An investigation of the relation between price adjustments based on price indices and passive waste in public procurement

An exploratory interview study focused on public authorities in Sweden

Master's thesis in the master's program Management and Economics of Innovation

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ABSTRACT

Various public organizations in Sweden depend on the Swedish Public Procurement Act (2016:1145), in their procurement processes. Public procurement is estimated to account for a sixth of Sweden's total GDP and is a form of collective good for the citizens. There is a notion that public procurement has waste associated with it and this implies an urgency for sound management of money spent on procurements. Waste in public procurement may manifest itself in two different forms: i) active waste and ii) passive waste. i) Active waste is associated with things such as corruption or favoritism. ii) Passive waste, however, is a larger part of total waste and is often not as distinct as active waste. Passive waste is things such as lack of skill in a procurement, low incentives to reduce costs etcetera. Today many of the public procurers also use price adjustment clauses in their contracts, often in the form of price indices. This is an area of public procurement where research has lagged behind. This study thus investigated: How “price adjustments based on price indices” usage in public procurement processes relates to passive waste.

We, the authors, conclude that price indices are associated with, and may have an effect, on passive waste. It may manifest itself in the form of reduction of moral hazard, adverse selection, evening out information gaps and mitigating some strategies that bidders could use. But it may at the same time cause higher transaction costs due to complexity and lack of knowledge. Lastly, indications show that this type of price adjustment clause may also reduce ex-post negotiation and spread the risk between buyer and supplier.

The study has performed semi-structured interviews with different public procurers to explore and acquire the practitioner's views. Furthermore, this has led to the capture of five comprehensive dimensions of passive waste in public procurement.

Further actions should be taken to increase the knowledge about price indices in public procuring organizations and increase the knowledge sharing between organizations in order to exploit information differences and lower the transaction costs.

Keywords: Public procurement, price index, passive waste, active waste, LOU

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We would also like to pay our special regards to the twelve interviewees that chose to participate in our study. We appreciate that you took the time and contributed with key information, and positively encouraged the thesis subject. Every single interviewee was involved in the progression of the empirical investigation; answering sometimes novice questions, contributing with basic tips, and sharing new knowledgeable contacts that we could interview.

Furthermore, the study would not have become what it is without the support from our supervisor Karolin Sjöö, at the Department of Technology Management and Economics at Chalmers University of Technology. Your guidance and allowance of freedom formed this thesis and helped us advance in our sometimes-struggling situations.

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Your sincerely,

Axel Mårtensson and Oscar Örnmark

ABBREVIATIONS

CPI - Consumer price index

CPFF - Cost Plus Fixed Fee

CPIF - Cost Plus Incentive Fee

FP - Firm Fixed Price

LCI - Labor cost index

LOU - Swedish Public Procurement Act (2016:1145)

PA - Procuring Authority

PI - Price index

PP - Public Procurement

SCB - Statistics Sweden

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1 INTRODUCTION

1.1 Aim of the study

The ambition of the report is first and foremost to foster a knowledge growth about public procurement and explore the usage of price adjustments based on price indices in public procurement contracts. The question in focus is if this method of price adjustments can be beneficial in reducing what is called *passive waste*. In this study we will use two definitions of waste i) active waste and ii) passive waste, Active waste is defined as discrimination, corruption and/or favoritism to for instance exclude foreign actors (Bandiera, Prat and Valletti, 2009). Passive waste on the other hand is waste that can present itself due to things such as absence of incentive to make a "good deal", lack of skills from the procurement authority, regulatory burden etcetera (Bandiera et al., 2009). According to Bandiera et al. (2009) passive waste stands for the majority of waste in government spending and was approximated to 83% of total waste. For a further explanation on i) active waste and ii) passive waste see the *Theory* chapter. The issue of price adjustments based on price indices relates to passive waste has previously not been studied to a great extent in Sweden.

Hopefully, this could lead to expanding the understanding of price indices implications for public procurement and we aim to lay a foundation for a more strategic handling of price adjustments and price indices in the future. Public procurement is a major part of the national economy and adding to the efficiency in how it is conducted could be beneficial to social welfare as a whole.

1.2 Background

The procurement of public projects in Sweden occupies a large volume of the national economy. During 2017 the value of purchases that falls under the procurement laws, e.g. the Swedish Public Procurement Act (2016:1145), was estimated to be 706 billion SEK (Töyrä et al., 2019). This corresponds to roughly one sixth of the Swedish gross national product.

Public procurement (PP) is the public sector's process of acquiring resources and investments to operate the organizations. In Sweden PP is regulated by for instance the law (2016:1145) of public procurement (LOU). LOU is one of the laws that authorities and public actors in Sweden need to comply with when procuring goods, services, or long-term projects (SFS, 2016). The law outlines how these public actors should act when performing procurements (Lindahl Toftegaard, 2020). The law is supposed to safeguard equal terms for those agents seeking to supply the public actors. It is an attempt to clear away any non-purchase specific factors such as private relationships or loyalty. The law is an effort to mitigate the active waste as defined by Bandiera et al. (2009).

The Swedish laws are also stated to be based on a European directive, which originated in 2016, and hence aims to create efficient and competitive markets in the whole of the EU. Threshold

limits for procurement costs decide whether or not the EU directive shall be implemented, but LOU is best practice and the principal rule (Lindahl Toftegaard, 2020).

The procurement process can be divided into multiple steps: 1) preparation, where the organization identifies needs, plan and decides what should be procured. 2) implementation, it involves contract agreement, supplier evaluation and the bidding process. 3) deliver, where the objective should be fulfilled, delivered, and paid for. 4) follow up, evaluation of the process and the procured objective (Lindahl Toftegaard, 2018). It is mainly 2) that is regulated via LOU, and the other steps are controlled via other regulations. But to be able to follow through accordingly to LOU, and utilize the public resources efficiently, the full perspective of both before and after the procurement implementation is needed (Lindahl Toftegaard, 2018). It is in 1) the preparation phase where most of the strategic work takes place. Further on, in the implementation phase a procurement requirement specification is produced. The outlined specifications cannot be changed when the invitation to tender has been published and is available for the potential tenderers, also known as bidders. The third step is where the supplier delivers and the last step is the part of the process where the procurer assesses the procurement (Lindahl Toftegaard, 2018).

According to a study by the European Commission (EC, 2016), Sweden is amongst the peers in the European Union (EU) considered to be in the forefront regarding the implementation of public procurement directives. The report does however state that Sweden are facing some challenges in phase 1) prepare and 4) follow up (EC, 2016). There is also a potential issue in the decentralized structure of Sweden's government (EC, 2016). It is according to the report difficult to find consolidated data which makes it more difficult to navigate future policies regarding public procurement.

LOU, and the other Swedish procurement laws, does not in themself guarantee a good procurement deal (Spagnolo, 2009). The legal framework is designed to reduce active waste (Bandiera et al., 2009). It is possible to follow the laws, and still not maximize value for the organization and the general social welfare (Spagnolo, 2009). It is however not a de jure hindrance to make a “good deal”, but the procuring authority (PA) does need to take measures to reduce the passive waste (Bandiera et al., 2009; Dotoli, Epicoco and Falgario, 2020; Bergman & Lundberg, 2013).

1.2.1.1 Swedish public procurement authorities

There is a vast array of contracting authorities that are subject to the Swedish procurement laws. In Sweden roughly 4100 organizations need to perform public procurements (Töyrä et al., 2019). The various public actors that need to comply with LOU, have different requirements for their operations, but also different resources. In Sweden, the different authorities can be divided into three main categories: i) governmental; ii) municipal and iii) regions.

During 2018, 1155 different procuring authorities (PAs), governmental agencies (or entities) and public companies issued at least one “invitation to offer”, colloquially “call for bids” (Töyrä et al., 2019). Of the 18522 invitations to tender that were published during 2018, the Swedish

municipalities, and their subsidiary companies, accounted for 69 %; Governmental authorities 19 %; regions 11 %[1] (Töyrä et al., 2019). Examples of municipal procurers are Stockholm city, Gothenburg city and Malmö city. The organizations in regions are instead hospitals and healthcare actors. The overall largest actors when it comes to public investments are FMV and Trafikverket. These two are also more material and resource heavy in their procurements compared with municipalities for example (Murray et al, 2013).

1.2.1.2 Use as price indices for price adjustment in Sweden

The length of the majority of the contracts were a three to four-year period (Töyrä et al., 2019). A contract entered at year 0 thus needs a mechanism to regulate the price in say year three. This is called a price adjustment regulation and the design and selection of indices are a strategic part of the procurement process. The most readily available price index is the Consumer Price Index (CPI). This is a measure of the average price trend of domestic consumption issued monthly by Statistiska Centralbyrån (SCB, n.d. a). As stated by SCB (n.d. a) CPI is a model based on a basket of different goods and services that is consumed in Sweden, not the specific development of a specific good or service. CPI may then not accurately reflect the price shift ex-ante to the actual cost of a good ex-post. Thus, leading to a situation where the buyer is either over- or underpaying for said commodity. This fact is why choosing the appropriate price indices in a public procurement becomes a strategic part of the process.

There are no clear guidelines regarding using a price index (and price adjustment clauses) for public procurement in Sweden. It is even sometimes advised against. For instance, the industry organization Confederation of Swedish Enterprise (Svenskt Näringsliv) says in their paper aimed at helping the actors in the Swedish PP marketplace *Kommersiella villkor i offentlig upphandling* (Kihlman, 2018) that:

> "As with all other terms of a contract, the simple [solution] is often the best [one]. It causes fewer interpretations and thus fewer problems. It is therefore best - at least from that aspect - [to use] a fixed price. Next best is a simple calculation model for the price, such as price per unit of time, number or distance." (page 12) [n.b. translation from Swedish to English by the authors]

This is in stark contrast to what was described in the previous section. However, later in the paper it states that the longer the duration of contract, the greater the need for price adjustments are (Kihlman, 2018). They then also recommend some form of price index-based adjustment, and for the reasons of transaction cost and information asymmetry discourages from methods such as negotiation (Kihlman, 2018).

[1] There are also additional organizations that stood for 3 % of the public procurements.

A joint guiding paper by the Swedish authorities Upphandlingsmyndigheten and Kammarkollegiet called *Vägledning: Kommersiella villkor* (Upphandlingsmyndigheten, 2014) states that in longer projects there is a need for price adjustments. The guidelines recommend that price adjustments should adhere to industry specific indices (Upphandlingsmyndigheten, 2014). In the absence of suitable industry specific indices, a PA could consider adjusting goods in accordance to the general CPI and services according to the Labor Cost Index (LCI) (Upphandlingsmyndigheten, 2014).

1.3 Previous research

Studies of public procurements (PPs) are not uncommon, there exists plenty of studies on the subject in Sweden. There are many different angles that the research takes on. However, there are not many studies on how price indices (PIs) affect the organizations using it or the effects on intangible aspects, especially not in public procurement. Historically there are a few actors that stand for a large amount of the total evaluations and follow ups on price indices function. These are Försvarets Materialverk (FMV) and Trafikverket. The focus has been on analyzing if budget allocations are proportional towards the real price development and not the impact PI have, i.e. (Nordlund, 2018; Murray et al 2013). Furthermore, we found that the academic research has been even more limited on PIs.

That this is an unexplored research area was identified by Kosmopoulou and Zhou (2010), who focused more on the tender phase. It is confirmed that the investigation of PIs overall impact on organizations is limited, even though this type of price adjustments has increased in popularity over time (Kosmopoulou & Zhou, 2010). Eger and Gou (2008) mean that the price index model has not been sufficiently investigated ‘‘although it is one of the most common models in infrastructure provisions” (page 290).

Furthermore, as depicted previously PPs stands for a large amount of the total GDP in Sweden and additional knowledge in unexplored areas of the process can assist efficiency. Hence, it is motivated to explore how the use of price indices when adjusting a price relates to the concept of passive waste in public procurements in Sweden.

1.4 Problem definition and research question

Based on the previous reasoning the following objective of the study has been to explore:

> **How “Price adjustments based on price indices” usage in public procurement processes relates to passive waste?**

In this study we will use the definition of passive waste as presented by Bandiera et al. (2009). Passive waste will be further explained in the *Theory* chapter, but the concept encompasses different types of waste ranging from i) costs in a project due to misalignments of incentives, ii) increased transactional cost and iii) mismatch between markets.

We aim to answer this research question (RQ) by exploring the practitioner's view from the so-called “buyer side”, in the case of public procurement officials. The rationale behind studying the buyer side[2] is that the study aims to explore the behavior and notions of the practitioners regarding public procurement, passive waste and price adjustment clauses based on price indices.

1.4.1 Delimitations

This study has been limited due to several factors, mostly due to the breath of information regarding public procurement in general and the complexity surrounding the field. The study is limited by the following factors:

- **Focus area:** public procurement and the viewpoint of the buyer.
- **Geographical location:** Sweden.
- **Study objects:** Governmental agencies, regions, municipalities and/or companies owned/operated by the aforementioned entities.
- **COVID-19-Pandemic,** unexpected high impact event.

Rather than having a too wide subject area, this study has acquired a narrower focus and strives for rigor and depth. Even though the EU directives apply to all member states of the union, this study focuses on the nation state of Sweden. The effects in Sweden may not be generalizable for the rest of the member states, despite the fact that the Swedish laws are in fact built upon the same directives. The countries interpret the directives differently; the national laws may take divergent approaches on some issues. This fact may cause the external validity of the study to be affected.

When choosing interviewees several criteria were employed. Focus has been on finding a cross representation with interviewees from different levels of public authorities. Due to the time constraints of the project, availability of the subjects has influenced the outcome of whom in fact that has been interviewed. The time schedule and resources allowed performing a total of twelve interviews.

Furthermore, the conclusion of the thesis is centralized around PIs and price adjustments, and hence other factors that affect the procurement process are considered ceteris paribus. One should be aware that these factors co-exist and may affect each other. Secondary data such as financial reports, tenders to offer and the likes have also been gathered and used when needed. This more quantitative data have complemented the empirical findings of the interviews, but due to the scope and time constraints the study is primarily based on primary data generated by interviews. Lastly, the choice of literature is based upon the research questions and the scope of the study which have

[2] This is instead of studying the so-called “seller side” - organizations providing goods and services to the public.

been a process of iteration. The quantity of readings has been limited by the time constraints of the project.

Lastly, due to the unusual society conditions with lockdowns and business shutdowns, which are results of the Covid-19-pandemic, the number of interviews have been affected negatively. The study originally was going to have 15 interviewees, but in the end 12 responded and participated. The ones that did not participate were mostly municipalities. The answers from them would have been beneficial, but we suspect that they would in fact reinforce our findings.

1.5 Sustainability and ethical impact of the study

Sustainability is often derived from three categories, environmental, social, and economic sustainability. These three pillars compose the overall sustainability concept but due to the reports characteristics the emphasis will be put on economical sustainability. Nevertheless, the three pillars are interconnected, and hence environmental and social sustainability is analyzed in parallel to the economical aspect which lays the foundation for the report.

This report investigates public procurement from a passive waste perspective, and therefore the management of tax resources is central from an economical sustainability point of view. Management of tax resources is a sensitive topic which affects the society on various levels. Not only for the individual taxpayer but for the country as a whole when allocating resources. Multiple public procurement deals in Sweden have been highlighted as mismanaged and inflicted unnecessary negative financial impact for taxpayers (Hausel Heldahl & Värja, 2019). The consequences of inefficient management of public resources is harmful for a society in both short and long term. The report hence strives to discover and investigate passive waste in the public procurement process.

The two other pillars, social sustainability and environmental sustainability are also concerned when discussing economic sustainability. Priorities of economic aspects will create indirect consequences for social and environmental sustainability, especially when dealing with tax resources. Due to public procurement value size, the resource allocation has practical implications for social sustainability which can be viewed as the impact on the economic consequences for individuals and society of Sweden. It will furthermore also impact environmental decisions taken by a nation.

Additionally, it will add context to the rationale - if using price adjustments based on price indices can impact passive waste, then it will be beneficial to the society as a whole. Therefore, there will not be a separate *Sustainability* section in this study.

To consider the ethical implications the interviewees and organizations will be anonymized. This is a suggested approach for protecting the integrity of participants and mitigate the risk that the interviewed subjects suffer any potential drawback stemming from their answers (Easterby-Smith et al., 2015).

2 THEORY

This chapter lays out the theoretical basis of the study. It consists of three main parts: 1) challenges within public procurement; 2) different types of waste in public procurement, and 3) what is a price adjustment clause based on price index. These areas have been identified as essential for the studied area and shines light on the gathered data gathered later in the Discussion *chapter. It will also help ease the reader's understanding of the subject by defining rudimentary concepts.*

2.1 Challenges within public procurement

There are many challenges that can arise in a public procurement process. In the following subsection the salient challenges are described.

Description of the general procurement process

The public procurement (PP) process is as described earlier often a stage-gate approach. Using the model by Lindahl Toftegaard, (2020) the PP process can be divided into multiple steps: 1) preparation, 2) implementation, 3) delivery and 4) following up. The need for a procurement arises before stage 1) and often comes from the operational part of the procuring authority (PA). This is coherent with how the process was described by public procuring authorities in Sweden.

A PP process is front loaded for the procuring authority. Everything involved in a public procurement needs to be specified ex-ante a publication of an invitation to tender. This includes design documents, administrative regulations, and other information (Knutsen-Öy, 2015). There are limited possibilities to change the statutes of a contract after the invitation to tender has been published. This has some ramifications for PP. It is hard to know all parameters of a project in order to for instance write a design specification that is not liable to change ex-post (Bajari, Houghton & Tadelis, 2006).

For the continuation of the study *longer contracts* will be considered contracts longer than one year[3].

Evaluation of bids in regards of cost and quality

The EU directive is designed to amongst other things reduce the risk for discrimination, promote free competition and transparency (Dotoli, Epicoco and Falgario, 2020). This focus on rules and predictability in essence leads to lower degrees of freedom for a public authority in comparison to a private procurer (Bergman & Lundberg, 2013). Even though there is a harmonization of PP rules within the EU and some guidelines are provided for choosing criteria for evaluation and their weight, there are no specifications regarding which methods to use (Dotoli, Epicoco and Falgario,

[3] Worth noting is that some of the interviewed organizations consider long contracts above 2 years.

2020). The most common approaches are Lowest Price (LP) and Most Economically Advantageous Tender (MEAT[4]) (Dotoli, Epicoco and Falgario, 2020). LP means that the contract goes to the lowest bidding contractor. MEAT takes other criteria in consideration, a function between project cost as well as technical and quality aspects. Combining the facts that there is a heavy front-end in PP and the PA may suffer from a lack of information regarding actual costs of a project (Eger & Guo, 2008) leads to an information asymmetry between the seller-buyer. This also may lead to a moral hazard (Knutsen-Öy, 2015). The bids in themselves therefore become a gauge of the market. The concepts of moral hazard and asymmetric information will be explained later in this chapter.

Creating a market - the need to attract suppliers

According to Bergman and Lundberg (2013) the bidding behavior is affected by the number of bids on a contract. They state that when there are few bidders, the sellers will tend to be less aggressive in their bids. Less aggressive in essence means less competitive. When there is severe competition present the seller can expect the bids to contain information regarding cost and quality. Thus, when there is a lack of aggressive bidding the offers that the PA receives will be more likely to not reflect the actual costs of the sellers (Bergman & Lundberg, 2013). This in effect means that having a dynamic market makes it easier for a procuring authority to find the most favorable combination of price and quality.

The need for knowledge

The circumstances described in the previous section creates a need for internal competencies on part of the PA. Especially, since when the invitation to tender is published all available information that the bidder needs to estimate the project must be presented.

Sporrong, Bröchner and Kadefors (2005) argues that there is a prevalence of lack of competencies amongst procurers. According to a survey conducted by Nämnden för Offentlig Upphandling (NOU, 1999) less than half of the queried procuring authorities followed LOU to its full extent. The complexities of the rules demand a high knowledge base amongst PAs.

Sporrong et al. (2005) also points out that procurers at the municipal level were the ones most in need of competence boosting. The rationale behind this sentiment was that the municipal procurers needed to master a wider portfolio of goods and services (Sporrong et al., 2005). Indén et al. (2014) reinforces this sentiment, and found that there, based on their procurement portfolio, is a difference between governmental administrative authorities (or agencies)[5] and municipalities administrative

[4] It can also be abbreviated into EMAT - Economically Most Advantageous Offer (Bergman & Lundberg, 2013).

[5] Examples of governmental administrative authorities may be FMV or Trafikverket.

authorities[6]. The municipalities have a greater diversification of their portfolio that they need to consider. Having market specific knowledge is resource demanding. The diversification of the municipalities does not allow for that degree of specialization. Indén et al. (2014) made no differentiation between a municipal administrative authority and a municipal (publicly) owned and operated company[7].

This concludes the general aspects of PP that are needed for this study. The coming section will describe the theoretic foundation of passive waste, and challenges that surround this concept.

2.2 Waste in public procurement

Public procurement has a strong impact on the national economy and in Sweden it accounts for one sixth of the Gross National Product (GDP) (Töyrä et al., 2019). It is thus prudent that a PP is conducted in an efficient manner and reduces waste.

The European Union (EU) directives that the Swedish laws are built upon are mainly focused on mitigating discrimination or favoritism linked to either corruption or an effort to exclude foreign actors (Spagnolo, 2009). This is what Bandiera et al. (2009) defines as *active waste*.

The other form of waste, called *passive waste*, can arise from lack of skill from the procurement officer, regulatory burden, or lack of incentive to actually reduce the waste (Bandiera et al., 2009). According to Spagnolo (2009), the EU directives are not intended to provide:

> "good value for taxpayer money. The EU Legislation has been written by bureaucrats and legal experts, with an evident lack of knowledge on the economic forces and competitive dynamics crucial to efficient procurement" (page 8).

Bandiera et al. (2009) estimates that 83 % of all waste could be derived from passive waste.

There have been several revisions made to the EU directive over the years. The directive from 2014[8] aimed at providing simplification and flexibility for the regime (EC, 2011). This was an attempt to increase the efficiency of public spending and value of money (EC, 2011). The effect has instead been a further increase of complexity and volume of regulations (Treumer & Comba, 2018). This creates a risk for the appearance of the aforementioned passive waste.

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[6] Municipal administrative authorities may be for instance the Real estate committee of the municipality of Gothenburg.

[7] A publicly owned and operated company could be Göteborg Spårvägar AB or Stockholm Energi AB.

[8] DIRECTIVE 2014/24/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on public procurement and repealing Directive 2004/18/EC

Finding ways to reduce the passive waste in public procurements becomes an important aspect in enhancing the process. There are many different aspects of a project that lead to the occurrence of passive waste but based on previous research and literature there seemed to be three forces that affect the occurrence of passive waste in public procurement. These could be grouped into market related issues, strategies employed by suppliers and the choice of price indices. Figure 2.1 illustrates this.

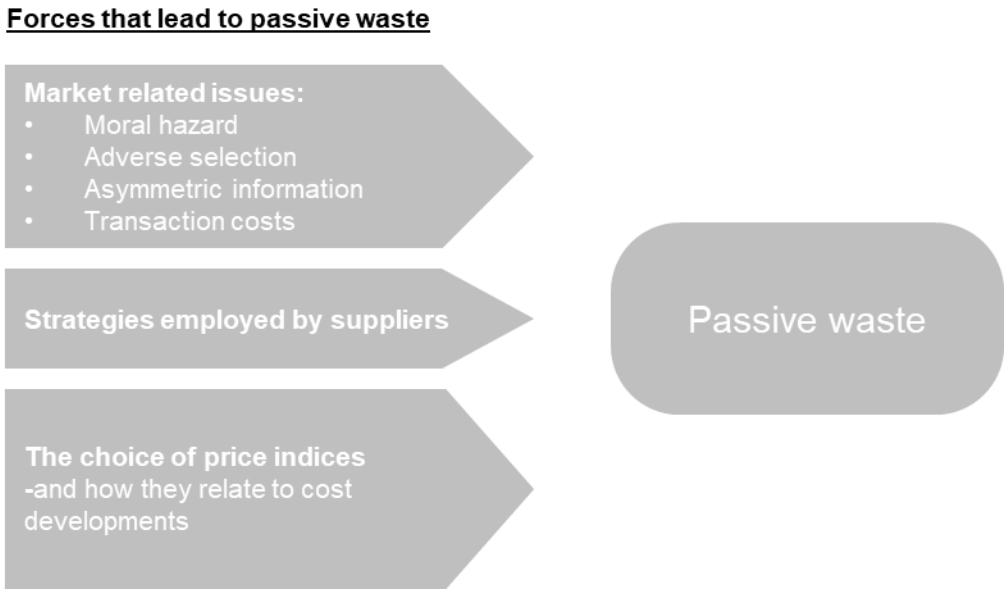

Figure 2.1: The three forces that were deemed to interact with passive waste in public procurement. Authors own copyright.

In the coming section the market related issues of 1) moral hazard; 2) information asymmetries; 3) adverse selection and 4) transaction costs will be described in short.

2.2.1 Market related issues to passive waste

2.2.1.1 Moral hazard

Moral hazard is something that can arise due to what is called the principal-agent problem (Grossman and Hart, 1992). In essence the principal has a stake in something undertaken by the agent but has no surefire way to observe or monitor the agent. This can lead to instances when the agent acts in a way that is not beneficial to the principal. Knutsen-Öy (2015) describes that PAs have a hard time to monitor a contracted supplier and whether they meet the prerequisites in a contract. Eger and Guo (2008) argue that moral hazard may occur when the bidder has information regarding the cost of a project that the PA is unable to acquire.

2.2.1.2 Adverse selection

Eger and Gou (2008) describe adverse selection when a PA has trouble measuring the expected outcome and/or production level of a contractor. This leads the PA to difficulties in separating an efficient contractor from an inefficient one. Bergman and Lundberg (2013) postulates that an adverse selection is more likely to occur when quality is defined ex-ante. This may inadvertently favor low-quality suppliers. The risk for the PAs thus also increases when procuring goods and services where it is difficult to measure and evaluate aspects such as quality (Sporrong et al., 2005). According to Knutsen-Öy (2015) situations with adverse selection may have far-reaching consequences and may even lead to market failures.

2.2.1.3 Asymmetric information

Asymmetric information in short means that one party in an interaction has more information than the other (Löfgren, Persson and Weibull, 2002). It is a common feature in a market. Since it contradicts the assumption that both parties have perfect information, much economic theory revolves around how this affects the market interactions. Information asymmetry can lead to strategic opportunities but may also lead to inefficient markets (Knutsen-Öy, 2015). Moral hazard and adverse selection are both a part of an asymmetric information environment (Eger & Guo, 2008).

Information asymmetry in PP can manifest itself in many different stages of the process (Knutsen-Öy, 2015). An easy example to illustrate this could be when a PA writes the requirements and does not know the market for the product or service, they may inadvertently favor a supplier they know. Another case could be regarding pricing. If a PA does not know the cost of something, they must rely on that the ex-ante price from a supplier is the correct one (Eger & Guo, 2008).

The uncertainties regarding cost increases when there is some form of refining or transformation involved in a project (Sporrong et al., 2005). For instance, a commodity can have properties that are apparent or well known for the procurer. A service on the other hand is more intangible. A service of any form may require harder to measure quality metrics than a commodity. This creates asymmetric information between the buyer-supplier relationship (Sporrong et al., 2005) and can affect the trust levels and outcome of a project.

2.2.1.4 Transaction costs

Transaction costs is the notion that not only tangible costs such as those associated with production matters. In other words, reducing transaction costs increases efficiency for both an organization and/or a market (Downey, 2019). In the PP setting intangible costs could arise at different times of the process (Sporrong et al., 2005). For instance, they could be exemplified as follows:

- Before the signing of a contract - e.g. cost associated with finding suppliers, writing of administrative regulations, or negotiating with bidders.

- After a contract is signed - e.g. cost that are associated with monitoring compliance with the provisions of the contract or negotiations with the suppliers.

Intangible costs such as time consumed with finding information can be considered one of those transactional costs. Therefore, asymmetric information should also be associated with transactional cost (Sporrong et al., 2005).

The next section will cover some of the strategies employed by the suppliers to create a strategic advantage for themselves.

2.2.2 Strategies employed by bidders to exploit passive waste

Suppliers may intentionally try to exploit passive waste and participate in behaviors called "gaming" or "strategic behavior" (Iossa, Spagnolo & Vellez, 2007). These behaviors entail that a firm deliberately misreports costs or otherwise manipulates information so that they obtain benefits in negotiations or price adjustments. The gaming actions a supplier engages in could also be somewhat nefarious, for instance "creative accounting". Other examples of gaming are for instance when a PA uses benchmarking when trying to reduce information asymmetries. In a highly concentrated market, the information used for benchmarking can be reliant on a single firm that distorts or misrepresents information to their advantage (Iossa et al., 2007).

Other strategies entail that an incumbent creates barriers of entry for newcomers (Grant, 2016). Two of practices to scare away competitors, and new market entrants, are to either partake in i) *limited pricing* or ii) *predatory pricing*. Both strategies are a form of aggressive price-cutting. The aforementioned, i) limited pricing, means that a strong actor can set prices at a level that is discouraging to newcomers (Grant, 2016). The second, ii) predatory pricing, is when an incumbent cuts prices to a level where smaller competitors are not able to compete. In essence subsidizing their increased market shares from other parts of the company (Grant, 2016). This also sends a somewhat threatening message to potential new entrants into the marketplace.

Iossa et al. (2007) also point out that an adverse selection may occur due to the bidding behavior of suppliers. If a supplier expects a contract revision ex-ante of being awarded the project, they may be overly aggressive in their initial bid. The supplier does not consider the initial contract as binding and thus wants to win the procurement at any cost.

The aggressive behavior from larger firms have been shown by previous research (Knutsen-Öy, 2015). Larger firms know that lowering their price will benefit them in the evaluation leading up to signing of a contract. Small- and medium-sized enterprises (SMEs) are aware of this strategy. Hence, they will be reluctant to even consider bidding on a contract (Knutsen-Öy, 2015). This could affect the structure of the market and lead to issues such as adverse selection or increase the risk for moral hazard.

The next section will further elucidate the potential effects of using price indices and price adjustment clauses in the PP process.

2.2.3 What is a price adjustment clause based on price index?

The theoretical foundation of a price adjustment based on price indices is that the value of a currency fluctuates over time, thus future payment should be tied to the future value of the currency (Eger & Guo, 2008). Implementing this may reduce perceived risk for suppliers in longer contracts (Iossa et al., 2007). This risk reduction is likely to lower initial price in bids and reduce risk premiums (Iossa et al., 2007).

A price index-based adjustment in long contracts is in most cases used to achieve a satisfactory relationship between the selling and buying party. A price adjustment clause should provide the supplier with a hedge against unpredictable cost increases outside of their control, but still incentivize the effort for cost-reduction and increasing efficiency (Iossa et al., 2007). The presence of a price adjustment clause reduces the risk a supplier is faced with when bidding for a long contract (Kosmopoulou & Zhou, 2014). It may seem counterintuitive that the buyer is to shoulder more risk - this should increase the direct cost for the PA. This notion may be counteracted by the fact that firms are risk averse, and thus a PA may reduce cost by reducing the uncertainties the supplier faces (Kosmopoulou & Zhou, 2014).

To perform price adjustments or price regulations with indices means that the price should be adjusted in accordance with the percentage change of an index between two time points (SCB, n.d. b). This is calculated from the formula:

Eq. 1 (SCB, n.d. b)

*old price * index at time one / index at time two = new price.*

In some contracts and clauses, the full price is not regulated from an index. It could instead be a percentage of the full price that is regulated, and in this alternative setting the price is calculated in the following way:

Eq. 2 (SCB, n.d. b)

*(Index at time two - index at time 2)/index at time one *constant*old price + old price = new price*

where the constant is the proportion of the price which is regulated (SCB, n.d. b). SCB (n.d. b) also mentions that indexes in the specific case is a model and hence cannot reflect the full price development. Different price indexes are commonly used in public procurement contracts and determined based on what is procured.

2.2.3.1 The match between price indices and real prices

To investigate the real price development of services and goods and compare it with a price index can be difficult. It all comes down to what is included in the basket that constitutes the index. One case of the importance of index matches with the real price are concluded by Nordlund (2018) who investigates FPI, a Defense Price Index used to track the development in costs of military material and salaries. FPI is used to compensate the Swedish armed forces for changes in prices of material and personnel. Changes in the structure of the current FPI in 2012 led to low correlation with the real prices of material and personnel. Further on these changes in the index led to a reduction of 2.5 billion SEK for the year of 2018 compared with what the allocation should have been that year. During the whole period of 2012-2018 the discrepancy became 8.7 billion SEK in lower appropriations (Nordlund, 2018). Some of the factors that have affected the adherence with the real price development was the removal of LCI in the new FPI. The index does also include consumer goods which is broad compared to the defense material, which may dilute the adherence. Due to the reasons mentioned above it is highly important to review the design of the index to enhance the compliance with the real price change (Nordlund, 2018).

A report from Murray et al. (2013) evaluated price indices match with real price development and have noticed differences between possible constructions. Net Price Index (NPI) is used for allocating resources to the authority from the Swedish government for road and railway-projects. The real price development did not match NPI or CPI, instead it is calculated to be 1,7% higher than for CPI. This results in a lower allocation of money to Trafikverket than what was needed. To solve this issue Trafikverket have chosen to use a specialized infrastructure index that reflects the real price development better (Murray et al, 2013).

Both Trafikverket and FMV are the authorities with the largest investments in Sweden and hence liquidity changes have large impacts on these organizations. These organizations also differ from other authorities because there is a difference in what is procured. To summarize, Trafikverket have historically seen a price development higher than the general price development (CPI) of around 1,5-2 %, and FMV have seen a price development 3-4 % higher than CPI. Thus, it is of great importance to use adequate price indices for price calculations and not the general indices (Murray et al, 2013). Using a general index may also distort the incentives for the supplier since the variations of the index does not reflect the costs of the supplier (Iossa et al., 2007). Another side of the issue is that an index that is too industry specific may be manipulated by the suppliers in that market (Iossa et al., 2007).

2.2.3.2 The problem of asymmetric price adjustment

One issue with price adjustment is what is called asymmetric price adjustment. This means that firms tend to raise their prices faster when their costs go up compared to the speed in lowering them when costs go down (Gwin, 2009). Gwin (2009) formulates this as a macroeconomic question: "*Are the prices more sticky (slow to change) downward than upward?*" (page 249). Gwin (2009) also found some evidence of this phenomena in certain industries.

The occurrence of downward stickiness has implications for public procurement. Ball and Mankiw (1994) argues that it is in part due to information asymmetries between the buyer and supplier that these asymmetric price adjustments occur. A bidder for a contract has greater insight into how their response to a market shock will be. Ball and Mankiw (1994) postulates that a firm is more likely to act downward sticky when demand falls compared to when demand rises. Firms therefore employ a pricing scheme with low initial prices. Low initial price raises their output by enough to counteract the effects of their asymmetric ex-post adjustments (Ball & Mankiw, 1994). This is reminiscent of one of the strategies described previously that a bidder may make a low bid in a PP expecting an ex-post negotiation. The prevalence of asymmetric price adjustment becomes something to consider when employing a price adjustment based on price indices.

2.3 Methods a procuring authority can use to mitigate the issues in public procurement

The issues described above are all contributing to passive waste as described by Bandiera et al (2009). Bergman and Lundberg (2013) argue that the goal for a PP is to balance quality and price. To achieve this a PP process needs competition, low transactional costs (both that fall under passive waste) and an absence of active waste. The laws are designed to mitigate active waste; thus, the challenge is how a PA could structurally try to reduce the waste in the PP process.

Creating trust between the buyer and seller seems to have an impact in reducing uncertainties in a procurement process (Sporrong et al., 2005). Different evaluation methods that also consider quality and not just lowest price may help with this (Bergman and Lundberg, 2013; Dotoli, Epicoco and Falgario, 2020). Sporrong et al., (2005) also states that a PA needs to consider structuring agreements that lower both the transactional cost and traditional production related costs. How those agreements relate to passive waste will be the focus for the next section.

2.3.1 Structural methods to counteract passive waste

The section will discuss different contracts and how they could be used in public procuring. This will be followed by an overview of how these contracts may affect passive waste. Lastly this section will focus on the importance that a contract in public procurement is able to adapt to changes that are hard to predict before a contract is signed.

One of the main ways to reduce the above-mentioned challenges is how a PA structures their contracts and compensation schemes. Having a standardized contract will also reduce the transaction costs[9] (Iossa et al., 2007). Additional important aspects are devising a (contractual)

[9] This is provided that both the seller and the buyer agree of the clauses of the contract.

way to divide the risk between the buyer and supplier. This is a way to incentivize more aggressive bidding[10] (Kosmopoulou & Zhou, 2014).

Eger and Guo (2008) argues that a when a PA is designing a compensation scheme exposed to the issues of moral hazard and adverse selection due to an asymmetric information environment there are three basic countermeasures:

- Cost Plus Fixed Fee (CPFF) - a fixed sum and variable fee depending on some condition.
- Fixed Price (FP) contracts - a fixed sum depending on for instance quality standards.
- Cost Plus Incentive Fee (CPIF) contracts - a fixed sum and variable payment to compensate for cost incurred during the project.

The CPFF is deemed to not be appropriate when a project's cost relies to a great part on the supplier (Iossa et al., 2007). There is low incentive for the contractor to enact cost saving efforts for those imply lower profit for the contractor. There are some benefits of a CPFF, mainly that the contract offers a degree of flexibility to compensate for uncertainties ex-post of a project commencement.

A FP works well when the suppliers are larger companies that can bear a larger risk (Iossa, et al., 2007). However, the quality aspects need to be easily monitored if a FP is to reduce moral hazard or adverse selection. This is due to the fact that the contractor tends to have an incentive to lower their project costs, and thus reduce their quality (Iossa et al., 2007). In its purest form a FP does not have any way to adjust prices, which can create issues in longer contracts. A FP does however have the benefit of low transaction costs since there is a low degree of things such as negotiations (Iossa et al., 2007).

CPIF is the middle ground between CPFF and FFP (Iossa et al. 2007). The CPIF has some incentive for the supplier to undertake cost saving actions (Iossa et al., 2007). A CPIF implicitly involves some transaction costs since the work done by the supplier needs to be evaluated and compensated (or reimbursed/deducted compensation). This can sometimes outweigh the benefits and make a PA opt for a FP instead (Iossa et al., 2007). The general trend is however to replace a CPFF with a CPIF contract (Eger & Guo, 2008).

2.3.1.1 Difference effect that contractual methods may have on passive waste

Taking the above contracts into consideration one can see that a FP has a low impact on moral hazard (Eger & Guo, 2008). As mentioned previously the PA has to trust that the ex-ante price of a supplier is in fact the correct one. Bandiera et al. (2009) describe that the risk for passive waste increases with the complexity of a project, and thus other forms of contracts become more effective. Bajari and Tadelis (2001) also argue that a FP may indeed create an incentive to reduce

[10] In this case aggressive bidding is a positive from the vantage point of the PA. It means more fierce competition. This is in contrast to the aggressive price-cutting mentioned as a strategy utilized by bigger firms.

cost, but if the project description is incomplete when the invitation to tender is published the cost for negotiating ex-post is high. A contract that facilitates adaptation with a defined and simple reimbursement processes may instead be advantageous. Therefore, they say that complex projects, with a low completeness of their design, benefits from a contract that facilitates a higher degree of adaptations to changes (Bajari & Tadelis, 2001).

At the onset both The CPIF and CPFF have an increased transactional cost compared to FP (Eger & Guo, 2008). But comparing them the CPIF has greater incentives to be cost effective on the supplier's side (Eger & Guo, 2008). Modifying the CPIF into a price adjustment contract based on price indices may also streamline some of the associated transaction costs (Eger & Guo, 2008) and make it more adaptable to the changes mentioned by Bajari and Tadelis (2001). This is why the price index variant of the CPIF seems to be the most common compensation scheme in for instance infrastructure projects (Eger & Guo, 2008).

2.3.1.2 The importance being able to adapt a project to changes ex-post

One additional aspect to consider is the discovery by Bajari et al. (2006). They found that most of the transactional costs tend to occur ex-post, after the beginning of a project. This is due to what they call adoption cost - all costs that are incurred due to incompleteness of the description of a project ex-ante. Adoption costs include things such as negotiation and increased coordination within the project team. The risk for adaptation cost increases with the complexity of the project (Bajari et al., 2006).

The findings also indicate that changes in an adjustable contract does not affect the contractor's profits (Bajari et al., 2006). Thus, a method to allow for change ex-post is needed in public procurement. Kosmopoulou and Zhou (2014) argue that potential upside of a contract like a price adjustment contract based on price indices has potential beyond direct savings in project cost. Having a defined ruleset in the event of large changes in price will reduce the need for ex-post negotiations. Negotiations after the fact are susceptible for strategic manipulations by the suppliers (Kosmopoulou & Zhou, 2014). Kosmopoulou and Zhou (2014) also argue that indexation of prices will reduce the occurrence of these adjustment costs[11] and thus lead to a greater social welfare.

2.3.2 Price indices effect on bidding behavior of suppliers

To further understand if a price adjustment based on price indices is beneficial for a public procurement process it becomes salient to see if it has any effects on the suppliers. A procuring authority needs to create a market. More suppliers bidding will lead to more aggressive bidding (Bergman and Lundberg, 2013; Bajari & Tadelis, 2001).

[11] Such as claims, disputes and the delays that they cause to the project.

Kosmopoulou and Zhou (2014) found evidence that when uncertainty is reduced in a bidding process for a contract firms indeed bid more aggressively and there is a lower dispersion between the bids. This is indicative that there are more suppliers willing to bid and that the prices may more correctly reflect the actual project cost. As presented previously, having a price adjustment may reduce the perceived risk for suppliers (Iossa et al., 2007; Kosmopoulou & Zhou, 2014). Thus, having a price adjustment based on price index should lower the initial bids, make them reflect the actual cost better and attract more suppliers.

2.4 Concluding remarks on the theory

The theoretical chapter is concluded by referring to Iossa et al. (2007) who argue that the final decision on whether to implement a price adjustment method should consider the trade-offs between incentives and efficiency described in this chapter. Kosmopoulou and Zhou (2014) argue that their findings speak in favor of this method. The challenges presented above and the approaches to mitigate them is the theoretical foundation in this paper. In the next section we will describe the method used and data collected.

3 METHOD AND DATA

In this chapter the choice of research strategy will be presented together with how the data was gathered and the process of analyzing it. A visualization of the coding will also be available to guide the reader through the coming chapter. Aspects and assessment of the research quality will also be discussed.

3.1 Research strategy

Using the framework presented by Edmondson and McManus (2007) the knowledge regarding how price adjustment clauses and use of price indices affect the financial outcome of a public procurement could be deemed to be nascent. In a new, more nascent field, an explorative, qualitative approach is suitable. Taking this into account, this report will be an explorative study that utilizes empirical findings by conducting interviews and complementing this with the available literature.

Due to the exploratory nature of this study the aim is not to test a hypothesis but rather to understand the complex nature of public procurement and develop general hypotheses around the use of price indices. Thus, an inductive approach would be a good fit, and to enhance the qualitative rigorousness the approach formulated by Gioia, Corley and Hamilton (2012) is used. The approach is founded in developing and discovering new concepts, which is suitable in a nascent field that does not have adequate referent in existing theory (Gioia et al., 2012). To explore the subject and depict a clear picture of the issue, the target interviewees will be individuals who work in public procurement within different public authorities.

An assumption for this research strategy is that the interviewees are knowledgeable agents that possess unique experience, thoughts and understanding. To give an accurate representation of the informants' message, the researchers should not impose prior constructs or theories. Drawing on the language of the informants will foster the inductive process and the development of new concepts, instead of confirmation of established concepts (Gioia et al., 2012). Additionally, moving back and forth between theory and empirical findings enhanced the understanding of the discovered phenomena (Edmondson & McManus, 2007). The literature in turn was intended to lay a foundation for the investigation, but also support the construction and interpretation of the interviews.

Further, using the framework for qualitative studies developed by Maxwell (2012) the RQ will be iterated over time. Maxwell argues that a study should not have a linear approach, but rather reflect how actual workflow. One could need to go back, evaluate, and adapt to changes in the environment. The major phases of the project will reflect Edmondson and McManus (2007). The project had an initiation stage, followed by a planning stage that was terminated in a time plan. Thirdly, data gathering with literature review and finally an analysis of the data.

To conclude, this approach has been chosen mainly because of the report's explorative nature, hence the emphasis on conducting and processing the interviews. The choice was also influenced by Ericsson et al. (2017) which combined literature and interviews with industry experts in corporate finance to explore and analyze the effects of the negative repo rate on financing decisions.

3.2 Empirics and primary data gathering

The study is based on interviews. This is a cost-effective way to learn more about a subject and formulate hypotheses. Performing an interview study is suitable when the aim is to reach a deeper understanding of an issue (Blomkvist & Hallin, 2015). Interviews also make a good breeding ground for discovering new research ideas and allow serendipitous findings.

The format of the interviews has been semi-structured. This synergizes well with the inductive approach of the study, for it provides the benefits of reusability of questions and guidance, but still allows a degree of flexibility (Easterby-Smith, Thorpe and Jackson, 2015). Also, since it is a nascent, relatively unexplored field the semi-structured form has allowed off-script to follow up questions. The method is deemed favorable when the aim is an in-depth understanding of a subject (Blomkvist & Hallin, 2015). A semi-structured interview does not steer the interviewees but let their expertise emerge.

The interviews were recorded, and the most vital parts were transcribed. Interviews were conducted in pairs, with one person guiding the interviews and the other taking notes. The interview process was divided into three stages: 1) first covering an overview of procurement in general; 2) investigating if price indexes are used in regards to price adjustment clauses, and 3) if a specialized index is used and if that could enable cost control. Regarding the interview questionnaire, Alvesson (2003) argues that using a reflexive framework and making the interviewees describe their concepts with different words could further the understanding. The interview questionnaire is found in appendix 1. Appendix 2 gives a summary of each interview.

To answer the research question addressing different scenarios and relationships in public procurement is needed. Thus, by an iterative approach the research question was divided into five guiding sub-questions that lead the process towards the overall objective of answering the research question. We used the guidance of previous research as an inspiration for the sub-questions. The sub-questions are:

I. Are PIs used by public authorities in public procurement and if so, in what way is it used and how are they managed?
II. Are there internal consequences of using price adjustments based on price indices?
III. Do price adjustments based on price indices affect the relationship between the buyer-seller?
IV. In what way does price indices fulfill the purpose of representing the market developments?

V. Does using price adjustments based on price indices influence bidding behavior of contractors?

We answered these questions by the interviews. Later in the *Discussion* chapter we compare the data and available literature to further help the study in understanding the main research question.

3.2.1 Sampling strategy and participants

The sampling strategy of this study is based on purposive sampling (Easterby-Smith et al., 2015). Purposive sampling is deemed efficient when there is a clear idea for which part of a population is needed to answer the RQ (Easterby-Smith et al., 2015). Starting our sampling principles on theoretical sampling we could evaluate if potential sample members were suitable or not (Easterby-Smith et al., 2015). The basis of the sampling principle was that in order to answer the RQ the study needed to explore the perspective of the "buyer side", meaning public procurement officials in for instance government agencies.

Based on the assumption that there is a difference between the procuring agencies in Sweden a sample frame was devised and the grouping of desired interviewees became 1) Swedish municipalities and their companies, 2) landsting (regions) and 3) Swedish governmental agencies or companies. The most differentiating perspectives were deemed to be found in mainly 1) and 3). Thus, 2) Landsting (Regions) were excluded from the sample frame. [12]

The population that falls under the public procurement acts are limited to roughly 4100 organizations (Töyrä et al., 2019). The sample principles were also based on the amount of procurements undertaken each year and the volume (Töyrä et al., 2019). The evaluation criteria for the sample therefore was:

1. procurer, purchasing manager or project leader.
2. or individuals that work with supporting roles regarding price indices.
3. that works either in
    a. a Swedish governmental administrative authority,
    b. a Swedish municipal administrative authority or
    c. a Swedish public owned and operated company.
    d. a private company that works with PP.

The aim was to find three to five organizations each section. However, the COVID-19-pandemic led to that some of the subjects did not respond or withdrew their participation in the study.

[12] See the section "Challenges within public procurement" in the *Theory* chapter for further elucidation on the assumptions leading to the sample frame.

3.2.1.1 Organizational identification and overview of the interviewees

The organizations and interviewees will be anonymized as to avoid any repercussions stemming from answers given. To be able to identify them each organization will have an identification consisting of “organization” followed by a capitalized letter, such as for instance “organization C”. The interviewees will instead be identified by the NATO phonetic alphabet, such as for instance “Alfa” or “Foxtrot”.

Worth noting is that interviewees India and Juliette both comes from organization I. Therefore, the corresponding letter between interviewee identification and organization may differ. Table 3.1 gives an overview of the twelve informants and their organization that participated in the study.

Table 3.1: Organizational and individual identification matrix

Organization index	Owner/type	Market	Position	Index interviewee
A	Publicly owned company (half government, half municipal)	Energy	Purchasing manager	Alfa
B	Private company	Healthcare	Project manager	Bravo
C	Governmental	Infrastructure	Project manager, index and procurement	Charlie
D	Governmental	Defense	Procurement and strategy	Delta
E	Governmental	Service agency/ expert	Manager business unit	Echo
F	Governmental	Real estate	Procurer	Foxtrot
G	Governmental	Infrastructure	Index	Golf
H	Governmental	Infrastructure	Procurement department manager	Hotel
I	Municipal administrative authority	General	Procurer	India
I	Municipal administrative authority	General	Procurer	Juliette
J	Publicly owned company (municipal)	Energy	Purchasing manager	Kilo
K	Governmental	Service agency/expert	Manager	Lima

3.2.2 Method for coding and analysis of the data

A systematic approach of the presentation has been implemented in the *Findings* chapter. The collected data from the interviews was coded into 1st and 2nd order categories based on the Grounded theory (Gioia et al., 2012). 1st order categories are the first step in distinguishing patterns and is based on informant-centric terms and codes. The 2nd order categories are on the other hand based on researcher-centric terms, concepts, and themes (Gioia et al., 2012). The research question has set the terms for the 2nd order categories, which will be displayed further

on. Building the findings on this type of tandem reporting of both voices, interviewees, and researchers, promotes the systematic structure for a rigorous qualitative demonstration of links between the two types of viewpoints. Consequently, it will also lead to generation of concepts and theories without imposing prior concepts on informants (Gioia et al., 2012).

The practical course of actions started with transcribing the vital parts of the interviews. Subsequently the data was aggregated in spreadsheets to be able to create an overview. Information consisted of which interviewee, question, and answer. The data was then sorted into three main categories in relation to the grouping of interview questions. See Appendix 1for the interview questionnaire.

After the data was made transparent, the first attempt to distill codes and categories was initiated by only analyzing the answers given by the interviewees. The result ended in 317 1st order categories. The issue of many 1st order categories is common and getting lost is part of the process, "*You got to get lost before you get found*" (Gioia et al., 2012, page 20).

The next step was to start deducing 2nd order categories. This was performed by grouping the 1st orders patterns into higher levels of abstraction, while simultaneously anchoring with existing research for explanations of the observed patterns. The locus of this stage was to find similarities and differences between groups of answers and to identify their relevance to the subject. The emergent themes on this level are then aggregated under each sub-question. In the end 14 dimensions have been outlined, which will be presented in the findings chapter.

As a guide in the findings the five sub-questions were used as a basis for the concepts. The disposition of the data is visualized in table 3.2.

Table 3.2: Disposition of concepts based on the data and how they relate to sub-questions.

Question	Concepts based on the empirical data
Are PIs used by public authorities in public procurement and if so, in what way is it used and how are they managed?	● Management through explicit or tacit knowledge ● Organizational approaches how to manage price adjustment ● Different approaches of handling price indices ● The (organizational) knowledge about price adjustments and price indices
Are there internal consequences of using price adjustments based on price indices?	● The consequences of organizational limitations ● The impact of using price index model on the organization
Do price adjustments based on price indices affect the relationship between the buyer-seller?	● The perception of regulatory hindrance ● Challenges arising with non-harmonized quality definitions ● How price adjustment affects the buyer-supplier relationship ● Responsibility over price adjustment in ongoing projects
In what way does price indices fulfill the purpose of representing the market developments?	● Practitioners perceived trust in price indices ● The divergent opinions on whether price index represent the market
Does using price adjustments based on price indices influence bidding behavior of contractors?	● The pool of supplier's effect on bidding behavior and project outcome ● Unrealistic prices in bidding for a contract

3.3 Research quality assessment

To ensure that the study has validity, reliability, and generalizability (Easterby-Smith et al., 2015) an adherence to the method proposed is essential. Also, as Gibbert, Ruigrok and Wicki (2008) argues that in order to increase construct validity a (qualitative) study needs to investigate what it in fact states it is about to investigate. To ensure this, a dialogue with external parties (academic supervisor etcetera) was sought throughout the study.

It is vital to emphasize that the sample of informants may not be to the representative for all public procurement organizations in Sweden. The knowledge between informants within organizations may also differ. This may lead to the generalization and replicability of the study can be limited. We suggest that the study should be viewed as a springboard for further research and touch points of the subject.

This study is based on semi-structured interviews, which have met criticism throughout the years. For example, Diefenbach (2009) writes that this qualitative approach may end up in inflicting the researchers own bias on the result. To enhance qualitative rigor in the study it was chosen to adopt the model of Gioia et al. (2012). The coding approach chosen is used to increase the systematic approach of the qualitative structure and to help deduce the analysis of answers. Furthermore, the

semi-structured interviews can be seen as vital in this explorative area as it enables follow-up questions to point out the topics of greater interest. The view on public procurement also changes over time and is dependent on the actors in it, hence the answers can be seen as a representation of the current situation by the informants.

4 FINDINGS

*The thesis' intention is to explore how "*price adjustments based on price indices" usage in public procurement processes relates to passive waste. *With this intention the following chapter will present the findings stemming from the coding procedure previously described.*

As described in the *Method* chapter, the findings are based on the information gathered through interviews. The *Findings* chapter is presented by breaking down the data into five major parts based on the sub-questions that make up the RQ – how "price adjustments based on price indices" usage in public procurement processes relates to passive waste.

Table 3.2 illustrates the disposition of this chapter.

4.1 Are PIs used by public authorities in public procurement and if so, in what way is it used and how are they managed?

The findings found some difference in how the organizations approach the use of price indices. The main difference was if they had formalized their knowledge or not. This translated further into organizational approaches on how the interviewed organizations handle for instance price adjustments. The grouping is shown in figure 4.1.

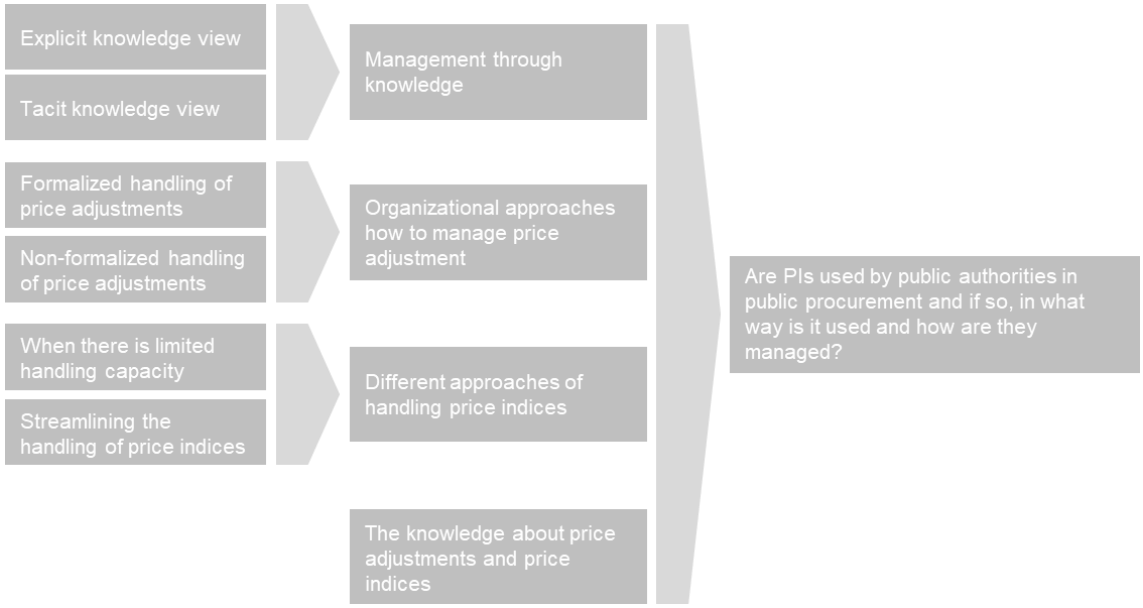

Figure 4.1: The findings that lead to answering the question "are PIs used by public authorities in public procurement and if so, in what way is it used and how are they managed?". Authors own copyright.

4.1.1 Management through explicit or tacit knowledge

All of the interviewees state that they did have a process for how they are supposed to perform a procurement. However, there seemed to exist a divide in how they approached knowledge retention. Using the definitions by Nonaka (1994) they could be divided into *tacit* and *explicit* knowledge. An explicit form of knowledge is when an organization has a formalized transference of their knowledge (Nonaka, 1994). This could be by written guidelines or templates. The tacit form of knowledge is when the information is more implicit and in essence person dependent. These organizations rely more on informal transference such as interfacing with coworkers.

Worth noting regarding knowledge accumulation during a public procurement (PP) process is that the biggest divide was found between procurement that falls under the auspices of public procurement laws and private companies. Alfa for instance says that in a "private procurement you can change the prerequisites after talking with suppliers". Bravo, who represents a private company, also mentions the same thing. When procuring for a private client (or themselves) Bravo says that "you can change your opinion on a meeting based on gut feeling. This is not possible during a public procurement". The data suggest that public organizations instead often work in cooperation with suppliers when they are not in a procurement process to try to find suitable ways to enhance their processes. Echo reinforces the point that a procurer needs to understand their suppliers and what affects the market.

4.1.1.1 Organizations that have an explicit knowledge view

Three different approaches to PP was identified that led up to the explicit knowledge view. The first one is that the organizations have an established function for strategic handling of procurement. The second approach was regarding how defined and structured the organization was in using formal templates, databases, and guidelines during the procurement process. The last approach works in conjunction with the use of guidelines. A stronger emphasis in using guidelines was correlated to having a more complex process for changing the internal practices.

Based on the interviews the distinction of strategic handling of procurement was a reflection of factors such as: i) size and competencies of the team; ii) if they utilize data and statistics when evaluating their performance; iii) when in the process of a PP the procurers enter and their responsibilities after a contract is signed. The approaches for procurement for the organizations in the study were similar but had nuanced differences.

Almost all organizations had different level boards that needed to sign off on a project/procurement depending on the volume of the proposed investment. However, there was a pattern that the procuring authorities (PAs) that had higher volumes of procurements, more defined tools and templates and a narrower market portfolio also had more gates to pass through. For instance, organization D can have multi-decade long projects that in essence needs to be signed off by the government.

There is also a difference in how the teams were constructed. The municipality had fewer people working with procurement and a broader portfolio. Organization A on the other hand laid out an organization with different specialties ranging from operational, to tacticians and strategic members. Bravo also said that there probably exists a difference between public authorities and private companies in the sense that public organizations have more diverse skill sets in their teams due to them being afraid of wrongdoings during a procurement process.

The main difference seemed to be how rigorous the organization has constructed their templates for producing items such as an invitation to tender. For instance, organizations C, F and H seemed to have a streamlined approach how to evaluate the different aspects of a PP and how to translate that into clauses and paragraphs in the invitation to tender, and later the contract.

4.1.1.2 Organizations that have a tacit knowledge view

The tacit knowledge view was based on two distinct behaviors. Firstly, the organizations were ad hoc and experienced based in their approach to procurement. Secondly, they had what could be called a contextual handling of procurement.

Ad hoc and experience based is somewhat a counterpoint to the use of guidelines in the explicit based knowledge view. These organizations seemed to handle the knowledge more as something implicit. India for instance says that organization I often looked at previous procurements and contracts and used those as benchmarks. Further, India also stated that their work with improvements were based on experience and good practices were incorporated into the knowledge base. Alfa also said that there were no defined rules for choosing things like price indices for their price adjustment clauses. Organization A instead based their decisions on a sort of best practice and benchmarking with other procurers.

The contextual handling of procurements was also present in all organizations. There were varying degrees of how much leeway the operations and procurement office have. According to the interviews the private organizations had the highest degree of freedom. But Alfa, which is a part of a publicly owned organization, said that the process was defined as “to where and when”. Notably organization A did however have a plethora of different boards that a project needs to pass through. India also explained that their process was just recently defined. Golf said that their decision system was based on cost volumes. Alfa mentioned something similar and stated that with lower cost volumes the PP does not need to be signed off in their investment boards.

4.1.2 Organizational approaches how to manage price adjustment

Almost all of the interviews explained that the main principle for price adjustment in contracts was using price indexing. For most organizations it was only the longer contracts that were regulated by price adjustment clauses.

There were differences regarding how the indexes were structured and how much time was spent on structuring them. A general observation from the interviews was that the overall time spent on preparing and updating price indexing did not seem to occupy a large amount of the total time spent in any type of PP an organization was working on. But the organizations had various approaches when it came to structure the PIs. The two different patterns that emerged was: i) a formalized handling of the price adjustment or 2) a (more) non-formalized handling of the price adjustments.

4.1.2.1 A formalized handling of price adjustments

Formalized price adjustment handling meant that the organization had decided on some sets of rules or guidelines for how they were supposed to use price adjustments and price indices (PI). They either used general PIs, utilized specialized PIs and/or constructs of PIs into "buckets". On the organizational side they seemed to have a centralized approach to decisions regarding structure of price adjustment clauses.

The pattern of using general PIs as a method for price adjustment meant that the organization mainly relied on indices such as CPI or LCI. Seven of the interviewed organizations said that they used PIs as their prime method for price adjustments in longer contracts. Delta said that the most common PI for organization D was LCI. In organization C, CPI seemed to be most common. Kilo also said that the most commonly used were CPI or LCI.

Further, some of the organizations also used more specific, narrow indices when adjusting prices. This also included the construction of "buckets" of indices with parts from for instance CPI and LCI. Alfa mentioned this as a method to avoid "putting all the eggs in the same basket". Charlie, Delta, Golf, Foxtrot were heavily involved in the structuring of PIs in the contracts. Charlie used different rules for what percentage of contracts that should be regulated and had both general and specific regulations. The specific regulations were used when purchasing unique products or materials consisting of at least 5 % of the total project costs, according to Charlie.

Delta outlined a formal process for structuring PIs. Worth noting is that organization D had multiple people working on these PI structures and the analyzing the use of PIs. Organization D had a set of between 80 to 100 different indices that were being used in different contracts. Organization G also worked intensively with indexing and had recently established a new method where buckets of indices were used, new arrangements and more time is spent on PIs. The reported logic behind this was that suppliers had not been satisfied with previous indices. Foxtrot and Hotel had also developed structures, even though the time spent on PIs in general was small in relation to other parts of the procurement. Charlie notes that thanks to a well-defined process the time spent on constructing price adjustment clauses was limited.

A more centralized decision-making process is exemplified by India that noted that it is up to the individual procurer to make a proposal and higher managers confirm the decision. In most cases this seems to not be a problem. Delta explains that they land somewhere in between. Organization

D has clear guidelines. As long as a procurer is within bounds of these guidelines no further approval is needed. Otherwise a department head needed to sign off.

4.1.2.2 A (more) non-formalized handling of price adjustment

A noticeable amount of the interviewees did not have any structured approaches regarding PIs. Alfa, Bravo, India and Juliette all used benchmarking when it came to decide what PI that should be used. The interviewees explained that their organizations had not established any guidelines for the structuring. Instead it was common to look at previous structures when deciding what index to use. Organization E, which supports PAs, did not have any recommendations about indexing and did not offer any advice about it if not queried by a PA. This led Echo to believe the issue is less important than other challenges in PP.

For organizations that had decentralized decision-making processes, the common approach seemed to be that the individual procurer of a PP finds an appropriate PI. This could be done either by benchmarking, experience or discussing within the organization. Foxtrot for instance said that it is up to himself to decide.

4.1.3 Different approaches of handling price indices

From the interviews two different approaches for managing price indices emerged. The first approach was organizations that had a limited handling capacity. The other approach was identified in the organizations that used many different indices. In order to not create administrative cumbrance these organizations needed to streamline their approach to price adjustments and PIs.

Both these aspects regarding the usage of PIs related to the internal capabilities of handling, updating, choosing, and assuring quality over time. According to the interviews the handling of PIs had effects on project economics, the organization and relationships between the buyer and supplier. The notion was that if a large amount of time and resources were consumed then there would be an implicit cost of using PIs. The interviewees said that there also could be direct costs associated with an index. An example could be paying for the subscriptions for narrow indices published by for instance consultants or industry organizations.

4.1.3.1 When there is limited handling capacity

If an organization had a limited handling capacity and still used PIs when adjusting prices, they tended to favor general PIs such as CPI. The smaller organizations, such as municipalities, did not seem to have someone dedicated to the issue of handling price indices. They relied more on historical approaches and what other people had done in previous procurements. For instance, Juliette mentioned that they used benchmarking when trying to find out what PIs were deemed suitable for their projects. Some of the interviewees were responsible for indices within their respective organization and Delta worked in a department focused on using indices for the entire

organization D. They found the process more straightforward. Alfa said that since "it is a complex undertaking to produce PIs. Since we have limited resources and time, we cannot commit much time to constructing buckets of PIs". Organization A thus tended to rely on CPI and LCI. Charlie said that it takes some time to follow up and evaluate PIs, but no more than "half an hour here and there".

The above mentioned is however more in regard to one specific procurement or ongoing projects. Alfa stated that in comparison to the entire process of a PP, the handling PIs was not time consuming. Echo meant that the handling of PIs probably was not a "big issue" since organization E did not receive almost any questions regarding how to handle PIs from PAs. Golf said that it often was no more time consuming than any other clauses in a contract. However, when they used one or more specialized indices it could be a bit more demanding than using a general PI. India meant that there is not a great deal of time invested in handling PIs. The notion that emerged from the interviews was that if an organization had limited handling capacity, but still used general PIs the time consumption compared to the whole PP process was small.

The direct economic consequences when using PIs was deemed as negligible or hard to measure by the interviewees. One direct cost that was mentioned by for instance Charlie was that they pay subscriptions for a series of indices. Charlie perceived the impact of this as low and said, "considering the number of contracts that are being governed by these indices the costs are very low".

4.1.3.2 Streamlining the handling of price indices

Organization D can be used as an example of how to streamline the management of PIs. They had somewhere between 80 to 100 different indices at work. This demanded a regular curating of the database which was time consuming. The database did however seem to create operational efficiency. Delta said that it was a straightforward process to perform a simulation of the costs of a project and obtain a risk assessment. Organization D also performed a review of all projects and indices twice a year. This was a bit more time consuming, but still efficient since all the data was available.

Another example came from Charlie that said that the texts for the administrative regulations were already in their templates. This also included the PIs that could be used by procurers in organization C. Organization C also had advice and tips in their IT-systems on what to consider when writing the procurements.

4.1.4 The (organizational) knowledge about price adjustments and price indices

The majority of the interviewed persons said that there was a general lack of knowledge surrounding price indices. The organizations that were unused to work with indices found it both complex and time consuming. Echo explicitly said that "the notion is that it is difficult to choose the right and adequate index. A lot of understanding is necessary". Equally, Charlie emphasized

this notion and meant that the knowledge regarding PIs amongst project managers, procurers and even suppliers could be improved. Charlie said that “often it is like they do not understand how to use them”.

The answers were somewhat contradictory. Many felt that using PIs in a procurement was rather straightforward, since indices such as CPI were readily available. However, being more proficient and having a strategic approach seemed to be more obtuse. The interviewed people stated that a certain competency was needed for constructing buckets of indices or even finding reliable indices apart from the more general ones, such as CPI. Alfa perceived that it was hard to find information about actual price development on a product/project specific level. Bravo also said this and continued with “if trustworthy information about our market exists it would benefit us”.

The limited knowledge seemed to lie in if the PIs reflected the market and if an organization should have opted for a more specific index instead of a general one. Regarding this perceived necessity for using more narrow indices Foxtrot said “not really. It will take too much time. But it will reflect prices better”. India also expanded on the same point and said “that we do not know if we need to use more specific indices. The ones that we use are deemed enough. If we knew about more precise PIs, we would use them”. Even Delta, whose organization has a large set of indices, said that they had limited knowledge about indices outside the ones that organization D actually used.

To improve the knowledge Golf thought internal education regarding indices was necessary. Golf meant that the future would revolve more around baskets of indices. According to Golf this “will create more work in the beginning of a procurement, but in the long run will create more flow and avoid unnecessary problems”.

Hotel thought than increasing knowledge about PIs would lead to better calculations for prices and requirements for projects ex-ante. It however needed to be operationalized into an explicit form of knowledge, according to Hotel. Hotel meant that there in the future should be different approaches with for instance checklists and templates to make the process easier. Hotel stated that there “needs to be less to read and the information must be more readily available”. Juliette also thought that the tempo needed to increase, and the process shortened. An increased cooperation with other procurers and suppliers could also be beneficial in gapping the knowledge barrier, said Juliett.

4.2 Are there internal consequences of using price adjustments based on price indices?

The findings found that there are some internal consequences of using price indices. There was a divide between the organizations regarding their resources and capabilities. This had an effect on how they approached price indices. Figure 4.2 illustrates the findings further described in this section.

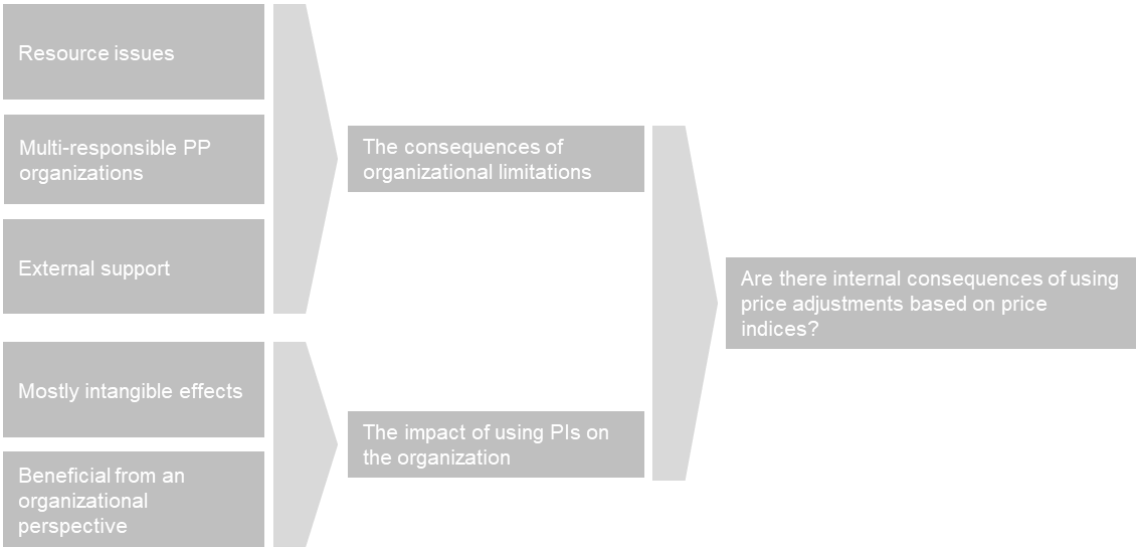

Figure 4.2: The findings that lead to answering the question "are there internal consequences of using price adjustments based on price indices?". Authors own copyright.

4.2.1 The consequences of organizational limitations

Organizational limitations were derived from three patterns that consisted of: 1) resource issues; 2) external support; 3) multi-responsible procurement organizations.

Interviewees Alfa, Echo and Beta commented that insufficient resources were a recurrent issue for procurers of smaller organizations with widespread procurement portfolios. Echo explained that municipalities often had limited time and resources allocated for procurements. Oftentimes there was just one person procuring, which when combined led to an exposed and stressful situation. This limited the time spent in preparing and following up on procurements, and instead the procurer needed to focus on the current situation.

Regarding external support interviewee Charlie explained that for some procurements, consultants were hired. The consultants were brought in to assist with for example evaluation in different procurement phases. This was also explained by Bravo, whose business idea was to provide external strategic support to public healthcare during procurements.

Lastly, multi-responsible procurement organizations were also described as a limitation. It made it difficult for the procurers in an organization to focus. There were multiple examples of procurers that had split responsibilities according to both Echo and Bravo.

4.2.2 The impact of using price index model on the organization

The organizational benefits of using price adjustment clauses and price indices were perceived to be more intangible than metrics such as economic efficiency. There was a general notion amongst the interviewees that using price indices could be beneficial from an organizational perspective.

Factors such as time constraints, a lack of staff and specialized knowledge were mentioned by the interviewees in favor for using price indices as a way to unburden the organizations. Using indices in price adjustment clauses was also deemed as resilient and durable for when the work is done it is replicable in future procurements.

Regarding the benefits for the internal organization Charlie said that having PIs "is something to lean upon both internally within the organization and externally when interfacing with the suppliers". Delta, who worked with prognosticating the project costs for organization D also illustrated the internal benefits with using PIs - it was an integral part of the budgeting process. Both Golf and Hotel talked about how they perceive that PIs unburden the organizations and help to reduce stress. Golf also stated that when using a PI more precise requisite for a project can be drafted.

A possible more problematic effect of using PIs was described by Delta. Delta said that an inconsistent use of PIs can lead to problems within an organization. To exemplify, Delta said that if an organization calculated project costs with a narrow index, but on the corporate level when estimating a budget instead used some form of general PI this could lead to a form of *squeezing effect*. Delta said that if the rate of change for the narrow PI increased faster[13] than the general PI the cost for the projects will overtake the budget. Delta continued with that since project costs are the actual costs, and in this scenario apparent for an organization first when the bill arrives, this can have negative consequences for an organization. Delta expressed a great deal of concern regarding this. Deltas department calculated the future cost for organization D based on the indices used in the actual contracts. Organizations D's appropriations was in turn calculated on a general index that had a lower, or even negative, changes. Thus, Delta felt that they were subject to the squeezing effect.

4.3 Do price adjustments based on price indices affect the relationship between the buyer-seller?

The findings found that using price indices in a contract may affect the relationship between buyers and sellers. The interviewees also explained how LOU and similar laws affect the relationship on the basis of things such as administrative burden and cost versus quality in a project. Figure 4.3 illustrates the coming section and the findings.

[13] Delta said that this could for example be because of international market effects on a specific item and/or project.

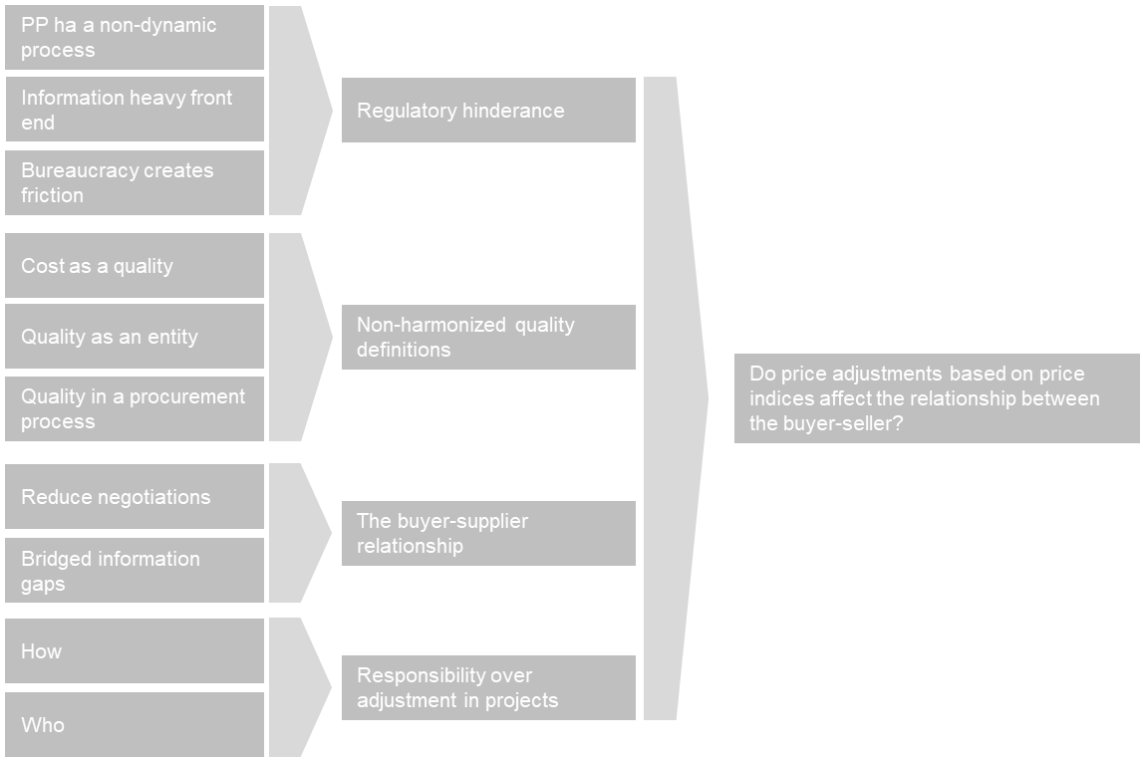

Figure 4.3: The findings that lead to answering the question "do price adjustments based on price indices affect the relationship between the buyer-seller?". Authors own copyright.

4.3.1 The perception of regulatory hindrance

All the interviewees were asked regarding common issues that they encountered during the procurement process. It appeared that the different organizations experienced similar complications. The overall challenges in public procurement tended to be tilted towards the legal framework and the bureaucracy. The answers could be further divided into three different opinions: 1) the bureaucracy created friction; 2) there was an information heavy front end; 3) the PP had a non-dynamic process.

Almost all of the interviewees when asked about the EU directive that regulates the laws surrounding PP said that the intention behind the directive was clear. The rationale behind the directive was interpreted as a means to increase fairness on the market and increase the competition. Not one interviewee mentioned that the directive should facilitate reducing the actual cost associated with a project or make the PAs behave in an efficient manner. According to the interviewees Alfa, Bravo, Charlie and India PP results in lots of administration. For instance, Carlie said that many procurers that work in PP feel stifled by the law LOU. Alfa in turn said that "LOU has a lot of administration associated with it".

The information heavy front end was also deemed to be an issue. For instance, Alfa mentioned that the requirement that the design specifications needed to be written before an invitation to tender is published gave the procurers few degrees of freedom to adapt to developments ex-post.

Both the administrative burden and the information heavy front end contributed to the notion that the PP had a non-dynamic process. According to Charlie there often was a lot of discussion regarding interpretations of a contract or administrative regulations. Bravo compared a PP with procuring for a private client and said "when we are procuring for private clients, we can be more efficient and avoid a lot of bureaucracy. We can reach an agreement faster". Foxtrot also described the process as being non dynamic when asked about issues regarding PP.

4.3.2 Issues arising with non-harmonized quality definitions

According to the interviews the notion of quality in regard to procurement was a contested issue. There were two different opinions that emerged. Either an interviewee considered cost as a metric for quality, or they saw it as a separate entity. There was also the notion that quality also represented a successful procurement.

Almost every interviewed person said that such as the law is written everything needs to be specified when the offer to tender is published. There were few degrees of freedom to change ex-post. In essence, this meant that the desired quality needed to be decided upon at an early stage. Almost all of the interviews also mentioned that quality is an important aspect in the procurement process. Several interviewees thought that there was no clear divide between quality and cost - they were equally important metrics in successful procurements.

However, Alfa from organization A said that it was crucial not to strive for higher quality than was necessary. Alfa meant that the quality needed to be in line with the intended life cycle of the project. If an organization strived for the highest quality in every aspect, they will have overpaid in regard to the de facto needs. Echo, that came from the advisory organization E, did mention the need for a total life cycle analysis before starting a procurement process. One notable thing was that Bravo was the sole interviewee that explicitly talked about cost reduction for their clients as an important aspect of quality. This may however be counteracted in part that Alfa said that "their job is to make sure you get the right costs in terms of providing the right quality". Lastly, Foxtrot said that quality is situational; they had no guidelines for what constitutes quality, and much was based on previous experience.

Quality as a form of successful procurement

There did however seem to exist a difference between how the different organizations perceived a successful procurement. For instance, India postulated that success was when "the most suitable supplier wins and delivers according to the contract". Charlie mentioned something similar and said that success was when "you get a contractor that wants to undertake the work and has estimated in a good way and that they deliver in accordance to the agreement and on time". Charlie said that a successful procurement was based on an understanding of the requirements coming from the operational side of the organization.

Four of the interviewees mentioned quality as an aspect of finding the right supplier. They were worried about the lack of tenders during a PP. Hence, they said that to ensure quality many different offers were needed.

4.3.3 How price adjustment affects the buyer-supplier relationship

Apart from the internal organizational effects stemming from streamlining the day-to-day work, unburdening the operators, and reducing stress, the major effects of using price indices seemed to be in the relationship between the supplier and the procuring authority. The interviews indicated two different perceived effects in the supplier-buyer relationship. The first was that it seemed to be a benefit when interfacing with the suppliers. Using a PIs also helped with bridging information gaps for the PA.

The benefits in the external relationship between the buyer and supplier was mentioned by almost all of the interviewees. Having a price adjustment clause based on a PI could reduce negotiation time and increase the predictability of project costs. According to Alfa it would consume much time to negotiate with every supplier. That was why many organizations employed a time period when a supplier could advertise the need to correct the price for the coming year in a project.

Echo said that having a price adjustment clause based on PIs may reduce "bickering" between supplier and authorities. Echo pondered if it would however be a tangible effect since many of the PP contracts in Sweden are under a year long. Echo did believe that it would however be beneficial in a longer contract.

Many of the interviewees mentioned that they had a close relationship with the suppliers in their market niche. Charlie stated that they perceived their role to be that of a "good procurer and counterpart to their suppliers". Charlie said that they regularly talked with the suppliers both regarding what index to use, updating of prices and other issues regarding public procurement. Golf pointed out that once a price adjustment clause was enacted the parties could focus on other issues in a contract. Juliette reinforced this notion and meant that:

> "using PIs introduces a degree of predictability. They may not have a direct impact reducing the project budget, but it fulfills a relief and risk minimization function. It is possible to focus on other issues and parameters within a contract when price adjustments are based on PIs".

According to the interviewees the other major benefits PIs seemed to have was alleviating information gaps and helping reduce the risk in procurements. Juliette meant that having a PI would reduce the risk for extra costs and makes the supplier more adherent to the deal. Golf said that indices have many different effects; they reduce the risk for unnecessary additional work, which was a strategy used by suppliers to increase their revenues. Delta said that if they did not use a price index then the suppliers would calculate their estimates with a risk premium; the economic effect would then be that there will always be an increase in cost. Worth noting was that organization D also seemed to demand reimbursements from suppliers if an index had a negative development. Charlie pointed out that the explicit purpose of using a PI was to help balance developments in longer contracts. It was according to Charlie, impossible to know what would happen in the future. Lima in turn thought it was hard to estimate the effect that price adjustments based on PIs had on the direct economics of a project, but that it indeed fulfilled a risk minimization function.

Points of contention in the supplier-buyer relationship

There were however according to the interviews some instances where having a PI may increase negotiation and frictions. Some of the organizations have historically had issues with indices that stopped being published or had PIs with some underlying fundamentals shifted. This could become an issue because the laws were strict in that all information needed to be disclosed when a procurement was published. For instance, Charlie said that this had led to negotiations with suppliers. Delta also mentioned that this happened on occasions, "sometimes the index shifts base year or is depublished. Then a renegotiation is in order".

It could also be that a specific index in use was contested. Kilo mentioned that it is not uncommon that suppliers wonder why a PI was being used and may want another in its stead. Juliette mentioned that this was a small issue. Some interviewees also said that there could be instances when if a rather unknown PI were being used it would become a point of contention. This was however not a major issue according to the interviewees.

4.3.4 Responsibility over price adjustment in ongoing projects

One issue that affected the relationship between suppliers and buyers was how the price adjustments actually took place. There seemed to be three approaches in use: 1) supplier-initiated adjustment; 2) buyer-initiated adjustment and 3) a hybrid with a predetermined time period when price adjustment could be called for.

The implication if an organization chooses either a supplier initiated, or a buyer-initiated approach could reflect how the procurer thinks regarding both price adjustments and the relationship to their

suppliers. It was not a clear divide, however. For instance, Charlie said that it was their role to be "good procurers" and that they therefore oftentimes reminded their suppliers that an adjustment was to take place. Alfa said regarding this that if a supplier missed their window for price adjustment, then no correction would take place for that year. Bravo stated that they perceived it as their responsibility to try to initiate the negotiation even if it formally laid on the supplier.

Using the method of a predetermined time period was prevalent for both the supplier initiated and the buyer-initiated approach. That is why it was a form of hybrid approach. The most commonly used method was that the suppliers would have a couple of months in the beginning of each year to advertise if there was a need to revise their price. An example could be Juliette that explained their approach for how they adjust prices in ongoing projects as "once every year, when the supplier calls for it".

Most interviewees said that for the majority of their contracts they did not need to adjust the price due to the length of the project. But regarding how the actual price adjustment took place there were two different ways that the organizations seemed to use. Either a price index-based adjustment or negotiations. The sentiment was that negotiations consumed much time. As Alfa stated, "there never is enough time to negotiate with every single contractor: Therefore, a price index is more efficient". Bravo in turn, was the one most strongly in favor of negotiation. Bravo stated that since they saw quality as an effect of lowering cost for their clients, they preferred to negotiate a new price in lieu of using an index. This notion is echoed by Alfa who stated that when they negotiate the price will generally be lower than an index.

4.4 In what way does price indices fulfill the purpose of representing the market developments?

The findings regarding on how a price index represents the actual market developments and which price indices an organization should choose was divided in large part due to how proficient a PA seemed to be in using PIs. Figure 4.4 illustrates the coming section.

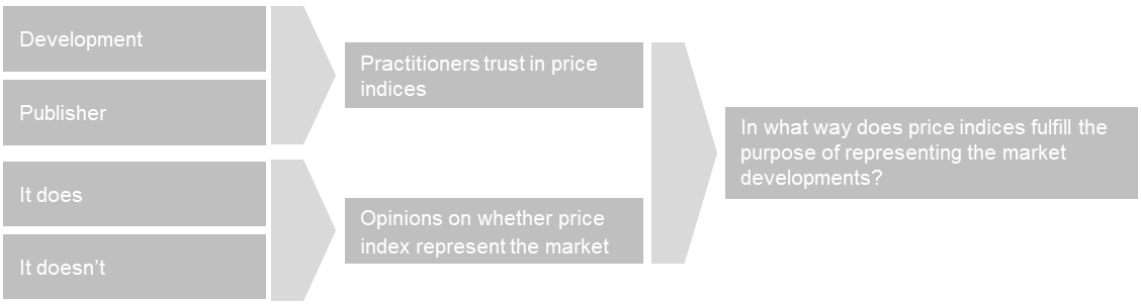

Figure 4.4: The findings that lead to answering the question "in what way does price indices fulfill the purpose of representing the market developments?". Authors own copyright.

4.4.1 Practitioners perceived trust in price indices

Two issues stated by the interviewees regarding the trust of PIs seemed to be how they are developed and published. Some interviewees tended to be skeptical towards indices stemming from for instance industry organizations, or other actors. There was a notion that these indices had a faster positive change rate than other indices. There was also a suspicion that indices published by industry organizations not only have a higher derivative but also had a higher base value than for instance CPI. Bravo perceived it as:

> "the existing price indices are there for the suppliers to raise their price over time. Our mission is to give the suppliers as little contractual room as possible to do that".

The possibility that the price developments were more inclined towards raising the price in favor of lowering them made many interviewees hesitant towards the reliability and acceptance of price indices. The common sentiment was that a price index needed to be independent in some way. The ability to review a PI was important for establishing trust in their construction. Charlie said that:

> "the indices need to be available for the ones bidding on a contract. Widely available so that you can see the history and estimate the bid. Will the PI help me in covering my costs?"

Charlie was hesitant to some industry organizations price indices because they may contain wages. Charlie thought that wages were more easily manipulated than goods and commodities; if the wages increased then the index that they aggregated into would also increase. Bravo also expressed some hesitancy towards PIs stemming from industry organizations. India worried that a PI could be too one sided if it did not come from a reliable publisher.

Another issue that was raised regarding the availability was that more specific indices could require some form of payment. This would make it harder for a supplier to review the indices before submitting a bid according to several of the interviewees. It can even be an issue for the authorities. Delta commented that they are reluctant to use indices that are behind a paywall, since it was not readily available and made it hard for organization D to review it a priori any procurement. Juliette also said that they wanted to be able to evaluate the PIs based on performance.

Many of the organizations considered having multiple companies bid for their projects as a form of quality. Thus, they said that price adjustment also needed to be coherent with the notion of dividing risk between the procuring authority and the bidding companies. In line with this some organizations let the suppliers suggest what index, or index construct, that could be appropriate. Charlie specifically mentioned this and that the suppliers wanted organization C to shift from using general indices such as CPI and instead indices published by industry organizations. Therefore, one issue with trust regarding PIs in price adjustments was whether to base the choice on what the market thinks is appropriate or not. This seemed to be a point of contention in the relationships between suppliers and procuring authorities. Juliette mentioned that they as an example used

benchmarking when deciding and were reluctant to go outside what is commonly used. Delta stated that the common practice for organization D is to ask the suppliers what index reflected their market the best. Echo meant that using a PI helped the procuring authority in understanding their suppliers and what drove their costs. This in turn would lead to better prerequisites and facilitating a better relationship between the two parties. To exemplify Echo paraphrased a supplier's sentiment “if you had procured in this manner then I could have done it with less cost”. Alfa said that they decided in cooperation with suppliers.

To conclude, almost every organization said that a narrower price index could be useful for them. As long as the above-mentioned factors were considered it would be possible to use specialized indices.

4.4.2 The divergent opinions on whether price index represent the market

Continuing on the issues of the trustworthiness of PIs two major positions was identified. Either an organization found that PIs was a good proxy for the market or the inverse - it was not a good proxy for the market.

4.4.2.1 Price index is a good proxy for the market

The notion that PIs were a good reflection of the market could be exemplified by Alfa that said “I have not heard from within the organization that we need to change to more specific indices. Based on the ones we use today we can sufficiently govern our cost”. Alfa mostly used constructs of CPI and LCI. Delta expressed something similar and said, “the big upside is that a contract based on a PI follows an actual price development”.

Regarding if there was a perception that price indices only accounted for raising prices the divide seemed to lie in whether an organization actually called for reimbursements from a supplier. For instance, Charlie said that “I perceive that an index should not only be regulated upwards” and then mentioned a couple of instances when suppliers had to reimburse organization C. Also, Hotel mentioned a high-profile project when the contractors needed to reimburse organization H after a downward shift of an index.

4.4.2.2 Price index is a poor proxy for the market

Almost half of the interviewees expressed the notion that a general PI such as for instance CPI was a poor reflection of the market. There was some form of discrepancy between a general PI and the actual market development. Delta mentioned that a broad, general PI had items in it that did not reflect what a specific project was procuring. To exemplify, Delta mentioned that price development of consumables such as “mustard and ketchup” was not relevant to what is involved in a high technology project. Delta also said that “a general index would never be accepted by a supplier. They want an index that helps them reach cost neutrality”. Foxtrot said that a general PI does not reflect the price shifts on the market sufficiently. Alfa meant “that is why you need to use

multiple PIs. If we were to use only CPI it would be incorrect". Hotel has had suppliers that complained about the indices in a contract. Hotel said, "it is not realistic to only use general indices". Bravo in turn meant that if you:

> "saw a devaluation in oil on the world market then there in theory should be a reduction in prices for petroleum products and plastics; this was however not the case".

Golf stated:

> "yes, this is very problematic. CPI is not representative of the industry. This will create issues for the supplier who does get paid correctly. This will make them lower competencies in a project by removing personal, use other methods to get paid such as "creative" additional works. It will lead to lots of discussions and stress".

Considerations were expressed that a more narrow, specific PI became a poor proxy for the developments of the markets when an index also had wage cost associated with it. For instance, Alfa said that "indices coming from consultants and industry organizations may have a higher development". Juliette also mentioned that those indices may be too one sided. Bravo thought that wages are easier to manipulate than other components in an index. Charlie said, "we use one without wages, because you can affect the index by raising wages".

Most of the interviewees had experienced that prices were not correcting downwards. Foxtrot said that this is an effect of that the suppliers call for the adjustment; the suppliers would not call for an adjustment if it meant that they had to reimburse payments. Golf meant that "it is problematic when a price index does not raise the price. Then the supplier will find other means to raise their price". Bravo said that reimbursements or lowering prices due to PIs was uncommon. Specifically, Bravo said "they [the prices] do not go down".

4.5 Does using price adjustments based on price indices influence bidding behavior of contractors?

The interviews presented two different patterns on how the procuring authorities perceived that the price indices affected bidding behavior: 1) attracting potential suppliers and 2) unrealistic bids. The section is illustrated in figure 4.5.

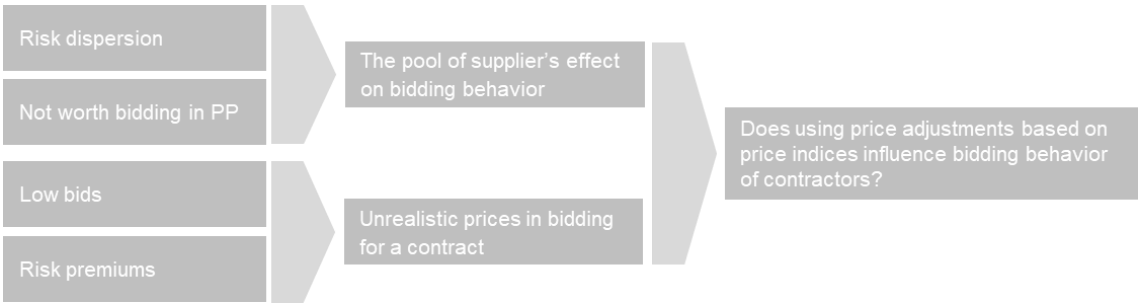

Figure 4.5: The findings that lead to answering the question "Does using price adjustments based on price indices influence bidding behavior of contractors?". Authors own copyright.

4.5.1 The pool of supplier's effect on bidding behavior and project outcome

To exemplify the importance the pool of suppliers has on a PP Foxtrot meant that how many suppliers submitted a bid was a metric for how successful a procurement. Foxtrot explained "the most important is that you get competition, good competition, at least three to five bids". Most of the interviewees also emphasized that it was very important to find a suitable supplier for a project. It is key to find a supplier that delivered according to plan, was told by Charlie and India. Echo said that it was hard to influence the supplier pool; for example, the number of bidders could in some periods be explained by the economic situation as a whole. Echo continued and said this was because in good times public contracts are viewed as less attractive by external suppliers, it was instead more interesting to take on available private contracts. Those contracts are easier to find in economic booms, concluded Echo.

Echo also wanted to reinforce the effect of having unlimited liabilities placed on the suppliers. According to Echo, historically in Sweden there were many times where a procuring authority has had difficulties to attract bidders due to how the liabilities were divided between the parties. For instance, larger, multinational companies tended not to accept having to assume all the risk in a contract. Echo continued with saying that not attracting bidders and having them exposed to competition seemed to be somewhat of the gordian knot in public procurement.

Echo also wanted to associate using PIs with attracting smaller companies to bid. Echo thought that inexperienced bidders were more likely to underestimate the changes in price for a long contract and thus exposed themselves to financial risks and possible bankruptcy. This would have ramifications for a procuring authority since they had a de facto need for something to be done, and this would lead to a restart of the same procurement/project. According to Echo this could be avoided by having a price adjustment clause based on a PI.

4.5.2 Unrealistic prices in bidding for a contract

There seemed to have been many instances when the procuring authorities had received what they perceived to be unrealistic bids. The issue of unrealistic bids was when they were too low

compared to for instance what was expected based on ex-ante estimations or what has been experienced in previous projects, as commented by Echo, Golf, Hotel and India. For example, Golf said that unrealistic bids were a recurrent issue. The main challenge according to Golf was when suppliers were awarded contracts based on unrealistically low prices. This, said Golf, created problems ex-post since the suppliers wanted to reach cost neutrality and they started doing additional work and/or sending unmotivated invoices.

Kilo perceived that it was too difficult to reject bids with too low prices. Kilo considered this a result of the regulations in the PP laws; a rejection had to be detailed, motivated and could easily lead to legal disputes. Kilo mentioned that there were not enough tools in PP to manage this motivation process and that the legal framework has made it too complicated to reject unserious tenders.

Echo in turn meant that attracting bidders and using PIs as price adjustment tools would have an effect on the bidding behavior. Echo thought that using price adjustment and PIs would reduce the probability of an unrealistic bid or suppliers calculating their bid with a risk premium. Kilo also mentioned instances when fixed prices had been used and the suppliers took out a rather severe risk premium.

5 DISCUSSION

The purpose of this study has been to contribute with additional knowledge to the usage of price indices within public procurement. The following chapter will discuss the viewpoints from the findings in conjunction with the available literature.

Our findings indicated that using price indices has some implications regarding passive waste in public procurement. The use of price indices could for instance reduce passive waste if used in an appropriate way. It could however increase things such as transaction cost due to the organizational and individual knowledge needed to utilize price indices.

Differences between the organization's knowledge about the subject and practical handling were observable. This seemed to stem from capabilities and resources within the organizations.

The findings also found that using price indices does have an impact on attracting the suppliers. This by increasing trust levels between suppliers and procuring authority; reducing uncertainties for the supplier and dividing risk between the parties. The influx of suppliers was deemed to increase competition and reduce the risk of instance adverse selection and mitigate some of the strategies observed by suppliers.

By discussing the empirical findings in conjunction with previous research this chapter will try to answer the five sub-questions raised in this study. The outline of the chapter will be based on the findings under each sub-question. In appendix 3 a graphical breakdown of the findings and possible benefit of using PIs in PP can be found. Figure 5.1 is a quick illustration of the aggregate findings and how they relate to passive waste.

Question	Possible impact of using PIs on passive waste
The usage and management of PIs by public authorities in public procurement	
The internal consequences of using price adjustments based on price indices	
Price adjustments based on price indices effect on the relationship between the buyer-seller	
Price indices purpose fulfillment of representing the market developments	
The influence of price adjustments based on price indices on bidding behavior of contractors	

Figure 5.1: A quick breakdown on how the findings related the use of PIs on passive waste. A thumbs up indicate that there is a positive association between a reduction in passive waste and PIs. A sideways thumb mean that the findings are somewhat inconclusive. A thumbs down indicates that the findings show that PIs may be associated with an increase of passive waste.

5.1.1 The usage and management of PIs by public authorities in public procurement

To begin with, two distinct views on the procurement process was identified where. Firstly, in organizations C, D, G, H and K the knowledge and expertise of the organization tended to be more explicit. The interviewees in organizations A, B, I and J instead seemed to handle the knowledge more as something tacit. The rest could be viewed as somewhere in between or not applicable to this categorization.

There seems to be a link between the two views on knowledge (explicit and tacit) in regard to the PP process and the different approaches the organization took to managing price adjustments (formalized or non-formalized). Organizations that had an explicit knowledge view tended to rely more on utilizing guidelines and templates. This is in turn reflected in that the de facto handling of price indices seemed to be based on these formal tools. The converse seemed to be true for tacit knowledge and non-formalized handling of PIs. The literature also provides ways to understand the difference. As mentioned, the laws such as LOU are complex and demand certain levels of competencies and time from the organization procuring (Sporrong et al., 2005). Thus, it is possible to suggest that there is a tradeoff for what should be prioritized. Some organizations need to focus more on the daily operations while others have more time for developing new approaches and strategies. Indén et al. (2014) discussed the same notion but with the distinction between governmental administrative authorities and municipalities administrative authorities, where the municipalities had a more diversified portfolio and the municipalities consequently lacked more specialized knowledge in the procurement process. Interviewee Echo described it not as an effect of procurers per inhabitant, but that it seemed to exist a critical mass of procurers that leads to the more formal handling. There was a divide between the two types of organizations: one side that was limited in their handling capacity while the other side, such as C and D, had a defined streamlined process; due to lots of different indices and structuring it is important for these organizations to have a well-established streamlined process.

As mentioned by Kosmopoulou and Zhou (2010) it has previously been shown that price indexing could involve extra work and may inflict higher costs, in other words transactional costs and adverse choice. It is hence possible to argue that the organizations A, B, I and J did not see the additional value of establishing structures of how price indexing should be used; instead, they went with what was considered standard practice. Moreover, the added value of working more with PIs would not exceed the time and resources that would be necessary to invest for these organizations to move from say a tacit knowledge into an explicit. Differently, the organizations C, D and G viewed PIs differently and had formalized their PI structuring and handling. It is possible to advocate that these organizations saw that the formalized process for PIs adds value to their organizations. Worth noting was that C, D and G were governmental authorities. F, H and K were harder to define, and may have believed that the benefits would not outweigh the extra resources spent on PIs. It seems that the strategic handling of procurement was a representation of variables such as size and competencies in the procurement team, which also applied to the structuring of

PIs. This is confirmed by the literature. The implications of these notions seem to be that a PA should review their methods and choose the approach that most suits their capabilities and situation. As described by some of the interviewees the formal handling of PIs is robust and lends itself to be replicable in later procurements.

Our results showed that the internal organizational knowledge about price adjustments based on price indices was key to the previous reasoning. Based on the answers there seemed to be a discrepancy in knowledge between the organizations. The organizations that did not have established processes found PIs more time consuming and complex to work with. However, even the more experienced organization believed there exists a lack of knowledge about PIs, both internally and in the PP environment as a whole.

Overall, general indices were seen as more efficient and good enough. The interviewees did however agree that a more thorough knowledge was required in order to decide if more work was needed. The apparent lack of knowledge about PIs may have been due to transaction costs as discussed by (Sporrong et al., 2005). The lack of knowledge also created a risk for moral hazard as depicted by Grossman and Hart (1992). Due to the low understanding of PIs it may have resulted in passive waste for an organization when the utilization of PIs was not evaluated, or when they did not know if it should be evaluated.

5.1.2 The internal consequences of using price adjustments based on price indices

Based on the interviews using PIs seemed to have internal consequences for the procuring authorities, but the use of PIs was linked to the organizational limitations. Some of the internal limitations that were discovered in the interviews were direct resource factors. Many organizations could only prioritize the daily tasks and hence PI was not often included. Insufficient resources were more common amongst the smaller organizations with a wide spread of procurement assignments. This is also reflected by for instance Indén et al. (2014). Consequently, these were more limited in their exploration of new strategies, such as the development of PI structuring and management. Efficiency and decision making also seemed to suffer because of this. This implies that the resources demanded from employees such as time and knowledge for developing PI strategies were too high. Hence the transaction costs were limiting the development of knowledge.

Moreover, applying PIs did not only have a hedging effect for the prices as stated by many of the interviewees. The interviews indicated that additionally there seemed to be internal intangible implications of using PIs. Some of the mentioned effects were support in negotiations and unburdening the organizations. For example, in organization D it was considered a helpful tool when budgeting. Many of the interviewees thought that using PIs also freed time to focus on other parts of the procurement process. Based on the finding it seemed as PIs aided in reducing internal transaction costs when in place.

The findings indicated that there was an issue when an organization was not consistent with price indices within the organization. If the rate of change of a general PI and a non-general PI differ this may create a form of squeezing effect. This issue of using different types of price indices was mentioned by the interviewees, and Organization D was an example of this. This is also confirmed and discussed in more specific terms by Peter Nordlund (2018).

5.1.3 Price adjustments based on price indices effect on the relationship between the buyer-seller

The interviews all had the same understanding regarding the EU directive about public procurement. They all mention that it is put in place to open up the internal market, increase transparency and reduce the risk for corruption. This is coherent with the definition of active waste as defined by Bandiera et al. (2009). Almost all of the practitioners did however face similar issues - the regulation created friction and passive waste. The laws such as LOU were even described as a hindrance for a "good deal". The transaction cost seemed to be high due to reasons such as the need for ex-ante complete designs. The laws and contracts used put limits for PAs on how to adapt to changes in a project. It was deemed difficult to find correct information about costs and the regulations even hindered in rejecting unserious bids. All this was coherent with the notion of passive waste and the issues of moral hazard, transaction costs, adverse selection and information asymmetry. The feeling seemed to be that it was an uphill battle as a procurer to find ways to alleviate this.

The data also suggested that there were other confounding factors in the structure of, for instance, LOU that made it even harder finding a "good deal". The need to have a finalized design ex-ante and difficulties in measuring quality left the PAs at the mercy of the suppliers. Using the Most Economically Advantageous Tender (MEAT) or other methods to assess quality puts an even higher requirement of proficiency on the PA. Based on the interviews this seemed to be a high information asymmetry environment, with risk for moral hazard and adverse selection.

The combination of the above stated factors suggested that a contract form that can be more adaptive ex-post is important in longer, complex contracts. This need was also presented by Bajari et al. (2009). Worth considering is that the higher transaction costs as mentioned by Eger & Guo (2008) in combination with the increased knowledge regarding price indices needed could in fact be why many PAs seemed to opt for an easier way, such as fixed price contracts. Kosmopoulou and Zhou (2014) did however argue that they found evidence that price adjustments based on price indices could be one way forward.

The findings indicated that how the de facto price adjustments took place was an important aspect of the relationship between buyer-seller. Looking at it from a passive wastes perspective this could have an impact both on the transactional costs and direct costs. The friction this can lead to makes it a part of the transaction costs associated with PP. There were three different approaches to the effectuation of price adjustment: 1) the contractor called for the adjustment, 2) the PA initiated the

process or 3) a hybrid often combined with some form of time window for when the price adjustments for the coming period takes place. Depending on the approach used by the interviewed organizations different passive waste could be identified. The most prevalent seemed to be the time consumed communicating and negotiating with suppliers. Negotiations were deemed to be inefficient by many of the PAs, and thus most opted for the third approach of having a standardized time window when price adjustments could be called for. Alfas quote "there never is enough time to negotiate with every single contractor: Therefore, a price index is more efficient" was a good summary of the perceived transaction costs associated with this interaction.

Sporrong et al. (2005) argued that creating a high degree of trust between the suppliers and buyers could reduce the uncertainties a PA face in public procurement. The interviewees express that using a price index indeed helped in creating this trust. The presence of a price index i) reduced the transactional cost, e.g. ex-post negotiations, and ii) helped in alleviating information asymmetry between the buyer-supplier. For instance the comment by Juliett that using a price index introduced predictability and fulfilled a "relief and risk minimization function" spoke in favor of having price adjustments based on price indices as a method to facilitate trust between the suppliers and buyers.

There was however an expressed worry about the risk for an increase in transaction cost when a PA uses price indices as a basis for future adjustment. Some interviewees mentioned the issue when a PI is depublished or changed and the negotiations this led to. The transaction costs could also materialize themselves ex-ante when a PA needed to defend their choice of a certain PI to their suppliers. The common approach seemed to be that PAs favored good relationships with their markets and therefore oftentimes was accommodating towards the wishes presented by their suppliers. To avoid this point of contention many PA stated the need for a PI to be "independent and accepted" before using it. Using accepted guidelines, such as those proposed by Upphandlingsmyndigheten (2014) could be one way to reduce this friction. Another way could be to use standardized contracts (Iossa et al., 2007).

5.1.4 Price indices purpose fulfillment of representing the market developments

For the price adjustment with price indices to be an effective method to counteract the passive waste in public procurement, trust in the price indices themselves were deemed important. There was a fear amongst the interviewed practitioners that an index could be subject to manipulation. For instance, industry sector indices that take wages into account was mentioned several times. If suppliers raised the wages in the sector the index would have a positive development disregarding on whether other costs were in fact decreasing. This was an example of one of the "gaming" strategies that could be employed by suppliers to create strategic advantages for themselves (Iossa et al., 2007).

These trust issues regarding price indices explained the strive for using independent PIs found amongst the interviewees. The PAs expressed needs for being able to review indices historical

performance, and how they were constructed. Thus, they generally felt more secure in using price indices that were readily available. Using industry specific price indices that for instance required payment to access was deemed as not favorable. The issue of the heavy front-end before the publishing of an invitation to tender was also expressed in conjunction to the availability of price indices - all information must be available ex-ante for a supplier; if there was a payment needed to access a price index before a supplier bids for a contract it might lead to some suppliers forgoing a public procurement. The above-mentioned facts could be considered to increase transactional cost for PAs.

Regarding if a price index reduces actual cost seemed to be a function of if they accurately reflected the market developments. It almost became an epistemological question if a price index showed the actual market development or was an aggregate reflection of it. There were two different notions regarding how well a price index reflected market developments - either they did, or they did not. As mentioned in the *Theory* chapter a price index is just a model and does not reflect the full price developments taking place. The interviewees seemed to take a pragmatic stance regarding this. It became a question on whether an organization could manage their costs in a sufficient manner or not. There was some agreement that just using general indices such as CPI would distort the prices in longer contracts. Hence, many used some form of construct of different indices or more industry specific ones.

The data gathered indicated that using price indices from an established actor such as SCB, or generally accepted ones, reduced the transaction cost for the PA when interfacing with their suppliers. This could lead to that PAs favored more widely used indices, in lieu of ones that more accurately reflected the market. There were however voices that said that only using a general index would have detrimental effects for a project and that many suppliers would react negatively if a project was adjusted based only on CPI. This was also described by Iossa et al. (2007) where they state that a general index might skew the incentives for a supplier because of the disparity between a supplier's cost and the index.

One integral part of if a price index represented the market development was connected to the issue of asymmetric price adjustments and if there is a stickiness in prices shifting downwards. Most of the interviewed individuals had experienced the downward stickiness of prices. The notion of downward stickiness did however seem to in part stem from if an organization actually had lowered prices or not. Some of the interviewees had adjusted prices down, but most had not. Charlie's quote that “I perceive that an index should not only be regulated upwards” is an example of an organization that had lowered prices based on an index. The implications here was that when a supplier was calling for an adjustment they will only do so if it is advantageous for themselves. Some of the interviewees said outright that they did not ask a supplier to reimburse the PA (or lower the prices) if an index being used had a negative development. This notion was reflected in the quote by Golf that said: “it is problematic when a price index does not raise the price. Then the supplier will find other means to raise their price”. This sentiment was in line with the information

asymmetry and moral hazard problem. The procuring authority needs to be able to trust that the information they obtain from their suppliers is correct.

Eger and Guo (2008) states that they did not find any significant effect on the real price development when comparing fixed price contracts with price adjusted using price index ones. This could perhaps be explained in part due to the circumstances found in this study i) suppliers call for price adjustments and ii) PAs were reluctant to ask the suppliers to lower their prices. Kosmopoulou and Zhou (2014) did in turn instead find a direct cost reduction when they studied another set of fixed contracts and price adjusted using price indices contracts. One difference between Eger and Guo (2008) and Kosmopoulou and Zhou (2014) is that the latter study seemed to involve some form of automatic triggering of price adjustments if the index in use changed above the +/- 3 % range. There were no manual calls for adjustment, but instead an invoice was sent from the PA automatically if the index had a negative development. Bajari et al. (2009) also found the presence of a lower total cost when a contract was more efficient in responding to ex-post changes, in other word lowering adoption costs. Thus, we conclude that there were indications that *who* and *how* a price adjustment is handled matter in reducing the asymmetric price adjustment found in PP.

5.1.5 The influence of price adjustments based on price indices on bidding behavior of contractors

Not attracting bidders and having them exposed to competition was expressed as the gordian knot in public procurement according to the interviews. Finding ways to increase the supplier pool and having them bid aggressively was expressed as a goal for many of the procurers. Attracting many bidders also seemed to have an impact on reducing information asymmetry and adverse selection. According to the literature when there are few bidders and the PA do not possess the knowledge about the correct price ex-ante, they needed to assume that the suppliers bids were correct (Eger & Guo, 2008; Bergman & Lundberg, 2013).Thus one benefit of having more bids on a contract was that the bids should also reflect the actual cost of a project better. This would reduce the likelihood of adverse selection, or as Echo describes it “if you only have one bidder then you’re stuck in the boat with them”. The goal from the procurers of attracting bidders therefore reflected that they seem to understand the risk of adverse selection and the risk associated with a higher degree of market concentration. Bergman and Lundgren (2013) stated that more suppliers will lead to more aggressive bidding. Kosmopoulou and Zhou (2014) in turn found that having introduced the method of using price indices when adjusting prices should not only lead to more aggressive bidding, but also a lower dispersion between the bids.

The transactional cost of bidding in a public procurement was mentioned as a barrier that keeps suppliers from tendering. Echo reasoned that during economic booms there were enough opportunities in the private market. If there was a choice between two different projects, it was likely that the supplier would choose one with lower transactions cost. As discussed in this paper

there were indications that using price adjustment based on price indices is one way to reduce the transactional costs involved in PP.

The findings indicated that having multiple, more aggressive bidders was both a measure of quality for many authorities and reduced the risk of being stuck with a sub-par supplier. As stated by Echo there was also a risk when an inexperienced bidder won a contract. Due to information asymmetry Echo reasoned that an inexperienced company could underestimate price changes in the future and exposed themselves to financial risk. Worst case scenario was stated to be when this underestimation led to bankruptcy and the PA needed to procure another supplier. Having a price adjustment based on price index was deemed to mitigate this information asymmetry and reduce the risk for both the PA and the supplier.

Combining the transaction costs with what Echo described as the historic precedence of PAs placing unlimited liability on the suppliers led to reductions in bidders. Dividing the risk between the parties would also likely increase trust levels. That a PA should voluntarily accrue more risk (and ex-ante transactional costs) is arguably counterintuitive. As discussed in the *Theory*, facilitating price adjustment ex-post would reduce the risk for suppliers (Iossa et al., 2007; Kosmopoulou & Zhou, 2014). Risk reduction was likely to lower initial price in bids and reduce risk premiums (Iossa et al., 2007). Using price indices could also mitigate some of the pricing strategies employed by dominant suppliers and make a PP more attractive to smaller actors. The outcome of using price adjustments based on price indices could therefore be estimated to attract more suppliers and lowering the initial bids.

6 CONCLUSION

This study's ambition has been to expand the current understanding of price adjustments based on price indices in public procurement. More specifically it investigated the relationship to passive waste, through the following research question: *"Price adjustments based on price indices" usage in public procurement processes relates to passive waste?* This chapter will outline the conclusions reached in this study and also give guidance for future research.

It can be concluded that using price adjustment based on price indices are indeed related to passive waste. The findings found that it may be both beneficial in reducing waste but may also create some increased transaction costs. The benefits seemed to stem from that using price indices can help to reduce moral hazard, adverse selection, even out information gaps and mitigate some strategies that bidders can use. The main benefit according to the findings seemed to be in the relationship between the procuring authorities and their suppliers. The presence of price indices may reduce ex-post negotiation and act as a way to divide risk between the parties. This will both unburden the organizations and introduce predictability in the public procurement. There are also indications that these benefits could help increase the supplier pool for a procuring authority. Support for this was also found in previous research. These are arguments that price indices should be continued to be used within public organizations and further developed.

Moreover, there are drawbacks associated with PI. One of the most noticeable drawbacks is that using price indices in an efficient manner seemed to require a high degree of knowledge and competence. Acquiring this knowledge, and formalizing it was deemed time consuming. Thus, many organizations tend to choose ways that are suitable for their capabilities and resources. Notable is that even the organizations with a more structured process seems to have a demand for more knowledge about price indices within the procurement team. To enhance this knowledge more information sources regarding price indices need to be available. It is suggested that the knowledge should be shared and easily accessed within the whole procurement team.

Based on the gathered data one can identify that there was a difference between different organizations regarding how they use price indices. Some of the procurers with the most developed internal structures for price indices were governmental organizations with not so diversified portfolios which enhanced specialized knowledge in the procurement process. The study finds indication that the divide could be found between larger and smaller teams of procurers. We chose in part to reach out to the procurers with most yearly procurements and still found this divide. Thus, it would be opportune to investigate how for instance smaller municipalities with fewer procurements approach these challenges. One way forward would be to develop knowledge exchange between different types of organizations to increase the awareness for price indices.

What should happen next?

Furthermore, the implications of the study are that a procuring authority should evaluate their use of price indices but choose an approach that suits their capabilities and situation. Since some

limiting factors seemed to stem from organizational capabilities a joint undertaking between different organizations could perhaps act as a force multiplier and make the knowledge go from tacit to explicit.

An implication found in this study was that it seems to matter who calls for a price adjustment and how it is performed. Since the procuring authorities are in a business relationship with the suppliers a standardized, or even automated, handling could benefit in realizing some of the potentials. This may have a direct effect on cost for a procuring authority. Thus, a quantitative analysis may be in order to reinforce this hypothesis. A procuring authority may also want to consider an automated approach for price adjustments.

We extend a call for further research in the economic benefits of using price indices in public procurement. For the economic effects to be realized seemed to depend on which price index that is being used. Basing the adjustments on a general index may not reflect changes in the costs for a supplier. Thus, there seemed to be potential in using more narrow indices that track the cost developments more closely. Finding indices that can fulfill this and that is accepted by the market could be beneficial. This would require a quantitative analysis of procurements made, similar to the ones performed by Kosmopoulou & Zhou (2014), Eger & Guo, (2008), Bajari and Tadelis, (2001) or Bajari et al. (2006).

To conclude this study, we perceive that a strategic and appropriate use of price indices may benefit procuring authorities in reducing passive waste. Since a public procurement, and tax-payer money, could be considered a collective good reducing these inefficiencies may creating benefits for the social welfare as a whole.

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APPENDIX

Appendix 1 - Interview questions

Del I - Generellt om upphandlingar

- Berätta lite om dig själv?
    - Vad är dina arbetsuppgifter?
- Berätta om upphandlingsverksamheten?
    - Hur ser processen ut för offentlig upphandling?
    - Hur stora belopp/år?
    - Vad är det för typ av saker ni upphandlar mest?
    - Har ni kartlagt processen?
- Vad anser du vara en lyckad upphandling?
    - Finns det en jämkning mellan pris och kvalitet?
- Vilka problem möter ni i er vardag?
- Har ni ett beslutsystem?
    - Hur ser systemstöden ut?
    - Används det för att följa upp projekt över tid?

Del II - Om prisjusteringsklausuler vid ingång av avtal

- Kan du berätta om ett nyligt projekt och hur ni arbetade med prisjustering under tiden?
    - Vilka inputvariabler använde ni för när priset skall justeras?
        - Varför valde ni denna lösning?
        - Hur såg processen ut runt kring det beslutet?
            - Vem fattade beslutet?
- Vad anser du om prisjustering klausuler?
- Vid vilken typ av upphandling använder ni en prisjusteringsklausul?
- När ni har prisjusteringsklausuler, hur strukturerar ni dem?
    - Vilka är de främsta metoderna som ni använder?
    - Hur stor andel av kontraktsvärdet är reglerat?
- Använder ni prisindex?
    - Hur används prisindex i nuläget?
    - Vilket index använder ni, KPI?
    - Hur väljer ni mellan olika index?
        - Hur ser arbetet kring valet av index ut och hur är det organiserat?
            - Hur mycket tid ägnas åt detta?
        - Anser du att det finns det några kostnader förknippade med detta?
            - Ekonomiska
            - Effektivitet
    - Hur väl fungerar prisindex i relation till prisutvecklingen?

- Vilka är det gömda kostnaderna för en organisation med otillräckliga klausuler och regleringar?
- Är det viktigt att index är väletablerade och godkända i branschen?

Del III - Hur hanteras justeringarna under pågående avtal?

- Hur kvalitetssäkrar ni priset under tiden?
- Hur har indexkonstruktionerna uppdaterats?
- Vilka inputs används för att signalera att det är dags att uppdatera priserna?
- Är det ni som meddelar om att det är dags att uppdaterat priserna eller är det leverantörerna?
- Har ni i så fall kontrollerat så att uppdateringarna stämmer med avtalet?
- Hur ser processen ut för att uppdatera själva indexet? Har ni upplevt någon problematik kring detta?

Del IV - Om förbättringar av processen

- Finns det ett behov av mer specialiserade prisindex?
- Anser du att prisindex som varit för ospecificerade bidragit till problem?
    - Som ekonomiska kostnader?
    - Ineffektivitet?
- Ser ni några möjligheter i att identifiera förbättringsmöjligheter för att reducera kostnader och kommersiella risker?
- Ser du några hinder mot att använda mer specialiserade prisindex?
- Finns det någon mer som du känner att vi borde intervjua?
- Övriga tillägg?

Appendix 2 - Organizational overview

Organization A

Organization A is a Swedish public owned and operated company in the energy sector. It has a joint ownership between a government and a municipality. The interviewee Alfa is the procurement manager for the company.

The organizational procurement process at glans

Alfa says that they handle a yearly volume of procurement around 3 billion SEK. Alfa could not count how many different purchases it is divided amongst, but a rough estimate is that 60 % goes into CAPEX investments and 40 % are OPEX. Organization A has a highly specialized team with skills ranging between such things as administrative to tactical implementation of purchases up to project directors that are working in the strategic sphere. The procurements are both materials, services, and raw commodities.

Alfa perceives the process of procurement to be defined as to what, when and where. They need to comply with the directives regarding public purchasing, so every contract needs to be publicly posted. The purchases are mostly pure LOU, direct procurement, or framework agreements. Organization A has a process for procurement with different level forums depending on the cost of a project. For instance, first an investment goes to the purchasing board to develop a strategy, then it is introduced to an investment decision board and depending on the amount later presented to the board of directors. If a strategy is in place and has received a go ahead then a procurement is started. After the completion of a procurement the result is vetted and compared to the budget and if deemed good a contract is signed and the project management office takes over the responsibility of the fruition of said project.

Alfa finds that the most common issues with procurement for organization A is that public procurement has many rules and regulations that creates an administrative burden on the organization. When a tender to offer is sent out there are few degrees of freedom to change things as they emerge. In a non-public setting there are more leeway to cooperate with the supplier to tease out things such as quality and cost aspects. Time management is also an issue: an offer to tender needs to be publicly available for a period of time, this thus creates a need to be organized and well planned in what is needed in the coming period. This combined makes procurement a resource consuming endeavor for organization A.

Alfa's notion of a successful procurement procedure is when the end result is within budget. Alfa says that their job is to assure that the cost of a project is within the bounds stipulated at the onset of the procurement. It is hard to reconcile the notions of cost and quality. Alfa comments that over delivery in quality is also a problem. If a purchaser strives for a quality high above what is actually required, then the organization will be spending more money than needed on that project.

Approach to price adjustments and price indices

Organization A does use price adjustment clauses, and oftentimes it is based on some general indices such as CPI. Alfa says that organization A uses price indices for both materials and services. According to Alfa they are selective in which indices they use in the regards that they want them to be published by an independent, reliable source. Alfa specifically mentions organizations such as SCB. Organization A almost exclusively use some form of construct with at least two different indices in a constructed bucket. For instance, it could be half CPI and half an equivalent based on the cost of wages.

The amount of time that is allocated to work with indices and price adjustments in the pre-contract stage are deemed low by Alfa. However, in projects where other methods are used, such as compiling estimates by all the different suppliers, are time consuming.

Alfa says that it is the role of the respective procurer to decide if, how and which index to be used for the specific project. Organization A does not have a formal decision on how a price adjustment clause is to look. According to Alfa it is based on benchmarking with other procurers and an emergent “best-practice”. Organization A does however seek to hedge their price adjustment clauses and use a bundle of different indices.

Once a price adjustment clause is in effect it is generally organization A that supplies the materials for calculation. It is however generally the suppliers that call for a price change. Organization A uses two methods for price adjustment in ongoing contracts. Either negotiations or a method where there is a time period each year where suppliers can call for an update in price. If a supplier misses that window no adjustment takes place that year in that project. The latter is more common since it is faster for organization A to perform.

To assure quality and that the right indices are used organization A has regular conversations with their suppliers and the market. There is also a dialogue about updating the indices that are being used. They generally do not shift the index that is being used in an ongoing contract. There are cases where they shift in an earlier stage.

There is also a divide in how organization A approaches price adjustment, in this case different indices. Alfa states that most of their contracts do not have any form of price adjustment. It is only when a contract is longer than 24 months that they deem it relevant. When there is a shorter time period Alfa says, “you know what to do and hence what the suppliers are bidding for ". Alfa mentioned that for longer framework agreements there is a negotiation, and they use price indices as a sort of fallback position. In other cases, they have different categories of suppliers. For those categories, the contract has a price list. This reduces the cumbersome work of negotiating with many suppliers at the same time. Lastly, there is a form of contract where the price is determined at the onset of the contract and the price development is according to a construct of price indices.

Alfa perceives that the main benefit of using price indices is organizational. It reduces negotiations and conflicts in longer contracts. One cannot negotiate with all the suppliers under contract. If there is a contract with regular negotiations organization A does however use an index as a foundation. The economic effects of using a price index or not in a specific contract Alfa perceives to be neglectable. When there is a negotiation the price tends to be lower than if it is calculated on an index. It is however a complex undertaking to work with and produce indices. Since organization A perceive themselves to have limited time and resources, they cannot devote too much energy to the issue. Alfa says that the way that they employ price indices in a way that is efficient for organization A.

Attitudes towards using general versus narrow indices

Alfa thinks it is hard to find information about the actual price developments on materials and services. For instance, CPI tends to show a lower change than the fluctuations for some materials. That is why organization A does not employ only general indices, but instead op to have buckets consisting of different indices.

There is definitely a need for more specialized indices. Alfa for instance mentions some materials that they often procure where it would be beneficial with an index that closer tracks that specific market. Alfa has however not heard anything from the coworkers in the organization that this is in dire need. The notion is that given the indices they have used up to this point one could strategically manage project costs anyway. There is no direct organizational hindrance to shift indices and start to use ones that are more specialized. Alfa does however reinforce that they need to be independently developed. That is why for instance CPI is deemed sufficient and is accepted by both parties in a contract.

Organization B

Organization B is a fully private company. They work mostly with helping health care services procuring different goods. They do this by what Bravo calls category-based management where they procure one category of material at a time. Most often this is from a single supplier. They procure for roughly 30 million SEK per year. Bravo is a project leader at organization B.

The organizational procurement process at glans

Organization B has a defined stage gate process for procurement. Bravo says that since they are procuring for other organizations there is a great emphasis on studying the needs of their client. Organization B often work in tandem with their clients' procurement teams and support their process. According to Bravo, organization B has a variety of checklist and other tools to assist their procurements. After they have negotiated a contract with a supplier organization B hands over the relationship to their clients. In effect a supplier has a list with the clients of organization B. Likewise the clients themselves receive a list with suppliers for different goods and prices. The standard length of a contract is two year and then they run with a period of notice.

Bravo means that it is important to tease out the aspects of quality for every procurement in the early stages of the process. The notion of quality in a procurement is context dependent. When they are undertaking projects for other organizations it is important to raise the issue of function and quality. Bravo means that when they procure for their own organization, they “have to live with the consequences”. Even though they follow their professional expertise and utilize their toolbox a procurement could either way turn up bad. Bravo thinks that this oftentimes is due to person-related issues. When procuring for themselves, or another private company, they are able to shift their demands at will and there is no real need to justify why they choose to end a procurement. Bravo says that they during a meeting cab react to their gut feeling. When procuring under the auspices of for instance LOU this is not possible. In a public procurement every aspect of the contract needs to be published and every decision justifiable.

Bravo defines a successful procurement when they fulfill the needs of their client. Another important aspect for success according to Bravo is when they are able to deliver a lower price point than the client themselves are able to do. Hence, lower price is both quality and a metric to measure success.

Since Bravo works both with public procurement as well as non-public ones and thinks there is a stark difference between them. During a non-public procurement, a lot of bureaucracy can be avoided. An agreement between the parties could be reached much faster. This is not the case with public procurement. It is often more cumbersome, and a procurer is not able to incorporate findings from the process in an iterative manner. As stated previously everything needs to be accounted for at the invitation to tender. Bravo says that the main issue working with their clients in the health sector is that they have a little time. It is hard to find time to perform a thorough analysis of their

needs. That is according to Bravo the biggest issue they face with procurements - the lack of input from the client organization.

Approach to price adjustments and price indices

Bravo says that they approach the issue of price adjustments differently on a case-to-case basis. Up to this time they have not felt it necessary to have these clauses present. Organization B are still growing their procurement volume and as such they would rather negotiate with the suppliers directly. Bravo says that when they negotiate, they have a form of negotiation paper based on benchmarking other suppliers and the market. Based on this paper they strive to find arguments that take effect. A negotiation could take up to a whole year, according to Bravo. Asked if different price indices are used as a basis for the negotiation paper Bravo says that Organization B does not use price index as a basis for their negotiations. When they have employed price indices it has mostly been for procuring services.

The economic effect of using price indices in a procurement may possibly be the reverse of reducing cost over time according to Bravo. Apart from general indices such as for instance CPI Bravo thinks the existing ones are stacked in the supplier’s favor. The notion is that indices tend to have a positive change over time and thus facilitate an increase in price. Organization B strives to have as few contractual ways as possible for suppliers to raise their price. Bravo says that if an organization uses constructs of indices as a baseline for price adjustment it is unlikely that price development will be negative, meaning lowered prices. There is also the problem of long contracts where Bravo thinks there is a strategy for suppliers to bid with a lower price and radically increase them after a certain point of the contract.

Regarding more organizational effects when using there could be benefits thinks Bravo. Organization B is currently undertaking work to become more efficient and breaking down everything into processes. A part of that undertaking is something akin to develop price adjustment clauses. Bravo perceives that this will reduce negotiation time and as their procurement volume increases this will be beneficial. However, Bravo ponders that if effectiveness is to be defined as delivering effect to their client the current procedure with negotiations has a higher benefit.

Since organization B historically has not utilized price indices to a great extent Bravo says that they currently have no method for updating indices or assuring quality. There probably exist some form of continuous learning and preloading. An organization becomes better and better handling their indices using them over time.

Organization B tends to be the instigator for negotiations over price. They stipulate intervals for negotiation in their contracts. In some cases, it is the responsibility of the suppliers to flag for the start of a negotiation, but in practice more than not it is organization B that instigates it. The suppliers are however responsible for compiling statistics before the negotiations.

Attitudes towards using general versus narrow indices

Bravo's main issue with price indices is that they seldom shift downward. As stated previously there is a sentiment that they are stacked in favor of the suppliers. Thus, an index may not necessarily reflect the actual development of costs for a supplier. For instance, Bravo mentions that if the price for oil is decreasing a harmonious lowering in price for petroleum products and plastics should take place. Bravo do not think this is the case, but that suppliers hold out during a downturn in raw material but are quick to raise their price if the reverse is taking place.

One could however follow an index without stipulating it in contractual terms. If there existed reliable information that reflects the market trends it would be beneficial in Bravos work.

Bravo thinks that public procuring authorities excel at using price indices in their contracts. A public procuring authority is also more likely to employ lawyers and the like in their process. This is probably due to the fear of breaching the principle of equal treatment, according to Bravo.

Organization C

Organization C is a governmental authority. They have a procurement volume of roughly 40 billion SEK yearly and 1500 procurements. The procurements are infrastructure projects, maintenance, materials, and services. Charlie is a qualified buyer at a regional part of the larger national organization. Charlie is also a project manager and is involved before, during and after a procurement. Charlie has a strategic focus and is also an index manager for organization C.

The organizational procurement process at glans

Organization C has a well-defined and structured process regarding procurement. Mostly it is planned maintenance and materials where the need stems from the operational parts of the organization. They also have several larger infrastructure projects. Charlie says that the actual procurement comes in the middle of the process. After a contract is signed, they are responsible to manage contracts over time. Organization C has several systems to assist them. They range from templates for the administrative regulations in an offer to tender to enterprise management systems and planning tools.

Charlie thinks a sign of quality in a procurement process is when there are good contractors that want to undertake the project and that the contractor has estimated the cost in a fair and reasonable manner. Additional is that the work is performed according to the agreement and on time. Organization C has had difficulty in finding many bidders for their contracts. That is why Charlie thinks that a good invitation to tender is one that allows more contractors to bid. Lastly, Charlie mentions the necessity of interpreting the demands from operations and translating them into the contract is a key component for a high-quality procurement.

Problems with public procurement are according to Charlie that many feel constrained by the regulations of the law. It is hard to be iterative and change conditions based on emergent information. There is also a lot of room for interpretations regarding text in contracts and general provisions.

Approach to price adjustments and price indices

Organization C is proficient in using price adjustment clauses and price indices. They have a general adjustment where the price is set for 24 months and first on month 25 the contractor or supplier can call for a price adjustment. The most common used indices are general ones such as CPI or wage price index. Charlie says that they also have specific indices published by industry organizations or for materials that are subject to the world market price. For instance, fuel and steel. If these are in use that is stipulated from the start of a project. There is also a way to handle radical changes in price for shorter contracts. The change needs to be over 25 percent and more than 0.5 percent of the sum total of the contract. To sum up Charlie says that all types of procurements use price indices for their price adjustment.

There are many different constructions of price indices used by organization C. Charlie says that for general contracts roughly 75 percent of the contract sum is regulated by CPI, while the rest is fixed. When they use the indices connected to the world market at least five percent of the contract sum needs to consist of those materials.

Since organization C has clearly defined procedures regarding price adjustments the time devoted to identifying the one index to use is low. Charlie also says that it is up to the individual procurer to decide which one to use.

Charlie says that using price indices is a natural part of a long contractual relationship. It helps with dividing risk between the procuring agency and the contractor. It is hard to predict economic developments long term. This helps with attracting more bidders for a given contract. The direct economic impact for organization C is low according to Charlie. They pay some subscription fees and the like but divided on the number of procurements that they undertake and the other provisions in a contract the cost is low. If the time to work with the indices are considered a cost it is still low. Charlie says it is something like “a half an hour here and there”:

On the organizational front there is a clear benefit of having an index to lean on. This reduces noise both internally and externally. As described above all regulations regarding index and price adjustments are defined in their templates.

Charlie says that the quality and reliability of indices are a quality factor. Organization C use independent indices, so according to Charlie they should reflect the market and therefore have a high quality. Organization C sometimes get asked by contractors to shift from CPI to indices published by industry organizations. The supplier’s sentiment is that CPI has a lower change than the indices that supposedly more closely track the development in their market niche. Charlie says that they in fact do use these types of indices for some materials in projects. A final aspect of quality and reliability is the basis month for an index. Whichever month is used, usually the month when the bid is due, could have a great impact on the development of price over time.

Charlie says that organization C is currently considering if they should switch the different indices they use. This is an ongoing process. They have experienced that indices that they have used have stopped being published. At least one case they asked the publisher, SCB, to continue the publication for a couple of years due to ongoing projects. In other cases, they needed to find new ones and renegotiate with the contractors. Charlie specifically mentions an index regarding steel in a project.

Charlie feels that an index should not only increase over time. It should reflect the de facto developments of costs for suppliers. For instance, there was a project a couple of years ago where the index regulating price shifted downwards. The contractor for that project then needed to reimburse organization C.

Attitudes towards using general versus narrow indices

Charlie mentions that an issue with general indices could be that they also weigh wages into their development. This makes an index more susceptible for manipulation. By increasing wages for employees, the index will go up regardless how the cost for say materials develop.

Organization C continuously evaluates their indices. If they deem it necessary to have a more specific index, they often look towards those compiled by industry organizations. Charlie says that an issue with more specific indices is that they need to be readily available when a contractor drafts their bid. It is important that the bidders can see the history. An index is supposed to help the bidder cover shifts in costs, according to Charlie. It is pertinent to use an index for budgeting even if one is not prescribed in the provisions of a contract.

Charlie concludes that there is a need to increase the knowledge amongst the operators in a procurement process. This goes for both project managers, procurers, and contractors. Everyone could become more proficient. Sometimes it is like people do not really know how to use them, says Charlie.

Organization D

Organization D is a governmental procuring authority. It mostly procures material systems and the like for other governmental agencies. It has a large portfolio ranging from perishables to complex systems. Delta is responsible for governance of index and currencies, mostly with contractors from foreign countries. Delta is also involved in prognosticating changes in costs for organization D that is part of the appropriations and budget discussions with the government. Delta and Deltas teamwork with a supporting role producing methods and processes as well as agreements.

The organizational procurement process at glans

Delta says that there is a clear governance on how to use price adjustments within organization D. Not every procurement is supposed to utilize it. The method was developed in conjunction with the head of procurement, which is a different department from the one Delta works in.

Organization D is professionalized and has many support systems for projects in place. Delta is engaged in a supportive role, and thus does not want to go into detail regarding the processes of procurement. The support systems do however feature how to weigh different indices in the construction of buckets.

Approach to price adjustments and price indices

It is clear that organization D uses both price adjustments and price indices. This is an integral part in the organization. It is pertinent when a contract has a certain life length and unsure market conditions. Delta exemplifies it when they have sub-contractors that use different currencies to organization D. Organization D use indices for both materials and services.

An important aspect for choosing between different indices for organization D is that they must be publicly published, available and connected to the country they are buying from. When a contract is formalized the contractors must be able to find the information. Therefore, they rely on SCB or international indices. According to Delta they do not have any “weird” indices, but many. It is in the range of between 80 to 100 different ones being used currently. The most common approach is to enquire about the contractor which index best represents their market. The most commonly used are Swedish wage cost indices. Organization D does not accept indices that you need to pay for. The index needs to be published.

Delta talks about a high-profile development contract that organization D is responsible for. The lead time of that project is long, and the underlying technology may change over the course of the project. A project like that also has many different stages and there are many different positions in a del. Thus, it is important to have guidance when trying to prognosticate future developments of the cost for organization D.

Organization D uses different contractual constructs with some prices fixed while others are subject to change in accordance to the decided price index in question. Delta calls the fixed portion

a rationalization quota. It is generally around 10 percent of the total cost base for a project. When they perform a procurement in competition the rationalization quota may be even higher.

Delta also expands on how base year for a deal affects the development going forward. Often the base year is when the procurement is enacted. However, in the prognostication for the appropriation negotiations the difference in base year could affect the sum of project costs.

Since Delta, and organization D, works with prognostications in conjunction with different indices there is quite some time dedicated to assuring that the revenue is in line with the budget. The time spent differs depending on which stage they are in. When they are simulating project cost for risk assessments are different from the biyearly price adjustment for the entire organization. For the latter it takes Delta roughly two weeks twice a year to work through the projects and aggregate into a budget requirement. Then the compilation of the projects to the entire budget for organization D takes substantially longer to process. Delta also emphasizes that due to this index are important for organization D. It is the foundation to decide how big the stock of projects is.

Delta explains that the meaning of using a price index in an economic sense for organization D is to reach cost neutrality. The benefit is that the development of cost closely tracks a de facto price adjustment.

Organization D has decentralized the decision making for indices. It is the respective departments under a branch that makes the decision. However, if a departure from the norm is to be made it needs to be signed off by a branch head. But otherwise the process is streamlined and there is no need to seek approval.

The organizational benefits of using indices are clear for Delta. Organization D has a database with the indices used at any given time. If there is a contract that uses an index, you can find it in the database, and it is readily available. This makes it easy to prognosticate the long projects that organization D has. Curating and updating of their indices take a lot of time. This is because the sheer volume of indices that organization D uses. As stated previously they employ roughly between 80 to 100 different ones at any time. Delta says that if they were to use a single index for every project then the time spent would dramatically be reduced. Then the process of updating and curating it would be fast. Then the problem of risk premiums from the contractor would arise.

Regarding quality, Delta says that it is always problematic to try to predict the future. This is an issue with indices that is based on historical facts rather than the future. Delta finds it easier to approximate where a wage cost index is going, generally up. Index for materials can fluctuate more. It is hard to determine if a material index is going to move up or down. Delta perceives that the consequences still are low. Not using an index would make it more erratic. Then a risk premium would be placed on the estimates by a supplier. This is harder to predict but will always be moving the price upwards. There are some cases where an index could be non-beneficial. In a targeted deal organization D would have to have access to the bookkeeping of their contractors to evaluate things such as the degree of utilization of employees. On the contrary, if there is no index in this specific

deal then organization D just needs to consider the increase in wages for their suppliers. There is also a regular change of indices. No index is published forever, says Delta. If an index goes out of commission or a change in base year is needed this will initiate a negotiation with the contractor.

Delta regularly lowers costs based on indices. Since they perform prognostics there is a possible mismatch between the actual cost and the prognosis. Organization D has no feedback from operations to the team Delta works in. It is the respective project managers that sees the effects and changes of price. This is then evaluated by another staff department in charge of budgeting. And as Delta says, you really do not know what happens before you get an invoice.

Attitudes towards using general versus narrow indices

Delta explains that it is nigh impossible for organization D to only have one index. There are so many moving parts in their projects. Also, a single general index would never be accepted by their suppliers. The suppliers also strive for cost neutrality in their deals. Therefore, organization D has any contracts based on for instance CPI. There have been problems with the disconnect between the appropriations and the real development of costs. The appropriations are based on a general index, which has at times been negative while the contracts with a more narrow, specialized index has been positive. This creates a squeezing effect with lower appropriations and higher costs. Delta explains that there in these cases may be a cost neutrality in wages, but the material projects are becoming increasingly more expensive due to advent of for instance new technology.

There have been instances when organization D has bought specialized indices. Delta mentions petroleum. But, according to Delta, it is not something organization D deems necessary. It has instead been requested by the suppliers in these cases. As fast as the need or hindrance for organization D to use specialized indices it is enough that they have the opportunity to draft contracts with them.

One issue with more specialized indices is that organization D simply has too little knowledge about them. They are more proficient in using the ones that they are using in different contracts. Delta perceives the main issue with more specialized indices is the availability of them. Organization D wants to have the opportunity to review the historical data. So, if they were to use one in a contract it needs to be peer reviewed.

Delta concludes that organization D has performed a rather in depth undertaking during the past years in developing methods on how they as an organization are supposed to work with indices. Currently they have reached a point where they feel that they are proficient and effective in the usage of indices.

Organization E

Organization E is a governmental expert and support agency. They are in effect a business support unit for every procuring authority in Sweden. Echo is the head of a unit that works with developing support and teaches public organizations in regard to procurement. Echo says that they want everybody to make better deals.

The organizational procurement process at glans

Organization E is active in assisting different procuring authorities developing their internal capabilities regarding procurement. They help organizations on all levels, from municipalities to governmental agencies. They have developed a lot of material to this effect. It ranges from lectures on site to question terminals on their webpage.

Echo says that there is a clear difference between organizations in for instance how much time and resources there are allocated to procurement. Commercial companies have long since understood how effective procurement affects “money outflow”, according to Echo. Public organizations do however not have the same purpose as private companies. The public organization’s purpose is to deliver a “good service” to the populace. Echo ponders that this should entitle them to economize resources, but it is somewhat forgotten. This discrepancy is illustrated by the recurring problem that for instance municipalities have very limited time and resources for their procurement. It could in essence be one person that is responsible for all the procurements ranging from perishables in a school to the school itself. Echo perceives that there is a difference between municipalities and governmental organizations. One issue is if the organization has clear governance and if the purpose of the regulations is understood. There seem to exist some form of “critical procurer mass”. It is not dependent on the number of procurers per inhabitants, but rather the size of the team. It almost goes without saying that a smaller team with a larger portfolio has a harder time to manage, according to Echo.

Another issue that procuring authorities face is that bidding for a contract is hard. Attracting a multitude of companies that want to enter into a public contract is also hard. During an economic boom it may even be that individual companies opt out of public procurement contracts in favor of working with private companies.

Echo also thinks it is important to look beyond other values than lowest price when performing a procurement. The whole lifecycle needs to be considered. It could become a greater cost to look at short term gains. Echo mentions that for instance a public organization could be locked in with a sub-standard supplier for a long time. Since it is difficult to change a contract once entered it could lead to a higher cost in the end.

Echo also emphasizes that public organizations need to professionalize. They need to properly analyze their own behavior and utilize statistics when procuring.

Approach to price adjustments and price indices

Organization E have guidance regarding many aspects of public procurement. They do not however have any explicit directions regarding price adjustment and using price indices. Echo says that it is a necessity. If you enter a contract you are not allowed to make changes when things change. Say that for a long contract there are no options to adjust price suppliers will not be interested in bidding for that contract. Echo says that it is hard to know what the actual cost for transportation seven years from will be now. Since there are no clear guidelines regarding the topic of price adjustment there probably exists a difference depending on the size of the organizations and how used they are to procure longer contracts. Echo thinks there probably does not exist any governance for smaller procuring authorities such as municipalities.

Echo does not think price adjustment is a major issue compared to other intricacies in regard to public procurement. The fact that organization E does not receive a large quantity of questions on the matter could act as an indication.

There are effects of using a well-defined method to price adjustment and referring to a price index is that according to Echo. Attracting bidders is a balancing of risk between the procuring organization and the suppliers. Having a clear playing field leads to a better relationship between the two parties. This thus leads to an undisputed economic effect according to Echo. If the supplier does not have the security of an index to lean on when estimating their budget, they will add a price premium to the bid to counteract the risk factor. Echo also thinks this leads to more professional suppliers and better competition. There is as stated previously a problem to attract multiple bids for a contract. If there is only one supplier answering the invitation to tender the procuring organization may be stuck with them. Echo thinks this risk diversification is the Gordian knot of procurement. Having unlimited liability, which the lack of possible price adjustment is, at the supplier's end will eventually lead to fewer suppliers.

Echo also thinks that using a price index will lead to a greater understanding of the realities of the suppliers. Understanding what drives their costs facilitates better placed requirements on the suppliers. Golf reinforces this and also thinks that using PIs could lead to better requirements.

The organizational effects of using price indices Echo perceives also be in the interface between procurer-supplier. A sort of worst-case scenario could be that an inexperienced supplier may make a poor estimate in lieu of a price index in a long contract. If the estimate is too low the supplier may even suffer catastrophic effects and not be able to continue their undertaking. For an equally inexperienced procurer this is also detrimental. Having an index could also lead to less friction between the different pirates. Negate the need for negotiation. Echo does however estimate this effect to be lower. Most contracts do not have that long of a duration.

Echo thinks price indices could be perceived a bit daunting by smaller organizations such as municipalities. It requires a lot of know-how to find and choose the right index for a given project. An important point in regard to choosing an index is that everything needs to be clear when an

invitation to tender is published. If anything needs to be changed a whole new procurement needs to be undertaken. This is an ineffectiveness that most organizations want to avoid, according to Echo.

Attitudes towards using general versus narrow indices

Since organization E does not have any developed guidelines in regard to price indices Echo have no clear opinions regarding the different effects of using a general index vis-a-vis a more specialized one.

Organization F

Organization F is a governmental authority which are responsible for the preservation and renovation of state-owned property in Sweden. Foxtrot is working with procurement within the organization.

The organizational procurement process at glans

Organization F is mainly focused on procuring 70 % building contracts the rest is public real estate, consultancy services and framework agreements. Organization F is procuring for around 2 billion SEK per year. The general process is well defined from the demand analysis followed by advertising and later on the procurement operation. They have organized as a central unit to increase their competence and knowledge. One procurement is managed by one procurer, project manager and administrator. The full team of procurement consists of 14 persons, where certain persons handle different procurement areas, foxtrot focuses on building contracts. Based on different amount limits different persons take decisions, the larger amount the higher up in the chain the manager needs to be to approve (fastighetsförvaltare->fastighetschef-Fastighetsdirektören->generaldirektören). Consequently, the process is rather strict and not especially dynamic.

The issue regarding prioritizing quality and price is situational and there are no guidelines to this. Instead it is the specific case that needs to be evaluated and one has to decide what is the most important. Some buildings have cultural value which makes quality of the job to be done the most important. Interviewee Foxtrot believes that competition is the most important in procurement, it should at least be 3-5 bidders in a procurement to be able to see the spread of proposals and achieve a competitive project. One issue that is somewhat common, is reviews, when potential suppliers are not happy with decisions made for suppliers. “Bad loser”, someone is not happy with the outcome and tries to apply for review. IT may be too easy to perform reviews today, according to Foxtrot.

Approach to price adjustments and price indices

Price adjustment clauses are used by organization F, and mainly price indices. This is not common for building contracts but for framework agreements that run over four years, price index is used. The first year of the contract is not regulated according to the index; instead, it starts the second or third year with a chosen base month. It is currently Foxtrot that is managing the indexes even though it is supposed to be an administrator's task. This may be due the no overwhelming complexity but competence demanding of designing the index structure in the contract. Most of the time there are finished indices that are ready to use to track the desired service or product. In most cases of Organization F, it is up to the supplier to call for price adjustments, and hence Foxtrot has never experienced an adjustment of the price downwards. The work with the indices demands continuous administrative tasks which sometimes are experienced as troublesome. Overall, the work with indexes is situational and depends on the specific contract, specific supplier that have

objections. Organization F is not constructing their own index instead they use what is available, sometimes multiple indices are used in one contract.

Attitudes towards using general versus narrow indices

The impact of price indices on contracts are different and somewhat not obvious. Foxtrot confirms that an index reduces time spent discussing prices and therefore also the negotiation time. Foxtrot's understanding is also that the indexes used follow actual price levels of contracts.

Minimizes risk, if the index was it used the supplier will have to consider the extra risk. When no good index is found, CPI is used. Foxtrot does not see a need for more specific indices in their area of operation, it would take too much time and if they are unofficial it may be hard for the supplier to access it, which is problematic. But it would enhance the correlation with real price development and accordingly decrease the risk for suppliers and lower the prices for the procurer.

Organization G

Organization G manages motorways, roads, railways, and other transportation systems in the region of Stockholm.

The organizational procurement process at glans

The procuring division of the organization is purchasing consultancy services, long term infrastructure projects, and construction projects. The team is made up of 9 persons, who all are working with procurement. Gold is a procurement manager. The organization conducts purchases of four billion SEK per year, and the number of procurements can vary a lot. One year it could be just one large and long contract, while other years it may be up to 20 procurements. Most of the larger projects take between 5 to 15 years.

In general, the procurement starts with a primary objective that needs to be accomplished. Persons from the procurement join the process before the procurement actually starts to plan the full process. This performed together with a planning group where to decide the way forward, overview of the project, costs etc. In this merged group of administrative personal and procurers different sub targets are outlined. Further on the plan is split up to smaller parts and consequently the process will be equivalent to a program of smaller tasks. According to the interviewee the process is well depicted and clear for those involved. Parallel with this the project request goes into different councils based on the cost level, where it has to be approved by the board or managers. One of the most important outcomes of the procurement is to find a suitable supplier that is trustworthy and lives up to the initial agreement according to interviewee Golf.

Furthermore, it is not possible to prioritize quality or price higher than the other. Both factors are equally important. To be qualified for the bidding process, the suppliers are assessed based on previous experience, key performance indexes and financial numbers. But in some projects, price is what is the main feature in the procurement and that means that suppliers with the lowest price win. Golf team does not manage the contract when the project starts, the team is done when the contract is signed.

Approach to price adjustments and price indices

The price adjustment clauses are always important according to Golf, mainly due to the fact that most of their contracts are long lasting, here rice indexes are used. Indexes is one method to minimize risks and make contracts fairer for both suppliers and purchasers. When purchasing material, it is also exceptionally important to just price indexes, 50-100 million SEK could be the price of changes in a project due the world market prices. Currently there are a few ongoing contracts which are problematic because the indexes have not been analyzed enough and there is a lack of knowledge of why they are used. There are also consumer indices used as CPI, which do not track what is actually purchased in the contracts, and Golf means this is wrong and very strange. Steel price, and oil price are a few examples where prices have changed a lot due to bad

indexes. In practice this will lead to bad/imaginary “ÄTOR”, where suppliers try to send invoices for undone jobs, or just imaginary tasks just to weigh the increased material costs or add non worked hours to the invoices. In some cases, the supplier will also remove personnel which decreases the overall competence in the project. In the end it may also lead to bankruptcy for suppliers, which is very problematic for the procurer. Suppliers should make profit, it is not a bad thing, but a necessity. Good indexes that follow the real underlying prices helps the supplier and will remove any unnecessary add on.

Attitudes towards using general versus narrow indices

The front load and time spent increases when having more niched indexes but in the long run it is worth it because the price will be covered. Currently different index baskets are designed for new specific projects, but this is done on the teams on initiative and is not standardized. It is not management that is pushing for this, instead best practice is general indices, but when the new index baskets were proposed it was positively received by management. Right now, a small team has been assigned to develop different indexes to develop the internal knowledge. Specialized indexes are very important for projects because it will help suppliers to set more correct prices from the beginning and also reduce any conflicts regarding prices that would hurt the cooperation and in the end the projects outcome and price.

Organization H

This organization is part of organization G but is operating in a different geographic area in Sweden. It has the same focus, infrastructure, roads, railways, and other transportation systems. For this part of the organization it is very common with building contracts, and consultants connected to this. This specific area does not focus on goods.

The organizational procurement process at glance

The procurement team consists of 35 persons, which has a procurement turnover of 8 billion SEK per year. First of all, there must be a demand, different projects are places in a bucket which have different business strategies connected. Furthermore, they cooperate with the more technical teams that bring the blueprints and technical aspects while Hotels team formulate the procurement contracts. This is strictly guided by the organization and some employees believe it creates a lack of freedom in the process and decreases the qualitative business sense. Which leads to a prevention of good deals. There are multiple different documents that describe procedures, this takes a lot of time to read.

There are also systems that are supposed to be used for following ups and to introduce new improvements. The employees are supposed to send in suggestions but according to the interviewee it is too complicated, and it is better to take the suggestion to a manager instead.

One issue that is rather common in public procurement for the organization is that suppliers enter with unrealistically low prices. This is problematic because it distorts the bidding process and if it would win a large cost add would be the result. Sometimes real price increases occur but this can be hard to separate from unjustified price add on.

The Eu directive is more or less clear according to Hotel. Interviewee hotel summarizes it as a legal framework to increase competition, fair treatment and to handle tax money ethically.

Approach to price adjustments and price indices

Price indices are used for contracts that cover multiple years and large volumes. The responsibility of indices is a cooperation between the purchasing department, managers, and the legal department. Some of the indices used are CPI and some raw material indices for example index for Bitumen. Hotel views the price indices as static, and that “they are what they are”. The indices are just something in the contract that is not discussed. Currently there are some problematic projects, where the problems are derived from price indices. Some suppliers perceive the indices used as unrealistic and do not reflect their prices. Moreover, the price index in a contract is used to both lower and raise prices, but it is more common with price raises.

Attitudes towards using general versus narrow indices

The interviewee states that there is a lack of knowledge about price indices in the organization but in general it is hard to see any possible improvements. Price indices effect on the organization is rather limited according to the interviewee.

Organization I

There are different administrations that are responsible for different product or service areas. The organization I is an administrative municipal authority. It manages a broad range of procurements for example security services, elderly care, management consultants and IT systems. As follows the majority of the procurement consists of services.

The organizational procurement process at a glance

In total the organization procures for around 40 billion SEK. The procurement process is situational and depends on the objective of the procurement. Due to this the procurers often look at previous processes and contracts and use them as benchmarks. The interviewees say that the process has just recently been clearly defined. The procurement starts with outlining the procurement document. Furthermore, when this is done, based on the volume of the contract a specific delegation signs the decision. The aim of every procurement is that the most suitable supplier wins and delivers according to the contract. Neither is there any tradeoff between quality and price according to the interviewees because the requirements are stated in the contract (what quality is demanded) hence it is prioritized as much as price. In the process the procurers also use different IT systems that support the internal administration, economical systems, and contract database. The team does not administrate ongoing contracts, it is the contract administrator's role, some form of project manager.

Lack of competence in some procurement areas is sometimes an issue in the team. Certain procurements demand particular knowledge and if it is missing it may limit the possibilities to detail all the requirements in the procurement which will affect the end result.

EU directive, same terms for suppliers when applying for public procurements and guidelines for the procurers

Approach to price adjustments and price indices

The price adjustment clause is used in almost every contract, due to the fact that most of the contracts are longer than four years. The interviewees opinion is that the indices work well. The choice of index and structuring also depends on the situation and precious procurements. A broad range of indices are therefore used, for example: LCI, cleaning indices, AKI. Most of the indices come from SCB. The time spent on evaluating and working with indices is small and not high prioritized. The single procurer can propose an index, but managers have to confirm the decision.

The supplier calls for price adjustment, prices should be regulated and then it is decided when or the supplier may call for this. They believe that it is the procurer job to manage this and plan for the price adjustments. The interviewees have not adjusted prices downwards due to a price index. But it is up to the contract administrators' task to see that the indices are followed and not the procurers.

Attitudes towards using general versus narrow indices

The general indices reduce the discussions about how prices are supposed to be adjusted. But the interviews can identify major organizational effects. Reduce risk between procurer and supplier, removes discussions. In the current situation the indices that exist are enough, but some issues may be that indices stop being produced, or that indices are lagging behind. One effect of the index is risk minimizing. The indices need to be fair and offered to the public and established. Indices are often no complicated question.

Organization J

Organization J is a municipal company and operates in the energy sector. It undertakes the role as seller and distributor of district heating, district cooling, electricity, and natural gas. As a result of being under municipal ownership the surplus is reinvested in the city that it is operating in.

The organizational procurement process at a glance

J has a procurement team of 14 people which purchases for around 1.8 billion seek per year. The process for procurement is standardized according to different steps. Foremost the team identifies a need or an objective. After this is identified the team gathers different departments for discussion and a unique procurement group is formed with relevant people from different areas of the organization. Afterwards the gathering additional questions will have to be answered, such as What are the requirements for the procurement? What is the expected amount? The last step of organization Js process is to look at the specific procurement and how it should be done based on previous conditions. The end result is the requirement specification document.

LOU must specify all requirements from the beginning. A successful procurement is when they can define expectations and needs clearly. No tradeoff between quality and price. quality is already specified in the beginning, that is the difference form private sector.

Approach to price adjustments and price indices

Price indices are used in the price adjustment clauses in procurement contracts. Kilo values the relationships with suppliers to a high degree. This in turn affects how indices are structured and the choices around the indices. For example, Kilo explains that this is why industry's indices are used in most cases. They do not want to find anything strange but what is commonplace. The index must be used in the industry of the procurement objective and the historical development needs to be suitable to the new procurement. This is evaluated based on previous experience and benchmarking. In some contract’s indices can be weighed against each other, but the choice is situational, and it is hard to instruct in general. It is also important that the index is delivered from an official source, the source for organization J is often o Statistics Sweden. If it is an index that is not used in the industry there can be comments and discussion about this with the suppliers, which is not welcome. However, Kilo has not encountered any disputes about indices in procurement contracts.

Prices are adjusted once a year and then it is the supplier who requests that they want price adjustment. At one moment Kilo mentions that their procurement team needs to be better at working with price indexes. The interviewee blames lack of time and the culture, those two factors together has made this a non-priority.

Attitudes towards using general versus narrow indices

Even though Kilo believes price indices should be higher up on the priority list, is hard to see the marginal benefit of more specialized indices. The current use helps avoiding extra costs during and in that way support the supplier during the whole project. The indices also offer predictability. Price index fulfills a risk minimization function. relief effect, then you can focus on something else in the agreement when the price index exists as an e function. Price indexes will not have large economic effects on the organization, and extra complicated work tasks with indices will not be worth it. According to Kilo more money can be saved when negotiating with suppliers.

Organization K

Organization K is a state-owned authority with a broad range of duties, over 30 areas. This also reflects the procurement task of the organization. Service agency/expert. Manager with long experience within procurement. Organization K procures state framework agreements for state authorities and also municipal. The agreements could be for IT, services, consultants, elderly care.

The organizational procurement process at a glance

These agreements that K manages add up to 15 billion SEK in total and there are more than 40 different framework agreement areas. In total there are 750 suppliers, where organization K manages the contracts. During the procurement process organization K uses different systems that support the procurement process, both internal and external. Lima also mentions that they seek to achieve a procurement where both supplier and purchaser are successful in the deal, the procurer should accomplish the requirements and the supplier should be profitable.

There is a tradeoff between price and quality. LOU demands the requirement specification, and this constitutes the foundation for the quality. If maximum quality should be achieved may lead to over detailed specification and fewer tenders and consequently higher prices. Lima thinks that the legal frameworks are too detailed and that it should be simpler for procurers to follow, it also hinders a flow in the procurement process.

Approach to price adjustments and price indices

For contracts more than four years, price adjustments are used. Lima mentions that price indices are one tool in the total procurement process, and it is not more important than other parts. The tool is used to minimize risk and help the relation between supplier and procurer. Some examples API, CPI, SKI (simple indices). Standardized clauses are used to structure the price adjustment part of the contracts, and the organization has ready to go indices.

These adjustments are mainly used for large monopoly contracts, when there is close cooperation between supplier and purchaser. One important factor when choosing the index is that it is neutral, and objective. Price indices are supposed to minimize risk and not help one of the parties. The index should hence be neutral and broad. Discussions about indices, suppliers wonder why something is used. Need to look at historical development. Lima mentions that there have been cases where a fixed price has been used and then the supplier has had huge price add-ons to minimize the supplier risk. Currently not long contracts, price lists are used, hence not much time is spent on price indices. But in other circumstances there has been more focus. Volume and length of contracts are the factors that need indices.

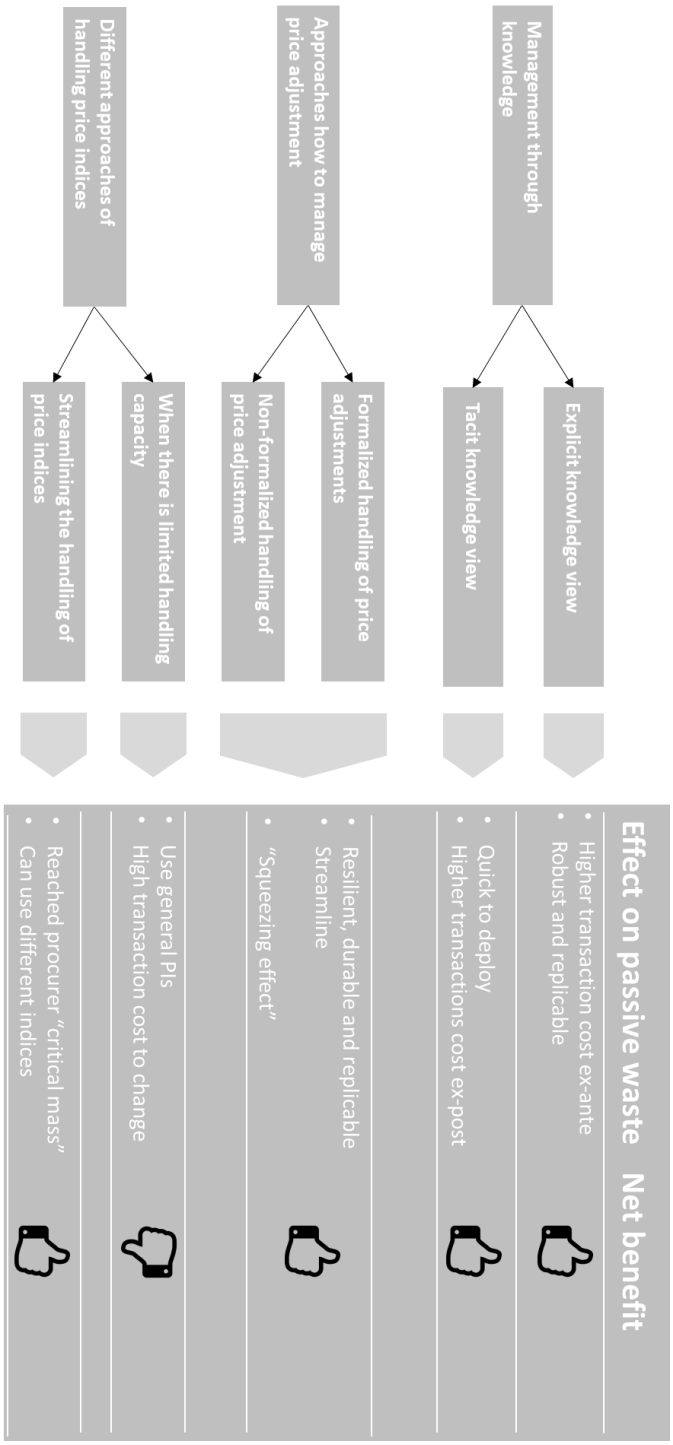
Attitudes towards using general versus narrow indices

The match with the real price is hard to tell, but Lima has not noticed any discrepancy. The need for different indices would depend on the type of contract, if it is a long contract different index

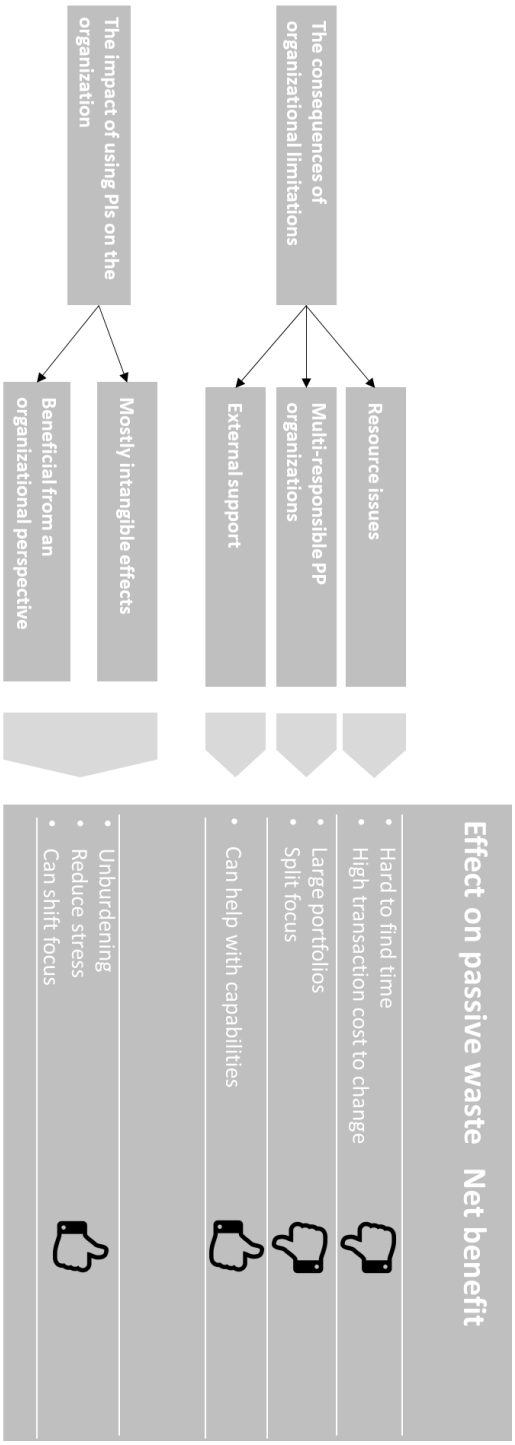
can have larger impact on price. Lima believes that for what they procure the indices that is used are enough. One does not want to achieve a to narrow index but instead a more general. If a narrower index would be used it would be for something very unique, but it is very important that is fair for both parties.

Appendix 3 – Illustrations of the association between using price indices and passive waste

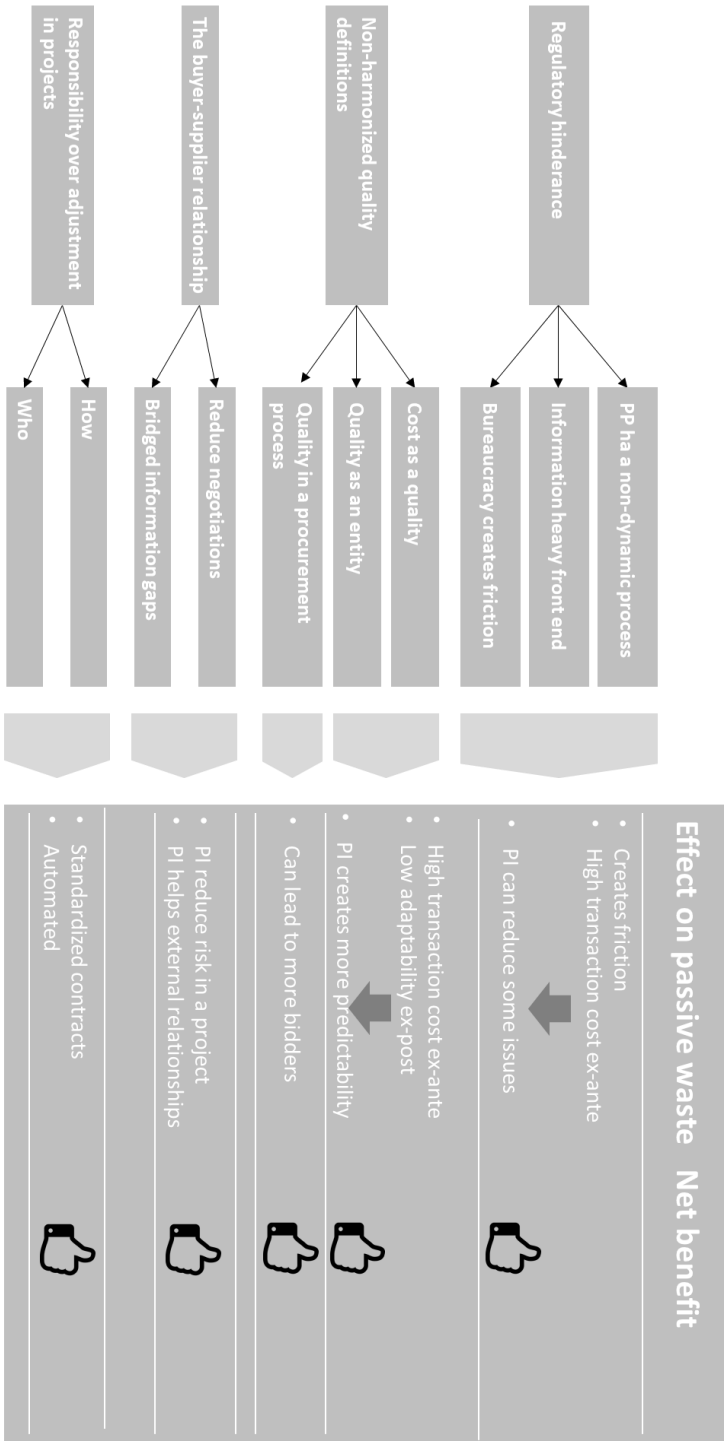
Are PIs used by public authorities in public procurement and if so, in what way is it used and how are they managed?



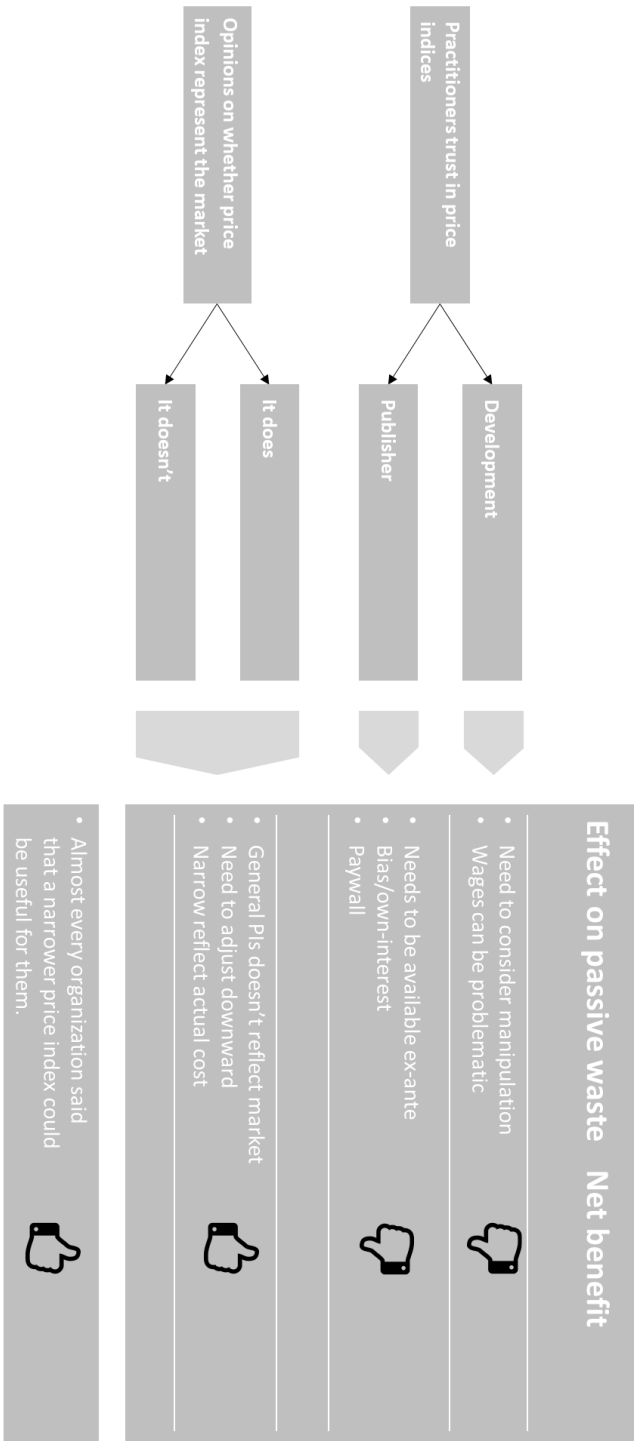
Are there internal consequences of using price adjustments based on price indices?



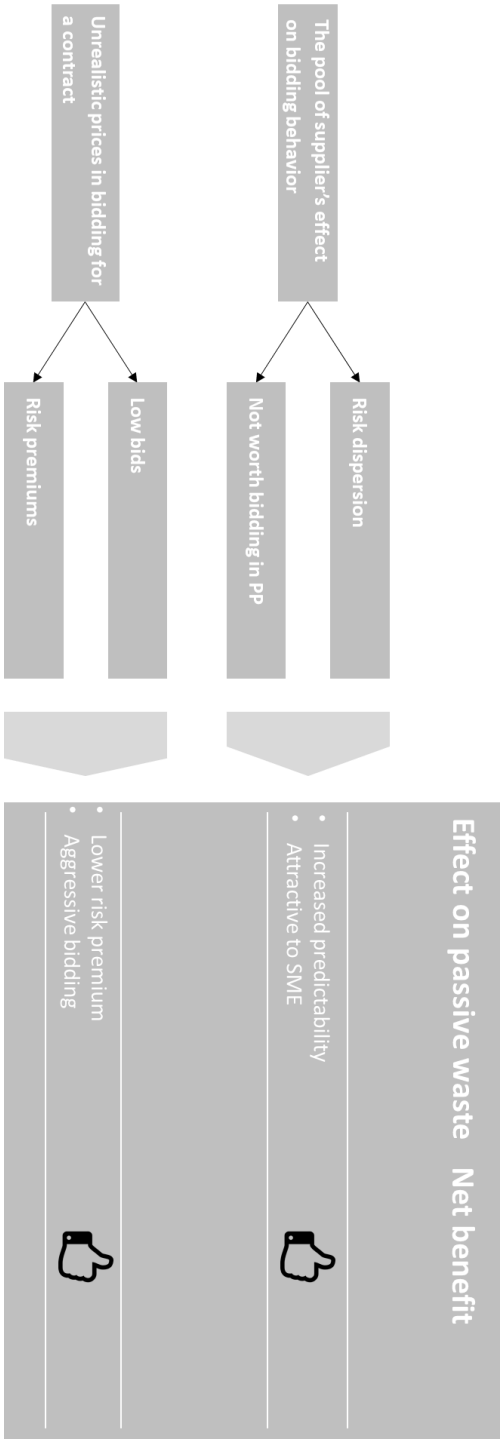
Do price adjustments based on price indices affect the relationship between the buyer-seller?



In what way does price indices fulfill the purpose of representing the market developments?



Does using price adjustments based on price indices influence bidding behavior of contractors?



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