-procurement), procurements surpassing national threshold (national procurement) and procurements going under national threshold. (Holma & Sammalmaa 2018)

In tendering of EU-procurements, regulations of national procurement law concerning EU-procurements and regulation of EU concerning public procurement in its entirety are applied. Regulations concerning national procurements of the procurement law are applied in national procurements, which allows using more flexible and lighter procedures in the tendering phase. Procurement law is not applied in cases, where the procurement is valued under the national threshold. (Holma & Sammalmaa 2018)

2.2 Procurement risk management

Biggest risks to business continuity lies in supply chains, because of high level of volatility in current business world (Christopher 2011, 190). Procurement risk management is an important part of supply management and has large influence on the success on it (Hong & Lee 2013). The rise in interest to outsourcing has brought challenges to procurement, as procurement is becoming increasingly more demanding in terms of supplier risk management. Majority of raw materials and components are being manufactured overseas
in countries, where the manufacturing is more cost-efficient, and this has brought various uncertainties in procurement. The largest part of procurement risks is related to demand, price, and contractual issues. (Hong & Lee 2013) Financial consequences of failed public procurements extend to markets by distorting competition and weakening general trust (OECD 2019).

The main target of risk management is to proactively manage risk and sources of risks, and this is seen as increased efforts from top managements in doing so. Understanding what disasters or smaller disruptions can cause in a supply chain is crucial. (Berg, Knudsen & Norrman 2008) Risk management involves decision-making related to risks and then putting those decisions into action. The main focus of the risk management process is understanding the risks and mitigating their impact by addressing factors such as probability and direct impact. (Norrman & Jansson 2004) A characteristic risk management process has four phases: risk identification, risk assessment, decision and implementation of risk management actions and risk monitoring (Hallikas et al. 2004). Phases of risk management process are examined more precisely on subchapters later.

All procurement actions include risks and therefore, effective risk management is one of key areas of focus in current public sector procurement management operations (European Commission Expert Group 2010). Mapping risks related to procurement process and manufacturing process of product or service is important in large procurement projects, especially procurements concerning crucial products or services for working of society. Procuring organizations should specify crucial services to be able to prepare by identifying needs and means. Goal of preparation is that crucial service is not interrupted or normalizes as soon as possible. (Valtiovarainministeriö 2023)

In contrast to private sector procurement, which often focuses on cost reduction and the concentration of supply into a smaller group of suppliers, public procurement has the responsibility to ensure that the buying power of government does not harm the national economy. Throughout several stages of procurement process individual procurement professionals make policy decisions that can have considerable impacts on the market. Taking these considerations into account, the decision-making process can be regarded as risk management, as it involves managing potential economic and market risks. (OECD 2019)
Risk management actions vary, but identified typical strategies include risk transferring, risk taking, elimination of risk, risk reduction and analysis of individual risks on a wider scale. (Hallikas et al. 2004)

Figure 3. Risk management process (Hallikas et al. 2004)

2.2.1 Risk identification

Risk identification is the first step on developing risk management. The process of risk identification includes addressing risk factors that needs to be monitored and managed. (Pontré et al. 2011) Identifying risks is important phase of the process, because by identifying the risks, uncertainty causing events are recognized and decision-makers are able to make plans on reducing or eliminating them. The main focus of risk identifying phase is in future uncertainties. (Hallikas et al. 2004) Understanding what the risk sources are helps on designing appropriate mitigation strategy for risks (Punniyamoorthly et al. 2013).

Hallikas et al. (2004) state, that risk identification includes three core functions, which are collecting information about risk factors and uncertainties, transferring information between key stakeholders and information filtering. The outcomes of improving company’s supply chain resilience by leveraging the same resources and capabilities can vary significantly from one company to another depending on the specific supply chain risks they encounter (Brusset & Teller 2017). Therefore, appropriate risk identification can help with better lining
of the company’s capabilities and resources. In the risk identification phase, recognizing all risk sources and interconnections leading to risks is important (Hallikas et al. 2004)

Risk identification and analysis has many methods for the support of the process. One valuable tool is risk mapping. Risk mapping is a structured approach, where risk sources are mapped to gain understanding of their potential consequences. Two commonly used techniques for investigating factors and causes that contribute to accidental events are fault tree analysis, FTA and event tree analysis, ETA. Both are logic diagrams used to portray the sequences of failures that can propagate through complex systems. FTA examines all possible events leading to a critical event and it is a graphical diagram that illustrates how a system can fail. The analysis starts with top events and then continues with necessary and sufficiently hazardous events, along with their causes and contributing factors using a backward logic approach. ETA, on the other hand, is a graphical logic diagram also, but operates in the opposite way. It focuses on events that may occur after a critical event and identifies and quantifies potential outcomes coming from initiating events by assessing potential consequences. (Norrman & Jansson 2004)

Fraser & Simkins (2016) add that timeframes are important in risk identifying phase. In order to identify risks and the related probabilities, it is crucial to define the specific time period being discussed, because without defining a specific timeframe, it becomes challenging to discuss about probabilities. (Fraser & Simkins 2016)

2.2.2 Risk assessment

Commonly risk is recognised as having a pair of dimensions, probability, and impact. Risk assessment methodology considers these dimensions by measuring them and then combining them for monitoring and management. (Pontré et al. 2011) The risk assessment phase is important in the risk management process, because in this phase correct methods on reducing or eliminating risks is chosen. (Hallikas et al. 2004) Risks should be assessed in each project regardless of the value because low value projects can include high risks too. (Pontré et al. 2011) One common approach to risk assessment involves comparing events by evaluating their probabilities and consequences and putting them into a risk map or matrix. In theory, when dealing with historical events, this task can be relatively straightforward and
quantitative. However, in business this process can be subjective and rely on specialists’ judgement. (Norrman & Jansson 2004)

2.2.3 Risk mitigation

Every organization is impacted by risks to some extent and the methods for mitigating these risks can vary based on the organization's environment and nature of the organization (Olson & Dash Wu 2010). The chosen management strategy and practices are affected by different factors, including industry of operation, resource availability, number of suppliers and geographical location of them, and the types of risks the organization is facing. Organizations need to adopt a more proactive attitude when managing the increased number of internal and external supply chain risks, particularly when the focus has been centred on internal risks for a long time. (Salamai et al. 2019)

Risk mitigation aims at managing and reducing the impact of a certain risk and the mitigation actions can be categorized as reactive and proactive (Kirilmaz & Erol 2017) Reactive risk mitigation actions are actions that don’t prevent or totally eliminate the risk but aims to minimize its impact once the risk takes place. Reactive risk mitigation actions are done when the risk realises, and these actions involve mechanisms such as buffers or insurance policies in attempt to mitigate the consequences. In contrast to reactive actions, proactive mitigation actions aim to prevent or minimize the likelihood of risk occurring in the first place. Proactive mitigation actions may for example include strategies such as multiple sourcing. (Hoffmann, Schiele & Krabbendam 2013; Kirilmaz & Erol 2017)

2.2.4. Risk monitoring and control

The final phase of risk management process is risk monitoring and control. Risk monitoring helps on detecting risks in advance and since, it enables organizations to react to those risks properly. It is important to note, that simply assessing the probability and severity of risks is not enough, as organizations need to monitor additional indicators to gain a full understanding of potential risks that are about to realise. Furthermore, it is important to take
into account that risk monitoring can be time-consuming and therefore, organizations should limit the number of risks they are monitoring and focus on most critical ones. (Hoffmann et al. 2013)

Since risks are linked to the future, it is important to continuously update data and maintain monitoring these risks (Kirilmaz & Erol 2017) Successful supply risk management process includes high level of maturity. This involves performing routine risk assessments for individual suppliers and analyzing those supplies that have been seen problematic. In addition, organizations should focus on continuous evaluation and improvement of their own risk management processes. (Hoffmann et al. 2013)

2.3 Procurement risks

Procurement risks have been researched plenty. In this subsection, procurement risks are identified and presented based on the earlier research. Procurement risks can be categorized in different ways. Hallikas and Lintukangas (2016) have presented risks associated with purchasing and sourcing in five categories in their research: disruption of supply, price, stock and schedule, technology, and quality risk. Kalvet and Lember (2010) have categorized risks in market, organizational, process, supply and control and financial risks. For their part, Tang and Musa (2011) have three main categories of risks presented: risks associating with material, financial and information flows. OECD (2019) presents risks that mostly touch public sector procurement. As can be perceived, categorization of procurement risks can be done in several ways. For risk management in public sector to be efficient, below presented procurement risks should be taken into attention in risk management operations.

Market risks

Private demand might not always respond adequately or follow the expectations. These kinds of situations can be classified as a market risks (Kalvet & Lember 2010). In public procurement, procuring units must specify requirements for the goods and services, where hides the risk of them being too strict for tenders to offer. Concerning necessary goods there can be a market risk in form of lack of companies that can deliver the needed goods (Kalvet
& Lember 2010). In category of market risks, Valtionvarainministeriö (2023) adds lack of considerable tenderers, the lack of competition, cartel operations, and other disruptions in risks associated with market circumstances. In public procurement, it is crucial to understand the market. Insufficient market understanding can lead to using a strategy that has distorting impact on the market. Market dynamics can be influenced negatively if favoured outcomes are selected. Favoured outcomes can be factors such as cost, sustainability. Market risks in public procurement also include the risk of certain businesses not engaging in the process. These businesses can be for example small of medium enterprises. (OECD 2019)

Organizational risks

Organizational risks are associated with the procuring organization. These kinds of risks can relate to failure of procurement or under-deliveries that are caused by the procuring organization. Public organizations have many different goals to accomplish when procuring. Following principles of public procurement, sectoral policies, being transparent and trying to save in costs at the same time might lead to misallocation of resources. (Kalvet & Lember 2010) Organizational risks include central person changes in positions in different parties, who are included in the procurement (Valtionvarainministeriö 2023). Persons changing in middle of the procurement process can cause critical information interruptions if information is not shifted from person to another in required accuracy and extent. Public procurement processes can take a long time and it is important to take notes and preserve the information for the whole time to be aware of important information and details.

Process risks

As stated earlier, preparation is key of succeeding in procurement processes. Lack of preparation can cause risks in procurement process. Preparation is the phase, where specifications for the procurement are set and according to Valtionvarainministeriö (2023), feeble preparation can cause deficiency of specifications or excessively strict specifications, excessively large or small totality, locking in current operating models and technology and invalid tenders. Deficiency of specifications or excessive strictness in specifications of procurement affect considerably on the amount of and quality of tenders. If tenders are
invalid or there are not any, the process needs to be started over, which causes delays on time schedules of the procurement.

In the specification phase of procurement process, there is also a risk that procuring units develop specifications that favour familiar suppliers, that have been selected before. Similar risk is that there are brands or technologies that the procuring unit is prescriptive about. (OECD 2019) These risks could be included also in the market related risks, because this kind of action in the process can leave many potential tenderers out of the competition, causing blindness towards the real market situation. Tendering phase includes the risk of procuring unit failing to identify corrupt or collusive practises (OECD 2019).

Reputation and sustainability risks

There is a wide scale of feeble evidence indicating that organizations can experience significant losses due to social, ecological, or ethical issues that exist in their supply chains. Nonetheless, research on supply chain risk management has largely overlooked these sustainability related concerns. Since sustainability-related supply chain risks can potentially do damage originating from supply chain operations, they should be classified as risks, similar to ordinary issues. Hence, supply chain risk management should encompass sustainability-related supply chain risks as a part of it. (Hofmann, Busse, Bide & Henke 2014) Traditional ideology in aim of public procurement has been cost savings, but research has shown that currently economic impact is measured also by natural, human, social and economic capitals. (Baranovsky et al. 2020) Therefore, these issues are tightly related also to procurement risk management.

In the public sector, the primary focus is on delivering objectives and services to benefit citizens. Decision making is held to high standards of transparency and accountability, as there is strong expectations in serving the public interest. Therefore, anything that could harm the reputation of public’s confidence is seen as a risk and is taken seriously in the public sector. (European Commission Expert Group 2010) Incorrect application of evaluation criteria in supplier selection can lead to selecting incorrect suppliers, which can do damage to reputation of the procuring unit (OECD 2019).
Supply risks

Supply risk refers to the potential disruptions in the inbound supply chain. These can be delays in delivery time, lower product quality or quantity and have the potential to result in unfulfilled or incomplete orders. Every business organization faces supply risk in some degree. (Zsidisin & Ellram 2003) The event in which a supply risk becomes a tangible issue is commonly referred to as a supply chain disruption. Unlike a risk, a disruption is a realized situation. It is a combination of two factors, an unintended and unanticipated triggering event that occurs somewhere within the supply chain or in environment surround it, and a consequential situation that notably threatens the business operations of a firm. (Hofmann et al. 2014)

Financial risks

There are two kinds of financial risks in public procurement – one associated with getting all the needed funds for the procurement and one associated with succeeding in meeting target costs for the procurement. (Kalvet & Lember 2011) Meeting target costs can be very difficult in public procurement, as in many cases there are not many suppliers able to make bids in bidding competitions of certain categories and therefore, prices can be higher than expected due to lack of competition.

Hong et al. (2018) add, that rapidly changing market prices and timing of purchasing increases uncertainty in cost prices. In addition, Hong et al. (2018) mention, that financial risks include situations, where products are not compliant with the requirements and therefore, only part of them can be used. Tang & Musa (2011) discuss financial risks as financial flow risks, which encompasses challenges related to inability to meet payments and making proper investments. Common risks of this category include exchange rate fluctuations, price and cost fluctuations and financial stability of supply chain partners and practices of financial management. (Tang & Musa 2011)

Financial risks in public procurement are also related to incorrect price estimates from the procuring unit, unpredictable rises in costs and changes in currency during tendering phase or contract period. Financial risks can come up from the supplier side in terms of their financial situation or subcontractors of the supplier, as well as technical performance and ignorance of them. (Valtionvarainministeriö 2023)
Financial troubles within one company can impact on its competitors in the same product market, as well as its customers and suppliers within the supply chain. There can be various indirect costs associated with financial problems. The financial distress of purchasing organization can increase the risk of supply chain disruptions, as suppliers might decline trade credits, withdraw from long-term contracts, or postpone shipments. (Hertzel et al. 2008)

Supplier related risks

There are several risks associated with the selected supplier, especially in the contract period. Supplier risks are associated with quality, financial, logistics and other aspects. Procurement unit sets requirements for product or service and there is a risk, that supplier is not able to fulfil those requirements. The requirements can change during the contract period because of legislation, organizational changes or changed market and financial situation. (Valtiovarainministeriö 2023) Contracting is very important to focus on, as it determines terms for the upcoming contract. In contract management, there is a risk that application of contract is overly lenient or strict, which can have a negative influence on the supplier’s behaviour (OECD 2019).

Supplier might have problems with capacity, delivery, storage, or other logistics. Estimated need for service or product can in reality be significantly smaller or larger, which can cause problems in deliveries or production. (Valtiovarainministeriö 2023) Problems can occur when suppliers are unable to meet the volume or product requirements in the order. Since the purchasing organization depends on their suppliers to maintain efficient production processes, the inability of suppliers to provide the necessary materials, components or products can have harmful consequences on the supply chain’s ability to meet customer demands. (Chen et al. 2013) There are various factors that can influence on supplier performance, such as constraints on production capacity, lack of quality control, bottlenecks in production or unexpected machine breakdowns (Zsidisin & Ellram 2003).

Lack of experience of the supplier can be a risk. Supplier might have not produced services or products for public sector earlier or is required to operate in multiple geographical areas, where they have not operated before. (Valtiovarainministeriö 2023) Lack of experience from
the supplier side can lead to inconsistency. Inconsistent performances from suppliers can make them unpredictable and therefore, increase supply risk (Chen, Sohal & Prajogo 2013).

Problems can emerge if supplier has ended up in a significant position for the procurement unit. This kind of situation can make changing the supplier difficult, as there can be financial reasons, better know-how or other reasons, that the supplier does better than its competitors. Key persons of supplier can change employer or are attached to other projects, which can cause uncertainty. In addition, focus of business of the supplier can move to other areas of business or other geographical areas. (Valtiovarainministeriö 2023)

There are financial risks associated with supplier. Supplier’s prices can raise during the contract period because of supplier or external factors. There is a risk that the financial situation of supplier becomes weaker during the contract period and supplier is touched by exclusion principles or in worst case, supplier goes bankrupt. (Valtiovarainministeriö 2023)

According to Valadares de Oliveira & Handfield (2017), these financial risks and bankruptcies of supplier are significant threats to purchasing companies. Financial distress and risks of bankruptcies are commonly recognized, leading suppliers and customers take actions to protect themselves from negative consequences. If suppliers encounter financial difficulties, purchasing organizations may need to wary of potential issues related to product quality, reduced value of warranties, the continuity of supply and serviceability. Additionally, the purchasing organization may impose costs by transitioning their purchases to either existing or new suppliers. (Hertzel et al. 2008)

**Information/technological risks**

Information and technological risks include issues such as information accuracy, information system security and disruptions. These issues are severe, because many value adding activities within a supply chain are often initiated by the flow of information. These information flows can encompass demand, inventory status, order fulfilment, modifications in product and process design and capacity status. Information flows can be viewed as the connection between material flows and financial flows, which is important for the optimization of resources. (Tang & Musa 2011) There are external threats for information system security, such as hackers, viruses, or natural disasters and internal threats, such as
internal employee frauds by employees intentionally or unintentionally disclosing proprietary information (Faisal, Banwet & Shankar 2007).

*Legislation related risks*

Legislation connects with public procurement tightly and procurement professionals need to have a good knowledge of legislation surrounding procurement to have success in procurement projects. Legislation concerning public procurement has positive influences on procuring, such as more efficient use of public funds and strengthened competitiveness of firms, but there is legislation related risks, that can have a negative impact on procurements. Dorn, Levi and Simeone (2008) argue that there are well-known risks that directives do not address, such as contractors being involved formally or informally in drawing up specifications, lack of timely and widespread publicity regarding the successful awardees and wide possibilities for slipping of contract parameters and re-negotiation of them.

*Risk of fraud and corruption*

Fraud and corruption have their own definitions but go hand-in-hand even though there are differences in their definitions. Fraud is misrepresentation of facts, concealment, and withholding of information with the intent of deceiving or misleading someone for personal gain. Corruption on the other hand involves giving or taking of bribes with the aim of obtaining or doing favours. Additionally, the abuse of authority for personal gain also falls under the category of corruption. Fraud and corruption can occur in various stages of the procurement process. It can occur in preparation, where artificially created needs can be introduced to manipulate the bidding process, but also in evaluation of bids, contract awarding and most seriously during contract performance stage. For example, in return for a bribe, contract is awarded to a firm with less experience and qualifications and the firm is unable to perform the contract. (Khan 2018) Williams-Elegbe (2017) specifies that procurement process includes four broad areas that are vulnerable to corruption. Firstly, project identification and design can be affected by political influence. Specification phase may be affected by favouring a preferred bidder. In evaluation, qualification and contract award phase, evaluation criterion can be abused as it is related to subjectivity of evaluation process.
2.4 Mitigation means of procurement risk management

Table 1. Literature based procurement risks and mitigation means of them (Tang & Musa 2011; Norrman & Jansson 2004; OECD 2019; Zsidisin & Ellram 2003; Hong et al. 2018; Faisal et al. 2007; Hallikas et al. 2020)

<table>
<thead>
<tr>
<th>Procurement risk</th>
<th>Risk mitigation means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market risks</td>
<td>Throughout analysis of market, generic specifying, communication with suppliers</td>
</tr>
<tr>
<td>Reputation &amp; sustainability risks</td>
<td>Sustainability requirements, audits, material regulations, clear evaluation plan</td>
</tr>
<tr>
<td>Supply risks</td>
<td>Inventory management, multiple sourcing</td>
</tr>
<tr>
<td>Financial risks</td>
<td>Flexible contracts, option and future contracts, integration of sourcing and inventory decisions</td>
</tr>
<tr>
<td>Supplier risks</td>
<td>Collaboration with suppliers in risk management, development of supplier relationship and contract management</td>
</tr>
<tr>
<td>Information &amp; technological risks</td>
<td>Mutual trust, maintaining confidentiality of information, business continuity plans</td>
</tr>
<tr>
<td>Fraud &amp; corruption risks</td>
<td>Good governance practices, laws and regulations, transparency, stakeholder involvement, audits</td>
</tr>
</tbody>
</table>

In the earlier chapter, various risks in procurement and supply chain were identified from earlier literature. To mitigate the effects of these risks and the reduce probability of risks occurring, there are different means of risk management (Tang & Musa 2011). Commonly used strategies for risk management include avoiding, reducing, transferring, sharing, or even taking the risk. Avoidance of risk means eliminating the types of events or activities that could trigger the risk, (Norrman & Jansson 2004)

In supplier related risks, collaboration between purchasing organization and suppliers can be key mean of risk management. Scope of risk management can be broadened to encompass
suppliers and sub-suppliers in addition to purchasing organization. This can be achieved through collaborative efforts in risk identification, assessment, management, and business continuity planning and by assessing on how suppliers address these issues and by putting specific requirements into contracts. (Norrman & Jansson 2004) Regarding to risks in contract management and supplier and subcontractor behaviour, development of contract management and supplier relationship management skills of procurement professionals are a mean, that mitigates contract related risks. (OECD 2019)

Common methods to managing supply risks include inventory management and using multiple sources. These methods protect organizations from the effects of supply risk due to uncertainty by creating a buffer from the adverse incidents that might occur. (Zsidisin & Ellram 2003) In multiple sourcing, the purchasing organization purchases the same product or service from two or more suppliers at the same time. Multiple sourcing is a strategic approach, which is used especially in situations where there is unavailability or incapability on the supplier side, and possible problems to provide the required supplies. In addition, multiple sourcing brings the benefit of risk diversification. (Costantino & Pellegrino 2010)

Another mean for procurement risk management is to provide purchasing and supply management professionals with tools aimed to reduce the likelihood of supply risk occurrence by using behaviour-based management techniques. Certifying supplier firms ensures that their production processes, capacity levels and quality procedures align with the requirements of the purchasing organization. (Zsidisin & Ellram 2003) Using diverse risk identification and mitigation measures can be used especially during tendering phase of the procurement process (OECD 2019).

There are commonly used strategies on mitigating financial risks. Integrating sourcing and inventory decision is one way to reduce price risk, as different procurement time and quantity can affect on inventory holding costs. Flexibility of contracts is another mean to mitigate price risk. Flexible contracts allow buyer to collect items in a certain period of time, while inflexible contracts can require buying organizations to determine optimal quantities and purchasing times. Option and futures contracts are financial tools that can help on mitigating price risk in terms of fluctuated exchange prices. (Hong et al. 2018)

To mitigate market related risks, procuring units should have broad communication with all potential suppliers and do a detailed and throughout analysis of the market. In addition,
creating and using generic specifications in the specification phase and not focusing on outputs as opposed to inputs is a mean for mitigating market risks. (OECD 2019) These means mitigate the risk of potential firms not engaging in the procurement, which leads to strengthened competition and appropriate market situation.

Many sustainable supply management practices also serve as mechanisms for reducing and assessing risks, not only to those related to sustainability, but supply chain risks in general. As the focus of companies has shifted to sustainability requirements, they have strengthened their practices and principles for supplier assessment, which helps risk management overall. For example, quality risk can be mitigated much more efficiently when using supplier audits and material regulations, or other sustainability practices in purchasing. Therefore, sustainable purchasing practices help on organizations in avoiding economic and reputational damage in addition to sustainability. (Hallikas, Lintukangas & Kähkönen 2020)

As mentioned earlier, incorrect supplier selection due to incorrect application of evaluation criteria causes reputational damage for the procuring unit. To mitigate risk of selecting incorrect suppliers, procuring units should create a clear evaluation plan and follow it. In addition, involving all the possible stakeholders in the evaluation process helps on mitigating risk of incorrect supplier selection, and therefore mitigating risk of reputational damage. (OECD 2019)

Mitigating information risks requires collaborative efforts from all supply chain partners. In order to effectively reduce information risks in a supply chain, mutual trust and maintaining the confidentiality of information among partners is unconditional. (Faisal, Banwet & Shankar 2007) Developing business continuity plans can be used against information risks. Business continuity planning is used to ensuring continuity of operations in case of unexpected events. Business continuity plans are commonly used in mitigation of risks related to computers and information technology. (Norrman & Jansson 2004)

Public procurement is vulnerable to corrupt and fraudulent practices. It can be effectively managed and prevented through good governance practices. Laws and regulations are the main stoppers of corrupt and fraudulent practices, but there are also other mitigation means. In order to mitigate risk of fraud and corruption, procuring entities can build necessary transparency in decision making, build capacity to conduct procurements in compliance with laws and regulations, ensure adequate skill levels of public officials involved in procurement
conducting, including stakeholders to procurement, collecting and analysing procurement information and using internal and external audits of procurement. (Khan 2018)

2.5.1 Benefits and drivers of procurement risk management

Supply chain disruptions have seen to be associated with financial, operational and relational costs. Supply chain risk management can thus be a source of better overall firm performance, as it can provide benefits that are greater than the investment put into process. (Manhart, Summers & Blackhurst 2020) Findings from Wagner and Bode (2008) indicate that negative associations are found between supply-side risks and demand-side risks and the overall performance of the supply chain. Therefore, efficient risk management can improve the overall performance of the supply chain.

Risk management can help in gaining different benefits. Firstly, risk management improves risk awareness. When organizations are aware of risks, the mitigation of those risks is a lot better in the beginning. Effective risk management can help on improving business knowledge, strengthened focus on risk-reward decisions, improved evaluation of uncertainties, and more effective decision-making based on risks (Berg, Knudsen & Norrman 2008). If risk management processes are not clearly defined, there is a risk of spontaneous and non-systematic action (Hoffmann et al. 2013).

Risk management can be expected to create competitive advantage in terms of anticipating risks. There is also a connection between risk management and operational management. Risk management can help on allocating capital and resources more efficiently and in addition, organization’s risk-taking becomes more transparent to all stakeholders. (Berg, Knudsen & Norrman 2008) The benefits of supply risk management are likely to increase as organizations improve maturity of their risk management, such as capabilities and processes (Hoffmann et al. 2013). Purchasing maturity depends on firm’s absorptive capacity, which includes effective sharing of internal knowledge and type of relations with partners (Schiele 2007). In his research, Schiele (2007) found that more mature firms were able to gain larger cost savings compared to less developed firms and purchasing absorptive capacity was the reason behind results. The positive correlation between purchasing maturity and cost savings can encourage organizations to set up more advanced purchasing functions.
The concept of absorptive capacity can be applied effectively in the field of supply management, as it offers a theoretical explanation to understand why more advanced purchasing organizations benefit most from newly introduced knowledge. Understanding the minimum maturity level of an organization, below which there would be no benefits to gain, is an important task for managers, as it allows managers to avoid overinvesting in methods and tools that the organization is not yet ready to implement. (Schiele 2007)

In public procurement, there are many other benefits identified from risk management activities in addition to above mentioned. In public procurement it is important that markets maintain equilibrium, public entities have a good reputation and trust of citizens and public funds are used as appropriately as possible. By managing risks effectively and successfully mitigating them, public procurement can have a major positive economic impact. Risk mitigation in market analysis by comprehensive market analysis helps on maintaining equilibrium in market, as using broad communication with suppliers can provide more opportunities to small and medium enterprises, as well as new entrants to join into the competition. Making generic specifications on a procurement and focusing on outcomes can welcome new and innovative approaches from suppliers, which can improve used technologies. (OECD 2019)

Risk management practices have also a positive influence towards certain government goals. Developing a procurement strategy that is aligned with the overall government strategy sets market more towards the goals of government. Selecting suppliers with comprehensive evaluation and in cooperation with stakeholders strengthens supplier participation and the trust in public procurement processes. (OECD 2019)
Table 2. Benefits and drivers of procurement risk management from literature (Manhart et al. 2020; Wagner & Bode 2008; Berg et al. 2008; Hoffmann et al. 2013; Schiele 2007)

<table>
<thead>
<tr>
<th>Benefits and drivers of procurement risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better overall firm and supply chain performance</td>
</tr>
<tr>
<td>More effective allocating of capital and resources</td>
</tr>
<tr>
<td>Risk awarenes &amp; mitigation</td>
</tr>
<tr>
<td>Improved business knowledge</td>
</tr>
<tr>
<td>More effective decision-making based on risks</td>
</tr>
<tr>
<td>Cost savings</td>
</tr>
<tr>
<td>Improved reputation</td>
</tr>
</tbody>
</table>

2.5.2 Challenges and barriers of procurement risk management

Challenging for the effectiveness of risk management can be the fact, that it might be difficult to know if no risks actualize, whether are the risk management efforts working or is it just luck. Positive results in risk management are often not tangible and the success comes from negative surprises not happening. Another challenge in risk management is the balance between costs and revenues – the work is connected to costs but there are not many tangible revenues for the counterweight. Therefore, it is difficult to weigh between the costs led from risk management work and the positive impact of risk management work. (Berg et al. 2008)

Measuring can be challenging in risk management work. In the beginning of risk management work, there can be lack of awareness of risk sources as well as consequences of them. When to work is started, performance indicators such as risk sources are likely to increase considerably. Finding many risk sources indicates poor performance, but on the other hand it is a positive concern that they are identified. (Berg et al. 2008) But identifying too many risks can hinder the effectiveness risk management by creating a large burden and keep the company from focusing to most relevant issues. It would be desirable to pick from twenty to ten most remarkable risks and monitor them. (Fraser & Simkins 2016)
Complexity and disintegration have become significant challenges in supply chain risk management. As supply chain operations have increasingly involved outside service providers, risks are less visible and difficult to identify. (Vilko & Hallikas 2012) Individual supply chain risks can be often connected to each other and risk mitigating actions on one risk can aggravate on other, making supply chain risk management difficult (Punniyamoorthy et al. 2013) Wang-Mlynek and Foerstl (2020) investigated barriers to multi-tier supply chain risk management in their study. Their findings indicate that limited information sharing and communication behaviour among supply chain partners can be one barrier to supply chain risk management. In addition, they found out that companies over depending on ICT is a barrier to supply chain risk management, as too much reliance towards ICT can increase organizations exposure to risks.

Table 3. Challenges and barriers of procurement risk management from literature (Berg et al. 2008; Fraser & Simkins 2016; Vilko & Hallikas 2012; Punniyamoorthy et al. 2013; Wang-Mlynek & Foerstl 2020)

<table>
<thead>
<tr>
<th>Challenges and barriers of procurement risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance between costs and revenues</td>
</tr>
<tr>
<td>Measuring</td>
</tr>
<tr>
<td>Complexity and disintegration</td>
</tr>
<tr>
<td>Limited information sharing and communication</td>
</tr>
<tr>
<td>Positive results of risk management not tangible</td>
</tr>
<tr>
<td>Identifying too many risks</td>
</tr>
<tr>
<td>Connection between different risks</td>
</tr>
</tbody>
</table>
3. Research methodology and data collection

This chapter is for presenting the used research methodology and data collection strategy used in the study. The research methodology used in this study is qualitative. To specify, the study was executed as a qualitative case study.

Qualitative research methodologies are commonly used to approach and research topics associated with social life. The results of qualitative research can vary, but the outcomes often present findings from the data analysis and can include new insights about the effectiveness of policies or programs. (Saldana 2011) Researching natural occurrences is in the centre of qualitative research. In addition, is common in qualitative research to describe the topic in a precise manner. (Patton 2005)

Method for this research is case study, where the topic is viewed from the case organization’s aspect. The case can be entities, such as an individual, a collective group, a school, a patient, a customer, a customer segment, or a department (Metsämuuronen 2001, 16-17). In this study, the case is HUS Procurement and their procurement risk management. As one advantage, case study allows generalization (Metsämuuronen 2001, 17). This implies that the findings of this research can be extended to encompass procurement risk management means in other hospital districts as well.

The empirical part of this study has executed by interviewing employees from the case organization. The aim is to create a vision of the current state of the procurement risk management in the case organization and find solutions on development. Semi-structured interview was chosen for data collection for several reasons. It efficiently accumulates valuable empirical data (Eisenhardt & Graebner 2007), the style of interview gives the researcher a lot of flexibility, the interviewee can respond to questions in more free manners (Koskinen, Alasuutari & Peltonen 2005, 104) and the researcher can guide the interview and steer it into the wanted direction (Walle 2015, 72).

More specifically on the interviews and data collection - interviewees are working as procurement directors, category manager, development manager, and senior procurement specialist in the case organization. In the empirical section, they are referred as interviewees A, B, C, D and E. All interviewees work close to the subject in own ways and therefore, they offer valuable knowledge for the empirical part of the study. In addition, interviewees have
different roles in the case organization, which gives the study diverse aspects of the researched subject. The interviews carry out the primary data for the study. Secondary data is conducted from findings from the case organization’s databases and own observations of researcher of this study.

Interviews were conducted in September and October in 2023. There were overall of five interviews. The interviewees got the interview questions a few days before the interview to prepare and familiarize themselves with the subject. The researcher made some follow-up questions during the interview in addition to the questions sent to the interviewees. Interview questions were divided in different themes to ease and clarify the interview process, making it more coherent. Interviews lasted from 20 to 40 minutes and were conducted via Microsoft Teams. Interviews were recorded and transcribed for the analysis of the gained material. Tables consisting answers of the interviewees in different themes were conducted to create a visual summary of each theme. The themes in presented tables are procurement risk management means, identified benefits and challenges of procurement risk management, identified challenges and barriers of procurement risk management and development ideas on procurement risk management.

Aim of the interviews and other collected data is to examine how public organizations can manage risks in procurement effectively. In addition, aim is to understand the subject deeply. This was done by considering practical risk management means to understand how it is done, motivation for risk management by identifying benefits and drivers and gaining understanding on what causes uncertainty on risk management by identifying challenges and barriers. This research will contribute to the field of procurement by giving knowledge on procurement risk management in public sector. Even though this study is conducted on a public organization’s standpoint, companies in the private sector can use the findings to their advantage, as procurement in public and private sector has a lot of similarities. Another aim is to find out similarities and differences between theory and the empirical part of the study. This research presents knowledge on procurement risk management for procuring organizations to manage risks in more effective manners in public and private sector.
4. Risk management in HUS Procurements

In this chapter, the current situation of risk management, significance of risk management and the identified procurement risks in the case organization are presented. Different procurement practices and policies, strategy, operating industry, and the extent of procurement all have an influence on what risks can appear and what are the most significant risks for the organization. Therefore, it is important to examine the current state of the organization to be able to create insights and findings on developing the risk management in the case organization. First, the case organization is presented. After the presentation, themes of the research questions are assessed by analysing the research material, which was received via the interviews.

4.1 Case organization

Helsinki University Hospital, HUS is the largest provider of healthcare and the second-largest employer in Finland. HUS employs nearly 27,000 people in 300 different positions. HUS is responsible for arranging specialist medical care in the Uusimaa region and provides care for many rare and severe diseases. The core values, which guides work in HUS are caring, pioneership and equality. (HUS 2023a)

The focus of the study deepens into one of the parts of the case organization, HUS Procurements. HUS Procurements refer to the procurement services unit within HUS Group’s profit area of Shared Group Services (HUS Intranet 2023c). HUS Procurements tender procurements of care and general accessories, medicinal devices, equipment and services in cooperation with care work professionals. (HUS Intranet 2023a) HUS Procurements is one of the biggest procurement entities in Finland. In 2022 HUS executed 677 procurement decisions, while the calculated value for the year’s procurements was 268 million euros. (HUS Intranet 2023b) Procurements are divided in seven different categories: 1. medical and surgical nursing, cardiology, 2. anesthesia and intensive care, 3. radiation technology and medical imaging, 4. laboratory, 5. basic health care, 6. social and health services, and 7. services and ICT. (HUS Intranet 2023a)
4.2 Interviewees

Table 4. Interviewees

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Position</th>
<th>Organization</th>
<th>Duration of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Director, Procurements</td>
<td>HUS Procurements</td>
<td>38 minutes</td>
</tr>
<tr>
<td>B</td>
<td>Senior procurement specialist</td>
<td>HUS Procurements</td>
<td>29 minutes</td>
</tr>
<tr>
<td>C</td>
<td>Category manager</td>
<td>HUS Procurements</td>
<td>37 minutes</td>
</tr>
<tr>
<td>D</td>
<td>Development manager</td>
<td>HUS Procurements</td>
<td>34 minutes</td>
</tr>
<tr>
<td>E</td>
<td>Procurement director</td>
<td>HUS Procurements</td>
<td>23 minutes</td>
</tr>
</tbody>
</table>

Interviewee A has a long working career in healthcare industry, including multiple jobs in different leading positions. Before coming to HUS, interviewee A had worked as a leader of one health care district. She has now worked 2.5 years as a leader of HUS Procurements. Her work in HUS Procurements is about leading general issues of procurement and her role is emphasized for the other parts of HUS as a part of procurement, participating in developing collective operating models of the organization.

The working career of Interviewee B composes mostly of working in logistics, technical logistics and technical field. He previously worked in different company for ten years in different positions, mentioning practical logistics work and moving to technical field from there. Interviewee B has worked at HUS Procurements for four years, starting as a procurement specialist and currently working as a senior procurement specialist.

Interviewee C has studied in different field but soon after graduating she wanted to do something different and went to work in procurement field. She worked in one procurement
organization in different positions for overall eight years and last three to four years as a procurement manager. In 2017 she started at HUS as a procurement specialist, then worked as a senior procurement specialist and now last 2 and half years she has been working as a category manager.

Interviewee D has a long working career in public sector and amongst public procurement. In the beginning of 21st century she worked in research operations in social and health services of one city, from where she soon started as a procurement secretary. Starting from there, she has worked in field of procurement to this day. Before coming to HUS Procurements, she worked as a tendering consultant and as a service manager, five years as a procurement manager at, five years as a consultant for other organizations. In 2020 she started in HUS Procurements as a procurement manager and currently working as a development manager.

Most of working career of interviewee E consists of public procurements, working almost twenty years in the field. In the beginning of his working career, he worked as a procurement jurist for 4-5 years in one city. Last 15 years he has been working as a procurement director in different organizations. In HUS Procurements he has been working as a procurement director for over 4 and half years.

4.3 Current state of risk management in HUS Procurements

Current state of risk management in HUS Procurements awakened different thoughts and assessments. This is a difficult question and cannot be answered directly because risk management is not an easily measurable matter. In addition, discussing about how good or bad the situation is, is also highly proportional. However, the researcher wanted views on the current situation of procurement risk management to channel the topic on the thoughts of the interviewees and to ease them to later think about possible development ideas on the discussed matter. The discussion was also volatile because the interviewees work in different positions and have different levels of knowledge regarding the topic.

Current state of procurement risk management was assessed on a wide level, discussing about strategy, and including procurement risk management as part of the current strategy. Procurement risk management is stated to start from the strategy. Risk management,
preparing for risks and putting focus on risks are all included in the strategy of the case organization. In addition, multiple processes that are developed in strategy work support procurement risk management.

From strategy level, the discussion shifts to operational work, where risk management is included in every part of the work. Aims for risk management are set on the strategy and then shifted to different operations. Procurement risk management is executed by categories in the final hand. Different procurement categories face different risks, and the risks are considered inside every procurement category. Procurement categories assess risks and probabilities for those risks to occur. In addition, they assess how severe each risk is and what kind of consequences the risk can cause. Every part of the procurement process includes risks and therefore, risk management is included in every part of the procurement process.

The case organization does not have direct goals around procurement risk management. However, many set goals support development of risk management simultaneously. In addition, in principle there are certain procurement risk management goals. Risks are not discussed directly as risks, but there are still identified matters, that are considered different risks. Solutions for these matters are also considered actively and how to prevent and mitigate them. Concept of overall management of suppliers has been on thoughts of the case organization, but it has not been implemented yet.

HUS Procurements has a quality system, which is based on identifying different risks, having solutions on actualisation of certain risks, and having set goals that directly or indirectly are related to procurement risk management, supporting risk management processes. Risk management goals are not directly discussed in the quality system, but there are different themes, which in procurement risk management falls within. There is a new system coming in use of the case organization, which will develop risk management further by presenting risks in a more comprehensive manner.

Following strategy work and the risk management work of the categories, the own expertise of the employees was also brought up. There are no general procedures for the procurement employees to follow regarding procurement risk management. Therefore, expertise of the employees is seen as a notable factor in success of the current risk management. Employees working with procurements get information of different risks during the procurement
process, which they use to tackle the known risks. Compressing the current state of the case organization’s procurement risk management, it was described that it is on a good level by its structures, but on the practical tendering work the expertise of each employee steps into the picture.

![Diagram of strategy, quality systems, process development, set goals, and procurement risk management]

*Figure 4. Current state of the case organization’s procurement risk management*

### 4.4 Significance of procurement risk management in HUS Procurements

Every one of the interviewees agreed that risk management is in an important role in HUS Procurements and significance of it is very high. Furthermore, risk management was stated to be the base for all working operations at HUS Procurements. Risk management is highlighted in strategy of HUS and from strategy it is implemented in all working functions. The importance of risk management in procurement comes from the use of the procured products and services because the operating industry of HUS is highly related to working and safety of society. Risk management has a very high significance because the case
organization works in a critical field for a working society. Risk management in HUS Procurements is stated to have above mediocre significance compared to many other fields. If any risk is concretised, the damages can be large and therefore, risk management is seen important for the case organization.

Procurement risks are related to concerns, which should be tried to avoid as well as possible. As HUS Procurements is a large operator, accessories, devices, and services are procured with high volumes. In addition, the operations of HUS Procurements are a big part of operations of hospitals. Therefore, if certain risks concretise, it can major cause problems and disturb the operations in hospitals extensively. In case of more of a minor and short-term risks concretising HUS Procurements can live with and create solutions but major long-term risks concretising can have far stretching consequences that the organization needs to manage as well as possible. Having a strategy for risk management is seen as a vital condition for the case organization, to be able to anticipate and react quickly if there is a situation, where a certain risk concretises.

Significance of procurement risk management is also high because of the values of the case organization. HUS Procurements wants to be a sustainable operator, which includes having sustainable partners, suppliers are audited, and societal responsibilities are fulfilled. In addition, HUS being a large operator working among public funds and interest, significance of procurement risk management is emphasized. The case organization has had procurement debt, which has shifted focus even more on the procurement risk management. The aim of procurement operations is that there are not any not tendered procurements and new procurements are procured inside set schedules. This relates to management of juridical risks which HUS needs to particularly focus on. Failing to operate inside procurement legislation and principles can cause unwanted harms, such as damage on reputation and excessive costs.
4.5 Identified procurement risks in the case organization

Table 5. Identified procurement risks in the case organization

<table>
<thead>
<tr>
<th>Identified risks in public procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply risks</td>
</tr>
<tr>
<td>Technological / information risks</td>
</tr>
<tr>
<td>Process risks</td>
</tr>
<tr>
<td>Juridical risks</td>
</tr>
<tr>
<td>Contract related risks</td>
</tr>
<tr>
<td>Sustainability and reputation risks</td>
</tr>
<tr>
<td>Market risks</td>
</tr>
</tbody>
</table>

The interviewees identified many different risks in public procurement. Procurement risks were identified from multiple aspects and from different levels. The main idea of discussing about procurement risks was to bring thoughts on the interviewees by letting them openly discuss about procurement risks they have identified in their work and generally in the public procurement field. Interviewees identified technological risks, supply risks, financial risks, sustainability related risks, market risks, legislation related, and risks associated with partners related to their work. Some of the interviewees identified different procurement risks by analysing procurement process and the different phases of it. Procurement processes are often lengthy, and every phase includes own risks.

In supply risks mentioned concerns were related to problems in deliveries. Problems in deliveries is seen as a significant risk because health care is heavily related to operational reliability of society. Continuity of operations is also seen to be in danger in case supply risks concretise. The effects of most recent pandemic, COVID-19 was also brought into the discussion related to supply risks. The pandemic was commented to show everyone at latest how vulnerable organizations are in case of these kinds of unexpected events. Many of the procured accessories and devices are critical and especially considering these critical procurements, supply risks are considered most significant risk for the case organization.
The importance of supply chains was brought to the attention regarding supply risks. It is seen important to know what is procured and where it is manufactured and to have somewhat a overall vision of what is happening in the supply chain.

Technological and information risks are related to information security, as a lot of delicate information is being handled in work. Related also to technological risks, it is highlighted that HUS being a large organization, there is a lot of information moving daily. Delicate information needs to be ensured to only be available for people which it belongs to. Information related risks were discussed on a deeper level, which went from procurements to as far as customers. In addition, it was mentioned that critical information about procurement projects includes risks also. Related to lengthiness of procurement projects, there is critical information accumulated during the procurement process.

The importance of preserving and documenting information was discussed related to information risks. It is not relatively infrequent, that the pacesetter of the procurement project is changed before the project is finished. It was discussed that there are information related risks that switching leading person of the procurement project can cause. Firstly, the substitutive person does not have the same knowledge about the project, that the original person who had been working on the project from the preparation phase. Too minor knowledge on the project can increase probabilities of information risks actualising and cause unwanted results or disadvantages. It was also considered as information related risk, that it is very difficult to currently ensure that information is moved from one person to another in sufficient enough levels.

Procurement process was brought up into the discussion from the aspect of risks. The procurement process includes several phases, and the phases include different risks. Therefore, risk management should be focused on every phase of the procurement process, starting from the preparation. Preparation phase is seen important part of the procurement process because there are many risks involved and by processing preparation phase carelessly, it can create even more risks to the later phases. Preparation of a new procurement project is started because there is a need for something new or current contracts are about to expire. If market mapping in the preparation phase is done carelessly or solute, it can backfire on the tendering phase and failing the tendering, which can lead to allowing current contracts expire due to failing schedules, which leads to unwanted situation of having no contracts.
Work in preparation phase is also described to include nothing else but thinking about different risks.

In tendering phase, the organization might face the risk, that there are not many applicable tenderers, or at all. Tendering phase also involves juridical risks, as unhappy tenderers might complain about the procurement decision. Therefore, specific accuracy and knowledge of legislation is needed in creation of invitation of tenders, as well as following good procurement principles. Risk regarding specifications is also identified. As an example was used that if there is not set upper limits to package sizes in the specifications, there is a risk that the procuring organization is not able to buy in those package sizes, which can lead to starting the tendering process again.

There are also many risks related to contracts and contract management phase. Contracts have a central role in what the procurement brings to the organization. Successful contracts ensure that wanted products or services are gotten in the wanted delivery time. Other way around, there is risk of getting unwanted products or services or allowing too long times for the deliveries. Procuring organization must ensure that the contracts include everything necessary in terms of business and they are aligned with legislation. Lack of time to manage contracts in wanted manner is also seen as a contractual risk. When there are not enough resources or suitable tools to manage contracts and fulfilment of them, it can generate situations, where the contracts are not followed as agreed. In addition, it is mentioned that contractual phase includes risk of needing to consider cancelling the contract due to for example significant decline in quality of supplied products or services.
4.6 Means for managing risks in HUS Procurements

Table 6. Means for risk management

<table>
<thead>
<tr>
<th>Risk management means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk assessment</td>
</tr>
<tr>
<td>Comprehensive preparation of procurement, market mapping</td>
</tr>
<tr>
<td>Multiple suppliers</td>
</tr>
<tr>
<td>Procuring products manufactured in home country</td>
</tr>
<tr>
<td>Examination of suppliers</td>
</tr>
<tr>
<td>Documenting and procedures</td>
</tr>
</tbody>
</table>

This theme considered practical procurement risk management means, which interviewees identified generally and which they identified to have used in their own work and brought into the discussion. The case organization performs a risk assessment yearly, which encompasses the whole organization, including HUS Procurements. Risk assessment is considered as a mean for managing all the possible risks that the organization faces.

Preparation of procurement has been discussed earlier and related to the phase; comprehensive market mapping is seen as an efficient risk management mean. It was elaborated that procuring unit must be very aware of what they are procuring. This means that it is highly important to find out all the possible details and factors that are related to the procurement in the preparation phase.

Market mapping is a tool for gaining information of the market related to the procured product or service. Market mapping is also seen important for managing risks related to tendering, because doing it comprehensively it can prevent risk of stopping the particular process of competitive tendering. Often stopping tendering process or need to start a part
competitive tendering process related to original entirety originates from lack of market knowledge.

Related to supply risks, there was identified use of multiple suppliers as a practical risk mitigation mean. Using multiple suppliers is seen important to ensure that the needed products and services are still delivered if one supplier cannot deliver for some reason. Using multiple suppliers is highly related to securing continuity of operations, which is crucial in healthcare industry. In addition to using multiple suppliers on mitigating supply risks, preferring products manufactured in home country is brought into the discussion. Global supply chains are seen to include considerably more supply related risks compared to national supply chains. Of course, it is not even closely possible always to get products manufactured in home country, but, when possible, it can be utilized as a risk management mean to mitigate supply risks.

The case organization does sanction and criminal record examination of suppliers and inspects backgrounds of supplying firms to mitigate financial and sustainability and reputation related risks. Revenue of supplying firms must cross the set limit, depending on the procurement. Risk classes of suppliers are also examined. By doing a comprehensive background examination, it ensures that the organization is not doing business with operators, that could cause reputational damage or that there are no financial related problems in the supplier side.

Documenting and procedures are mentioned as a risk mitigation mean. Procurement process involves so much information and small details, that it can be hard to remember what has happened during the whole process. Documenting the process and decisions mitigates juridical risks, as it can be indicated from the made documents, why was a certain decision made and with what basis. Procedures for one’s part instructs on how to function in situations and by following them, risks can be mitigated. In addition, cooperation with jurists in situations, where juridical expertise is needed is seen as a mean on mitigating juridical risks.
4.7 Benefits of PRM

Table 7. PRM benefits found from interviews

<table>
<thead>
<tr>
<th>Benefits of procurement risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows shifting focus to other issues</td>
</tr>
<tr>
<td>Less consequences from risks</td>
</tr>
<tr>
<td>Risk mitigation</td>
</tr>
<tr>
<td>Continuous learning</td>
</tr>
<tr>
<td>Benefits end users and society</td>
</tr>
<tr>
<td>Better contracts</td>
</tr>
<tr>
<td>Reputation</td>
</tr>
</tbody>
</table>

Benefits are one of the main reasons what drives organizations to act in a certain way. Benefits and drivers were brought into the discussion in interviews to examine reasons behind why the case organization needs procurement risk management in their operations and what motives them to manage procurement risks. It is stated that the importance of procurement risk management comes from all the spontaneous occurrences in the world that can happen all the time and which most likely have an influence on procurements also. Procurement risk management is seen as a tool that allows the case organization to shift their focus on bigger issues. When risks are consciously anticipated and there is a planned strategy for management of those risks, the procurement risk management work is less time-consuming and there are lighter potential consequences emerged from actualisation of the risks.

It is mentioned that even though risk management work takes resources, it brings benefits on the counterbalance. Procurement risk management is seen to be an essential tool for the organization. Recognizing that there is always a possibility that something bad can happen
and affect procurements on a negative manner is groundwork. In case some risk or risks actualise, there are operating models and procedures created for those situations and therefore, it is easier to take steps in tackling the risk or at least mitigating the consequences.

Learning from earlier occurrences is seen as important benefit that risk management work brings. When there are undesirable occurrences that have impact on organization and force them to function, there is always something to learn from it. There have been certain risk management actions, and they can be analysed and developed for the future. Whether there is something positive found from the earlier risk management actions or are defects, it is a base for developing the operations further and more effective.

Procurement risk management work is seen to have a multidimensional chain of impact that benefits several groups in the organization, as well as society in its entirety. For the case organization end users of their procurements are hospital staff. When risks are mitigated or tackled, it benefits straight the end users, as procurement risk management is seen to provide more reliability to deliveries. End users get quality procurements in correct schedules and there are less situations, where there is shortage of necessary products or services. Therefore, patients get better treatment and there are risky situations in terms of shortages less frequently.

As earlier came out, contracts and contract management include risks that needs to be managed. Procurement risk management allows better contracts, that benefit the organization during the contract period. This is explained by getting favourable terms into the contracts, that makes the procurements cost-effective and reasonable. Prices do not increase suddenly, and business is successful. Contract management becomes less complicated when potential risks concerning for time of the contracts are considered.

Lastly, procurement risk management is seen to allow the organization to operate on wanted manners, according to the legislation and sustainable. It allows the organization to handle procurements in schedule and helps on operating according to the procurement legislation. Risk management work also considers suppliers and when the cooperation partners are also working in appropriate manners, it benefits the reputation of the procuring organization and lessens the risk of reputation damage.
4.8 Challenges of PRM

Table 8. PRM challenges found from interviews

<table>
<thead>
<tr>
<th>Challenges of procurement risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing to other processes</td>
</tr>
<tr>
<td>Everything cannot be predicted and prepared</td>
</tr>
<tr>
<td>Depending on other groups</td>
</tr>
<tr>
<td>Large and complex procurement entireties</td>
</tr>
<tr>
<td>Tight schedules</td>
</tr>
<tr>
<td>No clear template for assessing risks</td>
</tr>
</tbody>
</table>

After discussing benefits and drivers for procurement risk management, challenges and barriers were discussed with the interviewees. As a large organization, the case organization has plenty of different operations and processes. Therefore, risk management in certain processes can be left a bit separated of other processes. Risk management might not be always viewed in perspective of other contributing processes, which might make it a little disconnected.

It was seen that there are no real challenges related to the case organization’s procurement risk management. Reasoning behind the good situation was mentioned that the case organization is very large and has a lot of professionals, that have know-how and knowledge on different matters. The case organization works closely with juridical professionals, logistics professionals who have knowledge of warehousing and fixing deficiencies, there are substance specialists who work closely with the procured products and services helping with every procurement. Furthermore, there are other public organizations that can be cooperated with in certain issues. If something alarming is noticed, there is always employees, who are capable of helping on the matter. Therefore, it is seen that there is no
reason why the organization could not prepare for risks sufficiently but there anything can happen, which cannot be predicted or effected.

There were challenges identified in matters, that are under the control of the case organization. For example, gaining a sufficient contract assortment can be challenging because there can be many different units using the procured products and services. The case organization is highly dependent on substance professionals in their procurements. There can be a situation where not every needed unit have not been able to be heard enough related to the procurement. In some cases, the procured product or service is new or for other reasons there are not enough knowledge of them. The procurement entireties can also be very large, which makes it challenging to include every needed product section in the procurement. Therefore, there can be risks that actualise in some part of the procurement process.

Schedules were discussed in relation to challenges of procurement risk management. Procurements can be very complex and taking all the possible risks into consideration can be very difficult. In addition to it being difficult to identify and consider all the potential risks, schedules can be another challenge for it. Thorough preparation needs time and procurements often include tight schedules, which makes it more difficult to manage all the possible risks.

Challenging for procurement risk management is also seen that there are so many procurements, which differ from each other in several ways. Therefore, it is not possible to create clear templates for assessing risks. Of course, there are similarities between procurements and earlier procurements can be acquainted with for assistance on the procurement. Still, every procurement includes its own risks that needs to be assessed carefully in each procurement, situation specifically.

4.9 Development ideas found from the interviews

The interviews started by assessing the current state of procurement risk management of the case organization. The other interview themes guided the interviewees on thinking the topic on different aspects and helping them to better get along with the topic. Lastly, interviewees were questioned on what kind of improvements could be made to the organization’s procurement risk management and how it could be developed to be more effective. Before
questioning the interviewees of development ideas, challenges and barriers of procurement risk management was discussed to help them to build on the earlier discussions. Many different development ideas were introduced and discussed.

One development idea was related to integration of processes. As was stated earlier, risk management process starts from the strategy along with many other processes. For development of procurement risk management, strengthening integration of processes to gain better contribution of their interdependence was raised into the discussion. In relation to earlier ideas, developing risk management on a state, that it is a systematic entirety that is continuously developed was added to the development discussion. Shared value creation was seen also as an issue that could be developed further to strengthen risk management. The case organization has spouses, who could be included in cooperation even more in order to develop procurement risk management. When there is shared value created, all parties are satisfied and everyone is engaged with the objectives, it can help on risk management also.

As discussed earlier, risk management has been discussed little according to the term in HUS Procurement. Having risk management unit to organise training related to risk management for the case organization is raised as an idea for development. It would make risk management work more conscious. In addition, stronger auditing in aspect of risk management could be in place. Even though, current example templates are up to date, there can be some documents and instructions that could be audited from the aspect of risk management and develop. Composing a handbook that includes risk management practices and that supports procedures was discussed as tool for development of procurement risk management. These development ideas could make risk management as a topic more visible.

One development idea for procurement risk management was related to information transferring. As discussed earlier, procurement processes include a lot of information, and it can be difficult to transfer information adequately. In cases where person in charge for certain procurement project changes during the process or new procurement starts, information transferring is essential for risk management. Therefore, for developing information transferring there could be a tool developed for the purpose. Hence, information could be transferred comprehensively and adequately enough for the next person procuring, helping on risk management.
Lastly, continuous monitoring and observing and reporting of defects was raised for development. Especially monitoring suppliers during contract period could be developed for risk management. Even though, risk classes are analysed in preparation of the procurement, monitoring living of the risk classes during the contract period more in detail is seen to develop procurement risk management. It would help on making conclusions regarding risks and help on adapting needed actions.

*Table 9. Suggestions for development of PRM*

<table>
<thead>
<tr>
<th>Suggestions for development of PRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration of processes</td>
</tr>
<tr>
<td>Shared value creation</td>
</tr>
<tr>
<td>Organising training</td>
</tr>
<tr>
<td>Tool for transferring information</td>
</tr>
<tr>
<td>Developing supplier monitoring</td>
</tr>
</tbody>
</table>
5 Discussion

This chapter includes discussion of results of the study, what new information this study brought and what was learned from the research. Empirical findings are compared to theoretical findings and similarities and differences between them are discussed.

Procurement risks were researched in the theoretical section to examine what kinds of different risks public sector procurement units commonly face in procurement. In earlier research procurement risks had different categorizations but there were same risks identified in different studies. In the theoretical section, identified risks in procurement were market, organizational, process, reputation and sustainability, supply, financial, supplier, information and technological, legislation related, fraud and corruption risks. Majority of these risks identified from earlier research was also included in the empirical findings. From this it can be interpret that organizations working in the public sector face similar risks in procurement and there are certain issues that need to be considered in procurement work.

Supply risks were discussed plenty in the interviews. Supply risks were identified by every interviewee, which tells about commonness of them and the impact they can have. Zsidisin and Ellram (2003) stated that every business organization faces supply risks in some degree. In HUS Procurements, supply risks were identified to have significant consequences especially because of the industry they are working in. In case of supply risks actualizing in HUS Procurements, health care services are at risk. According to Zsidisin and Ellram (2003) supply risks can result in unfulfilled or incomplete orders. Concerns in HUS Procurements regarding supply risks were related to problems in deliveries. Continuity of operations was discussed to be one of the main focus areas in HUS and actualisation of supply risk can put continuity of operations into danger.

Theoretical part of the study described market risks to include demand not responding adequately or following the expectations, lack of companies that can deliver the needed goods (Kalvet & Lember 2010), lack of considerable tenderers, lack of competition, negatively influenced market dynamics and other risks associated with market circumstances (Valtionvarainministeriö 2023). HUS Procurements faces market risk in terms of not having many applicable tenderers or at all in tendering phase of procurements. Therefore, there are similarities between theoretical and empirical findings regarding nature of market risks.
Financial risks were discussed quite plenty in the theoretical section but just slightly in the interviews. In the theoretical section, financial risks were identified to be associated with getting needed funds for the procurement, meeting target costs (Kalvet & Lember 2011) and uncertainty in cost prices (Hong et al. 2018; Valtiovarainministeriö 2023). According to Hong et al. (2018) financial risks also include situations, where products are not complaint with the requirements. This finding was similar to what interviewees discussed about financial risks. HUS Procurements identified the risk of significant decline in quality of supplied products or services. If it is due, contracts can be cancelled. Otherwise, financial risks were not discussed in the interviews. However, even though financial risks were not raised much into discussion in the interviews, these are common issues that every procuring organization can face.

In the earlier literature OECD (2019) and Valtiovarainministeriö (2023) addressed process risks regarding public procurement. When asked about procurement risks, many of the interviewees approached the subject from the procurement process standpoint. Valtionvarainministeriö (2023) pointed out that feeble preparation can cause deficiency of specifications or excessively strict specifications, excessively large or small totality, locking in current operating models and technology and invalid tenders. The interviewees agreed on that the preparation phase is important and discussed similar problems if there is too little attention given to the phase. Additionally, according to the interviewees, preparation phase is seen to involve many risks which makes it one of the most important phases of the procurement process. In relation to specification phase, what Valtionvarainministeriö (2023) addressed was similar to what interviewees said. In HUS Procurements specification phase is seen to include risks of deficiency of specifications or excessively strict specifications. In addition, it was discussed that failing in specification can affect timetables negatively because the process might be necessary to start over.

According to Valtionvarainministeriö (2023), organizational risks include central person changes in positions in different parties, who are included in the procurement. This matter was also identified as a risk in the case organization. HUS Procurements discussed that there can be challenges related to these kinds of organizational risks. It was mentioned that in case if leading person of the procurement needs to be changed during the process for some reason, it can be difficult to gain full knowledge about the certain procurement. These kinds of organizational risks are related also to information and technological risks. According to
Tang & Musa (2011), information and technological risks are related to information accuracy, information system security and disruptions. HUS Procurements agreed that information accuracy and disruptions are a considerable risk, which needs to be mitigated by documenting information properly. In the case organization it was discussed that information accuracy is important for the success of a procurement project. Information flows are also important for the optimization of resources (Tang & Musa 2011).

Decision making is held to high standards of transparency and accountability, as there are strong expectations in serving the public interest, which leads to that everything that can harm the reputation is seen as a risk (European Commission Expert Group 2010). HUS Procurements agree that it is important to operate according to legislation as well as sustainable otherwise. In HUS Procurements risk management work also considers suppliers. It was discussed that when cooperation partners are also working in appropriate manners, it benefits the reputation of the procuring organization and lessens the risk of reputation damage. This is agreed by OECD (2019), which state that selecting incorrect suppliers can do damage to reputation of procuring unit.

Once the risks in public procurement were identified, the focus shifts to means on managing those risks. Identified risks in public procurement were mostly similar between earlier literature and what the interviewees discussed. Also means for managing these risks had similarities. However, the literature presented more means that the interviewees did not discuss about. One important risk management mean in both literature and interviews was identified as preparation of procurement. OECD (2019) highlighted the importance of broad communication with potential suppliers and throughout analysis of the market to prepare the procurement properly. This was seen to mitigate market related risks and strengthen the competition. In HUS Procurements, it was added that comprehensive market mapping is an efficient tool for managing market risks and that the procuring unit needs to be very aware of what they are procuring. Additionally, the interviewees agreed on that preparation is one of the most important means because lack of preparation can add more risks in later phases of the procurement process.

Using multiple suppliers was identified to be a supply risk mitigation mean in both, HUS Procurements and literature. Using multiple suppliers ensures that products and services if one supplier is unable to deliver. HUS Procurements highlighted especially this mean because it is important for continuity of operations, which is crucial in healthcare industry.
Zsidisin & Ellram (2003) had similar thoughts about using multiple suppliers. According to them it protects organizations from adverse events that might occur. Constantino & Pellegrino (2010) agreed on this and added that it is a strategic risk management approach. Additionally, related to suppliers, it is seen important that they are reliable and operate in correct manners. HUS Procurements discussed that they do comprehensive inspection and examination of suppliers to mitigate financial, sustainability and reputation related risks. Similar thoughts were presented by Hallikas, Lintukangas & Kähkönen (2020), who said that sustainable purchasing practices help organizations in avoiding financial, sustainability and reputational risks. The importance of contract flexibility has been highlighted to reduce financial risks. Hong et al. (2018) stated that contract flexibility is essential for purchasing organizations to mitigate price risk. In HUS Procurements, the subject was referred by stating that good contracts allow cost-effectiveness, which mitigates financial risks overall.

Last theme in examination was benefits and challenges of procurement risk management. Fortunately, there is certainly some benefits that procurement risk management can bring and what motivates to develop and execute risk management in procurement. Manhart, Summers & Blackhurst (2020) discussed that supply chain risk management can be a source of better overall firm performance. It is in line to what was discussed in HUS Procurements. They said that risk management allows to focus on other issues and when risks are consciously anticipated and there is a planned strategy for management of those risks, the procurement risk management work is less time-consuming and there are lighter potential consequences emerged from actualisation of the risks. In relation to anticipating risks, Berg et al. (2008) add that there can be expected a creation of competitive advantage. HUS Procurements identified learning from earlier occurrences as one benefit. Berg et al. (2018) agreed with this by stating that risk management improves evaluation of uncertainties and decision-making based on risks. Other benefits of procurement risk management identified and discussed in literature, as well as in HUS Procurements were cost savings, better reputation and benefitting society along with the purchasing organization. Therefore, there are a lot of positive that comes from risk management and what should motivate organizations more to develop their operations in this area.

Unfortunately, there is also identified some challenges that relate to procurement risk management. The challenges of procurement risk management found in earlier literature and from the interviewees of the case organization were quite different. Berg et al (2018)
discussed that the effectiveness of risk management is difficult to monitor, because good results can be because of the efforts or just pure luck. Fraser & Simkins (2016) added that if companies are identifying a lot of risks and trying to monitor them all, it can be challenging, and shift focus off from relevant issues. Berg et al. (2018) also discussed that risk management work involves costs but there are not many tangible revenues, which can be challenging for motivation to develop risk management. In the case organization, identified challenges related to risk management were more related to practical procurement work, which is understandable as most of the interviewees approached the subject from standpoint of their own work. In HUS Procurements, challenges of procurement risk management were identified as tight schedules for the procurements, complexity of procurement projects, everything not being on their own control and not having clear templates for risk management work.
6 Conclusions

This section includes a summary of the research, answering the research questions, discussion of limitations, managerial implications, and propositions for future research. The main purpose of this study was to examine risk management in public sector procurement and related factors on it. This study consisted of theoretical and empirical parts, which both consisted of similar themes. The themes assessed were risks in public procurement, public procurement risk management means and benefits and challenges related to procurement risk management. Additionally, theoretical part also assessed principles of public procurement and risk management to offer a more comprehensive frame for the study. Purpose of the study was also to create proposals for development of procurement risk management by questioning interviewees about current state of procurement risk management and development ideas.

6.1 Answers to the research questions

The main research question of the study is as following:

How can public organizations manage risks in procurement?

Answer to the main research question is not unequivocal and therefore, the researcher of this study aspired to get answer to the question by researching procurement risk management on different aspects from earlier literature and questioning interviewees with related themes and different aspects. Dividing the interviews in multiple themes was done to receive encompassing information and combining the received information to gain a multidimensional understanding of what factors needs to be considered when discussing about managing risks in public procurement. The researcher aimed to answer the question by discussing about the present state of the case organization’s procurement risk management, identifying benefits, drivers, challenges, and barriers in procurement risk
management, discussing about current practical means of procurement risk management and
lastly, collecting development ideas on the topic. Answer to the main research question is
that risks in public procurement can be managed by identifying risks that the organization is
facing, applying correct means to manage those risks, identify challenges related to the risk
management work and develop it further with motivation brought by the benefits. This
answer is widely related to supply chain risk management literature, that highlights that
identifying risks is important phase of the process (Hallikas et al. 2004) and that identifying
risk sources helps on designing mitigation strategy for risks (Punniyamooorthy et al. 2013),
there are different means of risk management to mitigate effects of risks (Tang & Musa
2011; Norrman & Jansson 2004; OECD 2019; Zsidisin & Ellram 2003; Hong et al. 2018;
Hallikas et al. 2020). There were also found many challenges regarding procurement risk
management in earlier literature (Berg et al. 2008; Fraser & Simkins 2016; Vilko & Hallikas
2012; Punniyamoorthy et al. 2013; Wang-Mlynek & Foerstl 2020) that should be considered.
In addition, there were benefits found from the literature (Manhart et al. 2020; Wagner &
Bode 2008; Berg et al. 2008; Hoffmann et al. 2013; Schiele 2007) that should motivate
organizations to manage risks in their procurements.

The first supporting research question of the study is as following:

*What are the means to manage risks in public procurement?*

According to the interviewees of the case organization, means for managing risks in public
procurement are analysing the market, multiple sourcing, flexibility of contracts,
collaboration with suppliers, good governance practices, assessment of risks and information
transferring. These are similar to what supply chain risk management literature also
suggested (Norrman & Jansson 2004; Zsidisin & Ellram 2003; Hong et al. 2018; OECD
2019), but there were also other means found from the literature that was not discussed by
the interviewees such as inventory management (Zsidisin & Ellram 2003).

The second supporting research question of the study is as following:
What are the benefits and challenges of risk management in public procurement?

Risk management work is identified to include both benefits and challenges according to earlier literature and interviewees. Risk management work is identified to have benefits in from of it allowing shifting focus on other issues, having less consequences from actualisation of the risks, learning continuously, having better contracts, better overall performance and having positive impact on reputation of the purchasing organization. Earlier literature supports these benefits found from the interviews, as they are found from the literature (Manhart, Summers & Blackhurst 2020; Wagner & Bode 2008; OECD 2019; Berg, Knudsen & Norrman 2008) also. In the case organization challenges were identified as contributing to other processes, knowing everything cannot be predicted and prepared, large and complex procurement entireties and tight schedules, whereas earlier literature had identified balancing costs and revenues in procurement risk management, measuring, not getting tangible results (Berg et al. 2008) and identifying too many risks (Fraser & Simkins 2016).

The third supporting research question of the study is as following:

How can risk management be improved in public procurement?

This supporting research question aimed to find out development targets on the case organization’s procurement risk management. This research question was not used directly in theoretical section because the researcher wanted to answer to this question from the standpoint of the case organization. In the case organization there were a couple suggestions for development of procurement risk management, integration of processes, shared value
creation, organising training, having a tool for transferring information more effectively and developing supplier monitoring.

6.2 Managerial implications

Proper procurement risk management can give organizations great benefits and allows their operations to remain more stable in case risks actualise. Overall, this study shows that there are many considerable risks in public procurement that public sector organizations should take into account in their operations. Being conscious about risks and creating a strategy for procurement risk management can be very valuable in terms of continuity of operations and avoiding worst consequences from the actualisation of risks.

This study contributes to present benefits and challenges of procurement risk management. It shows that procurement risk management is beneficial in many ways. Additionally, challenges are presented to give guide what kind of challenges can be expected in risk management. Also, practical procurement risk management means are presented from the standpoint of the case organization to show direction of how risks are practically managed in daily procurement work.

The main aim of this study was to have an overview of public procurement risk management and add awareness regarding the topic. The results can be used to develop effectiveness of organizations’ procurement by concentrating on a main issue, risk management. Additionally, the results of this study suggest that public organizations should consider having a look on their procurement risk management.

6.3 Limitations and future research propositions

This study was executed by using a case study method, where the examined case was HUS Procurements and risk management of procurement of them. HUS Procurements operates in healthcare industry, but the study is not limited to a certain industry. Organizations working in the public sector, regardless of the industry, can benefit from the results of this study. Public procurement is guided by procurement law and therefore, every public organization
must follow the law and execute their procurements in similar fashion and following the procurement process. In addition, firms working in the private sector can benefit from the study. Even though this study focuses on public sector procurement, there are a lot of similarities between public and private sector procurements. There are similar risks that they are facing in procurements, as well as similar means to manage procurement risks. Also, the challenges and benefits of procurement risk management are similar between public and private sectors.

There are limitations identified regarding this study. The biggest limitation is related to data collection. There were overall of five interviews done. All the interviewees work in HUS Procurements, in different positions. If there were more interviewees, the collected data could have been more encompassing and include more aspects on the topic. Not interviewing all managers is also a limitation. Other managers could have provided different views on procurement risk management. HUS Procurements does not represent all public organizations and therefore, generalizing is a little challenging. However, as stated earlier, public organizations have same laws and regulations guiding procurements and they execute procurements in similar manners. Therefore, generalization is possible, at least partly.

Reliability and validity are concepts, that describe assessment of trustworthiness of a research methodology. In qualitative research it can be used to describe how understandable the research is. With reliability quality of the research can be evaluated. (Golasfshani 2003) Reliability aims to mitigate errors in research and reflects on how well research results can be replicated if a similar study is conducted. The reliability of qualitative research, where data is collected with interviews, can be improved by documentation of the interviews and the methods of their implementation. (Kähkönen 2011) In this study, reliability and validity is increased by describing data collection and analysis process. The description was done to provide the readers a comprehensive understanding of implementation of the study. Additionally, the interview questions are included in this report.

The importance of procurement in the operations has grown and it is continuously gaining more attention in business world as well as in research. Procurement risk management has been researched quite a lot in recent years, but research focusing on public sector procurement has gained less attention compared to private sector. Focus of this study was in examining how procurement risks are managed in a large public sector organization and deepen the examination into practical means of managing risks, as well as benefits and
challenges of the risk management practices. For future research, an interesting topic could be to study the creation and implementation of a procurement risk management strategy and the results of implementation of the strategy. Additionally, public procurement risk management could be researched from perspective of an organization working in a different industry.
References


Appendices

Appendix 1.

Interview questions

1. Would you tell about yourself?

2. Are you aware of the current state of risk management in HUS Procurements? What about the goals?

3. How significant is risk management in HUS Procurements?
4. What risks are most considerable in procurements? Is some phase of the procurement process specifically risky?

5. What kind of means HUS has in managing risks in procurements?

6. Who participates in creation of strategy for risk management? Is there a development group for procurement risk management?

7. What kinds of benefits you gain from procurement risk management?

8. What kinds of challenges there is in procurement risk management?

9. How could risk management be developed in HUS Procurements?