Stimulating Construction Industry Development by Qualitative Tendering

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Abstract: The change from contract awarding based on the lowest bid price to awarding based on the most economically advantageous tender (MEAT) has been recognized to be a stimulator for innovation. According to literature it is a procurement methodology that eliminates the drawbacks of traditional lowest bid tendering. For proper functioning, to create stimulus for innovation, contractors should be able to add value to their bids to be able to differentiate on quality from competitors (distinctive capability). The MEAT-methodology is regularly used in Dutch construction as a result of legal obligations. However, according to Dutch contractors, the governmental tenders lack possibilities to differ from competitors on qualitative aspects. This paper analyses the tender data of Dutch' largest civil works contracting authority, the department of transportation. A four-case study based on interviews was used for the interpretation of the findings from the data investigation. The study shows a loose relationship between tender characteristics and distinctive capability, but still provides insights in ways to improve MEAT-procedure effectiveness. As standardisation, short-termism and aversive behaviour have not led to the right extent of innovation, a more innovative procurement and collaboration approach is suggested, within or beyond current procurement structures.

Keywords: Construction Industry; Distinctive Capability; Innovation; MEAT; Public Sector Procurement; Tendering.

Introduction

The modern-day society faces numerous challenges in the public space for which the construction industry should be an important solution provider. Topical themes such as climate change, urbanisation and changes in the way we move around call for new solutions. But will the industry be able to deliver? When it remains in its current state, the answer will likely be negative. Because of internal sector problems, both the required quality and quantity seems to be unreachable if nothing changes. (World Economic Forum & Boston Consulting Group, 2016) Research reveals several reasons why the goals look unreachable of which the lack of innovation is an important one. Regularly, innovation is needed for companies to achieve a good competitive position. Due to advantages they are able to realise a healthy margin over a long-term period. The absence of this healthy margin is an often-heard complaint in the construction sector.

Innovation is a broad term, but it in this context it can be related to both quality and quantity. Where product innovation can be related to quality growth (relevant new products should be better in at least one way) (the quality of an output unit in Eq. (1), process innovation can lead to a decrease of effort units.

$$productivity = \frac{output\ units}{effort\ units} \quad (1)$$

Where the World Economic Forum mentioned the lack of innovation, the productivity aspect has also been subject of research. Taking into account the global construction sector, a relatively low production shows up. (Changali, Azam, & Van Nieuwland, 2015) Considering the Dutch construction sector results in a similar view, despite the reform initiatives that have taken place in the past decades. (Smid, 2014)

The need for reforms was a response to the construction fraud that dominated the sector around the turn of the century. Cartelisation eliminated the need for innovation in order to survive in the sector. A stricter bid-procedure turned out to be no vital solution, because tenderers could only differ on the price component of a prescribed solution. Therefore, qualitative tendering was introduced in the Dutch infrastructure sector. The qualitative bid-element served as a guard against collusion, because it was no longer possible to determine the tender winner before bid evaluation.

Along with the introduction of integrated contracts, in which the contractor is responsible for (at least) both design and execution, qualitative tendering seemed to pave the way for more innovation. Both on the product aspect related to the increased freedom of offer and on the process-aspect related to less prescribed work methodologies. However, according to the aforementioned productivity data this has not been the case. Questions arise regarding the effectiveness of procurement in the infrastructure sector, as the environment seems to be optimal for innovation.

The purpose of the present paper is to establish the effectiveness of tendering at Rijkswaterstaat from the *distinctive capability* perspective. The paper helps contracting authorities in making their tender procedures more effective and focused on quality.

Some definitions are broadly used in this paper and therefore shortly described hereafter: Procurement process, the process of interaction between contracting authority (client) and potential vendors, starting with the project definition on the clients side and ending with a signed contract; project characteristics, all characteristics of a project that are fixed regardless the procurement process; tender characteristics, all characteristics being added to the project as a result of the chosen tender procedure; award criteria, the criteria on which the bid selection in based; distinctive capability, the extent in which a bidder has the possibility to make a significant difference in his bid on qualitative aspects. Further on in the paper, the distinctive capability definition is thoroughly elaborated.

The paper proceeds as follows. First, the functioning of tendering in the Dutch infrastructure sector is described, where

the special attention is paid to the historical development of the current methodology. Thereafter, the research methodology is explained, the results are shown, and the data verification is elucidated. The paper end with considerations, conclusion and an advice to contracting authorities.

Research Methodology

Does Rijkswaterstaat provide distinctive capability for bidders in their tender procedures? To answer on this question, several steps had to be taken and different research methodologies had to be used. Previous research on public sector procurement has mostly relied on quantitative research methodologies. This methodology is, depending on the quality of the data, very useful for answering simplified research questions, with relatively few variables. For complex research questions, the statistical boundaries are too tightened to provide insight in the subject. Also, for answering on the question of this research, the expectation that a statistical prove would be absent was right.
This research has been a combination of quantitative and qualitative research methodology. The combination ensures the foundation based on factional characteristic and the practical applicability within the construction sector. (Abowitz & Toole, 2010; Zou, Sunindijo, & Dainty, 2014) A schematic view of the research methodology is shown in Fig. 1.

Research Environment
The research has been conducted in the Rijkswaterstaat (RWS) organization. RWS is the implementation organization of the Ministry of Infrastructure and Water Management. This organization is responsible for the conservation of the existing main roads, waterways and other assets in the Netherlands and the construction of new infrastructure. Despite the fact that RWS is not solely responsible for the realization of infrastructure, it is an important party in this sector. Other contracting authorities with a substantial share in public infrastructure procurement are municipalities, water boards and provinces. Given the total turnover of almost 19 billion Euro in the Dutch road, water and earthworks sector, the share of RWS is approximately 15 per cent (Centraal Bureau voor de Statistiek, 2018; Ministerie van Financiën, 2017). Despite the minor share, RWS is of major importance for the sector. In contrast to other contracting authorities, they are ahead of others on integral contract forms. Especially for the large construction companies, the portfolio of RWS plays a major role in their activities. This influences the rest of the construction sector because of the fact that a significant part of the work is executed by subcontractors.

Project and Tender Characteristics

In this chapter of the paper, the project and tender characteristics that have been part of the research are elaborated.

Contract Type
Within the RWS organization, the use of three main contract categories can be distinguished. (1) The integral contracts containing the design, construction and maintenance of a project, eventually expanded with a finance component (DBM, DBFM). Those contracts are regularly used for the execution of highly complex projects and awarded to large contractors or consortia of large contractors.; (2) Integral design and construct contracts (E&C, D&C). Those contracts are used for the construction of new assets or large maintenance works and awarded to large, medium or small companies, depending on the contract size; (3) Service contracts. Those contracts are used for regular maintenance works and calamities management.

Contract Size
The contract size is a variable that strongly depends on the nature of the contract and adaption is not easy. Whether this should be seen as a project or a tender characteristic is therefore arbitrary. It determines which contractors are able to tender the project as the minimum requirements of large projects can only be met by the large construction companies.

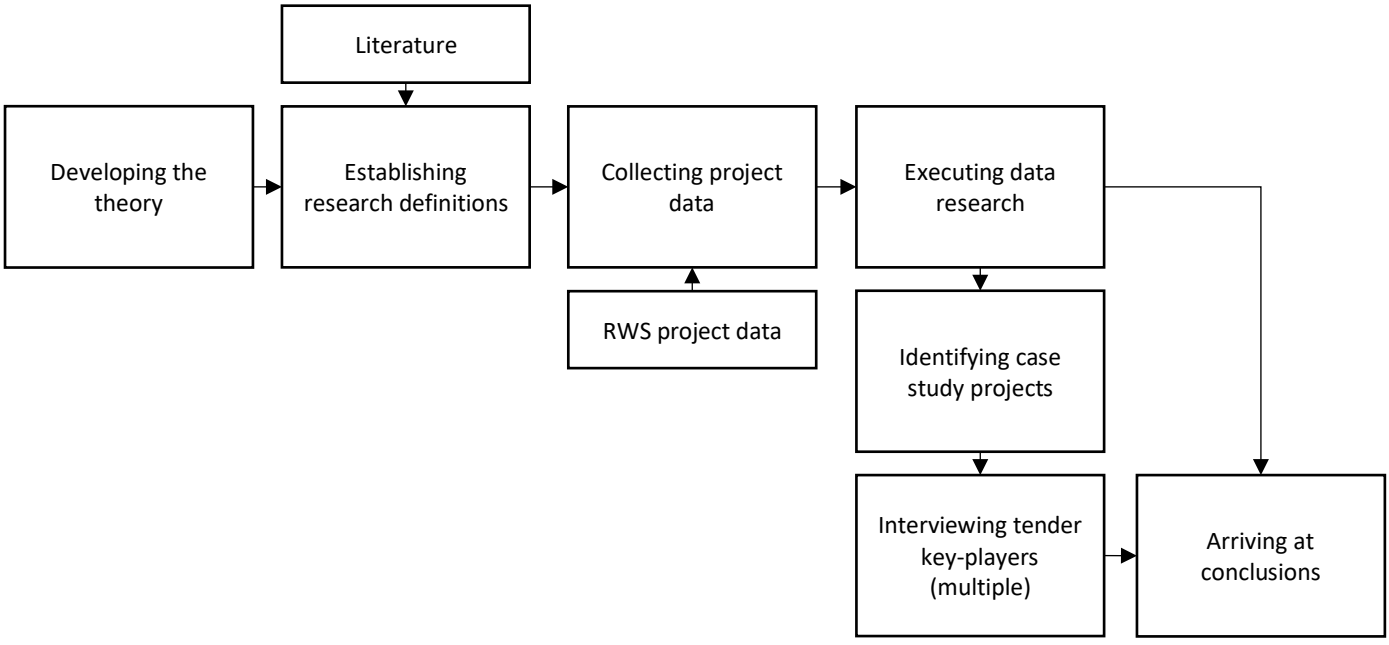

Fig. 1. *Research methodology process*

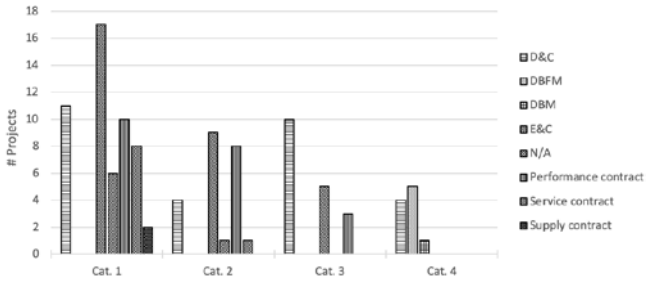

Fig. 2. *Contract type (Contract value, 1: €0+; 2: €5M+; 3: €10M+; 4: €50M+)*

Number of Criteria

Internal policy prescribes the use of maximal four qualitative criteria in RWS tenders, but in some cases this number has been exceeded. Due to the mathematical phenomena that the mean of the variances is smaller than the variance per criterium, the distinctive power of the criteria is likely to shrink.

Best Value

The use of the Best Value methodology has grown over the past years and this growth is likely to be continued. This methodology changes the perspective of the tender procedure, as it places the bidders in the leading position. The award criteria are specified on a higher level of abstraction, so the bidders should have more possibilities to show their expertise. The focus of the methodology lies on acquiring the bidder that fathoms the project the best, underpinned with verifiable performance indicators, not the bidder that makes the most promises. Analysis show that the distinctive capability of Best Value tenders is higher than non-Best Value tenders. The question whether this is caused by the less-prescribed quality criteria, the large step size in evaluation or another cause, is discussed later on in this paper.

Quality Criteria

Prior to the research, the hypothesis was as follows: *The criterion type influences the distinctive capability in a tender.* To test the hypothesis, the used quality criteria have been grouped based on characteristics. Literature shows that there is no consensus regarding the groups of criteria that are being used in construction. (Duren, Dorée, & Voordijk, 2009; Hatush & Skitmore, 1997; Palaneeswaran & Kumaraswamy, 2000; Sebastian, Claeson-Jonsson, & Giulio, 2013; Verheijen, 2010; Waara & Bröchner, 2006) Therefore, the RWS internal criteria grouping has been adopted, shown in Table 1 with the frequency in the data.

Table 1. *Criteria frequency in data set*

Criterium	Frequency	# Projects
[Best Value] Opportunities	89	14
[Best Value] Performance	89	14
[Best Value] Risks	89	14
[Best Value] Key team members	83	13
CO2-performance ladder	420	88
Sustainability	30	8
Extra quality design/product	24	8
Life Cycle Costs (LCC)	3	1
Environment	92	22
Price	52	11
Process control	185	21
Risk control	241	46
Time	70	19
Traffic	26	8
Other	98	22

Data Analysis

In this chapter of the paper, the data analysis is elaborated. Successively the definition of *distinctive capability* is worked out and translated to methodologies, the data collection protocol is explained, and the analysis outcome is presented.

Distinctive Capability Definition

As for most projects in the construction sector, the costs of materials and labour are more or less the same, the monetary difference has to be made by finding a smart solution or work methodology. In order to acquire works with those solutions, construction companies have to compare from others during a tender on objectified criteria. The possibility to differ from others depends on the set-up of the tender procedure. In the context of this paper the distinctive capability is defined as the extent in which a bidder has the possibility to acquire work on non-price criteria in a public tender procedure. Literature lacks methodologies to objectify distinctive capability. Therefore, multiple methodologies have been applied and compared with each other.

Exchange Methodology

Skitmore, Drew, & Ngai (2001) and Waara & Bröchner (2006) state that the MEAT-component of a tender has worked correct when the lowest bidder and the second-lowest bidder change places because of the qualitative criteria. However, this reasoning seems to be too much simplified. For example, it is possible that the lowest bidder also offers the highest quality. Previous research even shows that this is not a rare case. (Witteveen & Van de Rijt, 2013) On the other side it is possible that a bidder makes a qualitative difference but is not able to switch places due to an unbalanced price-quality ratio. The binary methodology is biased by the price-quality ratio and is therefore not suitable for the purpose of this research.

Variance Methodology

The variance is a mathematical value that indicates the spread of a certain data set. Within the context of the research, the spread of the quality scores of the bidders relates to the distinctive capability. A high variance indicates that the scores of the bidders are very far apart. On the other side a low variance shows that the scores are close to each other, that very few differentiation is achieved between bidders. The variance can be calculated based on the total qualitative bid or based on a single criterium, respectively with Eq. (2) and Eq. (3).

$$Tender\ variance = \frac{\sum(Q_{total} - \overline{Q_{total}})}{(n-1)} \quad (2)$$

$$Criterium\ variance = \frac{\sum(Q_{criterium} - \overline{Q_{criterium}})}{(n-1)} \quad (3)$$

Top-difference Methodology
A shortcoming on the approach of previous mentioned methodology is that bidders without a chance of winning the tender also influence the outcome. Regularly only a few competitors make a real chance on winning and therefore they are looking for ways to differ from each other. Compared to prospectless bidders they differ anyway on qualitative aspects. The value for this methodology is calculated by deducting the quality score of the second most economical advantageous bid from the most economical advantageous bid. Similar to the aforementioned methodology, the value can be calculated for both the whole tender (Eq. (4)) as a single criterium (Eq. (5) and Eq. (6)).

$$Tender\ distinction = Q_{Fic.1} - Q_{Fic.2} \quad (4)$$

$$Criterium\ distinction = Q_1 - Q_2 \quad (5)$$

$$Criterium\ distinction\ in\ tender = Q_{C.Fic.1} - Q_{C.Fic.2} \quad (6)$$

Descriptive Methodology
In previous research regarding the effectiveness of sustainability quality criteria, a descriptive methodology has been used. (Verheijen, 2010) Guided by a predefined criterion, the effectiveness of the tenders has been assessed. However, to translate this methodology to this research, a clear framework about how to judge the effectiveness of quality criteria should be present. Because this is not the case, the methodology is unlikely to be useful in this context.

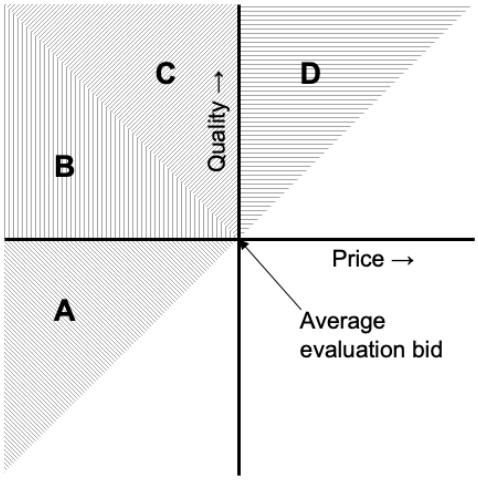

Fig. 3. *Segment definition by EIB*

Segmentation Methodology
To define the success of a tender, the Dutch economical institute for the construction industry (EIB) defined a methodology. (Hardeman, 2015) The method is based on the principle that a tender should give the bidders an opportunity to acquire a work that can be made with a healthy margin. The segments are shown in Fig. 3. The interpretation of the segment is given hereafter.

Segment A
If the tender winner is situated in segment A, the tender is awarded to the bidder with a lower than average price and a lower than average quality. This might indicate a low quality/price ratio and equally distinctive capability. For both the contracting authority as the bidder, this situation is far from likely.

Segment B
Tender winners in this segment offer the best price/quality ratio, but the financial component has been decisive. For contracting authorities this seem to be the best tender results on a short term, but for contractors, a healthy margin might be threatened.

Segment C
In this segment the tender winners with a higher than average quality bid combined with a lower than average price are situated. However, compared to segment B, the quality has been decisive. Possibility to realise a healthy margin remains a focus point.

Segment D
The winning bids in this segment are qualitatively higher than average, but the price is higher than average as well. Tenders in this segment are assumed to offer a high amount of distinctive capability. Especially for contractors being a bid winner in this segment seems to be beneficial.

Applicability of methodologies
Establishing a "best methodology" turned out to be impossible, because there is no existing frame to reflect the methodologies on. Therefore, all methodologies have been applied on the data set. However, some limitations can be applied as a result of a certain project characteristic that are discussed. Thereby, the *swap methodology* seems to be the least useful methodology because of its binary character. Therefore, this methodology has not been addressed further in this paper.

Data collection protocol
Free accessible data has been used to set up the project list that is used in this research. Only competitive RWS tenders with a least one qualitative criterion have been taken into account. As a result of data availability, only projects with a tender date on or between Q1-2016 and Q2-2018 have been part of this research. The data set has been completed with confidential tender/bid specific information from inner RWS sources.
A combination of Excel and SPSS was used to structure the data from different sources and to monitor for missing data and inconsistencies. As a result of missing and insufficient information, few projects have been eliminated for the research.

Data analysis results

Table 4 contains the summarized calculation results of the research. The rows contain data of the aforementioned tender characteristics, the methodologies are represented in the columns. For both “top-difference” methodologies, the table value is a 20% trimmed mean, to prevent the influence of outliers. The interpretation of the results is based on a combined view over all methodologies as not a single methodology stands out in its results. Where prescribed boundaries are absent, the interpretation of the research result in completely relative.

Table 2. *Summarized data research results*

Characteristics ↓ Methodology →	n	Exchange		Variance	Top-difference		Segmentation			
		2 → 1	≥2 → 1	× 10^{-2}	F1-F2	F1-Q1	A	B	C	D
Contract size	**105**	**17%**	**30%**	**5,29**	**11%**	**-6%**	**17%**	**30%**	**41%**	**12%**
0M - 5M	54	13%	22%	6,33	9%	-6%	15%	31%	39%	15%
5M - 10M	23	30%	39%	5,18	13%	-11%	17%	35%	43%	4%
10M - 50M	18	11%	50%	5,12	18%	-2%	11%	28%	50%	11%
50M+	10	20%	20%	3,78	11%	-5%	40%	10%	30%	20%
Contract type	**105**	**17%**	**30%**	**5,29**	**11%**	**-6%**	**17%**	**30%**	**41%**	**12%**
E&C	31	26%	35%	5,42	11%	-3%	10%	39%	42%	10%
D&C	29	10%	38%	5,50	22%	-4%	17%	21%	45%	17%
Performance contract	21	24%	29%	7,13	5%	-15%	19%	33%	43%	5%
Service contract	9	0%	11%	10,54	29%	0%	0%	22%	56%	22%
DBFM	5	20%	20%	0,44	1%	-4%	40%	20%	20%	20%
Supply contract	2	0%	0%	0,08	6%	0%	0%	50%	50%	0%
DBM	1	0%	0%	0,11	-1%	-7%	100%	0%	0%	0%
N/A	7	14%	29%	1,26	-2%	-11%	43%	29%	14%	14%
# of criteria	**105**	**17%**	**30%**	**5,29**	**11%**	**-6%**	**17%**	**30%**	**41%**	**12%**
1 criterion	22	5%	5%	5,34	2%	-2%	17%	52%	22%	9%
2 criteria	16	13%	25%	24,88	25%	-6%	13%	19%	50%	19%
3 criteria	25	28%	52%	5,05	12%	-6%	16%	24%	52%	8%
4 criteria	15	27%	40%	4,39	12%	-12%	13%	33%	33%	20%
5 criteria	13	8%	15%	5,26	20%	-8%	38%	23%	23%	15%
6 criteria	7	43%	71%	7,91	5%	-14%	0%	29%	71%	0%
7 criteria	6	0%	17%	5,31	22%	-3%	17%	0%	67%	17%
Best Value	**105**	**17%**	**30%**	**5,29**	**11%**	**-6%**	**17%**	**30%**	**41%**	**12%**
Best Value	14	29%	43%	9,42	28%	-10%	7%	14%	57%	21%
Regular	91	15%	29%	4,73	9%	-5%	19%	31%	37%	11%
Quality proportion	**105**	**17%**	**30%**	**5,29**	**11%**	**-6%**	**17%**	**30%**	**41%**	**12%**
0% - 25%	30	7%	7%	8,14	4%	-3%	21%	43%	32%	4%
25% - 50%	30	20%	27%	4,40	4%	-8%	27%	27%	27%	20%
50% - 75%	21	19%	48%	3,85	16%	-5%	10%	29%	52%	10%
75% - 100%	15	20%	67%	8,18	26%	-6%	7%	13%	53%	27%
100% +	9	22%	22%	6,38	19%	-15%	11%	22%	67%	0%
MEAT-criteria	**309**									
[Best Value] Opportunities	14	29%	43%	10,90	28%	-10%	-	-	-	-
[Best Value] Performance	14	29%	43%	11,67	28%	-10%	-	-	-	-
[Best Value] Risks	14	29%	43%	18,31	28%	-10%	-	-	-	-
[Best Value] Key team members	13	31%	38%	17,88	29%	-11%	-	-	-	-
CO2-performance ladder	88	19%	34%	2,68	12%	-6%	-	-	-	-
Sustainability	8	13%	13%	4,68	9%	-3%	-	-	-	-
Extra quality design/product	8	0%	33%	3,38	2%	-3%	-	-	-	-
Life Cycle Costs (LCC)	1	0%	0%	2,00	-16%	-16%	-	-	-	-
Environment	22	23%	36%	5,95	20%	-5%	-	-	-	-
Price	21	24%	38%	-	10%	-10%	-	-	-	-
Process control	46	22%	39%	5,23	14%	-6%	-	-	-	-
Risk control	19	5%	26%	2,76	3%	-9%	-	-	-	-
Time	8	25%	25%	9,10	47%	-2%	-	-	-	-
Traffic	22	14%	27%	6,96	4%	-5%	-	-	-	-
Other	11	18%	27%	5,44	12%	-10%	-	-	-	-

Tender characteristics

The contract size does not seem to be a major factor of influence of the distinctive capability. However, 10M+ tenders seem to be more capable of achieving high relative quality (F1-Q1).

In the contract type, the data shows more deviation. Integrated contracts have higher exchange rates and are more quality driven than other contract forms. On average this results in higher segmentations. In this data set the service contract stand out with a high variance. At the same time one can see that the acquired quality is above average, meaning that the qualitative difference is major for this contract types, but the highest are nonetheless acquired. The DBFM contracts differ from the integrated contracts as the variance is extremely low. However, despite the significant low-price acquisition, the quality still remains high (low top-difference), which is cost efficient for contracting authorities.

Despite few markable values, there seems not to be a relationship between the number of criteria and the distinctive capability. High numbers of criteria tend to decrease the change of a low segment tender winner.

The Best Value methodology turn out to be the most significant tender characteristic. All methodologies show higher distinctive capability and segmentation is higher. The lower F1-Q1 value is remarkable because this does not stand out in any other characteristic.

As can be expected an increased quality proportion results in increased distinctive capability. Strikingly, this mechanism seems not to be working anymore when the qualitative element is larger than the price element. Table 3 shows the average absolute quality score. This data shows the opportunities within the high-quality proportion tenders. Average winning scores are under 60% which leaves room for market improvement.

Table 3. *Absolute quality related to quality proportion*

Quality proportion	Average score	Fic.1 score
0% - 25%	72%	72%
25% - 50%	44%	52%
50% - 75%	40%	57%
75% - 100%	26%	59%
100% +	13%	47%

The segmentation methodology shows that in particular Performance and DBFM contract are underrepresented in the upper segments. This is in line with relatively low F1-F2 values. Low quality proportion projects show the same tendency.

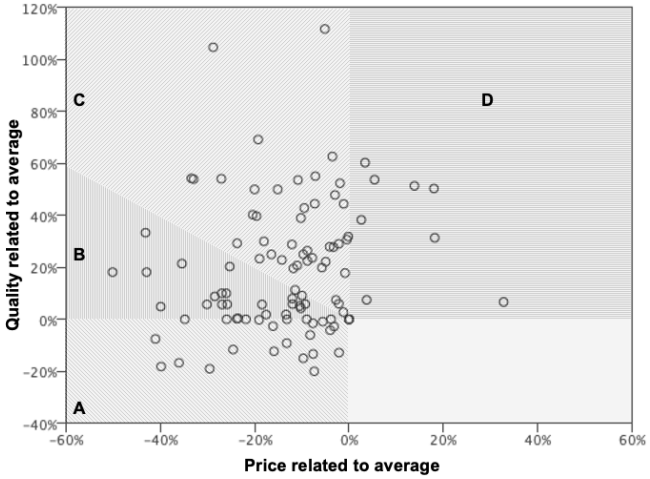

Fig. 4. *Tender winners related to average bid price and quality*

Criteria

With the exception of Best Value criteria, MEAT-criteria seem to have minor influence on distinctive tender capability. Differences according to all used methodologies are negligible. Just Best Value criteria outscore the other criteria, but as we saw in earlier results, this can be linked to the tender methodology.

Verification

Four projects are selected to take a closer look in the tender mechanism of that specific project. Thereby, expert interviews have been held to verify the data research findings and place it within the context of public tendering. The interviewees consisted of both contracting authority officials as market party representatives.

Project 1 – A24 highway link

The project is a highway link connection between the A20 and A15 on the west-side of Rotterdam. Characteristics are shown in Table 4.

Table 4. *A24 Highway link tender characteristics*

No. of bidders	2	
No. of criteria	4	
Contract type	DBFM	
Tender procedure	Competitive dialogue	
Ceiling price (NPV)	€ 630,000,000	
Contract value	€ 577,511,472	
Max. Q-value	€ 333,875,574	
Achieved Q-value	€ 319,125,574	(94%)
F1-F2	15%	
F1-Q1	0%	
Variance (10^{-2})	0,56	

This project is the only DBFM project in the population where the non-lowest bidders was able to get the contract. In this case, the difference was very small between the bidders. This is regularly seen at DBFM contracts. Despite the high qualitative score (94%), the competitive tenders do not work anymore to create differences between bidders. Whether this is desired or not depends on the view on competitive tendering. A possible explanation for the minor differences can be the tight design boundaries that were applied during the tender.

Project 2 – A10 highway and rail reconstruction

The project is an integral highway/railway reconstruction in the south of Amsterdam. Characteristics are shown in Table 5.

Table 5. *A10 tender characteristics*

No. of bidders	2	
No. of criteria	4	
Contract type	D&C	
Tender procedure	Competitive dialogue	
Ceiling price (NPV)	€ 1,060,000,000	
Contract value	€ 989,950,000	
Max. Q-value	€ 400,000,000	
Achieved Q-value	€ 373,543,058	(93%)
F1-F2	28%	
F1-Q1	0%	
Variance (10^{-2})	2,07	

This project is awarded to the bidder with the lowest bid and the highest quality, which is regularly seen. This shows the unexplored potential for market parties to increase profitability of their companies. This project has been an example of a tender where relatively much can contribute to distinctive capability. Because the criteria were aligned, the scores strengthened each other. The project is also unique because of the large design component which brings distinctive capability. Nevertheless, this might not be a solution for all projects, because of the major effort it takes for both contracting authority as market parties.

Project 3 – Embankment reconstruction

The project is an innovative embankment reconstruction with special attention for the environment in the IJsselmeer. Characteristics are shown in Table 6.

The project is a Best Value project which shows the proper functioning of a MEAT tender. The bidder with the highest quality won the tender, despite the major difference with the lowest bid (over 20M). The functional specification of the

project requirements resulted in a innovative solution to be carried out. This was strengthened by the good client-contractor collaboration.

Table 6. *Embankment reconstruction tender characteristics*

No. of bidders	3	
No. of criteria	5	
Contract type	D&C	
Tender procedure	Best Value	
Ceiling price (NPV)	€ 105,000,000	
Contract value	€ 88,800,000	
Max. Q-value	€ 83,190,000	
Achieved Q-value	€ 54,315,000	(65%)
F1-F2	109%	
F1-Q1	0%	
Variance (10^{-2})	20,52	

Project 4 – Performance contract

This contract is a regular maintenance contract. Characteristics are shown in Table 7.

Table 7. *Performance contract tender characteristics*

No. of bidders	9	
No. of criteria	5	
Contract type	Performance contract	
Tender procedure	Restricted	
Ceiling price (NPV)	€ 44,946,000	
Contract value	€ 9,658,000	
Max. Q-value	€ 34,192,400	
Achieved Q-value	€ 6,101,150	(18%)
F1-F2	-3%	
F1-Q1	-44%	
Variance (10^{-2})	13,68	

This project is selected because of the major quality gap between the winning bid and the highest-quality bid. The actual contract value of this project is below 25% of the ceiling price. This results in the malfunctioning of the tender mechanism and creates possibilities for bidders to win with a substantial low bid.

Expert consultation

The population of the consultation consists of the RWS contract manager of the aforementioned projects, completed with two market party representatives of the first two projects.

Without having been confronted with the research data, they reject the theory of a systematic link between tender effectiveness (distinctive capability) and tender characteristics or MEAT criteria. However, influence of the tender set-up on effectiveness is recognized and linked to the invested efforts of the contracting authority. Several logical explanations exist, but links with the researched data are weak.

Directions to improve tender effectiveness vary amongst interviewees such as a more systematic approach, improved risk allocation and tighter public private collaboration.

Discussion

The relevance of the research is based on the presumed lack of distinctive capability which is mentioned by several construction companies. As distinctive capability is seen as a precondition for successful tendering, this might be an explanation of the underperformance of the construction sector. This justifies the coupling with innovation and incremental improvement. However, the sector is neither uniform in its claim regarding distinctive capability nor the sector performance. Nevertheless, this research has been conducted based on the aforementioned assumption.

The RWS research environment made it possible to enclose data of the largest contracting authority in civil engineering in the Netherlands, which safeguards the validity for a broader perspective, as it is likely that other contracting authorities are facing the same challenges. Hereby should be noted that RWS has a leading position in the industry and might be ahead of other when it comes to uniformity in tendering.

The data research showed the variety in the research, which makes it difficult to draw conclusions out of data. Nevertheless, several main findings have led to valuable input for expert consultation. The consultation showed other variables that influence the productivity and quality of construction on the long term. The BPQR methodology is an instrument for quality improvement, but the success is highly related to the methodology framework, where three main elements should be pointed out.

Firstly, the standardization of the criteria has led to a decrease of distinctive capability and a stand-still in quality development. The past has shown that the goal-setting is a way to stimulate companies to achieve governmental goals. Thereby, the effectivity of project specific quality criteria has been broadly underlined. Therefore, a division should be made between long-term-goal criteria and project specific criteria. Long-term goals must provide contractors certainty and will likely lead to quality improving investments.

Secondly, a discord seems to be present in criteria specificity, but both highly specified as less specified criteria look to be useful. If a project is prepared on a high level of detail, highly specified criteria will be a good contributor to extra quality and will fit the needs of the contracting authority. Less prepared projects, or less complex projects look to be open for less specified criteria, as for example included in the Best Value methodology. This goes together with the finding that contracts with increased design freedom (e.g. D&C contracts) regularly lead to increased distinctive capability.

Thirdly, the collaboration between contracting authority and contractor is broadly mentioned as a success factor for quality and productivity improvement. Enclosing the collaboration in the tender procedure has proved to be a valuable element leading to higher bid quality. Further research should focus on how the in-tender collaboration can be proportionally implemented in tender procedures.

The research reveals the dilemma of contracting authorities. The tender mechanism cannot be used to solve all challenges in once. Establishing a high extent of distinctive capability can contribute to high project-specific quality and is a safeguard against extreme low bidders but seems not to be the right way in stimulation the market for incremental improvement. If there is consensus among the need for market-wide improvement, one should ask the question whether the current ways of tendering have reached their limits.

Further research should be carried out to establish the effectiveness of new initiatives and the influence of tendering on sector improvement. Thereby, for justification reasons, it would be interesting to research the relationship between bid quality and actual delivered quality.

Advice to Contracting Authorities

Based on the finding of this research, measures are suggested to be taken by contracting authorities in order to improve tender effectiveness and achieve authority goals. As research turned out that currently used criteria do not result in significant differences between bidders, one should consider moving toward more product-related criteria, where bidder can differentiate from each other. In combination with renewed focus on collaboration between contracting authority and market parties during the tender phase, this will likely contribute to reaching authority goals.

Conclusion

This paper addressed one of the presumed problems of current competitive tendering procedures in Dutch construction. Contractors argue that competitive tenders lack distinctive capability. This might be one of the causes for the lack of innovation an incremental improvement in terms of quality and productivity. The currently undertaken initiatives like the Market Vision and the Better Procurement Trajectory underline the problems and the actual relevance of the research.

In this paper, the importance of distinctive capability in competitive tender has been elaborated. The paper determines whether the bid procedures of the Dutch Department of Transportation lack distinctive capability or not. Thereby the influence of tender characteristics on distinctive capability has been assessed.

Data research disclosed that on average the presumed lack of distinctive capability does not exist. The average difference between the two fictitious lowest bidders of 13% of the achievable quality scores is interpreted to be significant. The difference with the average bid of 64% is even more striking.

However, a significant difference between projects exists. The most evident factor of influence on the distinctive capability is the extent of design/solution freedom for the contracting authorities. Therefore , it is suggested to extent the possibilities for contractors expertise in the bidding process. According to the consulted experts, this will not solely lead to sector improvement, as that should be sought in tighter client-vendor collaboration.

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