Tender characteristics influencing tender attractiveness in Public Procurement

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Abstract

Public procurement is a major contributor to the general economy and broader political/societal goals. Public procurement spends money belonging to the citizens who demand fairness and transparency in the procurement process. The European Union recognizes this demand and requires public contracting authorities to tender to ensure non-discrimination, equality, transparency and competition. Currently, contracting authorities often do not receive the optimal number of bids or a suitable bid at all, which brings the need for innovation in the tendering process.

The regulation regarding public procurement guarantees transparency and fairness but limits the possibility of leveraging traditional procurement strategies. For example, to ensure fair competition, contracting authorities cannot invest in exclusive long-term relationships and should expect no preferential treatment by the supplier, who is, therefore, not incentivised to invest in the relationship. Public procurement is thus required to leverage other antecedents to achieve more participants in their tenders; this is where the concept tender attractiveness gets introduced. It is expected that a tender and its characteristics can differ in attractiveness; this paper identified and tested these different characteristics based on existing literature and expert knowledge, which is a new contribution to the research on tender attractiveness.

This research analysed numerous tenders from three public contracting authorities. The tenders of these authorities were coded and summarised in a dataset. To ensure the reliability of this dataset, a sample has been re-coded and compared to the original dataset. The characteristics, such as the number of pages, were regressed against the dependent variable, ‘’the number of participants,’’ which is used as a proxy for tender attractiveness. This analysis provided evidence that characteristics do matter for tender attractiveness and identified five significant antecedents for tender attractiveness: the number of pages of the main tender document, the length of the tendering schedule, the inclusion of monetary ceiling amount, tender during the holiday period, and the number of pages for answering questions.

Based on the outcomes of the statistical analysis, contracting authorities are advised to ensure the tender does not overlap with the holiday periods and to maximize the time window for participation. Contracting authorities are also advised to include a ceiling amount and to lower the complexity and size of the main tender document and award criteria. While this already provides valuable, easy-to-implement leverages, future research with a larger sample size and sufficient frequency for some control variables might enable even more and better insight into antecedents for tender attractiveness.

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1. Introduction

Public procurement is a topic of great interest to the general public and a major contributing factor in the general economy. The purchasing volume of the Dutch public sector in 2019, amounts to a total of 86,5 billion, with services being the main driver (Significant Synergy, 2021). The sensitive subject of spending public money asks for great due diligence and strict accountability principles. Taxpayers expect fair procurement practices with value for money as a primary driver. Besides primary goals like value for money, public procurement can also be used to stimulate broader societal goals such as environmental sustainability and competitive markets (Caldwell et al., 2005). Public procurement creates functioning and innovative markets and supports SMEs (Jääskeläinen et al., 2022).

In the current economic environment (2022), suppliers have plenty of work to choose from and can be critical in selecting projects (Clahsen, 2017). This, coupled with production capacity problems and labour shortages across sectors, may decrease interest for tenders set out by public buyers as the need for work is low(Strauss, 2021) (Winkel, 2022). According to Shash (1993), the need for work is a major deciding factor for construction companies to bid or not to bid on a tender. Simply put, when work is short, the need for work leads companies to bid in a tender that they would not even consider under normal or optimal circumstances. For example, The largest builder in the Netherlands improved their earnings and profit margins by avoiding risky tenders (Clahsen, 2017). The need for work is a factor that public buyers can not control, and this highlights the importance of focusing on other explaining factors a public institution can control.

To ensure a competitive bid in a shallow market, it is necessary to have multiple suppliers who treat the bid as high quality. Multiple competitors also lead to better prices and more competitive offers in general. For example, Pavel (2010), as cited in Nemec et al., (2020) found that an extra bidder led to an average price fall of 3,27% when analysing tenders in the Czech infrastructure sector. Another example of the importance of multiple bidders is mentioned by Gupta (2002) as cited in Nemec et al., (2020), who hypothesised that at least 6 to 8 bidders are required for the most economical advantageous bids. The need for multiple bidders requires public buyers to be sufficiently attractive to maximise competition and guarantee the best possible outcome of the tender. Multiple bidders, however, do not only impact price but also complexity. According to Linthorst and Telgen (2006), formal methods and tools are needed to handle this added complexity, which might bring additional costs or interfere with sceptical attitudes towards advanced formal methods; contracting authorities must keep this in mind.

There is a lot of research on the importance of customer attractiveness and preferential resource allocation for preferred customers. To become a preferred customer, one first has to become an attractive customer; according to Schiele (2020), "the buyer's attractiveness plays a pivotal role if a public body wants to leverage its purchasing volume to promote social reforms and obtain goods quotes". Therefore, it seems logical for public buyers to become as attractive as possible to improve competition and increase the chance of becoming a preferred customer.

Despite this abundance of research into the benefits of customer attractiveness and the preferred customer status, public procurement finds itself in a difficult position when it comes to levering the required antecedents. Public purchasers are bound by legislation and laws to ensure non-discrimination, equality, transparency and competition. The need for transparency and equality in public spending led to the formulation of "Directive 2014/23/Eu of the European Parliament and of the Council" to ensure that" Contracting authorities and contracting entities shall treat economic operators equally and without discrimination and shall act in a transparent and proportionate manner" (*DIRECTIVE 2014/23/EU*, 2014). This directive led to the formulation of thresholds for public procurement. The general thresholds are € 5,382,000 for (subsidised) works contracts, € 215,000 for all non-central government purchasers and defence contracts not listed in annex III, and € 140,000 for all contracts by the central government, excluding abnormalities. All purchasing contracts above the mentioned thresholds are to be held in the form of a public tender. To ensure these principles, this directive also excludes the possibilities for guaranteed long-term relationships with suppliers. The exclusion of the opportunity to build a long-term relationship with the supplier reduces the ability to become an attractive customer (La Rocca et al., 2012). This also makes it harder for a public entity to reach the preferred customer status; without guaranteed business, there is little incentive for preferential treatment.

The inability to commit to long-term relationships is not the only problem public purchasing faces. The need for accountability and transparency leads to high transaction costs in public procurement. Compliance prioritised over performance leads to excessive bureaucracy, a passive waste of public resources (Nemec et al., (2020). This bureaucracy leads to higher transaction costs according to the transaction costs economics theory. The transaction costs economics theory by Williamson proposes to optimise economic efficiency by minimising the costs of exchange (Williamson, 1987). These high governance costs, the limited ability to enforce transaction cost economics, and uncertain relationships increase the need to decrease complexity in other areas of public procurement (Fink, 2006) (Rokkan & Haugland, 2021).

Due to the high transaction costs and inability to lever all traditional antecedents for becoming an attractive/preferred customer, public purchasers may want to improve the attraction of the tender itself. By changing the tender characteristics, tenders may become more attractive; this is in line with the advice Schiele (2020) gives to public purchasers: they should focus on optimising processes they can control. This thesis aims to find antecedents of tender attractiveness by analysing tender characteristics. The following research question has been formulated to find and test these antecedents: "Do tender characteristics matter for tender attractiveness in public procurement?".

1.1 Problem statement

Tender attractiveness is a little-studied topic but is heavily connected to customer attractiveness. Tender attractiveness is needed to increase competition to achieve optimal value for money and to have sufficient leverage to pursue broader societal goals. It is expected that the characteristics of the tender documentation influence the tender attractiveness. Bureaucratisation and high transaction costs due to extensive documentation in the tender process are hypothesised to reduce tender attractiveness. It is expected that, on average, more participants lead to a better overall outcome for the contracting authority and

that enough participant is a prerequisite for achieving broader societal goals. Because of this, this study used the number of participants to measure the level of tender attractiveness.

To measure the effect of tender characteristics- such as over documentation- on tender attractiveness, the following research question was formulated *"Do tender characteristics matter for tender attractiveness in public procurement?"*. By answering this question, the researcher can distinguish discriminating variables which may increase or decrease tender attractiveness.

To fully answer this question, the following sub-research questions have been formulated. These sub-questions are important because they provide the theoretical background and evidence needed to answer the research question. Sub-questions one and two are literature-derived and will be answered in the theoretical framework. Sub-question three is answered in the results because this question required data analysis of actual tenders.

1. How to measure TA?
2. What factors are expected to influence TA?
3. Which factors influence TA?

1.2 Academic and practical relevance

The aim of this paper is to contribute to the academic literature on tender attractiveness. Tender attractiveness is a relatively new phenomenon, with only one relevant hit on Google Scholar when searching for "tender attractiveness"; this is a master thesis by Daphne de Vos. The existence and importance of tender attractiveness can be derived from the transaction costs economics theory and research into customer attractiveness. The influence of the tender characteristics on the transaction costs can be linked to operational excellence, which emphasises good functioning processes to increase customer attractiveness (Schiele, 2020).

This paper is not only based on theoretical ideas; practice shows that contracting authorities regularly get (too) few bids on a tender. These authorities and researchers hypothesise that the characteristics of a tender may influence the attractiveness of a tender. These contracting authorities use various methods to increase the attractiveness of a tender. A practical example of such a method comes from Utrecht University, which started with ‘’aanbesteden op 3 a4’’. In preparation for this, the University Utrecht tender team followed a writing course to formulate the tender in simple language. The first tenders in this new format proved to be successful, with decent participation in a tight market (PIANOO, 2022). This example is anecdotal evidence and therefore provides little value for procurement strategies. This paper tested the actual influence of tender layout and formulation on tender attractiveness, which is valuable for developing procurement strategies in contrast to anecdotal evidence.

This paper used a quantitative research design to test the antecedents for tender attractiveness by testing existing factors found in the literature and new factors derived from literature or expert knowledge. This paper contributed to the limited work on Tender Attractiveness and may help public procurement organisations design more inviting tenders. Because this paper looks at the characteristics and not the specifics, the findings are relevant for all contracting authorities. Finally, it is important to mention the effect minor improvements can make; according to the European Commission (2017), improving public procurement by realising a 1% efficiency gain can save 20 billion euros yearly.

2. Methodology and Data

This paper used exploratory literature research and quantitative data analyses to answer the research question:" *Do tender characteristics matter for tender attractiveness in public procurement?".* The literature study was carried out to find literature-derived factors to test in the quantitative analysis. The literature research cites earlier studies regarding tender attractiveness, bid or no-bid decision factors and customer attractiveness in general. The search terms and the number of hits are shown in appendix 2. The goal of the quantitative analysis is to confirm or debunk the factors derived from the literature. The last paragraph of this chapter elaborates on the validity and reliability of this paper. The statistical methods and intercoder reliability are explained in chapter 5 and 6.

2.1 Literature study

The literature study distinguished tender attractiveness from customer attractiveness and bid-or-no-bid decision research. These concepts are all unique but related and are theorised to have the relationship as shown in figure 1; figure 1 forms the theoretical framework of this thesis. This study focuses on tender attractiveness; tender attractiveness is a short-term oriented procedural-based concept which influences the willingness to bid and is ultimately part of overall customer attractiveness (Jääskeläinen et al., 2022). The literature study shows that public authorities cannot leverage traditional procurement strategies due to legislation and regulation; these limitations shift the focus from the traditional antecedents of customer attractiveness to tender attractiveness for public contracting authorities.

Tenders should provide equal opportunity for all participants, excluding the possibility of long-term relationships or future growth opportunities. Because of this, tenders must compete on other aspects to increase competition; this research looked at the soft factors contracting authorities might want to improve. These soft factors are part of the characteristics of a tender, and it is expected that characteristics such as the length of tender documentation and the workload for the participant influence tender attractiveness. It is theorised that by optimising the tender characteristics and documentation, contracting authorities should increase attractiveness by reducing transaction costs and maximising operative excellence. This paper also included various control variables, such as contract size and sector, to ensure valid results and avoid bias.

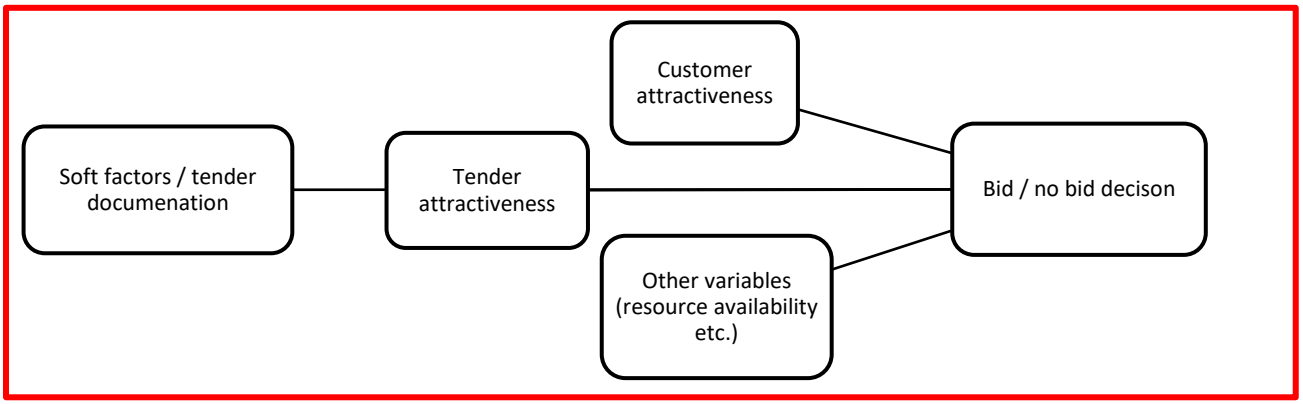


Figure 1 Relationship between TA, Bid or no bid and CA research.

This paper sought literature-derived factors worth testing in the quantitative analysis to test this theory and establish reliable antecedents that predict tender attractiveness. Not many studies on Tender Attractiveness have been conducted, resulting in a limited number of identified antecedents from primary papers. To ensure a comprehensive list of factors, this study also used factors mentioned in bid / no-bid decision research and on customer attraction in general. This paper preferably used peer-reviewed articles, which ensure better validity and reliability (Babbie, 2020)**.** Besides looking into the existing literature on tender/customer attractiveness and bid-no-bid decision-making research, this paper is also based on the transaction cost theory. Factors which influence transaction costs are expected to influence tender attractiveness. Transaction costs are always present when resources are exchanged but can be inflated by unnecessary information exchange or unclear information. Better tender documents are expected to decrease transaction costs, thus increasing tender attractiveness.

This research started with a preliminary list based on literature. This list comprises antecedents found in the limited research on tender attractiveness, the bid or no bid decision research, or customer attractiveness in general. To increase the validity of the variables, this list has been reviewed and complemented by experts in the field of public procurement. Other interesting factors -based on the transaction costs theory- found during the reading and coding process were discussed and judged by experts in the field of public procurement. If these factors were expected to influence tender attractiveness, they were also included in the factor list. This process led to a more inclusive set of factors while ensuring high validity. The different steps of this process are described in figure 2.

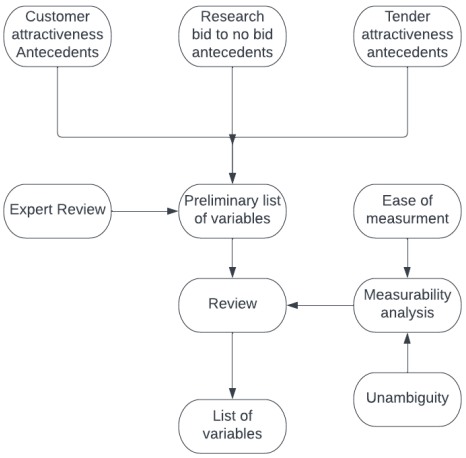


Figure 2 Research process to determine factors regarding tender attractiveness.

2.2 Data study and management

This chapter provides insight into the data study process and how the data was managed. This chapter increases the validity and replicability of this research and gives insights into the researcher's reasoning.

2.2.1 Data study

This study did not limit itself to the literature study but went all the way and tested the factors by statistical analysis. A data study was conducted to answer the research question and assess

the main drivers behind tender attractiveness. The dataset consists of researcher-generated data based on tenders from multiple public purchasing entities. The tenders are provided by Contracting authority A, Contracting authority B, and Contracting authority C. Although all tenders and tender data should be publicly available, these three public entities provided all tenders for 2020, 2021 and 2022.

The tenders were coded based on the factors described in chapter 4. The coding process was a combination of deductive and inductive coding. The deductive codes were formed based on the literature study; the inductive coding was done while reading and coding the tender documentation. Experts assessed the inductive factors to ensure their validity. Because this research includes data from hundreds of tenders, the researcher had to be selective in the selection of factors. Due to this research's exploratory nature, all possible factors were carefully examined and scored based on three principles: unambiguity, academic relevance and ease of finding. This method is deemed appropriate based on the suggestions made by O'Connor & Joffe (2020) in their paper on intercoder reliability, which proposes that the coding scheme should be appropriate for the intended level of research. This research tends to be quite exploratory, with few theoretically relevant concepts to fall back on. This type of research benefits from an unambiguity coding scheme; unambiguity coding schemes are expected to increase intercoder reliability in lightly researched topics. The unambiguity also proved to predict the "ease of finding variable". Unambiguous factors require little interpretation and can often be searched for in the respective tender files.

The factors are not only scored on unambiguity and ease of finding but also on academic relevance. Factors frequently mentioned in the literature or deemed by experts to be highly relevant might need to be included, even if they are not as easy to judge. This paper used a six-point scale on which each criterion was scored to decide which factor is included. To be included in this paper, a factor is needed to score a sum score of at least two plusses. The maximal score per criterion is +++, and the minimal score is ---. A score of two plusses is deemed an appropriate score of above 50% on a six-point scale.

After all the tenders were coded, the tender characteristics were summarised in SPSS and analysed to discover the relationship between the factors and tender attractiveness. In order to see which factors have a strong influence on tender attractiveness, the factors were tested against the number of participants, the proxy for TA. The outcomes of the quantitative study combined with the process documentation led to new reliable insights into antecedents for tender attractiveness.

2.3.1 Data management

This section provides insight into the data management behind this paper. This chapter explains the data collection, the reading process, the coding process, the data validation, and the dataset formulation process.

2.3.1.1 Data collection

This research gathered data from the Contracting authorityA, Contracting authority B and Contracting authority C (which procures for six departments of the Dutch government). These three public institutions are contacted and are willing to provide all tenders, plus their respective number of particiants, from 2020 and 2021 and some from 2022 to the researcher / PPRC. This provided a lot of reading and coding work; these processes are explained in the next sub-chapter.

This research included data from multiple public procurement institutions, ensuring that not all tenders have the same characteristics. Differences in tender characteristics and a large sample were required to answer the research question properly. The collected data is also recent; recent data helped generate more accurate findings. Tender attractivity is partly dependent on the economic situation; therefore, the economic situation of the sample should be comparable to the current economic environment. Recent tenders (2020 & 2021 &2022) are more likely to be similar in characteristics to ongoing and future tenders than older tenders. These factors combined increase the validity of this research.

2.3.2.2 Reading and coding

The provided tenders were analysed by reading them and coding tender characteristics based on the factors explained in chapters 3 and 4. The dataset was first formulated in Excel, the first column contains the tender name, which makes it possible to recode the tender. To ensure the reliability of the dataset, a sample has been re-coded and compared to the original dataset.

2.4 Reliability and validity

This paragraph discusses the reliability and validity of the different methods used in this research; this helps to guarantee generalizable and accurate findings.

2.4.1 Reliability

Reliability is defined by Taylor and Watkinson (2007) as "the extent to which independent surveyors evaluate a characteristic of an object or population, such as condition and reach the same conclusions". To ensure reliability, the factors must be clearly defined. This research primarily used peer-reviewed research to establish these factors. The established factors were discussed with experts in the field of public procurement and were assessed and complemented where necessary. A vulnerability of this paper was the code-reliability. The data collection and coding were characterised by a high work demand, increasing the possibility of coding mistakes. The researcher read and coded hundreds of tenders, which would not have been useable when coded unreliable.

To ensure intercoder reliability, a second coder has re-coded a sample of the tenders. This sample of tenders was chosen randomly and handed to a second coder who was instructed to code the tenders based on the instructions in appendix 4. After the second coder coded the tenders, the inter-rater reliability was calculated; this ensured reliable results. The inter-rater reliability is further explained in chapter 5**.** The reliability of this study is further reinforced by using an appropriately large sample size. A large sample size limits the effect of outliers or measurement errors and increases the statistical power of the tests. This paper also includes elaborate descriptions of the factors expected to influence TA, their background and the reasoning behind their inclusion; this provides insight into the decision-making process.

2.4.2 Validity

According to Sürücü & Maslakci, (2020), validity is "determined by the meaningful and appropriate interpretation of the data obtained from the measuring instrument as a result of the analyses". A measurement may be reliable without being valid, but a valid measurement will generally be reliable; therefore, reliability alone is not enough to ensure validity (Sürücü & Maslakci, 2020). Because of this, it is important to satisfy both the reliability and validity conditions to interpret the research findings safely. To ensure this study's internal validity, this research used literature-derived factors and provided extensive reasoning to support these factors. This research provides insights into the procedures, reasoning and thought processes

by describing each factor. To avoid including non-causal factors and weakening the internal validity of this study, the factors are discussed with experts in the field of public procurement. To further strengthen the validity, this research also included multiple control factors. Control variables are theory-driven and increase the validity by including other influencing factors (Antonakis en Dietz., 2011). Besides, the theoretical background consultation with experts in the public procurement field further strengthens the control variables' academic foundation.

This study's external validity is ensured by using real-world data from multiple companies and by including tenders from multiple sectors. Using data from multiple public contracting authorities increases the generability of the findings. For example, if this paper used only one company, the results would be less valid. This lessened validity is because firm-specific situations like payment behaviour may influence the number of participants more than tender characteristics. By controlling for different factors, the generalizability of this study is increased. Using a decently large sample size also increases the likeliness of finding statistically significant results and allows for a better understanding of the influence of different factors while simultaneously increasing the validity.

3. Theoretical framework

3.1 General theory

This chapter introduces the principles of tender attractiveness as a concept and how it differs from customer attractiveness. The concept of tender attractiveness is built on the transaction costs economics theory and the preferred customer/customer attractiveness theory. The transaction cost economics theory is associated with bureaucratic and process costs associated with tendering. The transaction costs economics theory is especially relevant because low costs to serve customers are deemed as attractive to suppliers as low-cost suppliers are to buyers (R. Bew., 2007 as cited in Hüttinger et al., 2012) . To better understand these principles and how these theories influence the concept of tender attractiveness, these are explained in the chapter sections after tender attractiveness.

3.2 Tender attractiveness

Attractiveness is required to reach a sufficient interest in projects and tenders. According to Gupta (2002), 6 to 8 bids are required to achieve the most economically advantageous bid, while Pavel (2010) cited in Nemec et al., (2020) predicts an average price fall of 3,27% per bidder. In the current situation in the Netherlands, 13% of all awarded public procurement contracts to tenders with just a single bidder (*Public Procurement*, 2020); this might not have been the case if these tenders had been perceived as more attractive.

This chapter focuses on tender attractiveness, a related concept to customer attractiveness, as previously explained and shown in figure 1. It is expected that tenders have different levels of attractiveness, comparable to differences in customer attractiveness but with different antecedents. The different levels of attractiveness in tenders are more interesting for the public sector than antecedents for customer attractiveness because they are much more controllable. It is expected that when tender attractiveness is increased, the number of bids and the quality of the bids will also increase.

According to Cheaitou et al., (2019), tender evaluation is often a subjective process in which personal perception of the tender plays an important role, leading to the belief that tender characteristics can influence the level of tender attractiveness. It is expected that the outcome of this ‘’subjective process’’ can be positively or negatively influenced depending on the

tender documentation's characteristics. The importance of structure and layout of a tender is also brought forward by the Contracting authority B, which conceptualised aanbesteden op 3 A4 (tendering on 3 a4 pages). By limiting the tender size to 3 pages, CONTRACTING AUTHORITY B simplified the tender and expected to increase tender attractiveness for bidders, especially for SMEs (Ministerie van Algemene Zaken, 2020). The possible increase in SMEs in participating has multiple benefits. According to Flynn (2017) the benefits of SME participation in the public market are competitive pricing arrangements while enhancing the local economic environment. SMEs can offer competitive pricing due to minimal overhead and streamlined operations; SMEs are also more likely to possess a superior geographical location when compared to (less numerous) larger firms.

The characteristics of a tender thus may attract or deter suppliers from bidding in a tender; for example, are suppliers discouraged from reading the tender when they see it entails 60 pages? The limited research on tender attractiveness and actions by contracting authorities point in this direction, multiple factors, such as the timing of the tender, the inclusion of a ceiling amount and the inclusion of unnecessary information, are all mentioned in previous research as influencing factors for tender attractiveness (Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021). These and other factors of this study identified are more elaborately explained in chapter 3.3.

Besides the subjective judgement of the tender documentation, tenders are often perceived as bureaucratic. This is partially due to legislation and regulation leading contacting authorities to prefer compliance over performance. The bureaucratic process of the tenders strains the procedural capacity of firms, and this is especially the case for SMEs that often lack procedural capabilities compared to large firms. Research by Flynn (2017) found that:" *firms adept at navigating through the formalities of the tendering process, pinpointing public buyers' requirements responding with a convincing value proposition and displaying competence in contract management are better placed to realise success"*. Therefore, the bureaucratic nature of the tender makes tenders less attractive, especially for firms lacking procedural capabilities; reducing this bureaucratic nature and increasing the ease of navigating the tender is expected to increase tender attractiveness.

Kelly et al., (2021) researched the consequences of low tender attractiveness, proving the importance of tender attractiveness. When tenders are not sufficiently attractive or if the tender process or outcome is dissatisfaction, this will invoke behavioural responses from the supplier (Kelly et al., 2021). When the suppliers are unsatisfied with the tender, the tenderer can expect non-response, poorly developed bids, negative relational impact and comparison of alternatives by the supplier (Kelly et al., 2021). To increase tender attractiveness and avoid unwanted behaviour, it is essential to improve tender attractiveness. Negative experiences with tenders in the public sector may decrease customer attractiveness for all companies who hold tenders. Therefore, tender attractiveness should be an essential focus of the entire public sector to keep the public sector attractive (Kelly et al., 2021); based on the research improving the procedural aspects of a tender should help achieve this.

3.2.1 Customer attractiveness

Becoming an attractive customer is something all procurement organisations should strive to achieve. The concept of customer attractiveness is a long-term and future-oriented process which aims to provide relational benefits to suppliers and customers (Jääskeläinen et al.,

2022). The concept of customer attractiveness is connected to the preferred customer phenomena. Steinle and Schiele (2008) advocate becoming a preferred customer to achieve preferential resource allocation. Besides preferential resource allocation, preferred customer status might enable access to better innovation and other privileged treatment (Hüttinger et al., 2012). Thus, becoming a preferred customer seems logical for public and private buyers.

Becoming an attractive customer and achieving the preferred customer status is well-researched in the private sector, the benefits are well-documented, and the theory provides valuable information on improving customer attractiveness. Research by Hüttinger et al. (2014) into the antecedents of customer attraction and satisfaction (in the automotive industry) found three significant paths for explaining customer attractiveness. These antecedents of customer attractiveness are Growth Opportunity, Operative Excellence and Relational Behaviour.

Unfortunately, public authorities are limited in maximising all these antecedents to become attractive suppliers (Schiele, 2020). Public buyers cannot influence all three factors because they are restricted by legislation and regulation. The first antecedent growth opportunity can not be fully exploited by public procurement. Public procurement has difficulty establishing long-term relationships or providing growth opportunities because this conflicts with the open competition value of public procurement (Schiele, 2020). The second antecedent is relational behaviour, and public procurement cannot fully exploit this antecedent. Legislation and the core principles of tenders limit the possibility of developing social relationships. According to Hüttinger (2012), the last antecedent is operative excellence, which includes optimising internal and information exchange processes. This antecedent is the least affected by the legislation and regulation in the public sector. Public buyers should avoid unnecessary problems and focus on streamlined operations to leverage this antecedent.

Despite the limited possibilities to exploit the antecedents for becoming an attractive customer, it is not all bad for public procurement. These antecedents do not exclusively decide attractiveness; other factors also influence attractiveness. Public procurement has multiple benefits compared to private procurement from a supplier's perspective. Open auctions are free to enter for all suppliers and provide equal opportunity while simultaneously discovering a fair market price (Tadelis, 2012). Another benefit from the supplier perspective is the payment policy. The bankruptcy risk of public organisations is negligible, and payments are often handled in compliance with the contract agreements; this significantly influences supplier satisfaction(Schiele, 2020). The low risk of bankruptcy implies a low risk of non-recovery, which allows for better financing terms for the supplier. According to Schiele (2020), these benefits lead to a preference for public firms over private firms at similar levels of profitability.

Overall public authorities are limited in leveraging the antecedents for customer attractiveness, reinforcing the importance of tender attractiveness. The public sector might benefit from combining the attractive attributes of the public sector with a focus on operational excellence. Attractive properties such as the low risk of bankruptcy and high contract compliance, combined with optimising operational procedures and processes, might increase customer attractiveness.

3.2.2 Transaction costs economics

The transaction costs theory expects that the goal of an organisation is to minimise the cost of exchanging resources in the market and inside the organisation to optimise economic performance (Fink, 2006). Public procurement is known for relatively high transaction costs due to the extensive need for transparency and compliance with legislation. Public procurement often turns to bureaucracy to ensure it complies with the legislation; this leads to excessive bureaucracy, reducing efficiency and increasing transaction costs which reduces the attractiveness of the transaction (Nemec et al ., 2020).

The transaction cost theory is highly associated with opportunism and governance. Opportunism combined with high-value contracts requires governance to control. Public procurement often uses contracts to ensure a sufficient governance level. In the private sector, firms can lower transaction costs through alternative methods of governance, such as long-term relationships in which trust and mutual benefits lower governance costs (Rindfleisch et al., 2010). The public sector is, as mentioned, unable to lever these long-term relationships and often diverts to contractual governance. Contractual governance leads to higher transaction costs and is difficult to combine with formal governance mechanisms. Wuyts and Geyskens (2005) suggest that formal governance might undermine informal governance methods. Contracting authorities should therefore be careful when relying on contractual (formal) governance; extensive documentation might lead to higher transaction costs and lower trust.

Transaction costs not only exist between organizations —highly bureaucratic processes in the firm and extensive documentation also increase transaction costs inside the organisation. Transaction costs will increase with the involvement of multiple departments or employees. Procurement often works in cross-functional teams, especially tenders, which are more complex and require multiple employees to formulate. These transaction costs will be further increased by the complexity of the documentation or the time it takes to read or formulate the documentation.

The complexity of the documentation is not the only source of tendering transaction costs. According to Thomassen et al. (2016) "*tendering costs are seen as a waste for losing bidders since the investments are asset specific and cannot be used for another tender in general"*, this does not only apply to losing bidders but also to cancelled tenders (Nemec et al ., 2020). Research by the centre for economic and business research, as quoted in (Flynn, 2017) found that the average cost of putting a bid together is €3200, rising proportionally with complexity and contract size.

Briefly summarised transaction costs will increase with the documentation's complexity and the tender documentation's extensiveness. The main sources of transaction costs are: preparing the tender documentation, training employees in preparing the bid, and salaries (Nemec et al., 2020). Costs stemming from salaries are associated with the time required to read the tender or to prepare the bid; longer or/and more complex documents will rapidly increase transaction costs. The high transaction costs compared to private firms makes public procurement less attractive. Transaction costs are therefore expected to impact participation rates, and it is expected that better tender documentation and processes will increase tender attractiveness because it decreases transaction costs.

3.3 Measuring tender attractiveness and identifying discriminating variables

After introducing the concept of tender attractiveness, it is necessary to define an appropriate measurement for this concept. This chapter is divided into two parts, the first section defines how to measure tender attractiveness, and the second half explains the possible discriminating factors influencing tender attractiveness. These factors are based on existing literature on tender attractiveness or the theories described in the previous chapter.

3.3.1 Measuring and defining tender attractiveness

Defining a measurement for tender attractiveness is necessary to answer the research question. There is currently no reference for measuring tender attractiveness and limited research on how to measure customer attractiveness. This section discusses various ways this construct can be measured and outlines each method's advantages and disadvantages. To better understand the principles of attractiveness, this paragraph also provides the general principles of attraction.

3.3.1.1 Measuring attractiveness

Attractiveness is a concept that everyone has to deal with daily. Attractiveness is not a clearly defined concept but is dependent on the context. For example, one can find a girl attractive because of her looks or a job attractive based on salary. Attractiveness is based on comparison, for example, I find her more attractive than her, or I find these circumstances more attractive than these making one thing more attractive than the other. In the context of tendering, attractiveness is expected to predict the interest in the tender. A tender characterised by its ease of reading and clearness may be perceived as more attractive than a tender consisting of 200 pages. The tender with a higher level of attractiveness is expected to lead to more interest which is theorised to lead to a more economically advantageous offer.

Measuring attractiveness is a complex topic for which different methods can be used. The MACBETH scale is one of the most frequently used methods for measuring attractiveness (Kundakcı & Tuş Işık, 2016). The MACBETH scale uses two measurements to define attractiveness. The first criterion meets the ordinal condition and is measured as: is X more attractive than Y? The second criterion meets the cardinal condition and measures the relative strength of the difference in attractiveness (Bana E Costa & Vasnick, 1994). This condition is measured by answering the following question on a six-point Likert scale. : "The difference in attractiveness between X and Y is?" (Bana E Costa & Vasnick, 1994). Evident from this is that attractiveness consists of multiple aspects but starts with comparing. In this research, this comparison is between tenders.

The limited research into customer attractiveness helps to lessen the abstractedness and provides a better understanding of which comparison will be made to decide attractiveness. La Roca et al., (2012) define customer attractiveness as:" *a supplier's assessment of a customer made on the basis of anticipated outcomes arising from customer-supplier interaction within a relationship"*. Therefore, attraction in the business context can be quantified by comparing the anticipated outcomes of multiple customers, in which the best scoring customer is hypothesised to be the most attractive. In the context of tender attractiveness, when controlled for influencing factors, tenders which are regarded as the most attractive will receive the most participants/attention. The following section of this chapter describes multiple methods of measuring tender attractiveness.

3.3.1.2 Number of views vs number of participants

The number of views might be used to measure tender attractiveness, and more views might imply more interest in the tender. The first problem with this measurement is that viewing the tender document is required to read the tender, which means that the number of views alone is unsuitable for measuring tender attractiveness. The number of views minus the number of participants in the tender might be more interesting. It can be argued that when there is a relatively high difference between the number of views and the number of participants, the tender is less attractive and vice versa. This seems a more appropriate measurement for tender attractiveness than the number of views alone and is an interesting factor. This measurement, however, still has a disadvantage. The number of views might be artificially raised by researchers and consultants who also view the tender documents but are not interested in participating. Another disadvantage of this measurement is the presence of different platforms. Tenders are often advertised on multiple platforms, requiring data from all these platforms to accurately determine the number of views.

3.3.1.3 Number of participants

It can be argued that the number of participants in the tender correlates with tender attractiveness. If a supplier participates in the tender, the anticipated outcomes are expected to be attractive enough compared to other tenders or work. The advantage of this method is that the number of participants is an easily accessible factor that is not artificially inflated. The disadvantage of this factor is that the researcher needs to control the open and restricted procedures. The restricted procedure has a preliminary selection round, after which at least the five highest-scoring bidders enter the actual competition. To control for this, the number of participants in the preliminary selection round must be included instead of the number of participants in the awarding round.

3.3.1.4 High bid price compared to similar tenders.

The bid price of a contract is expected to correlate with desirability; suppliers are expected to require higher profit margins when the tender is less attractive; thus, the bid price can be used as a proxy for attractiveness (Biruk et al., 2017). Contracts that receive relatively high bid prices are expected to be less attractive than contracts that receive relatively low bid prices. The advantage of this method is that attractiveness can be calculated following a mathematical process. If this process is correct, this provides a valid and reliable tool to measure tender attractiveness. It is beyond the scope of this research to determine what a relative high bid price and a relatively low bid price is. To accurately determine a definition for high and low bid bids, numerous tenders in comparable circumstances must be compared, which still leaves room for subjective judgment. This method adds complexity and may be of limited use when the number of bidders is low or zero.

3.3.1.5 Question information notes.

The number of questions on the information notes can be seen as a proxy for tender attractiveness. A higher number of questions may signify more (serious) interest. The number of parties responsible for the questions on the information notes might also correlate with the attractiveness of the tender; more different parties might be the result of an attractive tender. Despite the relative ease of tracking, this measurement tool has one significant drawback, the number of questions on the information notes is likely to correlate with tender quality. An incomplete or unclear tender likely receives more questions than a clear and complete tender.

While the complete tender is likely to be perceived as more attractive, this is not reflected in the measurement, making this an invalid measurement tool.

3.3.1.6 Final selection of the measurement tool

This paper decided to use the number of participants to measure tender attractiveness. This factor seemed to have the best combination of high validity and usability. This paper only uses data from open and restricted tenders (openbare / niet openbare aanbestedingen). The open procedure allows anyone to submit a full tender and is the most used procedure. The restricted procedure allows anyone to enter but uses pre-selection criteria; only pre-selected suppliers may submit a tender. In the pre-selection round, competitors are scored based on pre-determined selection criteria by the tenderer. These can be financial, economic or technical criteria. The best-fitting companies are invited to participate in the tender; this has to comply with the minimum number of five invitees (*Gids Proportionaliteit*, 2020). The scoring for this factor will be done in the following manner: for the open procedure, this factor includes anyone who has submitted a valid quote. For the restricted procedure, this is everyone who has submitted a valid entry in the selection procedure because this entails the initial interest.

3.3.2 The Discriminating variables

This section describes the expected factors based on the literature complemented by expert insights. The first section of this paragraph summarises the overall literature findings on which the factors are based. To enhance the readability of this paper, this paper uses factor groups; the reasoning behind these groups is explained in the second section. This paragraph's third and last section lists and describes the identified factors. For an easy overview of the factors, a summary list can be found in table 1, including the factor group, theoretical foundation and primary sources.

3.3.2.1 Overall literature support for the importance of tender characteristics

This section includes a brief, concise explanation of the most important findings of the literature study concerning the identified factors. This research uses factors based on transaction costs economics, tender/customer attractiveness research, or expert opinion. One factor may be linked to one or multiple theories.

The first theoretical basis for the factors is tender- and customer attractiveness, the factors linked to these are reasonably well documented in the literature. These factors are identified by previous research; an example is the factor "holiday in tender period". This factor was found in multiple case studies, including the study by de Vos (2021), and was therefore included in the factor list. The second theoretical base which factors are derived from is transaction cost economics. Transaction costs are the costs associated with the exchange of goods or information. Transaction costs are exceptionally high for tenders because they are generally quite complex; this is especially true when compliance with legislation is put before efficiency. These factors combined led to the inclusion of factors known to increase transaction costs.

The third and last input source is expert opinion. The inclusion of expert opinion ensures that factors which, according to experts, might influence tender attractiveness are included. Due to the lack of research on tender attractiveness, this provides new variables which can often be linked to the theory but are not explicitly mentioned in existing papers.

3.3.2.2 Factor groups

Factors in statistical analysis are often part of an overarching group, and insignificant factors might be part of an overarching significant factor group (Brown, 2015). In this paper, the statistical analysis did not indicate the need for factor analysis; the statistical analyses led to clear conclusions and required no simplification. Using factor groups was not expected to lead to a better outcome, and focusing on individual factors led to more precise managerial implications. This paper still identified and used four groups to separate the factors to enhance readability and ease of interpretation.

The four identified groups, besides the dependent factor tender attractiveness, are tender documentation, work demand supplier, tender characteristics and control factors. The factor groups tender documentation, work required, and tender characteristics follow a chronological pattern in tender assessment. The tender documentation refers to the outside of the tender, which can be seen without reading. The work required refers to the next step in the tender assessment process; this requires actual reading of the tender. The last step of the "first impression" of the tender is the assessment of the tender characteristics. When the tender is read, characteristics of the tender might influence tender attractiveness; these specifics might alter the willingness to participate in the tender. To account for tender or sector-specific differences, a group with all the control variables has been formed as the fourth group.

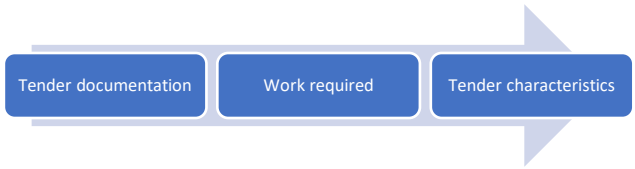


Figure 3 Factor groups in the tender assessment process.

Tender documentation

The first identified group factor group is "tender documentation". This group of factors forms the first impression to the reader. This factor does not require reading the tender document and contains factors like the number of pages and files. According to Kelly et al., (2021) the number of pages and files may be enough of a deterrent to avoid participation completely. It is quoted in Kelly et al., (2021) that" *just the whole approach where it sorts of says give me a price for this two-hundred-page specification document. We avoid them [IT1]"* and" *they are very wordy … about one hundred and sixty pages of tender specification sheets that came out"*, based on this, the first impression of a tender without reading may be enough to decrease attractiveness to the point of non-commitment.

Work required

The second identified group is "work demand supplier"; the factors in this group require actual reading of the tender document. The factors in this group influence the ease of participation in a tender. This group contains factors like the number of questions, the number of open questions and the number of references, all factors linked to the actual work demand for participation. This factor is also heavily connected to the transaction cost theory; when multiple companies answer the same award criteria waste is inevitable, which scales with the amount of work required.

Tender characteristics

This factor group refers to the factors that can be influenced by the tenderer but are not guaranteed to be consistently present in each tender. The factors in this group are not directly linked to the tender documentation but might influence tender attractiveness due to different mechanisms. The factors in this group also do not directly increase or decrease the work demand of the participant but may increase the perceived importance of the tender or the pressure the participant feels. For example, a short tender period may stress internal planning, or a framework agreement may be perceived as very important. This group includes factors like "tender in holiday period" and "optional grounds for exclusion".

Control factors.

This paper is aware that the antecedents for tender attractiveness are not limited to the formulation of the tender. Including the proper control factors increase internal validity and help find meaningful correlations (Antonakis & Dietz, 2011). To account for the influence of these variables, this paper included multiple control variables. These variables control for the influence of traditional customer attractiveness antecedents such as contract size. These variables also control for other aspects that tenderers can not or hardly influence, such as geographical location and sector.

Table 1 Factors

Factor name	***Factor group***	***Theoretical foundation***	***Sources and input***
Tender attractiveness	Dependent factor	Chapter 3.1	
Number of pages main tender document	Tender documentation	Transaction costs	(Schiele., 2020) (Prat and Valetti., 2009)
number of pages all tender documentation	Tender documentation	Transaction costs	(Schiele., 2020) (Prat and Valetti., 2009)
Number of questions in award criteria	Work demand supplier	Transaction costs	(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021)
Number of pages answers	Work demand supplier	Transaction costs	Expert input
Number of questions in selection criteria	Work demand supplier	Transaction costs	(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021)
Number of open questions in award criteria	Work demand supplier	Transaction costs	(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021)
Number of open questions in selection criteria	Work demand supplier	Transaction costs	(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021)
Number of appendixes and files	Tender documentation	Transaction costs	(Schiele., 2020) (Fink., 2006)
Number of documents to be submitted award criteria	Work demand supplier	Transaction costs	Expert input
Number of documents to be submitted pre-selection	Work demand supplier	Transaction costs	Expert input
Sector	Control factor	Control factor	Expert input
Location	Control factor	Control factor	(Shash., 1993) (Jääskeläinen et., 2022) (Schiele., 2020) (Karjalainen., 2011)
Length tendering schedule	Tender characteristics	Operative excellence	(Jääskeläinen et al., 2022) (Bageis & Fortune., 2009) (Oo et al., 2022)
optional grounds for exclusion	Tender characteristics	Operative excellence	(Jääskeläinen et al., 2022)
Open vs restricted procedure	Control factor	Control factor	Expert input
Contract value	Control factor	Control factor	(Oo et al., 2022), (Shash., 1993) (Jääskeläinen et al., 2022)
ceiling amount	Tender characteristics	Customer attractiveness	(De Vos., 2021) (Jääskeläinen et al., 2022)
Questions information notes	Tender characteristics	Transaction costs and personal perception	(De Vos., 2021)
Tender in the holiday period	Tender characteristics	Bid no bid decision and operative excellence	(Bageis & Fortune., 2009) (De Vos., 2021)
Penalties and bonuses	Tender characteristics	Customer attractiveness	(De Vos. 2021)
Completeness, clarity and quality of tender documentation	Tender characteristics	Transaction costs, operative excellence	(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993) (De Vos, 2021)
Number of references	Work demand supplier	Expert input and operative excellence	(De Vos., 2021) Expert Input
Type of references	Work demand supplier	Expert input and operative excellence	(De Vos., 2021) Expert Input
Pre-publication	Tender characteristics	Operative excellence	(Schiele., 2020) (Shash., 1993) (Jarkas et al., 2014) (Hüttinger et al., 2014)
Tenders divided into lots	Control factor	SME participation	(Eßig & Glas, 2015) (Oo et al., 2022).
Framework agreements	Control factor	Expert input	Expert input
Tender includes a presentation	Work demand supplier	Transaction costs	Expert input

3.4 Identified factors explained

This chapter summarises and explains all (control)factors found in the literature or advised by public procurement experts and briefly describes why the factor might influence tender attractiveness. Where deemed appropriate, citations from academic literature or case studies are given to help understand the factor. The factors are grouped in the formed factor groups to increase readability and interpretation

3.4.1 Tender documentation.

Number of pages main tender document and all tender documents

The number of pages is expected to influence TA negatively. Personal perception plays a role in assessing a customer; therefore, we assume that a tender's first impression plays a role in tender attractiveness (Schiele., 2020). It can be assumed that, on average, more pages take longer to read, implying higher transaction costs. More pages may even deter reading the tender if the supplier deems it too extensive. Prat and Valletti (2009 claim that descriptions that are too extensive can be a source of passive waste. The example they use to describe a source of passive waste is a 26-page-long description of chocolate cookies from the US Military Procurement Department, which may seem excessive to most. The variable number of pages has been included twice, once for the main tender document and once for the total amount of available pages in the tender documentation.

Number of questions award or selection criteria

According to experts, the number of questions the supplier has to answer in the tender's award or selection criteria section might influence tender attractiveness. A larger number of questions is expected to yield higher transaction costs and may negatively influence the suppliers' perception of the tender, this is expected to depend on the question type.

Number of open questions selection or award criteria

A larger number of open questions is hypothesised to reduce tender attractiveness. Open questions are more time-consuming to answer, may be perceived as harder to analyse or interpret and may generate more irrelevant information. These traits of open questions are expected to lead to higher transaction costs which, based on the transaction cost theory, are expected to decrease tender attractiveness. According to experts in public procurement, suppliers may find answering open questions more difficult. For example, a guardrail supplier may not have a clear vision of the development of guardrail systems in the upcoming ten years but may be able to supply a high-quality system despite this.

Number of pages for answering

This variable has been included to account for variability in question difficulty and the amount of work required to answer a question. The variables regarding the number of questions were determined insufficient to measure the actual workload demanded from the supplier. The variable "number of pages for answering" has been formulated to tackle this. To illustrate this problem the tender with project number: 1-D-13372-21 includes only one question. This one question, however, allows for a ten-page sized answer. If this research only included the number of questions, the actual workload would not be well reflected in the coding file.

Number of appendixes and files

The number of appendixes and files might influence the personal perception of the tender. Personal perception is connected to customer attractiveness; therefore, the number of

appendixes might influence tender attractiveness (Schiele, 2020). The number of appendixes is also expected to influence the transaction costs, especially unnecessary appendixes will decrease tender attractiveness based on this theory (Fink, 2006).

3.4.2 Work demand supplier

The number of documents to be submitted.

The number of documents a supplier must submit is expected to influence tender attractiveness, more documentation might imply a more complex tender and is associated with higher transaction costs.

Number of references

The number of references asked in the tender is expected to inlfuence tender attractiveness. A minimal number of references as a rigid criterion may scare off suppliers while increasing transaction costs for other suppliers, and references might also be seen as inappropriate. In the case study on Tender attractiveness by De Vos, (2021), suppliers found it difficult to find maintenance references because they do that themselves.

Type of reference

The type of reference is also expected to influence tender attractiveness. While reviewing a selection of factors, experts mentioned that the reference type could influence transaction costs and, therefore, tender attractiveness—this research distinguished between short and longer references. Short references only ask for a summary of the project and contact information, while long references ask, for example, for a letter of recommendation from the suppliers-supplier.

Presentation

While coding the first batch of tenders, this factor was identified as a possible discriminating factor. While most tenders require answering questions in the selection or award criteria, some tenders demand something extra in the form of a presentation. Because this variable increases the workload on the suppliers' side and may be perceived to be subject to a more subjective kind of judgement, the variable "presentation" has been included.

3.4.3 Tender Characteristics

Length tendering schedule

The length of the tender schedule is expected to influence Tender Attractiveness. This is based on the findings by Jääskeläinen et al., (2022), who found that short tendering schedules decrease attractiveness. A short tendering process might put more strain on capacity planning. This antecedent is further strengthened by Bageis & Fortune (2009) and Oo et al., (2022), which specifically mentioned the time allowed for submitting the bid as an important factor for bid–no–bid decision-making.

Optional grounds for exclusion.

The optional grounds for exclusion are a set of optional exclusion criteria.
When the public procurement institution wants to use the optional grounds for exclusion, this must be clear in the tender documents **Bron wet**. Examples of facultative exclusion criteria are failures to comply in previous tenders, a bad financial situation, and violation of environmental, social or labour laws. Optional grounds for exclusion might be seen as "rigid criteria" by some tenderers; the use of rigid criteria is expected to decrease tender attractiveness (Jääskeläinen et al., 2022). It is expected that tenders without these optional grounds for exclusion might be more attractive because they are perceived to be less

Ceiling amount
The presence of a ceiling amount is expected to influence Tender Attractiveness negatively. The ceiling amount is the maximum financial resources allocated to a specific project. A ceiling amount is considered a rigid criterion which makes tenders unattractive (Jääskeläinen et al., 2022). In the case study by De Vos (2021), supplier E mentions the following when it comes to ceiling amounts:" *the ceiling amount can be left out [of the tender documents], and clear communication is recommended".*

Tender in the holiday period
Choosing a correct tender period is mentioned at least twice in the literature. The time of season is mentioned as an antecedent in the bid-no-bid decision research by Bageis & Fortune (2009). They imply that the time of season might negatively or positively influence the willingness to bid. Public purchasers might overlook the importance of tender periods because they are active in different sectors with different traditions. For example, in the Dutch Construction Industry, many contractors are closed during the "bouwvak" holiday and are often closed between Christmas and the new year. While public buyers may set a tender during this period, it is expected that this will lead to lower tender attractiveness because the firms cannot properly assess a tender or prepare a bid. In the case study of De Vos (2021) this antecedent is described in the following setting: "*According to suppliers A,B,D, and E the buying entities need to take holidays into account. Currently, tenders are put out shortly before the summer or Christmas holiday and the deadline to hand in the offer is shortly after the holiday".*

Pre-publication
Public buyers can choose to pre-publicise a tender. The pre-publication allows for a shorter tender procedure and may enable suppliers to react better to future tenders. Based on the literature, pre-publication is expected to increase tender attractiveness. Pre-publication might give suppliers a better understanding of upcoming work and enable them to manage their resources better (Schiele., 2020). The availability of staff and the need for work are often considered important antecedents in the bid-no-bid decision (Shash, 1993) (Jarkas et al., 2014). Pre-publication helps to make forecasts, and reliable forecasts are seen as an important antecedent for operative excellence by Schiele (2020 and Hüttinger et al., (2014).

Questions Nota van inlichtingen (questions information notes)
The nota van inlichtingen or information notes are notes publicised by the contracting authority to clarify questions or to inform suppliers of changes in the tender formulation. All questions are answered in the information notes instead of a direct reply to ensure equality and transparency. The number of questions asked may say something about the difficulty or clarity of the tender but might also show a correlation with interest in the tender; more participants might equal more questions. The answers on the note of information are an antecedent for tender attractiveness in the case study by De Vos (2021).

Completeness, clarity and quality of tender documentation
Completeness, clarity and quality of the tender documentation are often mentioned as antecedents for tender attractiveness(Jääskeläinen et al., 2022) (Jarkas et al., 2014) (Shash, 1993). These factors are connected to the operational excellence antecedent for customer

attractiveness. Tender documents should be complete, easy to read, and of high quality. In the case study by De Vos (2021), it was mentioned that tender documents sometimes are copied and not case-specific, containing unnecessary information and increasing transaction costs. The quality of the documents entails the accuracy of the description, the overall structure and the included information. The document should contain all the necessary information and nothing more.

Penalties and bonuses

It is expected that bonuses will increase tender attractiveness while penalties will decrease tender attractiveness. However, this research only found this antecedent once in the available literature. This antecedent is described in the case study by De Vos (2021): *A penalty clause is seen as a risk because when the maintenance of a fire engine takes longer than, for example, five days, the supplier gets a fine.*" additional risk is expected to lessen tender attractiveness. However, according to experts in public procurement, penalties are expected to have a limited impact on tender attractiveness.

3.4.4 Control Factor

Sector

Because this research is not limited to one specific sector, the statistical analysis and dataset contain the factor "sector" to control this. Different sectors have different numbers of potential suppliers. For example, sectors that heavily leverage volume might have fewer participants when compared to sectors that do not leverage volume to the same extent. The inclusion of this factor also increases the external validity of this paper.

Geographical location

The geographical location is hypothesised to influence tender attractiveness positively or negatively depending on the location. According to Shash (1993), contractors will avoid contracts that are too far away from their operating area. Jääskeläinen et al., (2022) found that" *the favourable location where demanded service will be provided to end-users may increase tender attractiveness, but long distances between service locations without compensation decreases attraction'"*. Additionally, the descriptive statistics of this variable might help the contracting authorities consider pooling. According to Karjalainen (2011), centralising public procurement, as quoted in Schiele (2020), can often lead to double-digit savings; pooling in the area with the highest participation rate might help to achieve this.

Open vs restricted tender

This paper includes two types of tenders: open and restricted tenders. The researcher decided to include this factor to control for possible variance. The benefit of the restricted procedure from the bidder's perspective is that, generally, participating in the selection round requires less effort than a full bid for a tender. When not selected in the selection round, the loss of transaction costs is thus lower than when losing an open tender. The benefit for the contracting organisation is that using a selection round limits the number of offers the contracting authority has to assess.

Contract value

The contract value is an often-cited factor in the bid / no-bid decision research and is also mentioned in the limited tender attractiveness research. The contract value is also expected to be a moderator factor for other factors; firms are expected to avoid contracts which are too big

or too small for them (Oo et al., 2022). Project size is also mentioned by Shash (1993) and by Jääskeläinen et al., (2022) as an influencing factor on customer and tender attractiveness.

Tenders divided into lots

(Public) organisations can divide tenders into lots, a lot is a smaller part of the tender with its own bidding procedure. For example, a tender can be divided into five lots; a participant can bid on all five lots or one specific lot and will compete against other participants in that specific lot. Limiting the number of lots that can be awarded to one bidder is possible; this has to be included in the main tender document. Dividing tenders into smaller lots increases competitiveness, positively affecting SME bidding success (Eßig & Glas, 2015). Tenders divided into lots are expected to increase tender attractiveness because (specialised) contractors will avoid contracts that are too big for the firm size (OO et al., (2022).

Framework agreement

Tenders can also be held for framework agreements. Based on expert knowledge, framework agreements are expected to be more attractive to suppliers. Framework agreements are concluded with a four-year upper limit and can be awarded to one or multiple suppliers. The framework consists of several conditions (quality, quantity, delivery time) but does not necessarily contain technical specifications (Netherlands Enterprise Agency, RVO, 2019). When awarded to multiple suppliers, the awarding party needs to organise mini-competitions. For example, the University of Twente agreed to a framework tender with three employment agencies; when there is an assignment, they engage in a "mini-competition" to win this smaller assignment. Experts in the field of public procurement expect this to be more attractive because companies want to be included in the framework because they will not have access to these kinds of assignments for multiple years. Framework agreement tenders with multiple suppliers might also be more attractive when operating capacity is limited because companies can submit a non-competitive bid in the mini-competition when they are not interested, and vice versa.

4. Determining selecting factors

For replicability, it is essential to establish appropriate selection factors. This paper used relatively simple measurement levels due to the exploratory nature of this research. This chapter discusses the previous chapter's factors measurement levels and the reasoning for inclusion or exclusion in this research. The included factors are grouped in their respective factor group, the excluded factors are grouped in a separate paragraph. An overview of the included factors and the academic relevance and practicability of the factor is shown in table 2.

Factor	*Measurement tool*	*Academic relevance*	*Unambiguity*	*Ease of finding*	*Included*
Tender attractiveness	# Participants	+++	+++	++	yes
Number of pages main tender document	# Pages main tender document	++	++	++	yes
number of pages all tender documentation	# Pages all documentation	++	++	++	yes
Number of questions in award criteria	# Questions award criteria	++	-	++	yes
Number of pages answering	#pages for answers	++	+++	+++	yes
Number of questions in selection criteria	# Question selection criteria	++	-	++	yes
Number of open questions in award criteria	# Open questions award criteria	++	-	++	yes
Number of open questions in selection criteria	# Open questions selection criteria	++	-	++	yes
Number of appendixes and files	# Appendixes and files	++	++	++	yes
Number of documents to be submitted award criteria	# Documents to be submitted award criteria	++	++	-	yes
Number of documents to be submitted pre-selection	# Documents to be submitted preselection	++	++	-	yes
Sector	2 numbers NEVI CODE	++	-	+++	yes
Location	(main) delivery province	+++	--	+	yes
Length tendering schedule	# days tendering schedule	++	+++	-	yes
Optional grounds for exclusion	Use of optional exclusion grounds (yes / no)	---	+	++	No
Open vs restricted procedure	Open vs Restricted procedure (open / restricted)	+	+	+++	yes
Contract value	Monetary maximal contract value	+++	-	++	yes
ceiling amount	Monetary ceiling amount	+	+	+	yes
Questions information notes	Not included	+	---	++	no
Tender in the holiday period	Tender during the holiday period	++	-	+	yes
Penalties and bonuses	Not included	--	--	++	no
Completeness, clarity and quality of tender documentation	Not included	+++	---	---	no
Number of references	Number of references	+	+	++	yes
Type of references	Type of references (short / extensive)	++	-	+	yes
Pre-publication	Pre publicised tender (yes / no)	+	++	+++	yes
Tenders divided into lots	Is tender divided into lots (yes / no)	+	+++	+++	yes
Framework agreements	Is tender a framework agreement (yes / no)	+++	+++	+++	yes
Presentation	Tender requires a presentation (yes / no)	+	++	++	yes

4.1 Selection of factors and their measurement level

While the previous chapter identified the antecedents for customer attractiveness, this section provides insight into the measurement level and reasoning for inclusion. While this chapter already provides insight into the measurement methods for the variables, an even more extensive and specific coding scheme can be found in appendix 4.

4.1.1 Tender documentation

Number of pages main tender document.

The number of pages is expected to increase transaction costs and influence the personal perception of the supplier. This research distinguishes between the number of pages in the main tender document and the number of pages of the complete tender. This is done because the main tender document is regarded as the most crucial document, and the main tender document is, according to experts, the document which is likely to be read with the most interest. This specific factor only includes the pages of the main tender document. If the tender document includes appendixes which are also provided in a separate file, these pages will not be counted in this factor.

Number of pages all tender documentation

The number of pages of all tender documentation includes every page of the tender file. This numerical value is based on the number of pages of all tender documentation. The exception is when the appendixes are also listed in the main tender document; if this is the case, these are only counted once.

Number of appendixes and files

The number of appendixes and files might influence the personal perception of the tender, and unnecessary documentation will increase transaction costs. This factor is numerically based on the tender file's total number of appendixes and documents, and if an appendix is included multiple times, this appendix is counted only once. When a tender is divided into multiple parcels, an appendix specific to one parcel will only be counted for that specific parcel.

4.1.2 Work demand supplier

Number of questions in award criteria

The number of questions in the award or selection criteria might influence tender attractiveness. It is hypothesised that fewer, possibly combined with fewer open questions, will positively influence tender attractiveness because these are expected to hold lower transaction costs. This is a numerical factor based on the number of questions in the award or selection criteria. This variable will be counted at the level at which points are rewarded in the tender. If a tender consists of "question 1: 100 points", this will be counted as one question. If a tender consists of question 1a 40 points, 1b 30 points, 1c 30 points, this will be counted as three questions. Product demonstrations or try-out periods for a specific vehicle are not considered questions.

The number of pages for answersing questions

To control for the workload required to answer the questions in the award or selection criteria, this variable tracks the number of pages a supplier is allowed to use for a tender. This variable consists of the maximum number of pages a supplier can use to answer the questions asked in the award or selection criteria. In the rare case where a contracting authority did not explicitly state the number of pages a potential supplier is allowed to use to answer the question, the researcher assigned "one page" for the question. Pages are only counted for open questions, if a question is a multiple-choice question this will not be assigned as "one page".

The number of open questions.
It is hypothesised that a larger number of open questions increases transaction costs and may also negatively influence the personal perception of the tender. To measure the influence of open questions on tender attractiveness, this paper counted the number of open questions in the award or selection criteria section. This is a numerical factor based on the number of open questions in the award/selection criteria.

Number of documents to be submitted.
This is a numerical factor based on the number of documents a supplier must hand in to participate in the tender. These are the documents mentioned in the main tender document for the open procedure. For the restricted procedure, these are the documents specified in the main tender document for the selection procedure. When not explicitly mentioned in the supporting documents overview, it is assumed that each award criteria consists of one document. If documents do not need to be submitted straight away but need to be available on demand, these are still counted because they are still required for successful participation. This is because many documents need to be handed in shortly after winning the contract, in many cases, this period is too short to acquire these documents when they are not in possession.

Presentation
Some tenders require a presentation in the award stage of the tender. Preparing and holding a presentation is quite a lot of extra work and might influence tender attractiveness. This variable is included as a dichotomous variable. If a tender requires a presentation in the award or selection stage, this variable will be assigned 1; if a tender does not require a presentation, this variable will be assigned 0. If a tender requires a presentation after the award or selection decision has been made, this will not be counted as a presentation.

Number of references
The number of references required is expected to influence tender attractiveness, and more references are expected to lead to higher transaction costs, especially when these are "extensive references". In the Netherlands, tenders are advised by the "Gids proportionaliteit" to limit the number of references to one per core competence with a maximum value of 60% of the estimated contract size (*Gids Proportionaliteit*, 2020). Therefore, it is hypothesised that a larger number of references will decrease tender attractiveness. This factor is included as a numerical factor based on the number of references asked. This variable used the maximum number of references a participant is allowed to provide. If a tender requires one reference for three core competencies, this amounts to three references. If the participant can use one reference if it includes all three core competencies, it still counts as three references. If a tender not only requires references for the core competencies but requires further references in the selection or award criteria, these references are added to the total number of references; this is only the case if the tender allows for new references.

Type of references
Because the required type of reference can impact the transaction costs and negatively influence the supplier's personal perception of the tender, this research discriminates between simple and complex references. Simple references only require a supplier's contact details and the subject of the reference. Complex references require more extensive documentation, for

example, a written statement by the reference. The reference type is included as a dichotomous factor: 0 (simple reference) / 1 (extensive reference).

4.1.3 Tender characteristics

Length tendering schedule.

The length of the tendering schedule is expected to influence tender attractiveness. Longer tendering schedules allow for better resource planning and are expected to increase tender attractiveness. For restricted procedures, this factor is defined as the date for participation in the selection procedure -/- the announcement date of the selection procedure. For open procedures, this factor is defined as the date for participation -/- date announcement of the tender. This thesis uses the original tender period, meaning revisions or extended tendering procedures after questions on the information notes are ignored.

Ceiling amount

Including a ceiling amount can be seen as another rigid criterion hypothesised to decrease tender attractiveness. If a supplier thinks he cannot comply with the ceiling amount, no calculation will likely be made. A ceiling amount is included as a dichotomous factor: 0 (no ceiling amount in the tender) / 1 (ceiling amount in the tender).

Tender in the holiday period

When the tender period falls in the holiday period, it is expected to decrease tender attractiveness. This research used four weeks for the summer holiday and two weeks for Christmas to determine if the tender period falls within a holiday. The summer holiday period is based on the "bouwvakvakantie" of the respective year, which consists of four weeks. The Christmas holiday is based on the school holiday during Christmas, which is two weeks. A tender period has to be at least 5 days in the holiday period to be identified as a tender in holiday period.

Pre-publication

Pre-publication is expected to influence tender attractiveness. Early publication might allow for better resource allocation for suppliers, which is hypothesised to increase tender attractiveness. Pre-publication is included as a dichotomous factor: 0 (no pre-publication) / 1 (pre-publication)

4.1.4 Control factors

Sector

It is expected that sector-characteristics influence tender attractiveness or tender participation. The tenders are coded based on the CPV codes to control for this factor. Because of the exploratory nature of this research, this factor is limited to the first two numbers of the CPV-code. If there are main and sub-sectors, only the CPV code of the main category is included.

Geographical location

This thesis included the location factor to control for differences between geographical locations. It is hypothesised that economic activity between locations may differ, influencing participation rates. This factor is measured on the delivery province of the service or good; when there are multiple delivery locations, the province of the main delivery location is used. The specific codes can be found in the ‘’handleiding coderen’’ in appendix 4.

Open vs restricted procedure
The open vs restricted procedure might influence tender attractiveness and is an interesting control factor. This factor is measured by 0 (restricted procedure) / 1 (open procedure).

Tenders divided into lots
Tenders divided into lots are treated as individual tenders because they have individual procedures. Despite this, it is still hypothesised that this might influence tender attractiveness. Tendering in lots is aimed at increasing SME participation which might predict overall attractiveness (Hoekman & Tas, 2020). Tenders divided into lots are included as a dichotomous factor: 0 (not divided into lots) / 1 (divided into lots)

Framework agreements
Framework agreements might influence tender attractiveness. Winning a framework agreement with multiple suppliers gives access to the mini-competition. If the framework agreement is with one supplier, they might still be perceived as more attractive; all demand for a particular good or service is taken off the market and inaccessible to competitors. Framework agreements are included as a dichotomous factor: 0 (no-framework agreement) / 1 (framework agreement).

Contract value
This research uses the initial contract estimate if given in the tender. If the tender does not have a price range, the ceiling amount will be used if this is available. A high contract value is expected to result in lower tender attractiveness because firms will only participate in tenders appropriate for their size.

4.2 Not included variables.

While the previous chapter identified the antecedents for customer attractiveness, this section provides insight into the measurement level and reasoning for preliminary exclusion.

Completeness, clarity and quality of tender documentation
The completeness, clarity and quality of tender documentation are predicted to influence tender attractiveness. This factor is not included in the dataset due to the subjective nature of the factor and the need for expert knowledge on the tendering good or service. For example, one supplier might perceive the tender document as high quality and complete, while another might feel the opposite.

Penalties and bonuses
A penalty clause might decrease tender attractiveness, while including bonuses might increase tender attractiveness. This paper did consider the inclusion of this factor but decided not to. The nature of penalty clauses is hard to quantify. Some tenders include a general penalty for delays or non-compliance, while other penalties might be included to avoid unwanted behaviour. Because of the differences in penalties and bonuses, it is deemed an unreliable and inappropriate factor to predict tender attractiveness.

Optional grounds for exclusion.
Despite the suggestion that rigid criteria and the exclusion of bidders will lower participation in the tender, this variable is not included in this thesis. Nearly all tenders are expected to use some form of optional grounds for exclusion, making this an uninteresting variable.

Questions information notes.
Although questions on the information notes are mentioned by De Vos (2021) in a case study as an antecedent for tender attractiveness, this factor is not included in this analysis. Although the number of questions may say something about the tender complexity or completeness of the documentation, it is also a factor the tenderer can not control. The number of questions on the information notes is hard to interpret, and the number of questions may be higher if tender attractiveness is higher, more interest → more questions. The number of questions also does not reflect the actual load of the questions, for example, a question might be asked about a spelling mistake in the tender document. There is also the possibility that multiple tenderers have the same question; this data is not available, making the measurement unreliable. These factors combined support the decision not to include this factor.

5. Reliability of the coding

This chapter explains the statistical analysis and provides insight into the reliability of the coding. The first part of this chapter provides insight into the intercoder reliability of the coded data. This step guarantees the reliability of the data; this is necessary to make reasonable conclusions and provides value to the statistical outcomes. The second part of this chapter provides insight into the statistical tests that identify the antecedents for tender attractiveness.

5.1 Code reliability

To assess the reliability of the coding second coders re-coded a sample of 29 cases chosen randomly using a random number generator. The coders used the coding protocol, which can be found in appendix 4. While both coders came to similar findings as the original coder, coder B had a better overall similarity. Coder B had quite a lot of prior experience with tendering and tender documentation which likely helped in coding the tenders. Despite this, coder B had to re-code one tender because this deviated significantly. This was the first tender of coder B, which explains this dissimilarity. While coder A was not in the same level of agreement as coder B, differences in the coding were easily explained, and the cost of errors was deemed low. All variables were deemed to have a sufficient level of reliability, and thus, no variables were excluded based on reliability. The following sections of this chapter briefly describe the importance of testing the intercoder reliability and explains the identified errors.

Determining the reliability of the ratings is a prerequisite to yield noteworthy effect sizes; knowledge and explanation of the interrater reliability in a data set are crucial for valid and generalisable results. It is important to make a distinction between interrater reliability and interrater agreement. The interrater agreement relates to the extent coders assign the exact same value for each variable being rated, and interrater reliability refers to the consistency coders distinguish differences on a measurement scale. According to Gisev et al., (2013) there is no predefined acceptable level of agreement or reliability. Judgement on the reliability has to be made based on the nature of the study and the possible implication of the results. Therefore, assessing intercoder agreement is only possible when the seriousness of the disagreements is carefully considered.

While reliability can only be assessed when the effects of the errors are appropriately determined, it is still relevant to calculate the reliability using statistical analysis. Cohens Kappa has been calculated for the variables to calculate the statistical reliability of the code. It has been decided that Cohen Kappa is the most suitable test because it considers the random

error. Random error refers to the chance that a random variable by the second coder matches the original variable, which is more likely to happen to frequent variables. To account for this random error, cohen's kappa attaches less value to matching frequent variables and more to matching unfrequent variables.

Unfortunately, the kappa statistical test is only suitable for the nominal and ordinal variables (Klein, 2014). For the ratio variable, the intra-class correlation has been calculated. The ICC has been calculated using consistency instead of absolute agreement because it has been established that precise agreement is less important than consistency for the ratio variables. The statistics for ICC and cohen kappa are provided in the tables below.

Table 2 Reliability analysis Kappa

Variable	Statistical test	Outcome	Reliability
Presentation	Kappa	,567	Moderate agreement
CPV-CODE	Kappa	,885	Almost perfect agreement
Delivery location	Kappa	,749	Substantial agreement
Open vs restricted	Kappa	1,00	Almost perfect agreement
Ceiling amount	Kappa	,686	Substantial agreement
Tender during holiday	Kappa	1,00	Almost perfect agreement
Type of reference	Kappa	,767	Substantial agreement
Pre-publication	Kappa	1,00	Almost perfect agreement
Tender divided in lots	Kappa	1,00	Almost perfect agreement
Tender is a framework agreement	**Kappa**	**,047**	**Non to slight agreement**

Note. <0 agreement, 0,0-0,2 non to slight agreement, 0,21-0,40 fair agreement 0,41-0,60 moderate agreement, 0,61-0,8 substantial agreement, 0,81- 1 almost perfect agreement (McHugh, 2012)

Table 3 ICC intercoder reliability analysis

Variable	Statistical test	Outcome	Reliability
Pages main tender documentation	ICC	1,00	High
Pages all documentation	ICC	,996	High
Questions	ICC	,984	High
Pages Answering questions	ICC	,770	High
Open questions	ICC	,978	High
Appendixes and files	ICC	,991	High
Documents to be submitted	ICC	,913	High
Length tendering schedule	ICC	,609	Medium
References	ICC	,997	High
Contract value	ICC	1,00	High

Note. <0,5 low reliability, 0,5-0,75 medium reliability >0,75 high reliability (Koo & Li, 2016)

The outcome of the statistical tests provides evidence that the variables are reliable with one exception, namely the variable ‘’tender is a framework agreement’’. At first glance, this variable is too unreliable and is better excluded from the statistical analysis, but when further investigated, the cost of the error seems acceptable while, of course, not being ideal. The tender that severely affects this outcome is the tender "welzijnsaanbieder Contracting authority A, " coded incorrectly by the primary coder. When this tender is excluded, the kappa increases to 0,41, which shows moderate agreement for the other cases. This factor, therefore, has been included in the statistical analysis despite sub-optimal reliability.

It has been established that reliability can not be established by statistical analysis alone; therefore, this research conducted further analysis of the re-coded samples. This section will summarily explain the findings of this analysis. A detailed description of this process with examples from the actual data set can be found in appendix 6. This research identified three types of coding errors; these are minor errors, obvious coding errors and interpretation errors.

The first type of error is the minor error; this error is expected to have little effect on the study's outcome. In this study, this error is most frequently found in ratio variables. The cut-off ratio for this error has been established at a 10% difference between coders. If the difference is greater than 10%, this error has to be further investigated and is not seen as a minor error. With an error rate of 10%, this research ignores insignificant differences which stem from counting errors or similar mistakes. The researcher considered that not all differences are equal; dissimilarity in nominal or ordinal values is more severe than slight differences in ratio variables.

The second error is obvious coding errors; these errors are unfortunately expected with extensive coding schemes. According to Mouter & Vonk-Noordergraaf (2012), a too complex or detailed coding protocol makes it difficult for the second coder to consider all decision rules leading to coding errors. This type of error has a limited effect on the reliability of the dataset because these errors stem from improper compliance with the coding principles. Differences in knowledge on the subject seem to influence this error; coder B, more familiar with tendering, had fewer ‘’obvious coding errors’’ than coder A. Having multiple coders also reduces the effect of incompliance with the coding protocol; it is unlikely that both coders will fail to follow the directions of the coding protocol.

The third type of identified error is the interpretation error, and these are the types of errors which always require further investigation. This type of error seemed to be most commonly caused by ambiguity in the tenders and the complexity of the coding protocol. Not all tender documentation had the same level of completion, leading to some minor mistakes; these mistakes were analysed and discussed with the re-coders. Just like the other error types, examples and elaborate explanations can be found in appendix 6. Overall the statistical reliability analysis combined with the theoretical analysis provided evidence that the data is reliable and that there is no reason to believe that the findings of this study are compromised by unreliable coding.

6. Statistical analysis

This chapter describes the statistical choices and provides the reasoning behind these variables; this chapter is divided into three sections. The first section outlines the descriptive statistics; the second section explains the chosen statistical tests and the possible violation of assumptions; the results are included in the third and last section.

6.1 Descriptive statistics

The statistical analysis started with descriptive statistics. Descriptive statistics summarise the data and give preliminary insight into certain trends(Jonker & Marshall, 2010). Descriptive statistics thus provide the background information for the reader and help with interpreting the inferential outcomes. Generally, descriptive statistics can be divided into three major types: measures of frequency, measures of central tendency, and measures of dispersion (A. Gupta et al., 2019). This paper included all these types to guarantee a comprehensive panel of statistical tests. The descriptive statistics for the ratio variables are regarded as more interesting because they allow for more variation; the descriptive of these variables are provided in table 2.

Table 4 Basic descriptive statistics

Variable	N *	Minimum	Maximum	Mean	Std. Deviation
# Participants	337	0	21	4,33	3,682
# Pages main tender document	347	7,0	73,0	34,049	11,3081
# Pages all documentation	347	41	2849	201,28	270,612
# Questions	347	0	27	3,21	3,516
Pages for answering questions	347	,00	70,00	7,4071	7,92804
# Open question	347	,0	27,0	2,844	3,2629
# Appendixes and files	347	5,0	249,0	18,988	19,1607
# Documents to be submitted award criteria	347	2,0	27,0	10,870	2,9451
# days tendering schedule	347	20,0	139,0	54,977	16,2974
Monetary maximal contract value	224	25,000	208,200,000	8,185,419.09	23,517,788.114
Number of references	347	0	20	3,27	3,373

*. N = is the number of unique tenders and lots

The frequency tables of the nominal variables are included in Appendix 5; these may help the reader to interpret results or help to understand why variables are included or excluded in the inferential analysis.

6.2 Inferential statistics

This paper aims to provide antecedents for tender attractiveness; this has been achieved through inferential statistical analysis. This chapter explains the need for inferential statistics, the reasoning behind the selected statistical tests, and their assumptions. Inferential statistics further increases access to the presented data compared to descriptive statistics. Inferential statistics can be used to study the relationships between two or more variables or differences between groups (Marshall & Jonker, 2011).

This paper used regression analysis to determine which factors predict tender attractiveness. Regression analysis investigates the relationship between variables and can be used to predict values. This paper investigated the relationship between the identified factors and tender

attractiveness (O. Sykes, 1993). This paper ran a regression analysis between all independent and dependent factors using the "enter method". This method has a reduced chance of including the wrong explanatory factors compared to methods such as stepwise or backwards regression (Smith, 2018). After running the regression analysis, it became clear that the residuals were not normally distributed, violating an assumption of linear regression. To account for this paper used, bootstrapping when the residuals were non-normal distributed; according to Carpenter et al. (2003), "The bootstrap provides a natural way to address this [non-normal residuals] in regression". The independence assumption of the bootstrap is fulfilled because the contracting authorities are entirely independent of each other, and tenders are formulated independently of each other(Abney, 2002).

Another assumption which was violated was the co-variability assumption. This was tested by assessing the VIF values of the variables. VIF stands for variance inflation factor; a high VIF means that a variable is largely explained by another variable and might be redundant. There are many different sources which argue for an acceptable VIF level, mainly ranging from <2.5 (Johnston et al., 2017), <5 (Kim, 2019) to <10 (Hair et al., 2013), this research uses the threshold of 10. A VIF of 5 has an R2 of 0,8, while a VIF of 10 has an R^2 of 0,9; this means that another variable explains 80% or 90% of the respective variable. Because of the exploratory nature of this research, this research used the VIF threshold of <10; in this way, explanatory antecedents can best be identified while still limiting co-variability. Two variables showed a VIF of greater than 10. The variables open questions, and the number of pages answering questions showed strong co-linearity; therefore, the variable open questions has been excluded from the analysis, reducing the VIF to <5. This exclusion is non-problematic because the questions in the tender are still tracked by the factors ‘’questions’’ and ‘’number of pages for answering questions’’ in which the latter accounts for the complexity of the question, similar to the factor open questions did.

One variable was transformed to increase the collected data's usability; this is the variable monetary contract value. The contract value was not provided in 123 of the 347 cases, severely decreasing the sample size. To account for these missing cases, the factor was re-coded to the contract size estimation (yes/no), which has no missing cases. Transforming the factor CPV-code into goods and services has also been considered. In its original format, this factor has many values with low frequency, making it unusable with the current sample size. After consultation, it has been decided that it is better to exclude this variable than to combine all unrelated services and goods into two values. The variables delivery-location and pre-publication have also been excluded; 96,5% of the tenders have Zuid-Holland as the primary delivery province, while 99,3% of the tenders are not pre-publicised, providing little variance in these variables (appendix 5).

6.3 Results

This section explains and describes the results of the study. The regression model has an adjusted r-square of 0,167 which means that this model can explain 16,7% of the variance in tender attractiveness. This model uses an alpha of 0,1; this is deemed appropriate by this research's exploratory nature (Schumm et al., 2013). This model identified five statistically significant predictors (<0,1) of tender attractiveness: pages main tender document, days tendering schedule, ceiling amount, tender during the holiday period and the number of pages for answering questions.

Pages main tender document
The variable ‘’number of pages of the main tender document’’ is a significant predictor of tender attractiveness (B=-/-,084, P=,005). The number of pages in the main tender document negatively affects tender attractiveness; a higher number of pages predicts fewer participants in the tender.

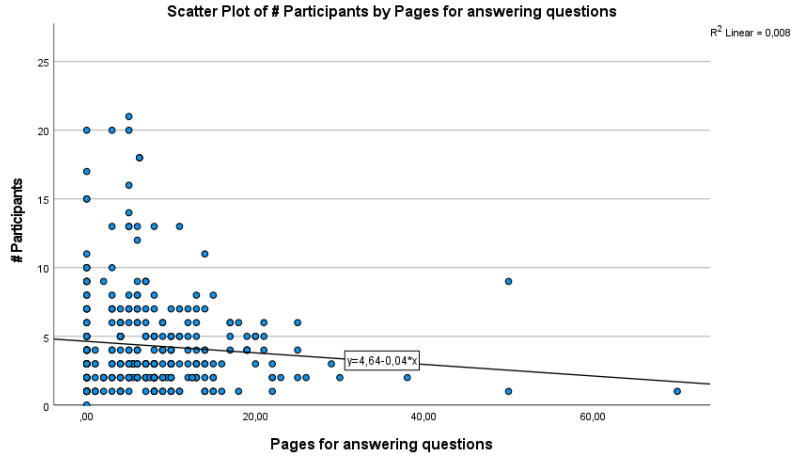
Days tendering schedule
The variable ‘’ number of days tendering schedule’’ is a significant predictor of tender attractiveness (B=,034, P=0,014). The time between the publication of the tender and the deadline for participation influences tender attractiveness, and more time between the publication and the deadline for participation predicts more participants in the tender.

Ceiling amount
The variable ‘’ inclusion of ceiling amount’’ is a significant predictor of tender attractiveness (B=2,275, P=<0,001). The inclusion of a monetary ceiling amount seems to increase tender attractiveness. The mean number of participants in tenders with a ceiling amount is 5,24, and tenders with no ceiling average 3,66 participants per tender.

Tender during the holiday
The variable ‘’ tender during the holiday’’ is a significant predictor of tender attractiveness (B=-/-2,462, P=<0,001). A tender during the holiday period negatively affects tender attractiveness. Tenders whose time window of participation falls in a holiday period average 2,9 participants, and tenders whose time window does not overlap with a holiday period average 5,08 participants.

Pages for answering questions
The variable ‘’ number of pages for answering questions’’ is a significant predictor of tender attractiveness (B= -/-,042, P=,097). This variable tracks the number of pages a supplier can use to answer the award criteria.

Equation 1 Pages answering questions vs participants



Tabel 1 Regression table

Factors	Combined B	Combined Sign 2.tail	B Contracting authority C	B Contracting authority A	B CONTRACTING AUTHORITY B
# Pages main tender document	-0,084	0,005**	-0,290**	-0,066*	0,076
# Pages all documentation	0,001	0,569	-0,003	0,002	-0,008
# Questions	-0,076	0,163	0,012	-0,023	-0,053
Presentation	1,147	0,216	2,277	1,008	0,363
# Appendixes and files	-0,027	0,342	-0,426**	-0,021	-0,014
#Documents to be submitted award criteria	0,036	0,699	0,463**	0,008	0,015
# days tendering schedule	0,034	0,014**	0,031	0,060**	0,121***
Open vs Restricted procedure	1,281	0,323	1,907	-0,194	N/A
Monetary ceiling amount	2,275	<0,001***	-0,416	3,053***	2,217*
Number of references	0,124	0,203	0,253	0,034	-0,300
Type of references (short/extensive)	-0,578	0,185	N/A	0,179	1,231
Is tender divided into lots	0,652	0,187	1,470	0,391	0,115
Is tender a framework agreement	-0,259	0,660	-2,513	0,266	0,754
Tender during the holiday period	-2,462	<0,001***	-2,663*	-2,687***	-2,066**
Contract size estimation yes/no	-0,522	0,283	1,083	-0,089	-0,858
Pages for answering questions	-0,042	0,097*	-0,063	-0,098*	-0,021

** <0,1 **<0,05 ***<0,001 Significance 2 tailed*

Additional regression analysis has been conducted for each authority to test possible differences between contracting authorities (CONTRACTING AUTHORITY A, Contracting authority B, Contracting authority C). The Beta's and their significance level have also been included in the table above, which makes for easy comparison and helps interpret the results. It is important to note that all significant beta's are either negative or positive for the respective factor, providing additional validity to the results. The Contracting authority A and the Contracting authority C used the bootstrapping regression method, while the residuals of the Contracting authority B showed a normal distribution, allowing for standard regression.

The variable tender during the holiday period is the most consistent factor and shows in all of the regressions providing strong evidence that this variable influences tender attractiveness regardless of circumstances. The variables ''days tendering schedule, monetary ceiling amount, and pages main tender document'' are shown in two regression analyses and the overall regression analysis; this provides reasonable evidence that these variables will be consistent for most contracting authorities. The factor ''pages for answering questions'' show only in the overall analysis, and for Contracting authority A, this may be because the sample

size of Contracting authority A (N=229) is the biggest, which increases the chance for statistically significant results.

The factors documents to be submitted and the number of appendixes and files only show results for the tenders of the National Contracting authority C. The relatively small sample size increases the vulnerability to outliers which might explain these findings (N: Contracting authority C=69, Contracting authority A=229, CONTRACTING AUTHORITY B=49). The relatively high standard deviation of the ‘’document to submit’’ (SD: Contracting authority C =4,18, Contracting authority A=2,53, CONTRACTING AUTHORITY B=2,33) suggests this factor might contain more outliers for the National Contracting authority C compared to the other contracting authorities.

The overall outcomes of the statistical analysis provide five antecedents for tender attractiveness. The variables, pages main tender document, days tendering schedule, monetary ceiling amount, tender during the holiday and number of pages for answering questions are statistically significant and show relationships in agreement with the literature. All variables, except pages for answering questions, show good or decent consistency between contracting authorities, allowing for generalisable results that should benefit most public contracting authorities.

7. Discussion, managerial implications and limitations

This chapter provides insights into the findings, the managerial implication and the limitation of this paper. The discussion describes the overall findings and outlines the interpretation in light of the existing literature. The managerial implications summarize the actions on how contracting authorities can leverage the identified antecedents. The last section outlines the limitations of this research and gives suggestions for future research.

7.1 Discussion

In procurement, both parties need to be sufficiently attractive to each other to succeed in business and have the most advantageous economic outcomes. If a customer becomes sufficiently attractive or more attractive than other customers, they might receive preferential resource allotment and competitive advantage. This idea has led to the introduction of the concept of customer attractiveness. Purchasing authorities should be able to increase their customer attractiveness by providing growth opportunities, operative excellence and by improving their relational behaviour (Hüttinger et al. 2014). Public contracting authorities, however, are unable or severely limited in levering these antecedents for customer attractiveness due to regulation and legislation.

Besides differences in attractiveness between customers, there might also be differences in attractiveness between tenders; this idea led to the concept of tender attractiveness. Tender attractiveness is a novel concept with a limited amount of existing literature. This concept is much more interesting for public contracting authorities because they are more accessible than the antecedents for customer attractiveness. Based on the transaction costs economics theory and the operative excellence antecedent from customer attractiveness, it is expected that optimizing the tender formulation process can lead to increased tender attractiveness.

This research aimed to find and test possible antecedents for tender attractiveness. This research used factors derived from the limited research on tender attractiveness and the bid-or-no-bid decision-making research. These factors were assessed and complemented by

experts in the field of public procurement to ensure a comprehensive factor list. Based on this factor list, three independent public contracting authorities' tenders (2020-2022) were coded and recoded, forming a reliable dataset suitable for statistical analysis. These factors were regressed against the dependent variable number of participants, which after careful consideration, seemed to be the most appropriate proxy for tender attractiveness. The statistical analysis resulted in five statistically significant antecedents for tender attractiveness; these five antecedents are comprehensively explained below their respective header.

Tender during the holiday period

Tenders whose time window of participation overlaps with the holidays have significantly fewer participants than tenders that do not overlap with a holiday period. The average number of participants of ‘’holiday tenders’’ is 2,9 versus 5,08 participants of non-holiday tenders; this factor is consistently significant for all contracting authorities. The existing theory on tender attractiveness also predicted this. In the master thesis of De Vos (2021), four (75%) suppliers mentioned that the buying entities need to consider holidays before putting out a tender. Tenders during the holidays might suffer from a lack of available personnel due to the holidays. This lack of personnel is expected to have at least two causes, the actual vacation of the employee and the pre-holiday deadline stress many firms experience. The negative effects of a tender during the holiday period are also mentioned in the ‘’Gids Proportionaliteit’’, which can be seen as a guideline for contracting authorities. It is stated that ‘*’it is not forbidden to publish a tender before the holiday, and proceed to the selection or award immediately after the holiday. However, this will not benefit the quality of the offers and may also exclude an important part of the potential bidders*’’ these remarks are in line with the findings of this paper, further strengthening this antecedent for tender attractiveness (*Gids Proportionaliteit*, 2020).

Days tendering schedule

On average, tenders with a longer time window for participation are more attractive than tenders with a shorter time window. This variable scored significant for the combined analysis and for two of three contracting authorities providing evidence that the consistency of this variable is high. The positive effect of a longer tendering schedule was also expected based on the existing literature; Bageis & Fortune (2009) identified time allowed for submitting bids as a factor in the bid or no bid decision-making research. This factor was also identified by Shash's (1993) research, which ranked tendering duration as the 17th most important factor of 55 identified factors. Actual research on tender attractiveness also supports this antecedent; Jääskeläinen et al. (2022) state, ’*’To increase tender attractiveness, public buyers should provide guidelines and enough time to respond to the tender.*’’.

Monetary ceiling amount

Including a ceiling amount seems to improve tender attractiveness significantly; tenders with a ceiling amount average 5,24 suppliers, while tenders without a ceiling amount average 3,66. This finding contradicts the case study of De Vos (2021), in which suppliers did not prefer a ceiling amount; this might be sector specific to firetrucks. A ceiling provides suppliers with clarity and guidance, which are mentioned by Jääskeläinen et al. (2022), Jarkas et al. (2014 and Shash (1993) as predictors for tender attractiveness or the willingness to bid. The perceived benefits of a ceiling amount seem to outweigh the possible negatives (rigid /lower profit), making including a ceiling amount a valuable tool to increase tender attractiveness.

Pages main tender document
The statical analysis provided significant evidence that more pages in the main tender document reduce tender attractiveness. This variable scored significant for the combined analysis and two of three contracting authorities, providing evidence that the consistency of this variable is high. In this analysis, on average, an increase of one participant could be achieved by reducing the number of pages by 12. It is noteworthy that even smaller reductions will eventually amount to a significant increase in participants and that one extra participant on average will lead to a price decrease of 3,27%, according to Pavel (2010) cited in Nemec et al. (2020).

Extensive tender documentation is expected to take more time to read, increasing the transaction cost and lowering tender attractiveness. Research by (Bandiera et al., 2008) provides theoretical evidence for this and mentions that tender documents that are excruciatingly detailed are a source of passive waste. Potential bidders might also be scared off by documentation perceived as too extensive; this subjective judgement can be linked to personal perception, which still plays an important role in the tender assessment process (Cheaitou et al., 2019).

Pages for answering questions
The last statistically significant factor is the number of pages a bidder can use to answer the award or selection criteria. This factor only shows significance at the highest alpha and is, besides the main analysis, only significant for the Contracting authority A. This variable is expected to (partly) reflect the supplier's workload and the complexity of the award criteria, and increased workload and added complexity are expected to increase transaction costs. In the paper by Kelly et al., (2021), it is mentioned that award criteria should be concise and clear and should avoid elements not directly related to the actual service. Based on this, the results align with the expectations; if a supplier is required or allowed to provide a more extensive answer contracting authorities should expect (slightly) less interest in the tender.

This research found evidence that the process of formulating a tender and the characteristics of the tender documentation can, in fact, influence tender attractiveness. These findings provide evidence that while legislation might limit public procurement, there is still room for improvement in the tendering process. Contracting authorities can easily leverage the identified antecedents to increase tender attractiveness while, in some cases, simultaneously lower transaction costs.

7.2 Managerial implications
This chapter summarizes the managerial implications that can be derived from the findings of this paper. The findings of this paper are primarily interesting for contracting authorities, especially for the procurement department and their managers. Besides contracting authorities, this paper could also be of interest to regulatory and advisory authorities. The findings of this paper should apply to most, if not all, contracting authorities and are fairly easy to implement.

The first implication has the most effect on tender attractiveness while simultaneously might be the easiest to implement; this is the factor tender during the holiday period. Tenders should not be held in the tender period. This paper tested for the Christmas holiday and the summer

holiday ‘’bouwvak’’ and found evidence that tenders in the holiday period have significantly fewer participants. In the lead-up to a holiday period, employees often experience high work pressure and might not be available to prepare a bid. Contracting authorities need to remember that different sectors have different customs regarding holidays, the contracting authority might not close during the holiday, but potential bidders might be closed for the entire period. Bringing forward or delaying a tender before or after a holiday period should be a straightforward implication for all contracting authorities, significantly increasing tender attractiveness.

The availability of employees and planning capacity seems to influence tender attractiveness because the second antecedent, the length of the tendering schedule, also is associated with these circumstances. More time between publication and the deadline for participation seems to increase tender attractiveness, and contracting authorities are therefore advised to increase the length of the tendering schedule to provide ample time to prepare the bids.

Complexity and workload also seem to influence tender attractiveness; these are concepts associated with the antecedents ‘’number of pages of the main tender document’’ and the ‘’number of pages for answering questions’’.The main tender document is likely the first document that a potential supplier reads and therefore is responsible for the first impression of a tender. If the main tender document contains many pages, it will take longer to read the document -increasing transaction costs- and appears to decrease tender attractiveness based on the statistical analysis. Contracting authorities should be careful when formulating a tender, only including necessary information and keeping the tender document as brief as possible. Based on the statistical analysis, this ‘’necessary information contains’’ a ceiling amount. Including a ceiling amount in the main tender document significantly increases tender attractiveness; this might be because this provides clarity and a target for potential suppliers.

Contracting authorities should be mindful of their input but should also consider what they ask of the potential supplier. A high number of pages allowed to answer questions is negatively associated with tender attractiveness and implies a high workload and added complexity. Contracting authorities should be clear about what they require in their Programma van Eisen and might want to reconsider if all questions in the award criteria are essential in their current form. The questions in the award criteria might have the effect of awarding the contract to the best bid team instead of the best supplier.

Besides the statistically significant factors contracting authorities should also keep in mind other factors which had, in this paper, no significant influence on tender attractiveness. Increasing tender attractiveness often results from reducing transaction costs or being a better customer, leading to a more attractive tender. Contracting authorities should, therefore, not pretend that improving insignificant factors can not help optimise the tendering process. Improving insignificant antecedents for tender attractiveness might still benefit the contracting and bidding authorities by providing monetary savings.

7.3 Limitations and future research

While the outcomes of this study are perceived to be valuable, this study is, like most studies, subject to limitations. The first limitation is that despite the considerable sample size, some variables still lack sufficient frequency for their variables. The variables geographical location, CPV-code, contract size and pre-publication all failed to provide useful data; further research with an even larger sample size might enable the use of these factors successfully. A

second limitation of this study is the lack of previous research on this topic. Due to the lack of prior research, the researcher needed to resort to associated topics and expert knowledge to establish valid antecedents. This limitation should be less severe in the future when more research on tender attractiveness has been conducted.

Future research could also test the antecedents identified in this paper, increasing the study's validity. Another topic of interest for future research is how contracting authorities can attract suppliers who are currently not active in the tendering process, the design of this study did not directly test this pathway for tender attractiveness. Another interesting research direction is statistical testing for different factor groups. While some factors might not be significant when tested individually, they might be significant as part of a factor group, providing an interesting opportunity for additional research.

8. References

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1%2Fs3%2Faws4_request&X-Amz-Signature=74930fc6cde4aba68f952be0a38de39b7a9a5e62d2a5a9607f826ccbf45635e2&hash=041795554a419dfb5eafbee52bdc0d0912797c5b3c8784884a5a2c66934b47fa&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=0167268187900382&tid=spdf-9e9f654d-6a23-40a5-9faa-6aa7355dbdbf&sid=2cb42f3274e714408e9b30e49944591a450dgxrqb&type=client&ua=4d56055c0a565b535504&rr=72a2d1927f310c0d

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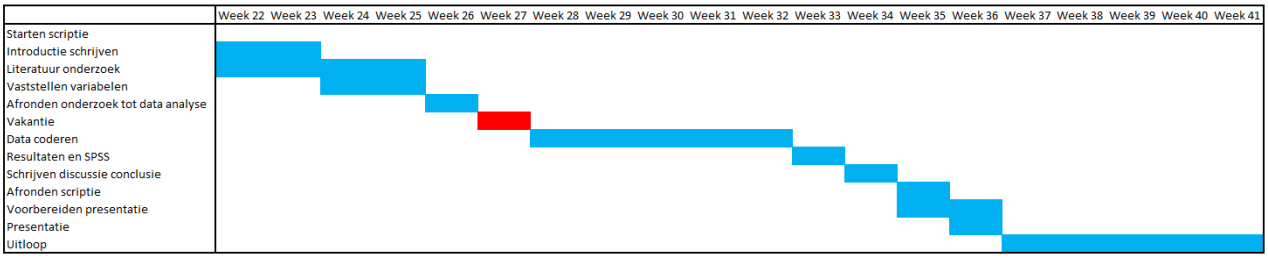
9. Appendixes

Appendix 1 Planning



Appendix 2 Search hits

Search Engine	*Term*	*Possible relevant hits*
Google Scholar	Tender Attractiveness	2
Find UT	Tender Attractiveness	0
Find UT	Customer attractiveness	3526
Google Scholar	Customer attractiveness	232000
Google Scholar	transaction cost theory	2700000
Find UT	transaction cost theory	132201
Google Scholar	bid or no-bid decision	12000
Find UT	bid or no-bid decision	6288
Find UT	"Tender characteristics"	0
Google Scholar	"Tender characteristics"	0
Google Scholar	"Tender attraction"	0
Google Scholar	customer attractiveness antecedents	52400
Google Scholar	public purchasing attractive	592000
Google Scholar	public tenders	123000
Google Scholar	public tenders in lots	21600
Google Scholar	public vs private procurement	1120000

Appendix 3 measurement level

Coded factors in the dataset and their measurement level

Factor	***Measurement level***
Number of participants	Ratio
Number of pages main tender document	Ratio
number of pages of all tender documentation	Ratio
Number of questions in award/selection criteria	Ratio
Number of pages answering questions	Ratio
Presentation	Dichotomous
Number of open questions	Ratio
Number of appendixes and files	Ratio
Number of documents to be submitted	Ratio
Sector	Nominal
Location	Nominal
Length tendering schedule	Ratio
Open vs restricted procedure	Dichotomous
Contract value	Ratio
Ceiling amount	Dichotomous
Tender in the holiday period	Dichotomous
Number of references	Ratio
Type of references	Dichotomous
Pre-publication	Dichotomous
Tenders divided into lots	Dichotomous
framework agreements	Dichotomous

Appendix 4 Handleiding Coderen van Aanbestedingen

Introductie

In dit document worden de coderingsprincipes omtrent de scriptie naar ‘’tender attractiveness’’ uitgelegd. Dit document is een handleiding om de consistentie, de validiteit en de betrouwbaarheid van de dataset garanderen. Het coderen van aanbestedingen is over het algemeen geen ingewikkelde taak maar uitzonderingen, unieke situaties, en hoe de codeerder moet om gaan met missende documenten dient op nauwkeurige wijze te worden vastgelegd. Op deze wijze kan de intercoder reliability worden gegarandeerd. In dit document zal per variabele worden uitgelegd over hoe deze variabele gemeten dient te worden.

Belangrijk: Behandel elk perceel van een aanbesteding als afzonderlijke aanbesteding, dit geld voor alle variabelen!, een vraag die uitzonderlijk betrekking heeft op perceel 1 tel je alleen bij perceel 1. **Elk perceel krijgt dus een nieuwe regel**

Participants / deelnemers

Het aantal inschrijvers op de aanbesteding is in deze studie de aangewezen metric voor het begrip tender attractiveness. Deze waarde dient dus gelijk te zijn aan het aantal inschrijvingen op de aanbesteding. Als een aanbesteding percelen heeft wordt elk perceel als unieke aanbesteding beschouwd. Een aanbesteding in percelen krijgt dus per regel de waarde die gelijk is aan het aantal inschrijvingen op dat perceel. **Voor de niet openbare procedure is dit het aantal inschrijvers in de selectieprocedure.**

Number of pages main tender document / aantal pagina’s tenderleidraad of beschrijvend document.

Het beschrijvend document of de tenderleidraad is het hoofddocument van de aanbesteding. Het aantal pagina’s van dit document wordt als belangrijke waarde gezien. Deze variabele is gelijk aan het aantal pagina’s van dit document. **Als er bijlagen zijn opgenomen in het beschrijvend document / aanbestedingsleidraad worden deze niet meegeteld voor deze variabele, eventuele lege eindpagina’s worden ook niet meegeteld, alle overige pagina’s wel.** Voor niet openbare aanbestedingen dient de **selectieleidraad** gebruikt te worden.

Number of pages all documentation / aantal pagina’s alle documentatie

Deze variabele is gelijk aan het totaal aantal pagina’s in de aanbesteding, dit omvat alle bestanden die zijn aangeleverd bij de aanbesteding. Bestanden die duidelijk niet bij aankondiging beschikbaar waren (antwoorden op NVI) laat je buiten beschouwing. Als er bestanden dubbel zijn aangeleverd, bijvoorbeeld in Word als PDF dienen deze pagina’s slechts eenmaal geteld te worden. Ook als er meerdere versies BV: (inschrijvingsleidraad 1.1 en inschrijvingsleidraad1.2) zijn van 1 bestand tel je slechts pagina’s van 1 bestand. Veel aanbestedingen bevatten Excel bestanden, elk werkblad dient als 1 pagina geteld te worden, ook foto’s, kladblok bestanden en e-mail correspondentie worden geteld als 1 pagina *(1 foto = pagina, 1 PowerPoint slide = 1 pagina, 1 mail correspondentie is 1 pagina, 1 Kladblokbestand = 1 pagina).* Bestektekeningen, tif-bestanden, autocad bestanden en alle overige bestanden zullen ook worden geteld als 1 pagina. De codeerder dient goed op te letten dat deze bestanden uniek zijn en niet in meerdere bestandstypes zijn aangeleverd. **Voor niet openbare aanbestedingen dienen de stukken omtrent de gunning buiten beschouwing gelaten te worden en gelden voor de rest dezelfde principes.**

Codeertip: Door de zipfile uit te pakken kan eenvoudig het aantal pagina's worden toegevoegd aan de weergave van de map, hierdoor hoeven niet alle files geopend te worden. Let wel op dat je de leidraad handmatig telt want deze kan bijlagen bevatten die niet dubbel geteld moeten worden. **Codeerder dient bij de aanbestedingen van de Contracting authority C goed op te letten op het documentformulier, deze bevat ook vaak pagina's die zijn bijgevoegd als separate bijlage. De codeerder telt dan alleen de pagina's die niet zijn opgenomen als separate bijlage.**

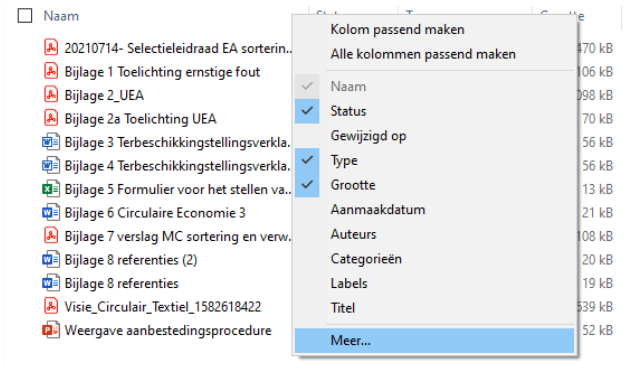


Figure 4 Aantal pagina's toevoegen

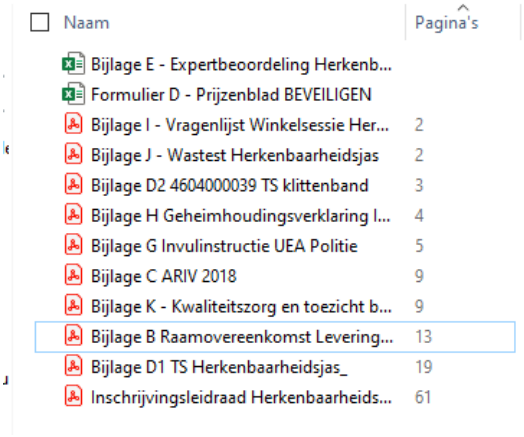


Figure 5 Overzicht als aantal pagina's is toegevoegd

Missende bestanden: Voornamelijk bij aanbestedingen van de CONTRACTING AUTHORITY B en de Contracting authority C missen regelmatig bestanden, de codeerder dient de bestanden die genoemd zijn in de inhoudsopgave van de leidraad te vergelijken met de aanwezige bestanden. **De missende bestanden dienen wel geteld te worden, in de bijlage is een overzicht van het aantal pagina's dat aan elk missend bestand toegekend dient te worden.**

Number of questions / aantal vragen

Het aantal vragen in de gunning- of selectieleidraad zegt wat over de hoeveelheid werk die een inschrijver moet verrichten. **Voor niet openbare bestedingen zijn alleen de vragen in de selectieleidraad relevant.** Deze waarde wordt geteld op het laagst mogelijke niveau waarop punten worden toegekend. Bijvoorbeeld: KC1 is 15 punten waard, maar bestaat uit 1a, 1b, en 1c die ieder 5 punten waard zijn, dit leidt dus tot een waarde van 3 voor deze variabele. Als kc1 15 punten waard is en bestaat uit 1a, 1b en 1c, maar hier worden geen individuele punten aan toegekend dan wordt dit geteld als 1 vraag. **Het is van belang om de vragen goed**

te lezen en de puntentelling te begrijpen, voorbeeld: subgunnings criterium emissievrije stadslogistiek is 150 punten waard, dit lijkt dus 1 vraag te zijn. Echter staat in de vraag dat dit bestaat uit 2 onderdelen, namelijk.

*Score Emissievrij Transport = Waardering Groeipad * Score Plan van Aanpak*

Er wordt dus op 2 onderdelen beoordeeld, namelijk de waarde van het groeipad en de score op het PVA. Er kan dus gesteld worden dat er overduidelijk per onderdeel punten worden toegekend, er kan ook brekend worden wat elk onderdeel eigenlijk waard is, dit zijn dan ook 2 vragen. In dit geval is de waardering groeipad een gesloten vraag (percentage emissievrij transport per jaar) , het plan van aanpak is een open vraag.

Open questions / open vragen
Om onderscheid te maken in het soort vraag is de variabele open vragen opgenomen, hier dient het aantal open vragen ingevuld te worden. Bij open vragen is vaak aangegeven in hoeveel pagina's ze beantwoord mogen worden. **Rekenvragen zoals een milieukosten indicator zijn ook open vragen. Vragen waarbij een percentage opgegeven dient te worden zijn geen open vragen (% emissievrijtransport etc.)**

Number of pages answering question / aantal pagina's om vragen te beantwoorden
Deze variabele geeft aan hoeveel pagina's er gebruikt mogen worden om vragen te beantwoorden. **Als er een aantal woorden staat aangegeven dan dient dit als volgt berekend te worden: aantal woorden / 400 = aantal pagina's.** Als een antwoord in een percentage gegeven dient te worden of een andere vorm van gesloten vraag wordt dit niet meegeteld als ‘’pagina om vragen te beantwoorden''. Als er niks vermeld staat reken je 1 pagina per openvraag.

Bijlage 14 Rekenmodel emissievrij transport perceel 3

Contractjaar			2020 - 2021		2021 - 2022		2022 - 2023		2023 - 2024		
Weegfactor				1		0,75		0,5			0,25
	Max. punten	Score	Inzet	Punten	Inzet	Punten	Inzet	Punten	Inzet	Minimumpercentage	Punten
Aandeel emissievrij transport	300	96	40%	48	50%	15	60%	12	70%	0%	21
Waardering groeipad = score / maximale score	0,32										

Geldigheidstoets	
Aandeel emissievrij transport	geldige reeks

Figure 6 Dit antwoordformulier telt dus niet mee

Als er om een cv gevraagd wordt gelden de volgende principes: als maximaal aantal pagina's is aangegeven is deze waarde het aantal cv's keer het maximale aantal pagina's . Als er geen maximaal aantal pagina's is aangegeven is dit x ‘’1’’’. Soms staat er niet bij hoeveel cv's er ingediend dienen te worden, ga dan voor elke functie uit van 1 cv. Als dit ook niet duidelijk is tel je slechts 1 cv, en dus 1 pagina.

Number of appendix and files / aantal bijlagen of bestanden
Het aantal bijlagen en bestanden kan een potentiële inschrijver afschrikken. Deze variabele telt elk bestand dat is bijgevoegd ter ondersteuning van de aanbesteding. Als een bestand in meerder bestandtypes is bijgevoegd telt dit als 1 bestand. Bijvoorbeeld: Een raamovereenkomst die zowel als PDF als Word in de bijlage staat verhoogd deze waarde dus met 1, dit geldt ook voor alle andere bestandstypen.

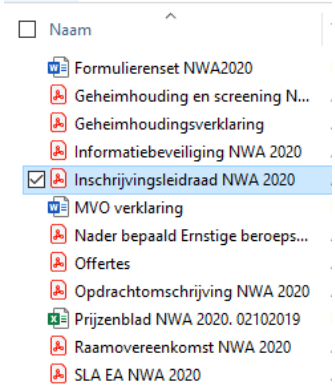
Het kan voorkomen dat de aanbestedingsdocumenten incompleet zijn, dit is voornamelijk het geval bij de Contracting authority C. Als dit het geval is dient de codeerder dit zo goed

mogelijk te corrigeren, hiervoor gebruikt hij de tenderleidraad, hier staan vaak de bijlagen vermeld die er oorspronkelijk bij zaten. Zo kan deze waarde alsnog worden ingevuld. Antwoorden op de NVI of andere bestanden die duidelijk later zijn toegevoegd zoals het aantal ingediende offertes dienen niet geteld te worden als bestand. De codeerder dient wel rekening te houden met het **formulierenset,** als dit aanwezig is zitten hier vaak formulieren in die afzonderlijk vermeld staan in de inhoudsopgave. Zie onderstaand voorbeeld

Voorbeeld: in de inhoudsopgave staan formulieren vermeld die duidelijk niet aanwezig zijn in de ‘’aanwezige bestanden’’, wel is er een formulierenset aanwezig, de codeerder dient dit bestand te openen om te kijken welke van de formulieren hierin staan. In dit geval ontbreekt in het formulierenset het UAE, dit is dus een missende file waarvoor de codeerder deze waarde dient te verhogen met 1. Het prijzenblad mist ook in het formulierenformulier maar is wel aanwezig in de aanwezige bestanden, dit kan dus gewoon op de normale wijze worden geteld. Offertes dienen niet meegeteld te worden

Inhoudsopgave

Aanwezige bestanden



Number of documents to be submitted / aantal in te sturen document
Het aantal in te dienen documenten is een variabele die wat zegt over de workload voor de inschrijvende dienst. Er zijn een aantal principes die gevolgd dienen te worden voor het coderen van deze variabele. **De codeerder gebruikt in beginsel alleen de tenderleidraad om deze variabele vast te stellen**, of er moet expliciet verwezen worden naar andere bestanden zoals een checklist of PVE. Het doel is om het aantal in te dienen documenten zo feitelijk mogelijk weer te geven, de volgende principes en uitzonderingen zijn van toepassingen. **Als bestanden situatie afhankelijk zijn zoals het beroep op derden in de aanbestedingen van Contracting authority A en de onafhankelijkheidsverklaring bij de Contracting authority C tel je deze niet mee,** deze bestanden zijn namelijk alleen verplicht wanneer van toepassing.

Gunningscriteria: in principe is elk **hoofdgunningscriteria** een ‘’to submit’’ document. Dus kc1 is een to submit document en niet kc1a, kc1b. Een uitzondering hierop is als er staat dat de gunningscriteria gezamenlijk ingediend dienen te worden, wees hier extra alert op bij gunningscriteria met een plan van aanpak. **Bij aanbestedingen van de CONTRACTING AUTHORITY B is er vaak een format gunningscriteria aanwezig, hierin dienen alle gunningscriteria beantwoord te worden, dit is dan ook 1 ‘’to submit document’’**. Als de gunningscriteria opgegeven dienen te worden in het prijzenblad is dit ook geen ‘’extra’’ to submit document.

Referentie: Als er referenties ingediend dienen te worden dient dit altijd als 1 to submit document gerekend te worden, ongeacht de hoeveelheid referenties. De tevredenheidsverklaring wordt ook niet meegerekend. Als er naast de kerncompetenties ook referenties worden gevraagd voor de selectiecriteria **wordt dit wel als 2 documenten gezien, dit is voornamelijk voor de niet openbare procedure.**

(ISO) certificaten en datasheets, bankrekening en contactgegevens: Benodigde certificaten zoals ISO of VCA tellen altijd als ‘’ to submit document’’, ook als deze slechts door de winnaar opgestuurd dienen te worden. Alle onderstaande documenten (zie afbeelding) verhogen dus deze waarde met 1, (6 in totaal), ondanks dat ze alleen door de winnende inschrijving ingediend dienen te worden. **Samples en proefmonsters tellen niet als in te dienen documenten, ontvangstbewijzen en datasheets wel! Bankrekening en contactgegevens tellen niet als ‘’in te sturen documenten.**

In te dienen bij verificatie van documenten door de winnende Inschrijver
Uittreksel uit het handelsregister van de Kamer van Koophandel
Gedragsverklaring aanbesteden
Verklaring van de Belastingdienst
Een geldig vergunning VCA*/VCA** – certificaat (of gelijkwaardig)
Een geldig ISO 9001: 2015 – certificaat (of gelijkwaardig)
Een geldig ISO 14001 – certificaat (of gelijkwaardig)

CV: Als cv's separaat ingediend moeten worden is dit per CV een ''to submit document''. Als de cv's onderdeel zijn van een gunningscriteria en **niet als afzonderlijk bestand** ingediend dienen te worden is dit geen ''extra'' to submit document.

Contracting authority A Prijzenblad, en kwaliteitseisen: Codeerder dient er rekening mee te houden dat in het overzicht van de in te dienen bewijsstukken het prijzenblad, de gunningscriteria en de kwaliteitseisen vaak ontbreken.

Contracting authority C / formulierenset: in de aanbestedingen van de Contracting authority C staat soms een formulierenset als document, als dit document aanwezig is telt dit als 1 '' to submit document''. Dit formulierenset is vaak niet compleet, alle missende formulieren tellen ieder als to submit document. **Voorbeeld:** formulierenset hoort te bevatten: prijzenblad, UAE, Referenties, inschrijvingsverklaring maar bevat alleen de inschrijvingsverklaring en referenties, dit telt dan als ''3'', namelijk (formulierenblad + UAE + prijzenblad). Als er geen formulierenset aanwezig is dan telt dit als ''4'', dan ga je ervanuit dat alles afzonderlijk wordt ingediend.

Presentatie: Een presentatie is alleen een ''to submit document'' als er vermeld staat dat de inschrijver deze presentatie ook daadwerkelijk beschikbaar dient te stellen. ***De Inschrijver stelt na afloop van de presentatie de digitale presentatie beschikbaar.***

Sector

De sector is een mogelijk interessante control variabele en wordt bijgehouden aan de hand van de CPV-code. CPV staat voor common procurement vocabulary en dient bij elke aanbesteding opgegeven te worden. De CPV-code is gebaseerd op het goed dat ingekocht dient te worden en kan hierdoor gebruikt worden voor de sector indeling. De codeerder dient de eerste 2 cijfers van de cpv-code over te nemen in de coding file. Als er geen CPV-code in de leidraad staat (**Contracting authority A)** dient codeerder deze online op te zoeken. In de meeste gevallen is het mogelijk om de aanbesteding op Tenderned terug te vinden, hier staat de CPV-code wel vermeld. Als codeerder de CPV-code niet kan vinden is het advies te zoeken naar ''dezelfde'' aanbesteding van een andere autoriteit, verwerking bladafval Contracting authority A heeft dezelfde CPV-code als verwerking bladafval Amsterdam.

Location / locatie

Het aantal inschrijvingen varieert mogelijk op basis van de geografische locatie waar het werk / de dienst geleverd dient te worden. Deze variabele wordt bijgehouden op provincieniveau. Aanbestedingen die meerdere provincies als uitvoerlocatie hebben worden gecodeerd als nationale aanbestedingen. Aanbestedingen met leverlocaties buiten de landsgrenzen van Nederland worden gecodeerd als internationale aanbestedingen, overzeese gebieden binnen het Nederlands Koninkrijk gelden ook als internationale aanbestedingen.

Nationaal	0
Zuid-Holland	1
Noord-Holland	2
Utrecht	3
Flevoland	4
Gelderland	5
Overijssel	6
Groningen	7
Friesland	8
Drenthe	9
Zeeland	10
Noord-Brabant	11
Limburg	12
Internationaal	13

Figure 7 Codering

Length tendering schedule / Duur aanbestedingsplanning

De duur van de aanbestedingsplanning is mogelijk van invloed op het aantal inschrijvingen. Deze variabele is gelijk aan de datum van sluiting inschrijving -/- publicatie van de aanbesteding. Voor niet openbare procedures dient de planning van de selectiefase gebruikt te worden, in onderstaande aanbesteding is deze waarde dus 16-09-2019 -/- 31/07-2019 = 47 dagen. Advies is om hiervoor Excel te gebruiken.

5.1.1 Selectiefase

Actie	Datum / tijdstip
Aankondiging Opdracht op TenderNed www.tenderned.nl	31 juli 2019
Uiterste datum en tijd indienen vragen over de Selectieleidraad[9]	14 augustus 2019, 10:00 uur
Schriftelijke beantwoording meldingen en/of vragen	4 september 2019
Uiterste datum en tijd voor het indienen van Verzoek tot deelname[1]	16 september 2019, 10:00 uur
Opening Verzoeken tot deelname	16 september 2019, na 10:00 uur
Selectiebeslissing en opvragen van Bewijsstukken bij begunstigden(n) [10]	15 oktober 2019
Uiterste datum voor het aanleveren van Bewijsstukken	30 oktober 2019
Opschortende termijn	vanaf 16 oktober 2019 t/m 5 november 2019
Selectie[11]	6 november 2019

Figure 8 Niet openbare aanbesteding aantal dagen voorbeeld

Open vs restricted procedure / Open vs niet openbare procedure

Om onderscheid te kunnen maken tussen de openbare en niet openbare procedure is deze variabele opgenomen. Niet openbare procedures krijgen de waarde ‘’1’’, openbare procedures de waarde ‘’0’’, dynamische aankoopsystemen worden gezien als openbare procedures.

Contract value / Contract waarde

De contract waarde is opgenomen als control variable, het is te verwachten dat bedrijven zich alleen inschrijven op contracten die passen bij de bedrijfsomvang. Voor een nieuw te bouwen snelweg of ander groot project zijn er vanzelfsprekend maar een beperkt aantal bedrijven waarbij dit binnen de operationele mogelijkheden ligt. In de coding file dient, waar mogelijk, de **maximale contract waarde opgenomen te worden.** De maximale contractwaarde is **de looptijd van het contract + eventuele verlenging X de omzet per jaar.** Eventuele **overgangstermijnen worden buitenbeschouwing gelaten**, dit is vaak een periode van 3 maand. Als de contractwaarde niet vermeld staat in de omvang van de opdracht maar er wel

een plafondbedrag is vastgesteld kan het plafondbedrag worden gebruikt om deze variabele te berekenen.

Ceiling amount / Plafondbedrag
De aanwezigheid van een plafondbedrag kan mogelijke inschrijvers afschrikken. Als er een plafondbedrag is ingesteld dient de waarde ‘’1’’ ingevuld te worden, bij geen plafondbedrag de waarde ‘’0’’. Het plafondbedrag staat vaak vermeld onder gunningscriterium prijs. Indien er uurtarieven opgegeven dienen te worden met een maximum dan geldt dit ook als plafondbedrag. **Randzaken zoals een maximum transportvergoeding per kilometer zijn niet bepalend voor deze waarde zolang de prijs van het te leveren product vrij is.**

Tender in holiday period / Aanbesteding gedurende vakantieperiode
De aanbestedingsplanning in de vakantieperiode zorgt mogelijk voor hectiek bij potentiële inschrijvers, het is mogelijk dat wegens onderbezetting of drukte de mogelijke inschrijver niet in staat is zich in te schrijven. Er zijn twee vakantieperiodes geïdentificeerd, namelijk de kerstvakantie en de bouwvak. Zoals voor te stellen is een aanbesteding waarvan alleen de laatste dag valt in de vakantieperiode minder problematisch, vanwege dit gegeven dient een aanbestedingsplanning minimaal 5 dagen te overlappen met een vakantieperiode om de waarde ‘’1’’ (tender in holiday) te krijgen, anders krijgt de aanbesteding de waarde ‘’0’’).

Number of references / Aantal referenties
Het aantal referenties dat een inschrijver moet doorgeven kan afschrikkend werken op de inschrijver. Deze variabele houdt het **maximale aantal toegestane referenties bij,** op deze manier kan dit het meest eenduidig worden bijgehouden. Vaak is dit één referentie per kerncompetentie, als er geen limiet staat dan wordt dit gerekend als één referentie per kerncompetentie. **De kerncompetenties en de bijbehorende referentie tel je voor de percelen waarop zij van toepassing zijn.**

Voorbeeld:

Een Inschrijver moet beschikken over de volgende kerncompetenties:

1. Het opmaken van krantenpagina’s

2. Het drukken van kleurenpagina’s
3. Het verspreiden van een Huis-aan-huisblad

Voor elke kerncompetentie moet de Inschrijver één relevante referentieopdracht indienen.
Hiervoor moet u het formulier ‘Referenties’ (**Bijlage 8**) gebruiken en bijvoegen bij de

Deze aanbesteding heeft dus 3 kerncompetenties, waarvoor elk één relevante referentie is vereist, dit geeft dus de waarde ‘’3’’. Stel dat deze aanbesteding het toe staat om met 1 referentieopdracht meerdere kerncompetenties aan te tonen *‘’Het is toegestaan om met één (1) referentieopdracht meerdere kerncompetenties aan te tonen’’* blijft de waarde nog steeds 3, dit heeft namelijk geen invloed op het **maximaal aantal toegestane referenties.**

Bij niet openbare procedures dient een inschrijver ook vaak te voldoen aan selectiecriteria. De selectiecriteria kan betrekking hebben op de aanwezige ervaring bij de inschrijver, dit dient de inschrijver dan aan te tonen met referenties. Als er hier ruimte is voor **nieuwe**

referenties worden deze meegeteld voor het aantal referenties. Als hier uitsluitend referenties gebruikt mogen worden die ook voor de kerncompetenties zijn gebruikt worden deze niet meegeteld, dit zijn namelijk geen nieuwe referenties.

Type of reference / type referentie
Er wordt onderscheid gemaakt tussen twee types referenties in dit onderzoek. Namelijk een korte referentie en een uitgebreide referentie. Een korte referentie beperkt zich tot het invullen van een project beschrijving en projectgegevens. Voor de uitgebreide referentie dient de inschrijver een ingevulde verklaring van tevredenheid of soortgelijk document te overleggen dat ondertekend is door de referentie. **Open het daadwerkelijke bestand ‘’referenties’’ of verklaring kerncompetenties, om dit te kunnen controleren, hier staat dit vaak aangegeven.**

Pre-publication / Vooraankondiging aanbesteding.
Contracterende autoriteiten kunnen ervoor kiezen om een vooraankondiging van een aanbesteding te doen. Dit geeft inschrijvers de mogelijkheid om zich voor te bereiden op een komende aanbesteding, mocht dit vermeld staan in de aanbestedingsplanning dient de waarde ‘’1’’ gebruikt te worden, als dit niet vermeld staat krijgt deze variabele de waarde 0.

Tenders divided into lots / Aanbesteding in percelen
De aanbieder van de aanbesteding heeft de mogelijkheid om de aanbesteding op te delen in percelen. Iedere aanbieder heeft de mogelijkheid om zich in te schrijven op een perceel naar keuze of meerdere percelen naar keuze. Een aanbesteding verdeeld in meerdere percelen zal dus al snel meer inschrijvers hebben dan een aanbesteding die niet verdeeld is in percelen. Om dit te voorkomen wordt elk perceel als aparte aanbesteding behandeld. Om te kunnen controleren welke aanbestedingen verdeeld zijn in percelen en wat het mogelijke effect hiervan is dient dit te worden bijgehouden, als een aanbesteding **niet is verdeeld in percelen krijgt dit waarde 0, als een aanbesteding is verdeeld in percelen krijgt dit waarde 1.**

Framework agreement / Raamovereenkomst
Als het doel van een aanbesteding is om een raamovereenkomst af te sluiten krijgt deze waarde de variabele ‘’1’’ (yes), als het een “normale’’ overeenkomst is de waarde ‘’0’’.

Presentation / Presentatie
Een aanbestedende autoriteit kan naast de normale gunningscriteria een presentatie vereisen. Een presentatie is een aanzienlijke extra taak voor de inschrijver, om deze reden is de variabele ‘’presentatie’’ opgenomen. Als een inschrijver een presentatie dient te houden krijgt deze variabele de waarde ‘’1’’, als er geen presentatie gehouden hoeft te worden krijgt deze variabele de waarde ‘’0’’. Een presentatie kan een toelichting zijn op gunningscriteria maar ook een op zichzelf staand gunningscriteria, beide gevallen levert de waarde ‘’1’’ op. **De presentatie dient niet meegerekend te worden voor de variabele ’’aantal vragen’’, dit is een opzichzelfstaande variabele, de enige uitzondering hierop is als de presentatie een casus beantwoord en de presentatie hiervan ook ingeleverd dient te worden.** EG: *De Inschrijver stelt na afloop van de presentatie de digitale presentatie beschikbaar.*

Productdemonstraties en ‘’proof of concepts’’ zijn geen presentaties. Presentaties of gesprekken die plaatsvinden na de gunning tellen ook niet voor deze variabele.

Bijlage aantal pagina's missende bestanden Contracting authority C.

UAE – 9 Pagina's

Invulinstructie UAE: 5 pagina's

Begrippenlijst Arvodi - 3 pagina's

Arvodi: 13 pagina's

Toelichting ARVODI: 15 pagina's

Inschrijvingsformulier: 2 pagina's

Onafhankelijk/geheimhoudings verklaring: 2 pagina's

Referenties: 2 pagina's

Inschrijfformulier: 1 pagina

Beantwoording kwalitiatieve gunning: 1 pagina

Factuurvereisten: 1 pagina

e-factureren aan Contracting authority C: 2 pagina's

Kwaliteitszorg Contracting authority C 9 pagina's

a-3 is tevens 1 pagina

Presentatieboekje meldkamer oost-nederland: 22 pagina's based on presentation 14 september.

ARW Begrippenlijst: 3 pagina's

Bijlage aantal pagina's missende bestanden CONTRACTING AUTHORITY B

Format NVI: 2 pagina's

ARBIT: 35 pagina's

Brochure elektronisch factureren aan de Rijksoverheid: 4 pagina's

ARVODI: 13 pagina's

ARIV: 9 pagina's

Bijlage CTM solutions: 17 pagina's

Appendix 5 Frequency tables

Presentation	Frequency	Percent	Valid Percent	Cumulative Percent
no	324	93,4	93,4	93,4
yes	23	6,6	6,6	100,0
Total	347	100,0	100,0	

	Delivery province	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nationaal	93	26,8	26,8	26,8
	Zuid-Holland	242	69,7	69,7	96,5
	NoordHolland	1	,3	,3	96,8
	Utrecht	4	1,2	1,2	98,0
	Overijssel	1	,3	,3	98,3
	Zeeland	1	,3	,3	98,6
	Internationaal	5	1,4	1,4	100,0
	Total	347	100,0	100,0	

	Open Vs restricted	Frequency	Percent	Valid percent	Cumulative Percent
Valid	Open	311	89,6	89,6	89,6
	Restricted	36	10,4	10,4	100,0
	Total	347	100,0	100,0	

	Monetary ceiling	Frequency	Percent	Valid percent	Cumulative Percent
Valid	no	198	57,1	57,1	57,1
	yes	149	42,9	42,9	100,0
	Total	347	100,0	100,0	

	Holiday period	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	228	65,7	65,7	65,7
	yes	119	34,3	34,3	100,0
	Total	347	100,0	100,0	

	Type of reference	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	short	129	37,2	38,2	38,2
	extensive	209	60,2	61,8	100,0
	Total	338	97,4	100,0	
Missing	System	9	2,6		
Total		347	100,0		

	Pre-publicised tender information	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	344	99,1	99,1	99,1
	yes	3	,9	,9	100,0
	Total	347	100,0	100,0	

	Tender divided into lots	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	184	53,0	53,0	53,0
	yes	163	47,0	47,0	100,0
	Total	347	100,0	100,0	

	Framework agreement	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	57	16,4	16,4	16,4
	yes	290	83,6	83,6	100,0
	Total	347	100,0	100,0	

	Contract size estimation yes/no	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	123	35,4	35,4	35,4
	Yes	224	64,6	64,6	100,0
	Total	347	100,0	100,0	

2 numbers CPV CODE	Frequency	Percent	Valid Percent	Cumulative Percent
15	1	2,0	2,0	2,0
30	2	4,1	4,1	6,1
32	1	2,0	2,0	8,2
34	1	2,0	2,0	10,2
39	5	10,2	10,2	20,4
45	1	2,0	2,0	22,4
48	1	2,0	2,0	24,5
60	1	2,0	2,0	26,5
66	1	2,0	2,0	28,6
71	4	8,2	8,2	36,7
72	9	18,4	18,4	55,1
73	5	10,2	10,2	65,3
75	1	2,0	2,0	67,3
79	4	8,2	8,2	75,5
80	3	6,1	6,1	81,6
85	2	4,1	4,1	85,7
90	6	12,2	12,2	98,0
98	1	2,0	2,0	100,0
Total	49	100,0	100,0	

Appendix 6 interrater reliability with an elaborate explanation

This appendix provides a more elaborate explanation of the identified errors, the probable cause of these errors while providing actual examples. This comprehensive analysis of the errors allows for a better understanding of the intercoder reliability and the potential severity of the errors.

The first type of error is the minor error; this error is expected to have little effect on the study's outcome. In this study, this error is most frequently found in ratio variables. The cut-off ratio for this error has been established at a 10% difference between coders. If the difference is greater than 10%, this error has to be further investigated and is not seen as a minor error. With an error rate of 10%, this research ignores insignificant differences which stem from counting errors or similar mistakes. For example, if coder A counted the empty back page and front page while the initial coder decided to ignore the empty back page and front page, this would not result in an error of more than 10% for most tenders. An example of the actual code comparison is shown in **figure 4** to help understand the costs of such mistakes. This error rate has only been applied to scale variables. For variables like geographical location or sector, a difference is much more costly, and these can not be seen as minor mistakes.

Tender	# Pages main tender document	original coder	# Pages all documentation	original coder
Welzijnsaanbieders perceel 14	64	64	705	706
Bestelauto's p1	23	23	71	66
Bestelauto's p2	23	23	71	66

Figure 9 minor errors in coding

The second error is obvious coding errors; these errors are unfortunately expected with extensive coding schemes. According to Mouter & Vonk-Noordergraaf (2012), a too complex or detailed coding protocol makes it difficult for the second coder to consider all decision rules leading to coding errors. The knowledge about tenders also seemed to influence this

error type for some variables. This type of error has a limited effect on the reliability of the dataset because these errors stem from improper compliance with the coding principles.

This type of error happened most frequently in the contract value and the length of the tender schedule. To better illustrate this, the figures below show the actual results of the two coders.

	B	U	V
	Tender	Length tendering	Original Coder
1	(Geconditioneerd) Transport Bloedblokken	63	63
2	1-D-03574-21 SO Steigers op Zuid (DB) perceel 1	124	63
2	1-D-03574-21 SO Steigers op Zuid (DB) perceel 2	124	63
2	1-D-03574-21 SO Steigers op Zuid (DB) perceel 3	124	63
3	1-D-13682-22 Inhuur personeel Infectieziekten (NT) perceel 1	45	45
3	1-D-13682-22 Inhuur personeel Infectieziekten (NT) perceel 2	45	45
4	1-D-13845-20 Dienstverlening van assurantie gerelateerde diensten perceel 1	69	39
4	1-D-13845-20 Dienstverlening van assurantie gerelateerde diensten perceel 2	69	39
4	1-D-13845-20 Dienstverlening van assurantie gerelateerde diensten perceel 3	69	39
4	1-D-13845-20 Dienstverlening van assurantie gerelateerde diensten perceel 4	69	39
4	1-D-13845-20 Dienstverlening van assurantie gerelateerde diensten perceel 5	69	39
5	1-D-14036-21 SB Natuurdata beheer (CD)	57	57
6	1-D-23403-20 SO Verkeersstellingen en adviezen (NZ)	77	77
	1-D-54321-20 Pensioenregeling SCC **Flex pensioenregeling SCC FLE**	46	43
8	201850015010001 EK maatwerk vergadermeubilair commissiekamers	41	41
	201850032020001 TV ROVK levering kantoorinrichting perceel 1	41	41
	201850032020001 TV ROVK levering kantoorinrichting perceel 2	41	41
	201850032020001 TV ROVK levering kantoorinrichting perceel 3	41	41
0	201850032020002 TK - Verhuisdiensten	72	42
1	201865002001010 BZK - Rookvrij Rijkskantoren 2021	42	42
2	201865002063001 BZK - Instrumentarium tbv de ontwikkeling van individuen, teams en org	42	42
2	201865002063001 BZK - Instrumentarium tbv de ontwikkeling van individuen, teams en org	42	42
3	Directievoering toezicht distr.kantoor Walcheren	41	41
	Kantoormeubilair Perceel 1	84	102
	Kantoormeubilair perceel 2	84	102
	Kantoormeubilair perceel 3	84	102
		1705	1393

Figure 10 Differences Length tendering schedule coder A

	A	V	W
	Tender	# days tendering schedule	Original
	1-D-26503-21 De beste verwerkervar	31	31
	Ingrediënten voor voeding en dranke	55	55
	Brandstofpassen en levering van bra	43	43
	Landschapsubstraten perceel 1	42	42
	Landschapsubstraten perceel 2	42	42
	Chemische analyses	49	49
	Monitor AOW-leeftijdsverhoging	63	63
	Verkeerslichten	54	54
	Resultaatgerichte jeugdhulp voor Jeu	22	22
	werkplekbeveiligingsbureau voor proj	62	62
	Begrazing vegetatie	50	50

Figure 11 Differences length tendering schedule coder B

Coder B achieved a 100% match with the original coding scheme, while coder A only achieved a 54% match. Such a difference points to a systematic coding mistake, and further investigation proved this true. This discrepancy between coders does not impact the reliability of the findings, and coder B proved that coders come to identical or very similar outcomes when properly following the coding protocol. Coder A used -semi-consistently -the day of publication of the winner instead of the deadline day for participation explaining the difference in this variable. The costs of this mistake is not seen as very significant; it stems from inappropriate compliance with the coding protocol, possibly caused by the level of detail in the coding protocol. This mistake is also seen in calculating the contract value; this variable needs to reflect the maximal contract value, including extension, instead of only the initial contract value sometimes used by the second or third coder.

The third type of identified error is the interpretation error, and these are the types of errors which always required further investigation. This type of error seemed to be most commonly

caused by ambiguity in the tenders and the complexity of the coding protocol. This mistake was most often seen in the variables "documents to submit", "ceiling amount''and' number of appendixes and files". For the variable documents to submit, it has to be concluded that the tender documentation lacks clarity, allowing for some level of subjective judgement. Most tenders provide an incomplete overview of "documents to submit" (APENDIX 4**),** often missing the award criteria and the pricing sheet, while these are arguably the most important documents one has to submit.

The conflicts in the variable of appendixes and the variable ceiling amount proved to be less significant. Most of the differences in these variables are easily explainable and should not hinder the outcomes of this study. The first source of conflict is missing documents, which is quite common for tenders for the Contracting authority C and CONTRACTING AUTHORITY B. To ensure the tender documentation is as accurate as possible, this study used the table of contents to identify missing documents. When documents were listed in the table of contents but missing in the supplied documents, they were still counted to reflect the situation at the time of the actual tender. The second source of conflict is caused by a unique judgement system used by the Contracting authority C when assessing prices. Instead of excluding a submitted bid above a specific price, the Contracting authority C award negative points, while most other organisations exclude the tender. An example of this method is shown below.

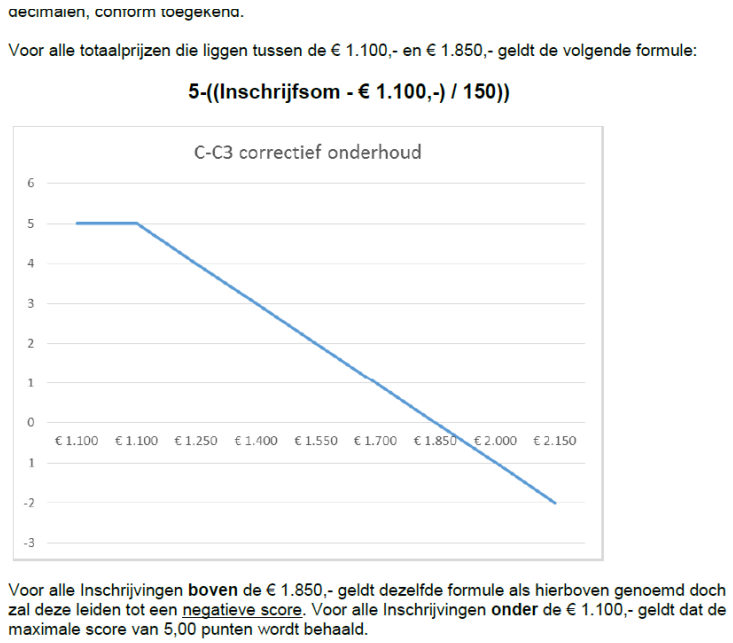


Figure 12 Award procedure price criteria