

Increasing contractor's competitiveness at bids for Most Economically Advantageous Tenders

**Realizing competitiveness through sustainability and other
competitive factors at infrastructural tenders**

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Pre-face

This report is the result of my thesis project of the master Systems Engineering, Policy Analysis and Management. Conducting this master has been very interesting and enjoyable. In addition, putting much study related knowledge in practice during my thesis project at BAM Infraconsult has been a challenging and interesting experience.

I would like to thank my graduation committee for their support and valuable advice during this thesis project. I have appreciated Joop Koppenjan a lot for his very positive contributions by providing me advice, fresh insights and fruitful suggestions. Also many thanks to Zofia Lukso for her support while searching a thesis project and her advice during the project. In addition, thanks to Hans de Bruijn for chairing the committee and his very sharp analysis which clarified very well the status of my work.

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Abstract

The award criterion 'Most Economically Advantageous Tender' (MEAT) is increasingly applied to award tender contracts in the Dutch infrastructural sector. Because of this, contractors are requested to develop solutions themselves instead of executing fully specified works. Therefore, new opportunities arise to become competitive. This research explores opportunities to increase the competitiveness of BAM Infra, a major Dutch constructor. Among other things, they aim to distinguish at MEAT tenders on the field of sustainability. Based upon literature addressing competitiveness in the construction sector, insights into competitive factors are derived from two strategic theories – competitive positioning theory and resource-based view – and organizational learning. In addition, these factors are supplemented with empirical findings. By means of semi-structured interviews BAM Infra's status on competitive factors has been analyzed resulting in improvement opportunities. Based hereupon, recommendations are formulated to increase competitiveness by distinguishing more at tenders, to shape conditions that enable increased competitiveness and to improve actual processes at projects.

Summary

Research problem

The award criterion 'Most Economically Advantageous Tender' (MEAT) is increasingly applied to award tender contracts in the Dutch infrastructural sector. This has affected contractors' tender processes because tenders are no longer solely evaluated on price, but also on value criteria. Contractors are increasingly asked to develop solutions themselves instead of executing fully specified works. Strategies other than offering the lowest price are therefore likely to become suitable to tender competitively. This is why BAM Infra, a major Dutch contractor, has raised the question how it can increase its competitiveness at MEAT tenders. Special interest was given to differentiating opportunities on the field of sustainability. This resulted in the following research question: *Which recommendations can be made for BAM Infra to increase its competitiveness at MEAT tenders, with a focus on sustainability criteria, for infrastructural projects in the Netherlands?*

Research methods

To answer the research question various research steps have been taken. The theoretical operation of MEAT tenders and its application to Dutch infrastructure was assessed first by means of desk research. Subsequently, to gain insight into factors that determine competitiveness at MEAT tenders, literature has been studied. Based upon the identified discussion about competitiveness in the construction sector, competitive factors were derived from strategic theories and organizational learning. The former, concerning Porter's competitive positioning theory and Barney's resource-based view, have become suitable according to the researcher because of changing market conditions. Insights into organizational learning were derived because of the widespread agreement in construction specific literature about the importance of this process to increase performances and competitiveness.

Further research was executed by means of semi-structured interviews, which suits well the explorative character of this research (Baarda et al., 1996). The interviews had a twofold goal. Empirical competitive factors, that address the specific characteristics of MEAT tenders, were identified first. In addition, BAM Infra's status on both theoretical and empirical factors was identified to detect opportunities for improvement. Based hereupon, recommendations were formulated to increase BAM Infra's competitiveness at MEAT tenders.

Functioning and application of MEAT tenders

In the Dutch infrastructural sector MEAT tender bids are mostly evaluated according to the 'virtual tender price' principle. This implies that performances on value criteria are expressed in virtual discounts according to predetermined evaluation procedures. Subsequently, the discounts are deducted from the tender price resulting in the virtual tender price. The bid with the lowest virtual tender price gets the contract awarded (see Figure a). Theoretically, this implies that contractors' bid decisions can be narrowed down to:

- add solution if discount > additional costs;
- leave out solution if penalty < cost savings.

However, uncertainties related to subjective criteria and systems' interdependencies complicate decision making.

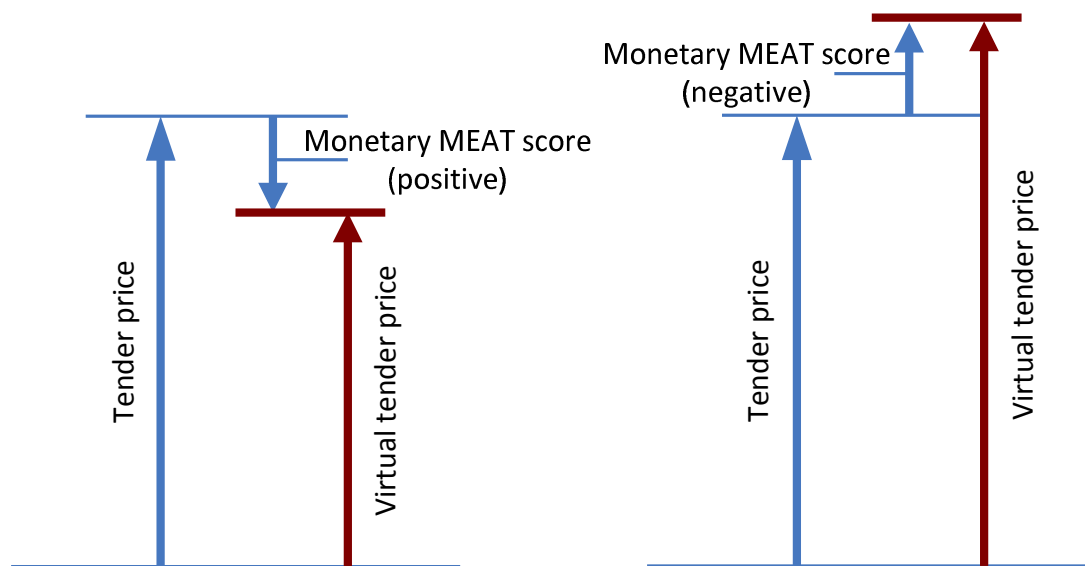


Figure a: Calculation of the virtual tender price

BAM Infra's principle public client that tenders out frequently according to MEAT is 'Rijkswaterstaat' (RWS). This is the executive agency that manages and develops the Dutch network of roads and waterways. Other important public clients are provinces and municipalities. Their MEAT policy is rather diverse and less developed as RWS's policy, which is why this research focused on RWS.

RWS is increasingly tendering out according to MEAT and value criteria are further gaining importance. In 2008 MEAT tenders represented over 60 percent of the total tender value. Within these tenders, expressed in currency units, value criteria accounted for 32% of criteria's weightings (External, 2009).

Sustainability, relating to environmental aspects, is in general not given great weight at tenders. Neither has RWS defined clear sustainability themes yet. The key hindrance is the complicated measurement of sustainability. Nonetheless, development of sustainability criteria is ongoing and it is expected to increase in importance.

Improvement opportunities

BAM Infra's status on competitive factors has been identified to explore improvement opportunities. These factors have been derived from strategic theories, organizational learning and empirical findings.

Strategic competitive factors: competitive positioning theory

The competitive positioning theory opts to position a firm according to a specific strategy: cost leadership or differentiation relatively for the whole industry or just a market segment (Porter, 2008). This corresponds not with BAM Infra's current strategy at MEAT tenders, whereby the aim is to score well on both price and value criteria. According to the competitive positioning theory, this implies that the organization does not fully develop its competitive advantages.

Strategic competitive factors: resource-based view

According to the resource-based view competitive advantages can be gained when a firm implements a value creating strategy that is not simultaneously implemented by any current or potential competitor (Barney, 1991, p. 286). This is in line with BAM Infra's strategy, notably regarding sustainability. However, its contribution to competitiveness is limited, mainly because organization's key sustainable innovations are little valued at MEAT tenders.

Process competitive factors: organizational learning

The project-based nature of the construction sector complicates organizational learning heavily. Projects are often unique and one-off which complicates knowledge development and deployment. In addition, knowledge is often implicit and therefore difficult to communicate. These barriers for organizational learning, derived from literature, were also identified at BAM Infra. As a consequence, knowledge is developed redundantly and not exploited to its fullest extent.

Empirical factors: sustainable project culture, client driven tendering and persuasiveness

Improving the focus on sustainability and client driven tendering was considered important by interviewees because it enables to grasp opportunities that are already in reach of the organization. Nowadays, opportunities are overlooked because sustainability is not considered as a natural decision criterion. In addition, acting client driven, by continuously modifying solutions towards client's needs and preferences, is not fully developed yet.

Furthermore, the manner in which plans are presented can affect tender outcomes. That is why it is important to present bids persuasively. For this, especially the writing process was considered important by interviewees. However, it is often seen as a side process to which insufficient attention and resources are devoted.

Recommendations

Based upon the identified improvement opportunities, related to competitive factors, recommendations are formulated. For this, also organization's characteristics and external factors were taken in account. The level of recommendations differs depending on the impact on the organization and the efforts to realize them.

Stimulate a sustainable project culture, client driven tendering and persuasiveness

In order to grasp more sustainability opportunities already in reach of the organization, project management has the task to question actively about sustainability as a decision criterion. This will create awareness in project teams and supports the formation of a sustainable mind set.

In addition, a strong focus on client's needs and desires is needed. Just like sustainability, this should become a natural decision criterion in project development. Pressure from project management is thus needed to further deploy the client driven mind set at projects.

In addition, acknowledgement of the importance of persuasive writing is needed. Interviewees considered it as a professional skill, which is why it should become an integral part of the tender process by devoting sufficient time and the right resources to it. Project management has the task to manage this process. In addition, development of writing skills can be facilitated by training and writing guides.

Devoting more efforts and emphasizes to these processes is a low risk measure to take and has potentially large benefits.

- Project management has the task to question actively about sustainability to make it a natural decision criterion.
- Project management has the task to define tasks and responsibilities relating sustainability to define its role at projects.
- Project management has the task to make client driven tendering and persuasive writing part of the tender process by creating awareness and devoting sufficient attention to it.
- Management of operating companies have the task to facilitate improvements on persuasive writing by enabling training, setting up writing guides or involve external support.

Inter-firm, problem oriented information system

Setting up an information system is recommended to capture learned lessons and knowledge from projects and make them suitable to serve other projects. Projects are, however, mostly unique, one-off and confronted with differing terminology. Therefore, the system is recommended to be problem oriented. Furthermore, to increase the reach of knowledge and to profit from the great amount of knowledge within the organization, the system is recommended to cover all BAM Infra's operating companies.

To make the system function well, incentives have to be created for project teams to add their input to the system. Setting up an information system and making it function effectively is a complex task. It is therefore not aimed at quick pay-off, but rather to gain long term competitive advantages.

- The recommended inter-firm and problem oriented information system contains a great deal of IT work and inter-firm coordination. Therefore, support from BAM Infra's management is needed.
- Roles have to be defined within the organization to structure the input of information from projects and to ensure the coherence of the system.

Further develop role of experts

A supportive role of experts on a wider scale is suggested. This is based upon literature's importance devoted to 'champions': employees who harness implicit knowledge and can stimulate change. This is in line with an ongoing development at BAM Infra, where experts are increasingly deployed at projects in a supportive role. The researcher recommends to further centralize the development of disciplines that fulfill supportive roles at projects. This stimulates the coordination and development of knowledge. In addition, the deployment of tacit knowledge can be increased by enlarging experts' work fields. Furthermore, cooperation with 'champions' within decentralized operating companies is important to facilitate knowledge and expert deployment within these companies.

- Further development of a supportive role of experts suits BAM Infraconsult. They are recommended to develop or centralize disciplines that can function in a supportive role at projects. Commitment of other operating companies and project management is needed to involve experts and to avoid redundant development of similar kinds of expertise.

Improve differentiation

According to the competitive theories – competitive positioning and resource-based view – it becomes clear that competitiveness can be improved by differentiation. The organization has to choose fields, which are highly valued by clients, on which it can distinguish itself from competitors.

The investigated pay-off of the organization's differentiation strategy on the field of sustainability is still little. Therefore, this strategy should be reconsidered to enable competitive advantages.

For this, insights into decisions to be taken are presented:

- How can (new) marketing approaches contribute to get recent and future sustainable innovations increasingly rewarded at tenders?
 - Does sufficient confidence exist about the key (sustainability) themes that are going to be important at tenders to aim a differentiation strategy at them?
 - How can the actual demand of project specific sustainable solutions be further facilitated?
 - Is sustainability the best field to aim (operational) differentiation at rather than competitive parity?
 - How can client involvement during R&D improve the match of innovations with clients' demands?
-
- BAM Infra's management is recommended to (re)define the differentiation strategy to improve its match with fields that are highly valued at tenders.
 - Heads of operating companies' R&D departments have the task to manage earlier client involvement during product development.
 - On all levels of the organization the task exists to take part in (new approaches of) marketing to get recent and future innovations valued more at tenders.

Distinct lowest price and MEAT tenders

Insights based upon the competitive positioning theory opt for organizational changes to realize competitiveness improvements. Lowest price tenders suit a price leadership strategy, while MEAT tenders enable a differentiation strategy. To aim at two strategies simultaneously, the theory suggests to set up two largely distinct business units dividing lowest price and MEAT tenders.

CPT's suggested distinction of business units is a severe measure to take and is built upon the assumption that differentiation is possible. At MEAT tenders this is only partly the case. Therefore, it is proposed to distinguish complex processes that are uniquely needed for MEAT tenders first. This enables to further develop the expertise needed by units devoted to these processes. Further distinction can take place in a later stage, which should be aimed at realizing cost advantages for regions competing at lowest price tenders.

- Further development of a distinction, based upon tender type, restructures the organization. Regional offices will have to focus more on (small and mid size) lowest price tenders, while central organizations' focus shifts to (mid size and large) MEAT tenders. Commitment of involved operational companies' management is therefore needed.

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1 Introduction

The award criterion 'Most Economically Advantageous Tender' (MEAT) is increasingly applied to award tender contracts in the Dutch infrastructural sector. Herewith, public authorities procure increasingly value based which changes contractors' tender processes. Namely, they have to develop solutions themselves instead of executing fully specified works. Additionally, award of contracts is no longer solely based on price, but also on value criteria. This creates opportunities to compete on fields other than price. This is why BAM Infra, a major Dutch contractor, has raised the question how it can increase its competitiveness at MEAT tenders. The organization aims to realize competitive advantages on the field of sustainability. Therefore special interest exists about differentiating opportunities on this field.

The goal of this research is to formulate recommendations for BAM Infra to increase its competitiveness at MEAT tenders, with a focus on sustainability criteria, for infrastructural projects in the Netherlands. For this, insight into competitiveness at MEAT tenders will be gained by means of a literature study addressing competitiveness in the construction sector. In addition, interviews will be conducted to gain further insights into competitiveness and to identify BAM Infra's status on identified factors that affect competitiveness. These insights, together with analyses of the application of MEAT tenders, will lead to the identification of improvement opportunities to increase BAM Infra's competitiveness at MEAT tenders.

Further explanation of the research's content and methods is presented in chapter 2. Hereafter, background information about MEAT tenders is provided. The theoretical functioning is explained first in chapter 3. Subsequently, chapter 4 elaborates upon the application of these tenders in the Dutch infrastructural sector. In chapter 5 theoretical factors that affect competitiveness are derived from literature addressing competitiveness in the construction sector. These factors are supplemented, in chapter 6, by empirical factors addressing specific characteristics of MEAT tenders. This chapter presents also the analyses of BAM Infra's status on both theoretical and empirical factors to identify improvement opportunities. Based hereupon recommendations for BAM Infra are formulated in chapter 7. The report concludes with the key conclusions and recommendations in chapter 8. In addition, the researcher will reflect on the conducted research in this final chapter.

2 Research problem

The award criterion Most Economically Advantageous Tender (MEAT) is increasingly applied to the Dutch construction sector in order to realize more value for money. The traditional award of contracts by the lowest price criterion has often led to dissatisfying results and poor performances (PSIBouw, 2007). Therefore MEAT tenders are not solely valued on price, but also on value criteria like project duration, traffic disruptions and sustainability. Because of this contractors need to adapt their tender process to realize competitive bids at MEAT tenders, which is the topic off this research.

An introduction to MEAT tenders and its impact on contractors is given in the first section (2.1). Subsequently, the content of this research is presented, which revolves specifically around BAM Infra's competitiveness at MEAT tenders (2.2). The research's starting points are presented first (2.2.1), followed by the research's objective and questions (2.2.2). Based hereupon, research methods are proposed (2.2.3) and the scope is defined (2.2.4). The final section presents the outline of the thesis report (2.3).

2.1 Introduction to MEAT tenders

MEAT tenders enable value based procurement at public tenders. In addition to price, other criteria play a role in contractor selection. European legislation enables such tenders since the nineties, but it has only recently been applied on a large scale. Also at the Dutch construction sector are MEAT tenders increasingly applied, with among other things sustainability as one of the value criteria. The increased application affects contractors' role at tenders, whose activities are extended into design and engineering.

The origin of the MEAT award criterion is explained first in this section (2.1.1). Additionally, the procedures as prescribed by EU and Dutch regulation are presented (2.1.2). Subsequently, the application to the Dutch construction sector (2.1.3) and the role of sustainability (2.1.4) is addressed. To conclude, the final subsection elaborates on how MEAT tenders affect contractors, specifically addressing BAM Infra (2.1.5).

2.1.1 Origin

Selection of the best price-quality tender has longtime been promoted, amongst others by Holt since the early nineties. He argued to select a contractor, one of the most important purchasing decisions, based on its all-round performance (Holt et al., 1994a). This is in line with studies concluding that contractor selection is not dominated by the price criterion (Holt et al., 1994b, Watt et al., 2009). The preferred criteria for evaluating are those which provide a measure of contractors' ability in terms of their management and technical capability, past experience and performance, reputation, and the proposed method of delivery or technical solution (Watt et al., 2009, p. 250). These findings indicate that solely the lowest price award criterion is often not preferable.

Legislative institutions in Europe have addressed the price-quality issue simultaneously. In 1993 the European Commission published the final report of the Strategic Study on the Construction Sector that included the observation that quality is as important as price (Commission, 2002). This was considered in public works directive 93/97/EEC, which allowed the award of a contract to the most economically advantageous tender. However, not before 1999 clear recommendations were made to allow 'a more systematic, consistent and auditable assessment of tenders to meet

criterion of MEAT'. The aim was to avoid the drawback of the lowest price criterion by eliminating abnormally low tenders. This had caused adverse effects on the whole sector (Perng et al., 2006). Directive 93/97/EEC was repealed on 31 January 2006 when directive 2004/18/EC came into force (Lambropoulos, 2007). It concerns the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts. Clear guidelines for MEAT award procedures are included, which are increasingly applied (Bouwer et al., 2006, VROM, 2009).

2.1.2 Procedures

Public works exceeding the threshold of 5,150,000 Euros need to comply with agreement 2004/18/EC as laid down in national regulations (EC, 2007). For this, five different tender procedures can be applied: open procedure, restricted procedure, negotiated procedure, design contests and competitive dialogue (see Appendix IV). The award of tenders is allowed to be based on two award criteria only: lowest price or most economically advantageous tender. The latter is applicable at all procedures and the only award basis for the competitive dialogue (EU, 2004).

The directive distinguishes selection and award criteria. Selection of contractors, based on their financial and technical capability to complete the project, takes place based on *selection criteria* (Lambropoulos, 2007). This enables the exclusion of parties at an early stage before bids are being prepared. The award of the contract to one of the selected parties must be based on the *award criteria* 'lowest price' or 'most economically advantageous tender' (EU, 2004). Besides price, MEAT tenders take in account value criteria. These exist of performance and quality criteria (RWS, 2006):

- *Price criteria* have a direct relation with price, e.g. the tender price.
- *Performance criteria* are expressed performance units, which can be directly translated into a monetary value. E.g. shortening the project duration with 5 weeks à € 20,000 per week, results in a virtual discount of € 100,000.
- *Quality criteria* are valued by scores or mutual comparison among the bids.

The final score of a bid can be expressed in a score, virtual tender price or value-price ratio. The virtual tender price mechanism is most common in the Dutch construction sector (Dreschler, 2008). For this, scores on MEAT criteria are expressed in monetary scores, which correspond with discounts for good scores on value criteria and penalties for poor performances. Subsequently, the virtual tender price is calculated by deducting the tender price with discounts and penalties (see Figure 1) (RWS, 2006). The bid with the lowest virtual tender price gets the contract awarded.

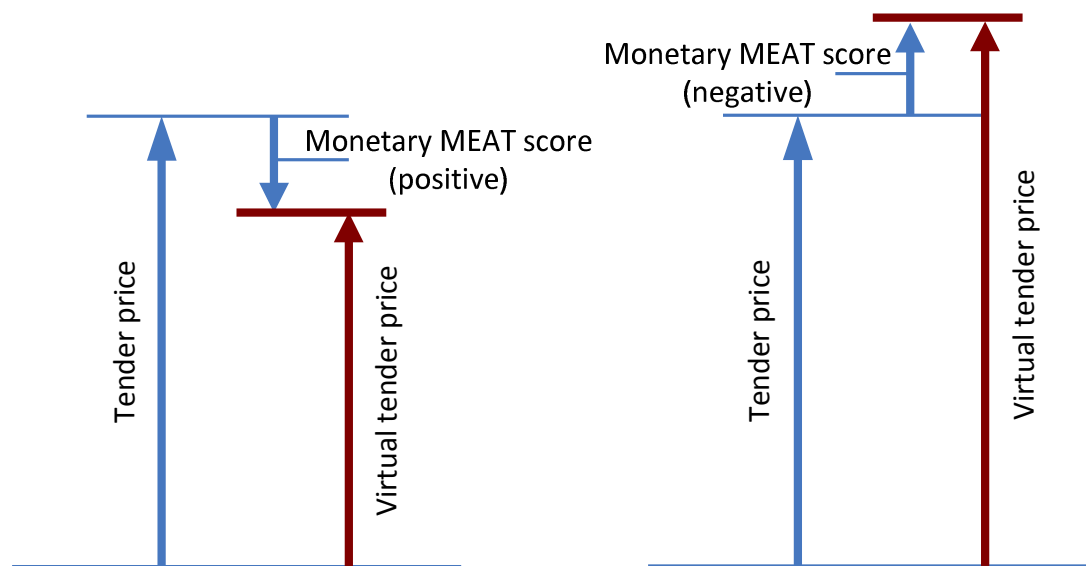


Figure 1: Calculation of the virtual tender price

2.1.3 Application to Dutch construction sector

EU directive 2004/18/EC has been implemented into Dutch regulation for public works in BAOⁱ, which came into force at 1 December 2005. The 'build ministries' - Housing, Spatial Planning and the Environment; Transport, Public Works and Water Management; Defense; Agriculture, Nature and Food Quality - are obliged to apply the tender guidelines as laid down in ARW 2005ⁱⁱ, which are conform the EU and BAO regulations. Other authorities can use the guidelines on a voluntary basis (ARW, 2005). A new tender law is in progress and planned to become effective before the end of 2010. The new tender law aims to simplify and clarify the tender process. The accompanying policy document of the law explicitly states "tendering should be aimed at obtaining the product with the best value-price ratio for the lowest burden possible" (EZ, 2009, p. 3). This seems like a stimulus for further expanding the application of value-based procurement.

The Ministry of Transport, Public Works and Water Management aims to outsource tasks that are not part of their core business to market parties. Final results are leading, to a lesser extent how it is achieved (RWS, 2004). This has led to increased application of design and construct (D&C) and design, build, finance and maintain (DBFM) contracts. It resulted also in a shift from price to value-based procurement. Contractors are thus requested to do more of the project development themselves, instead of executing ready-made projects (Valkenburg, 2008). The contractor's freedom to choose the construction method and design enables them to apply their knowledge and expertise from an earlier stage. This should result in added value for construction projects compared to the 'traditional approach'.

2.1.4 Role of sustainability

In total Dutch authorities procure yearly between 50 and 60 billion Euros (EZ, 2009) and 4.5 à 8 billion Euros per year in the "ground, road and water management" sector (SenterNovem, 2009a). A major sustainable impact can thus be realized when

ⁱ BAO = 'Besluit aanbestedingsregels voor overheidsopdrachten'

ⁱⁱ ARW = 'Aanbestedingsreglement Werken 2005'

sustainability criteria are taken in account with procurement (EZ, 2009). This is why the Dutch State has the very ambitious target to procure 100% sustainable at the latest in 2010 (see Appendix VII). Municipalities pursue to procure 75% sustainable in 2010 and 100% in 2015. Provinces and regional water authorities have a target of 50% for 2010 (VROM, 2008). The responsible Dutch minister, J. Cramer, stated in a progress report about sustainable procurement to the Dutch House of Representativesⁱⁱⁱ that the realization of these targets has her absolute priority (VROM, 2008).

Sustainable procurement implies that contractors in the construction sector need to comply with standards set by 'SenterNovem', a Dutch agency of the ministry of Economic Affairs. These standards are formulated in minimum and award criteria. When projects are tendered out, the latter can only be applied if the award of the contract takes place based on the MEAT award criterion (SenterNovem, 2009a).

Studies indicate that between 40% and 60% of all procurement contracts of ministries include at least minor sustainability requirements (Bouwer et al., 2006, Prenen, 2008, VROM, 2009). However, these results are based on past tenders and the construction sector is not specifically addressed.

2.1.5 Impact on contractors

The increased usage of MEAT tenders in the Dutch construction sector urge contractors to adopt their tender process. The importance of innovative solutions and adaptation to client's needs and desires has significantly increased. Offering the lowest price is no longer the only strategy to win. Nonetheless, little literature has been written on how to deal with MEAT tenders from a contractor's perspective.

This research focuses on the Dutch contractor BAM Infra to develop a strategy to improve its performance on MEAT tenders. BAM Infra consists of four operating companies: BAM Roads, BAM Civil Engineering, BAM Civil Engineering Technology and BAM Rail. In addition, they're supported by BAM Infraconsult, a consultancy and engineering firm that offers preliminary services to BAM Infra. These five operating companies are part of Royal BAM Group N.V (hereafter, BAM), a Dutch construction firm. Its core businesses are civil engineering, construction and property. BAM is market leader on these markets in the Netherlands, where 47% of its total turnover was realized in 2008 (BAM, 2009a). The Group is organized decentralized, consisting of many (semi) independent operating companies. While they are part of BAM, they do function as independent companies with own profit-and-loss accounts.

BAM Infra bids often on MEAT tenders in the Netherlands, mostly for infrastructural projects. Questions have been raised inside the organization about how to increase competitiveness at these tenders. According to BAM Infraconsult, the organization's potential at MEAT tenders is not fully exploited yet.

The application of MEAT tenders offers opportunities to differentiate from competitors on criteria other than price. BAM's ambition to innovate and contribute to sustainable development of construction works seems to offer an opportunity to differentiate at MEAT tenders. It is, however, unclear what BAM Infra can do best to further develop its competitiveness at MEAT tenders. Therefore the goal of this research is to make recommendations to improve BAM Infra's performance on MEAT tenders for construction projects in the Netherlands, focusing on sustainability, in order to increase its percentage winning bids.

ⁱⁱⁱ Dutch House of Representatives = Tweede Kamer der Staten-Generaal (in Dutch)

2.2 Research content

The aim of this research is to improve the competitiveness of BAM Infra at MEAT tenders, specifically by addressing opportunities to differentiate on sustainability criteria. The objective is based upon the research's starting points (2.2.1) and results in corresponding research questions (2.2.2). To address these questions effectively research methods are selected (2.2.3) and the scope is defined (2.2.4).

2.2.1 Starting points

The starting points of this research are based on BAM Infraconsult's assumptions and questions about unsatisfying results on MEAT tenders. They questioned if increased understanding of MEAT tenders could enable further exploitation of the firm's potential at tenders. This was among other things related to the importance of criteria. When do value criteria matter and when is price dominating? Furthermore, special interests existed about the differentiation opportunities on sustainability criteria.

Besides the understanding of MEAT tenders, questions were raised about how to increase competitiveness at MEAT tenders. Therefore, an interest existed about the application of theories addressing firms' competitiveness. Namely, MEAT tenders seem to allow strategies with less cost focus compared with traditional lowest price tenders. This is why theories on firms' competitiveness will be addressed to get insight into competitive factors, which will be used to analyze BAM Infra's tender process.

2.2.2 Objective and questions

The research's objective is to make recommendations to improve BAM Infra's competitiveness at MEAT tenders. Competitiveness is considered as how well a tender bid, which is in line with BAM Infra's business goals and principles, is evaluated by the client relative to other tenderers. Special attention will be paid to the opportunity to differentiate with sustainability at tenders.

The objective of this research leads to the following research question:

Which recommendations can be made for BAM Infra to increase its competitiveness at MEAT tenders, with a focus on sustainability criteria, for infrastructural projects in the Netherlands?

In order to be able to answer this question, six sub questions will be answered first:

1. How do tenders function according to the Most Economically Advantageous Tender award criterion?
2. How and by which public authorities are MEAT tenders applied in the Dutch construction sector and how is this expected to develop on the short term?
 - a. What is the role of sustainability within MEAT tenders in the Dutch construction sector?
3. Which factors determine competitiveness at MEAT tenders according to literature?

4. What is BAM Infra's current tender process and which factors contribute to competitiveness?
 - a. How does sustainability enable competitiveness?
5. What is BAM Infra's performance on competitive factors?
6. How can BAM Infra improve its competitiveness at MEAT tenders?
 - a. How can performances be improved on competitive factors?
 - b. How can performances be improved on the field of sustainability?

The sub questions will be answered chronologically. The functioning of MEAT tenders will be introduced first. Subsequently, the application of these tenders to the Dutch construction sectors is assessed. Hereby special attention is devoted to the role of sustainability. Understanding the application of MEAT tenders enables to select factors that affect competitiveness. These will be derived from literature, taking in account the specific characteristics of MEAT tenders and the construction sector. Subsequently, these factors will be supplemented with empirical competitive factors based upon interviews at BAM Infra.

Potential improvement opportunities will be identified by assessing the actual status on competitive factors. Finally, recommendations will be formulated based upon these opportunities. During the whole research, special attention will be devoted to the role of sustainability and how it can contribute to competitiveness. This will be reflected in the final recommendations.

2.2.3 Research methods

To meet the research's objective, sub-questions will be answered chronological. The research steps to be taken are explained in this section.

1. How do tenders function according to the Most Economically Advantageous Tender award criterion?

By means of desk research understanding will be gained about the functioning of MEAT tenders. This explains the theoretical basis and mechanisms of the. Among other things, it illustrates how tender processes are affected for contractors.

2. How and by which public authorities are MEAT tenders applied in the Dutch construction sector and how is this expected to develop on the short term?

Desk research will be conducted to the application of MEAT tenders in the Dutch construction sector. The most important public authorities, for BAM Infra, applying such tenders will be identified. Additionally, the content of tenders and the role of sustainability is assessed.

3. Which factors determine competitiveness at MEAT tenders according to literature?

A literature study will form the basis to select factors that affect competitiveness. For this, literature about competitiveness in the construction sector will be studied. The goal is to identify suitable factors that affect competitiveness to further analyze the organization's performances on them.

4. What is BAM Infra's current tender process and which factors contribute to competitiveness?

Semi structured interviews will be conducted to assess BAM Infra's tender process. The semi structured nature of interviews suits well the explorative character of the research (Baarda et al., 1996). Interviewees will be selected to create a representative range of functions that deal with MEAT tenders.

The interviews have various goals. Preliminary, insight will be gained about BAM Infra's performance on MEAT tenders and its generic tender process. The former will be supplemented by analyzing tender outcomes. Both findings will support further analyses of competitive factors. Namely, it supports to check if competitive factors are relevant. Interviewees will also be questioned about opportunities to improve competitiveness, which enables to identify empirical competitive factors. Specific questions will be raised about opportunities to compete with sustainability.

5. What is BAM Infra's performance on competitive factors?

The semi-structured interviews serve also the goal to identify the status of competitive factors based on literature and empirical findings. This will support to verify if and how these factors enable opportunities to improve the organization's competitiveness.

To conclude the interviews, the empirical findings will be discussed with two directors of two of BAM Infra's operating companies. The goal is to sharpen the findings and add the view from a management perspective to it. In this report, the results of these discussions will be processed together with the interview findings on competitive factors.

6. How can BAM Infra improve its competitiveness at MEAT tenders?

Findings of the preliminary sub-questions will be used to come up with recommendations to improve BAM Infra's competitiveness at MEAT tenders. The goal is to propose various recommendations with explanations of the line of argumentation. This enables to get insight into the recommendations and their likeliness to improve competitiveness.

2.2.4 Scope

This section addresses this research's scope by defining the project phase and region taken in account. Additionally, the meaning of sustainability in this research is explained.

The development phase of a tender will be taken in account in this research. From a contractor's perspective, this is the first phase of a project. In case the tender is won, additional stages follow like construction and maintenance. The phases after the award of the contract are thus outside the scope of this research. Frequently, pre-selection takes place to limit the number of contractors bidding for a tender. BAM Infra's performances on pre-selection are rather good (see Appendix IX). Therefore, this research focuses on the tender phase after pre-selection.

The regional focus on the Netherlands is a logic outcome of Royal BAM Group's decentralized structure. Operating companies operate mostly locally. International interaction on project level is little for infrastructural projects. Nevertheless, construction industries in Anglo Saxon and Northern and Western European countries have similar characteristics. Literature, addressing construction industries abroad, is therefore used to identify fruitful insights into competitiveness in the construction sector.

This research will address sustainability criteria of MEAT tenders in particular. Many attempts have been made to define sustainability univocally, but this will not be attempted in this research. This is because the relevant actors have different definitions of sustainability which leaves room for open interpretation (see Table 1). BAM and SenterNovem have defined sustainability according to the 'people, planet, profit' principle. BAM Infra's principle client, RWS (see Table 1), uses a narrower definition related to just the planet aspect. However, no clear interpretation of this has been made by RWS yet (External, 2009). Furthermore, much empirical information is gathered from interviewees, who have their own interpretations of sustainability. This is why this research considers sustainability as the general understanding of the overlapping 'planet' aspect.

Table 1: Key stakeholders' definitions of sustainability

BAM^{iv}	SenterNovem^v	RWS^{vi}
People <ul style="list-style-type: none"> - Clients - Community - Safety - Diversity - Learning and development 	People <ul style="list-style-type: none"> - International working norms - Fair trade - Human rights - Labor participating - Safety during execution 	
Planet <ul style="list-style-type: none"> - Planet - CO2-emissions - Waste - Sustainable procurement 	Planet <ul style="list-style-type: none"> - Environmental care - Sustainable usage of materials - Use of energy - Environment, nature and landscapes - Soil and water 	Sustainability
Profit <ul style="list-style-type: none"> - Business integrity - Innovation 	Profit <ul style="list-style-type: none"> - Minimizing costs 	
		The following key themes are <i>not</i> considered by the definition of sustainability: <ul style="list-style-type: none"> - Public focus - Safety - Project control

iv Based upon BAM (2008)

v Based upon SenterNovem (20009a)

vi Based upon RWS (2008a)

2.3 Thesis outline

The outline of this thesis report is based upon the chronological answering of the research's sub questions (see Figure 2). Preliminary, the theoretical functioning of MEAT tender is explained in chapter 3. Further background information is provided in chapter 4, which elaborates on the application of MEAT tenders in the Dutch construction sector and the role of sustainability.

To gain insight into competitiveness, results of the literature study are presented in chapter 5. Based upon the discussion about competitiveness in the construction sector suitable theories are selected to identify theoretical competitive factors.

Chapter 6 presents the results of semi-structured interviews that served a twofold purpose. Empirical competitive factors were identified first to do right to the specific circumstances of MEAT tenders. In addition, BAM Infra's status on the selected theoretical and empirical competitive factors was assessed. This enabled to identify improvement opportunities per factor.

Concluding recommendations are formulated in chapter 7. Improvement suggestions are made per factor based upon the background information the factor was derived from. Based upon these insights, specific recommendations for BAM Infra are proposed to increase its competitiveness at MEAT tenders.

The final chapter gives an overview of the main conclusions and recommendations. Furthermore, a reflection on the conducted research is provided followed by recommendations for further research.

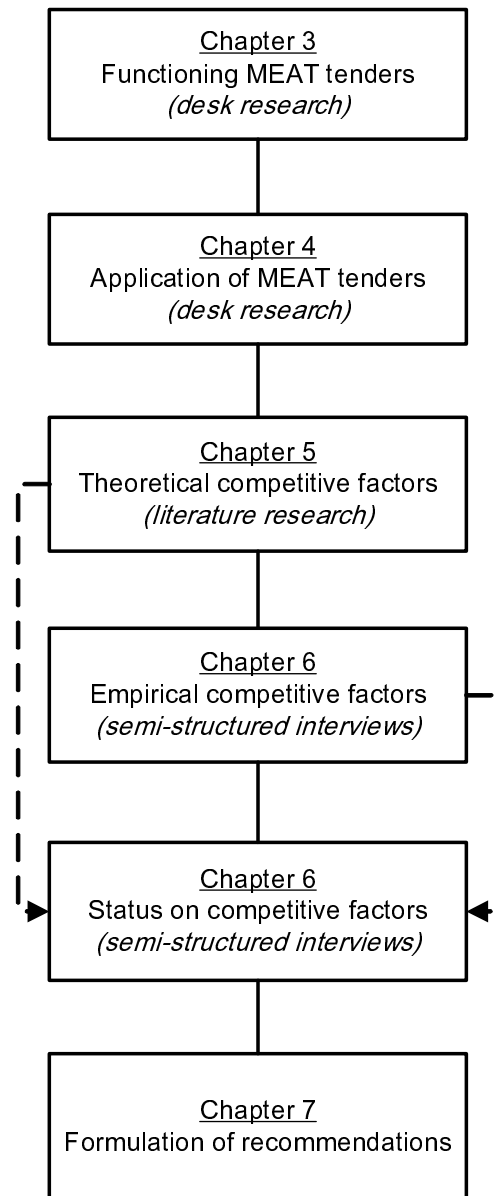


Figure 2: Overview research steps and chapters

3 Theoretical functioning of MEAT tenders

This research revolves around competitiveness at MEAT tenders, which is why preliminary the theoretically functioning of such tenders is assessed. This explains how contractors' work is affected in comparison with traditional lowest price tenders.

The first section elaborates upon the theoretical functioning of MEAT tenders (3.1). Subsequently, the specific pre-selection and inquiry phases of MEAT tenders are explained (3.2). Hereafter, elaborated will be upon award criteria and mechanisms. Additionally, the common evaluation procedure of tender bids is assessed (3.3). Subsequently, the impact on contractor's bidding process will be explained by demonstrating trade-offs that have to be made when addressing value criteria (3.4). The final section summarizes the key findings about the functioning of MEAT tenders and how it affects contractors (3.5).

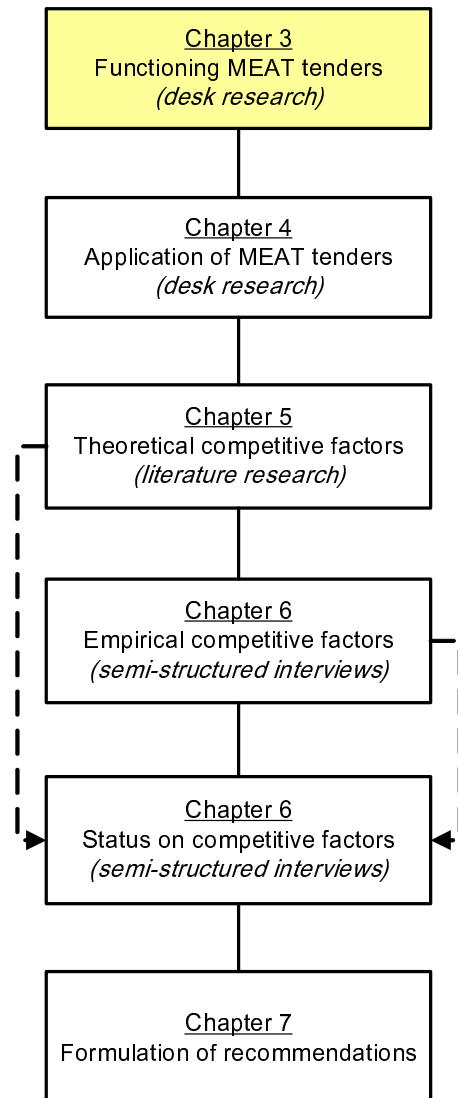
3.1 Theoretical explanation

The aim of the award criterion 'most economically advantageous tender' is to select the tender bid with best value for money. For this, the contracting authority looks to maximize benefit for a certain budget (price). De Ridder (2006) defines benefit as the difference between value and costs (see Figure 3). Value is the sum of the following values (de Ridder, 2006):

- perceived value: extent to which a construction is appreciated;
- user value: extent to which a construction is used;
- technical value: extent to which a construction fits its purpose.

Value is subjective and not equal for everyone. A client will thus aim to optimize the benefit according to its own point of view.

On the other hand, a contractor aims to maximize profit. This is the difference between the price and costs (see Figure 3). At MEAT tenders clients define requirements, which form a minimum level that must be met to make a valid bid. In addition, the client formulates desirers. Realizing this will increase the value according to the client's perspective. This is why in this research these criteria are called 'value criteria'. According to award mechanisms, which are specified on beforehand, the client will evaluate tender bids and determine their value. A contractor has thus an incentive to realize high value. However, the preliminary goal



is to maximize profit. Due to competition, trade-offs have to be made between value, price and competitiveness (see section 3.4).

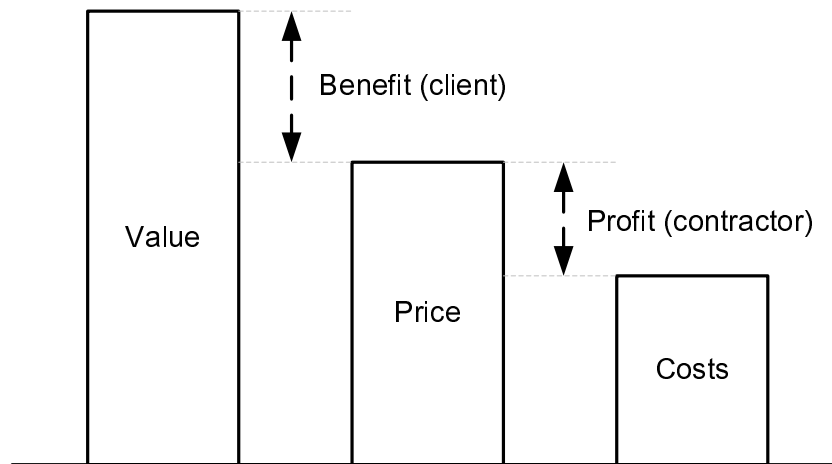


Figure 3: Visualization benefit and profit (based upon Dorée and de Ridder, 2003, p. 31, figure 2)

3.2 Pre-selection and inquiry phases

Often pre-selection takes place among interested contractors to limit transaction costs. Pre-selection is possible at non-public and competitive dialogue tender procedures (see Appendix IV). Projects involving design and engineering demand high efforts of tenderers. Therefore, often contracting authorities choose to pre-select 3 to 5 firms. This enables to keep the sum of all contractors' tender costs within proportion to the value of the contract. Pre-selection takes place based on criteria such as firm's turnover, experience with similar projects and sustainability policies. Subsequently, selection of firms can take place on either best performances or by lots.

After pre-selection has taken place, an inquiry phase enables the selected parties to gather further information about the project. Technical specifications can be gathered needed for design and engineering. Also information can be gathered about priorities and preferences of the contracting authority. However, no binding commitments can be made. The competitive dialogue procedure contains a more extensive inquiry phase: the dialogue phase. During this phase, the contracting authority has an open dialogue with contractors. They can share their point of view and discuss criteria. The final set of criteria will be developed coherently, although decision making power remains with the contracting authority.

3.3 Award of contracts

The award of the tender contract must be based on the award criterion 'lowest price' or 'most economically advantageous tender' (EU, 2004). These are the only options within the five different tender procedures as prescribed by EU legislation (see Appendix IV). This section describes the applicable award criteria (3.3.1) and award mechanisms (3.3.2). Subsequently, the evaluation procedures as common in the Dutch construction sector are described (3.3.3).

3.3.1 Award criteria

The contract of tenders can be awarded based upon two award criteria:

- *Lowest Price:* Award of contract to bid that fulfills all requirements for the lowest price.
- *Most Economically Advantageous Tender:* Award of contract to bid with the best price-quality. The offer must fulfill all requirements and will be valued additionally on price, performance and quality criteria (RWS, 2006):
 - *Price criteria* have a direct relation with prices, e.g. the tender price.
 - *Performance criteria* are expressed performance units, which can be directly translated into MEAT values. E.g. shortening the project duration with 5 weeks à € 20,000 per week, results in a MEAT value of € 100,000.
 - *Quality criteria* are valued by scores or mutual comparison among the bids.

The essence of the value criteria - performance and quality criteria - are similar. It's up to the contractor how and till which degree it realizes extra value.

3.3.2 Award mechanism

The final score of a MEAT tender bid can be expressed by award mechanisms in a virtual tender price, value-price ratio or score. The virtual tender price mechanism is most common in the Dutch construction sector (Dreschler, 2008). This section elaborates on the price correction mechanism which results in the virtual tender price. Furthermore, the ratio and score mechanisms will be explained.

Price correction mechanism

The price correction mechanism functions according to the principle of 'money for extra value'. For this, a virtual tender price is calculated by deducting the tender price with monetary scores on value criteria. This implies that good performances on value criteria are expressed in discounts. Optionally, penalties are calculated for poor performances (RWS, 2006). The bid with the lowest virtual tender price wins the contract (see Figure 4).

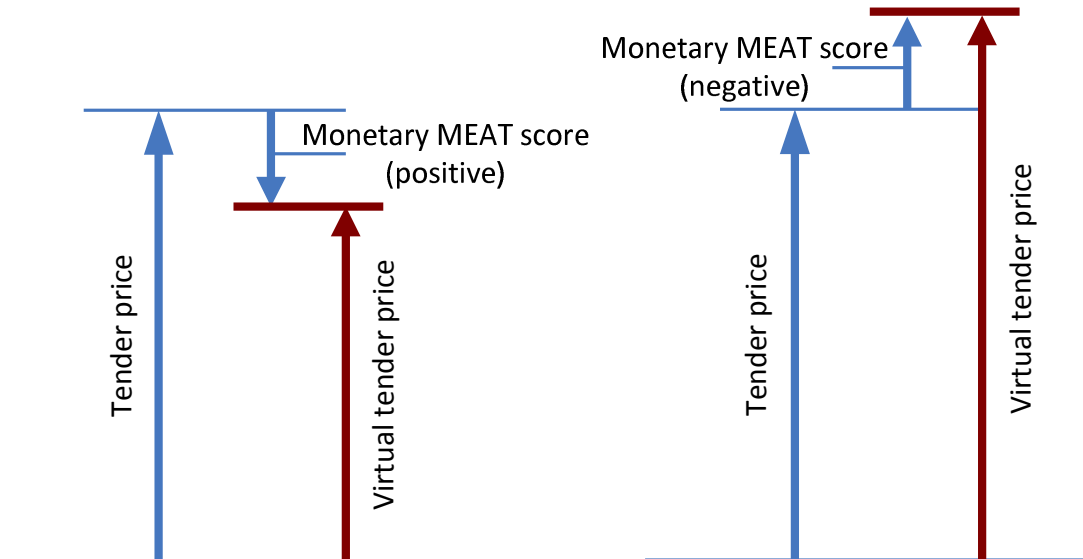


Figure 4: Price correction mechanism: lowest virtual tender price wins contract

Ratio mechanism

The ratio mechanism is applied to find the best value-price ratio. For this, the total value of the tender bid is divided by the tender price. The tenderer with the highest value-price ratio gets the contract awarded (see Figure 5). The ratio mechanism does not offer significant advantages over the price correction mechanism (External, 2009).

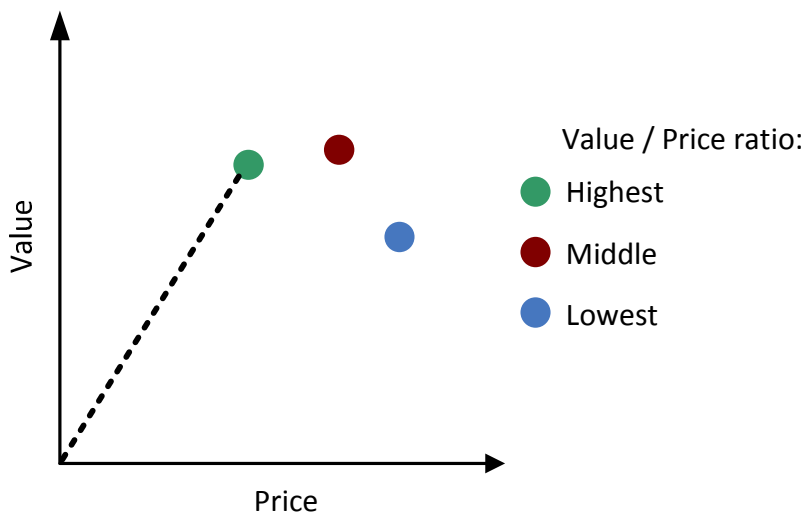


Figure 5: Ratio mechanism: highest ratio wins contract

Score mechanism

The score mechanism expresses prices and value in scores. Low prices and high performances on value criteria result in high scores and vice versa. The bid with the highest overall score wins the contract (see Figure 6).

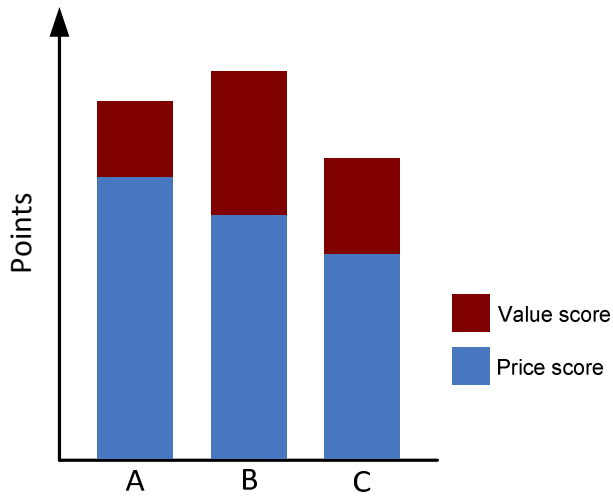


Figure 6: Score mechanism: highest overall score wins contract

Scores can be awarded according to three principles (EC, 2008, p. 7):

1. Compliance with a certain standard results in x points;
2. Performance beyond a minimum standard results in x points;
3. Performance without any minimum standards results in x points.

Details of the award mechanisms must be published in the tender specification, which enables the tenderer to prepare a bid accordingly. However, this is not possible if relative scores are used. This implies that scores are awarded based on comparison with other bids. Knowledge of other offers is thus necessary to optimize a tender bid, which can only be estimated.

Furthermore, awarding scores based on comparison with other tenders has serious shortcomings. The so called 'ranking paradox' shows that the winning bid is dependent on the content and number of other tender bids. A change of the number of tenders taken in account could suddenly lead to a winner that was outranked before by a tenderer still taken in consideration (see Example 1).

Example 1: Ranking paradox (based upon Chen, 2008)

Suppose that scores for price are determined by mutual comparison. The lowest price receives 50 points, second lowest 45, third 40 etc. Table 2 presents an imaginary result of the outcome of such comparison.

Table 2: Tender scores by mutual comparison

Tenderer	Quality score	Price	Price score	Total score
A	40	€ 100.000	50	90
B	44	€ 105.000	45	89
C	48	€ 106.000	40	88

In this case, tenderer A will get the contract awarded (see Table 2). However, this changes in case tender B's bid turns out to be invalid. The new ranking will point out tenderer C as the winner of the contract (see Table 3).

Table 3: Tender scores by mutual comparison without tenderer B

Tenderer	Quality score	Price	Price score	Total score
A	40	€ 100.000	50	90
C	48	€ 106.000	45	93

3.3.3 Evaluations

The evaluation of tender bids takes place by assessment panels according to the award mechanisms as specified in the tender. In the first place, tender bids have to be examined on the fulfillment of all requirements. If not, the bid is invalid and will not be further assessed. Subsequently, the quality aspects of bids will be evaluated. This should be done before knowledge is gained about tender prices (RWS, 2006). Otherwise it would be almost impossible to judge quality unbiased (PSIBouw, 2007). Finally, the combination of the assessments of quality and tender prices will lead to a winner.

The panel's composition can either be made public on beforehand or remain anonymous (RWS, 2006). According to a Dutch value based procurement guideline the panel should contain a good mixture of relevant kinds of expertise and authorities that match the award criteria. The panel should take the interests of all relevant actors in account (e.g. local residents and final users), but preliminary the contracting authority's interests. Obviously, the panel's members are not allowed to have commercial interests in participating tenderers (PSIBouw, 2007). Furthermore, a choice has to be made by the contracting authority if bids are made anonymous or not. The importance of the evaluation is evident. The evaluation team's influence on the outcome is especially large if subjective criteria play a role. In that case, the judgment of the panel is decisive. This is why an understanding of client's preferences and interpretation is important for contractors. It enables them to write their plans and bids in line with the likely preferences of the persons evaluating their tender bids. This is also in the best interest for the client. Therefore, transparency and good communication to the contractors are essential (PSIBouw, 2007, RWS, 2006).

3.4 Trade-offs for contractors

Irrespectively of competitive strategies, to win a tender you have to meet client's demand better than competitors according to the client. For this, the requirements have to be met with a competitive price. Optionally, value criteria can be addressed when considered to be beneficial.

The price correction mechanism allows theoretically the determination of the benefit of an additional solution. On condition that the award criteria are objective, the discount can be calculated according to the tender specification. In theory this enables to narrow the decision to:

- add solution if discount > additional costs;
- leave out solution if penalty < cost savings.

E.g. reducing the project duration with 2 weeks resulting in a discount of € 20.000 is only attractive if it can be realized for less than € 20.000. It becomes, however, more complicated when a solution affects other parts of the project, which complicates the estimation of additional costs.

The uncertainty of benefits by addressing award criteria increases further if subjectivity plays a role. This is the case with quality award criteria and by definition with the scoring mechanism. Subjective criteria are judged by decision panels, appointed by the contracting authority. Score expectations on these criteria can be estimated based on common sense and experience. More profound is the analysis with applicable tools such as goal programming, which contributes to determine the competitiveness of various bidding strategies (Tan et al., 2008). Nevertheless, uncertainty remains, causing a good understanding of client's needs and desires to be essential.

The changes to win are furthermore depended on competitors. Even if it is possible to define exactly the outcome of a proposal, the award of the contract is still dependent on the relative performance compared with other tenderers. The uncertainty of other bids is high, which is in fact one of the essentials of tendering. It creates competition and stimulates tenderers to make competitive offers. Regarding the comparison mechanism, uncertainty is present for both the tender scores and relative performance. It is thus very hard to determine the competitiveness of a proposal, when this mechanism is applied. Dutch public authorities advise against the application of this mechanism (PSIBouw, 2007, RWS, 2009b).

The subjectivity with the evaluation of MEAT tender proposals emphasizes the need of a profound understanding of client's needs and desires. Addressing a wrong interpreted award mechanism is likely to score low, thus harming the competitiveness of the proposal.

Furthermore, the weight of criteria is an essential aspect to take into consideration. This determines the importance of the relevant criteria, indicating the opportunity of differentiation. Price remains relatively most important. RWS aims to account price for 40 to 60% in 2012 (External, 2009). However, thinking in weights is outdated. Nowadays, the challenge is to determine the value of added quality. The challenge lays is addressing it with an appropriate monetary value. In other words, virtual discounts must reflect the importance of value criteria (External, 2009).

Example 2: Importance value determination

The tender evaluation of 'A2 North, Holendrecht – Maarssen' shows the importance of monetary value determination. Reducing the project duration was instinctively determined at € 500,000 per week, which turned out to be a major incentive to reduce project duration. 4 Out of 5 tenderers realized the maximum duration of 26 weeks. Only one tenderer did not. It reduced duration by only 21 weeks, but offered the lowest tender price. Finally, the contract was awarded to another tenderer because of the discount gained by the 5 additional weeks of reduction. This turned out to be sufficient to gain the lowest virtual tender price. Looking back, the contracting authority strongly doubts if reduction of duration was indeed worth € 500,000 à week. Furthermore, it questions if the criterion made tenderers willing to take larger risks in order to benefit maximally from the virtual discount (van Doorn et al., 2007).

Besides the relative importance of criteria, the differentiating potential is furthermore influenced by the scoring mechanism. E.g. score determination on a ranking from 1 to 10 is widely applied in Dutch construction tenders. It is based on the Dutch school mark system, whereby '6' is sufficient, '7' average, '8' good, '9' excellent and '10' means perfect. The interpretations of the scores are subjective in itself, but it shows the reasons that scores tend to cause little differentiation. It is easy to score a 6, very hard to get higher than an 8. Because of this, the opportunity to distinguish with award criteria valued by scores is often limited.

Competition could also take place solely on value. This is the case when the budget is fixed for which the project will be executed^{vii}. Tenderers have to meet requirements. In addition, competition takes place on value criteria. The tenderer addressing best the desires of the contracting authority wins the contract. Again, good understanding of client's needs and desires is essential. This enables to deploy resources addressing the criteria that matters in a way that satisfies the client's desires best.

3.5 Conclusion: functioning of MEAT tenders

The award of tenders according to MEAT award criteria enables clients to select bids with the best value-price ratio. For this, contractors' bids are evaluated on price and value criteria, according to pre-specified criteria. Prerequisite is that all requirements are met. Contractors can choose till which extent they address value criteria.

In the Dutch infrastructural sector, contracts are mostly awarded by comparison of virtual tender prices. For this, performances on value criteria are valued with virtual discounts. The level of performance determines the amount of discount. Subsequently, the tender price is lowered with virtual discounts resulting in the virtual tender price. The tenderer with the lowest virtual tender price gets the contract awarded.

Contractors have to adopt their bidding process, since contracts are no longer per definition awarded to the tenderer with the lowest tender price. Tradeoffs have to be made about the extent to which value criteria will be addressed. In theory the decision can be narrowed to:

- add solution if discount > additional costs;
- leave out solution if penalty < cost savings.

^{vii} E.g. the 'A2 Maastricht' project was tendered out by a competitive dialogue with a fixed maximum price.

However, determination of the benefits of solutions is rather complex. It frequently affects many parts of the design, which makes it difficult to determine additional costs and risks. Furthermore, often many uncertainties play a role like subjective criteria, client's willingness to make severe judgment differences and judgment panel's preferences.

Despite many uncertainties outside the contractor's sphere of control, the challenge remains to find a competitive balance amongst tender price and addressing value criteria. Obviously, offering low tender prices and addressing value criteria excellently will create the highest likeliness of winning a contract. However, in most cases such a win-win solution is not feasible, since frequently quality correlates with more costs. Therefore, tradeoffs have to be made to find a competitive balance of price and value.

4 MEAT tenders in the Dutch infrastructural sector

In addition to the understanding of the theoretical functioning of MEAT tenders, insight into its application in the Dutch infrastructural sector is needed. This enables to match competitive strategies with market's circumstances. For this, relevant actors, tenders' content and the role of sustainability criteria is assessed.

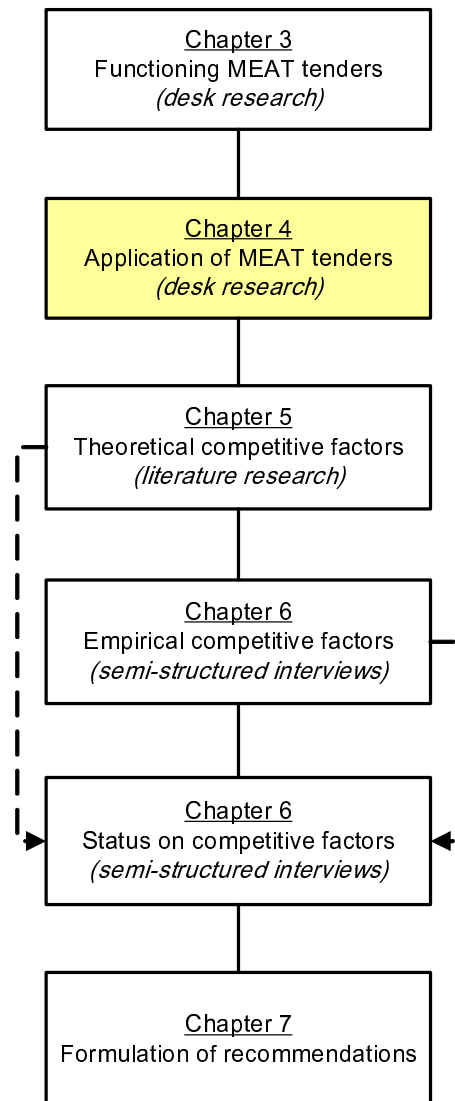
Relevant public contracting authorities are presented, which are as follows: 'Rijkswaterstaat' (4.1), provinces and municipalities (4.2). Among these clients, Rijkswaterstaat is considered to be most important. Among other things it has developed its application of MEAT tenders much further than the other public authorities. Therefore, the generic content of their tenders is assessed. Additionally, the role of sustainability in MEAT tenders is addressed (4.3). The last section summarizes the key findings of this chapter (4.4).

4.1 Rijkswaterstaat (RWS)

The executive agency 'Rijkswaterstaat' (RWS) manages and develops the Dutch network of roads and waterways under the authority of the Ministry of Transport, Public Works and Water Management. It is therefore considered as BAM Infra's most important client that tenders out according to MEAT (BAM_Infraconsult, 2009). In recent years RWS has made a transformation to a smaller organization by contracting out more tasks to private organizations, according to the principle 'market, unless...'. Private parties will no longer be asked to execute predefined projects, but will be asked to design and develop solutions themselves (RWS, 2004).

The application of functional value criteria has increased significantly during the last three years [see

Figure 7]. MEAT tenders revolved around four main quality themes, as defined by RWS: safety, public focus, sustainability and project control. Due to differing terminology and project specific criteria, it's hard to give an overall view of the content of MEAT tenders. Nevertheless, general figures give an idea about the weight of the four main themes. Otto, K. (2009) addressed in his thesis report 36 MEAT tenders of RWS in 2008. Price accounted, expressed in currency units, on average for 68% and value for 32%. Value is further divided over the four quality themes as follows: public focus 29%, sustainability 4%, safety 3% and project control 58%. The remaining 6% of



criteria were considered project specific (Otto, 2009). See Appendix V for further content description of the four key themes.

Even though the application of MEAT has increased, contractor's freedom remained often limited. This was caused by the application of many solution orientated value criteria, which left little opportunity for differentiation. This might be one of the causes that in 2006 67% and in 2007 65% of the most economically advantageous tenders were also the ones with the lowest tender price (RWS, 2009a, V&W, 2007).

Nowadays RWS focuses increasingly on the goal of value criteria. It should be clear why value criteria are used instead of requirements. Application of MEAT just to meet targets should be avoided. The main challenge is not weighting criteria, but the appropriate determination of how much added value is worth (External, 2009). This would imply a movement away from price-value thinking in terms of percentages. Nevertheless, policy goals are still formulated in that sense: in 2012 the application of MEAT criteria should be within the price/quality range of 60/40% à 40/60 (External, 2009, RWS, 2008b). These findings lead to the conclusion that development of MEAT tenders is an ongoing process at RWS.

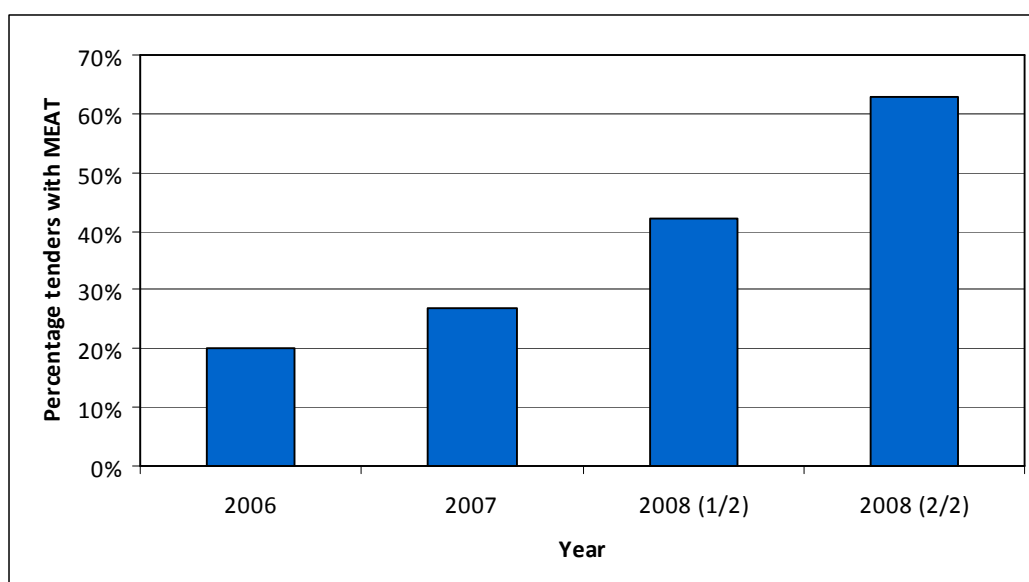


Figure 7: Percentage RWS's tenders with MEAT (External, 2009)

4.2 Provinces and municipalities

Besides RWS, provinces and municipalities are major public clients of BAM Infra. This research focuses nevertheless on RWS, since the tender policies differ widely per province and municipality. Furthermore, the degree of application of MEAT tenders is less developed by most provinces and municipalities in comparison with RWS. This is among other things reflected in lower goals for green public procurement for provinces and municipalities (VROM, 2008). Nevertheless, the principle of tenders is similar to RWS. Therefore, RWS is addressed as the principle client in this research. Recommendation will nonetheless be applicable to tenders of provinces and municipalities, unless stated otherwise.

4.3 Role of sustainability

Sustainability criteria play a limited role in RWS's tenders. Nonetheless, RWS aims to procure 100% sustainable in 2010 (VROM, 2008) (see Appendix VII). For this RWS's procurement has to meet standards set by SenterNovem, a Dutch agency of the

ministry of Economic Affairs. These standards are formulated in minimum and award criteria. When projects are tendered out, the latter can only be applied if the award of the contract takes place based on the MEAT award criterion (SenterNovem, 2009a).

The actual status of sustainability is reflected in recent studies indicating that between 40% and 60% of all procurement contracts of ministries include at least minor sustainability requirements (Bouwer et al., 2006, Prenen, 2008, VROM, 2009). RWS's ambition is to take sustainability in account as an important criteria for *all* tenders from 2010 onwards (RWS, 2008a).

Despite RWS's ambitious goals, sustainability is the quality theme that is applied most diversely. RWS relates sustainability to the planet aspect, but hasn't defined clear sub themes yet. So far, criteria are mostly project specific and terminology differs. In general, sustainability is not given great weight at tenders. No major projects have been tendered out with sustainability as a determining theme (External, 2009). However, some large infrastructural projects have been tendered out with a great extent of weight given to sustainability (e.g. 2nd Coentunnel and A2 Maastricht). These tenders, according to the 'competitive dialogue' approach, involved early contractor consultation and much freedom to develop solutions. Sustainability criteria were considered important and varied widely from the development of nature parks to air quality.

The main challenge with sustainability is measurement. This creates a major barrier and limits application of sustainability criteria. In spite of this and various other barriers, sustainability is expected to gain greater importance on the short term (see Appendix VI).

4.4 Conclusion: application of MEAT tenders

BAM Infra's principle public client that tenders out according MEAT is 'Rijkswaterstaat' (RWS). This is the executive agency that manages and develops the Dutch network of roads and waterways under the authority of the Ministry of Transport, Public Works and Water Management. Other important public clients are provinces and municipalities. Their MEAT policy is rather diverse and less developed as RWS's policy.

RWS is increasingly tendering out according to MEAT. In 2008 it represented over 60 percent of the total tender value (External, 2009). Within these tenders, expressed in currency units, price accounted for 68% of the weighting of criteria and value for 32%. The weightings of value criteria were further divided among RWS's four quality themes as follows (Otto, 2009):

- project control 58%
- public focus 29%
- sustainability 4%
- safety 3%

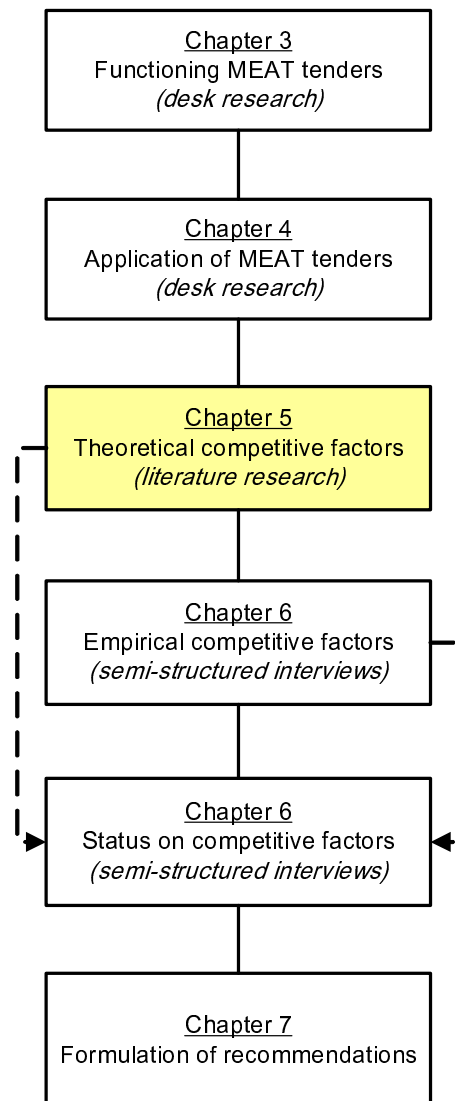
Sustainability, related to environmental aspects, is in general not given great weight at tenders. Neither has RWS defined clear sustainability themes yet (External, 2009). The key challenge is the measurement of sustainability, which hinders implementation. Nonetheless, development of sustainability criteria is ongoing and expected to increase in importance.

5 Competitiveness at MEAT tenders

To enable improvements on competitiveness at MEAT tenders, factors that affect competitiveness have to be identified first. For this, suitable theories are selected by addressing the discussion of competitive theories in the construction sector. Many attempts have been made to apply generic theories – competitive positioning theory and resource-based view – at the construction sector. However, due to specific market conditions different views on the applicability of these theories exist. In contrast, literature shows a widespread agreement about organizational learning as the key factor to improve performance and competitiveness in the construction sector.

Market conditions are changing, enabling more freedom to contractors to develop solutions themselves. The researcher believes therefore that new market conditions suit better the application of generic theories. In addition, the importance of knowledge development and deployment remains. Organizational learning will thus remain an important aspect to take into consideration.

To avoid different interpretations of the term 'strategy', this research's interpretation will be provided first (5.1). Subsequently, the discussion, as identified in literature, about competitiveness in the construction sector is presented (5.2). Hereafter, the researcher explains why, according to his point of view, competitive positioning theory and the resource-based view, despite earlier critics, become more relevant (5.3). This assumption is fed by changing market conditions. Furthermore, the researcher explains why also much attention will be devoted to organizational learning. Among other things, this matches the widespread agreement of construction literature on the importance of this process. Hereafter, the two selected strategic theories are further assessed: competitive positioning theory and resource-based view (5.3.1). In addition, insights into the process of organizational learning in the construction sector are presented (5.3.2). To conclude an overview of the identified competitive factors, which are further taken in account to improve BAM Infra's competitiveness, will be given (5.4).



5.1 Definition of strategy

Strategy deals with the means of an organization to meet its ends, that much is agreed upon within management theories (Langford and Male, 2001). However, there is little consensus about the definition of strategy. Therefore the following definition will be used in this research: strategy as an intended course of actions and processes to realize a successful tender bid. This definition relates very specifically to the research goal. Hereby, a tender bid is considered successful if BAM gets the contract awarded, according to the chosen strategy, with a bid that is in line with the company's goals and principles (see BAM, 2009a, p. 8-9).

5.2 Competitiveness in the construction sector

Since no literature has been identified in this research that addresses competitiveness at MEAT tenders, this section will elaborate on generic theories and construction specific literature. The field of competitive strategies is widely addressed and many schools of thought exist. Green et al. (2008b) identified six of such schools in an attempt to gain new insights into competitive strategies in the construction sector: the strategic positioning school (Porter, 1980, 1985), the process school (Pettigrew and Whipp, 1991; Pettigrew, 1997), the action school (Mintzberg, 1990), the dynamic capabilities school (Teece et al., 1997), the resource-based view (Barney, 1991) and the practice school (Jarzabkowski, 2005). Porter's competitive positioning theory (CPT) and Barney's resource-based view (RBV) receive the greatest popularity (Green et al., 2008a, Lu et al., 2008).

Many attempts to apply the competitive positioning theory and the resource-based view to the construction sector have been made. However, interpretation of their applicability differed (cf. Betts and Ofori, 1992, Gann and Salter, 2000, Green et al., 2008b). This is among other things a consequence of hindrances to apply these theories to the construction sector. Betts and Ofori (1992) mentioned 5 reasons why opportunities to apply concepts of competitive strategies in the construction sector are limited (Betts and Ofori, 1992, 523-524):

- Little opportunity to differentiate, since many project parameters and variables are determined before the firm is engaged.
- Economies of scale are not very relevant, since the construction sector is highly fragmented.
- Projects are unique and few construction firms have a structured feedback system, causing the importance of 'previous experiences' to erode.
- Existence of low entry and exit barriers because much construction works, especially at the small-firm and low-technology end, is relatively simple and the rate of technological change is relatively slow.
- The management intensive nature both stimulates and hinders the application of strategic planning. Because of the high number of day to day and on site decisions, management is the determining factor of the capacity and capability of a construction firm.

Additionally, Green et al. (2008b) criticize the leading theories, competitive positioning and resource-based view, on their limited applicability to the construction sector. They argue that it is "mostly used as an explanatory tool and fails to provide meaningful prescriptive guidelines for managers in the construction sector" (Green et al., 2008b, p. 429). Green et al. (2008a) describe it more severe by stating that CPT and RBV are "riddled by tautologies and ambiguities" (Green et al., 2008a, p. 427). Green et

al. (2008b) observed furthermore stagnation of the understanding of competitive strategies in the construction sector. They ascribe it to some part to the fragmented nature of this research field.

Green et al. (2008b) opt rather for dynamic capabilities. These are learned and stable patterns of collective activities through which the organization systemically generates and modifies its operating routines in pursuit of improved effectiveness (Zollo and Winter, 2002, p. 340). The dynamic capability can be seen as an extension of the resource-based view. Whereas RBV sees knowledge as a source of competitive advantage, dynamic capabilities emphasize the importance of the learning process (Green et al., 2008b, p. 429). This is why they attach great importance to organizational learning and knowledge management (Green et al., 2008a). Information and knowledge sharing is advocated to develop the right resources. Barney et al. (2001) respond to literature opting for dynamic capabilities and organizational learning from the RBV point of view. They argue that these views fit within the resource-based view, since dynamic capabilities are just a type of capability to deal with changing environments (Barney et al., 2001). Just like any other capability, this might enable competitive advantages depending on how well competitors are able to do the same. Dynamic capabilities' strong emphasis on organizational learning corresponds with much construction specific literature. Herein a widespread agreement can be identified about the importance of organizational learning. This is a result of many barriers for information sharing and knowledge deployment in this specific sector, while knowledge is considered as one of the most valuable assets of construction firms. Therefore, many authors stretch out the need to improve organizational learning as the key way to improve performances and competitiveness (cf. Barlow, 2000, Dave and Koskela, 2009, Gann and Salter, 2000, Gielingh, 2005, Green et al., 2008a, Green et al., 2008b, Holt et al., 2000, Love et al., 2000, Zhang et al., 2009).

5.3 Competitiveness at MEAT tenders

The construction sector has changed rapidly and developments are ongoing, among other things by the increased application of MEAT tenders and growing importance of sustainability. According to the researcher, this is likely to affect the suitability of competitive strategies. E.g. four means to differentiate in the construction sector, as described by Cannon and Hillebrandt (1990), are nowadays commonly applied; offer a range of project management methods, extend construction into design, extend into financial packaging and extend forward into commissioning and facilities management (Betts and Ofori, 1992, p. 525).

The most widely applied theories – competitive positioning theory and resource-based view – become more applicable when relating it to the changing market conditions. MEAT tenders offer greater opportunities to differentiate and are mostly applied at relatively large projects with technological complexity. In addition, feedback systems can increase the importance of previous experiences. This causes to erode some of the hindrances, to the application of competitive theories mentioned by Betts and Ofori (1992) (see 5.2).

Furthermore, according to Porter's competitive positioning theory, the rules of competition and firm's available strategies are for a large extent influenced by the market's structure in which it is active (Porter, 2008, p. 3). The movement towards the application of MEAT tenders in the Dutch construction sector increases the possibility to apply differentiation strategies. E.g. competitive advantages can be obtained by outperforming competitors on sustainability. Traditionally, with lowest price tenders competition took mainly place on price. Increased opportunities to differentiate, on

criteria other than price, enables to apply all competitive positioning strategies: price leadership and differentiation, respectively for the whole industry or a specific market segment (see 5.3.1).

Considering the resource-based view, MEAT tenders also enrich differentiating capabilities of firms based on their resources. It suggests that much more resources can gain competitive advantages, since they do not need to contribute per se to the realization of the lowest price. Thus wider range of unique selling points, if asked for at tenders, enables contractors to gain competitive advantages.

In spite of the likely increased application of strategic theories, it does not affect the sector literature's emphasizes on organizational learning. Barriers of information sharing and knowledge deployment are not resolved with new tender procedures. Increased freedom is given to contractors at MEAT tenders to develop solutions themselves, which is why knowledge development and deployment affect competitiveness. Therefore, processes of organizational learning are further taken in account to supplement the strategic strategies.

Competitive positioning theory, resource-based view and organizational learning are further taken in account to identify competitive factors that can be applied at MEAT tenders and sustainability criteria. The first two theories are rather strategic, while the latter addresses business processes. Nevertheless, both points of view have been identified in the literature to contribute to insights into BAM Infra's competitiveness at MEAT tenders. Therefore, the three points of view will be further explained and competitive factors identified. Subsequently, the organization's performance on these factors will be analyzed to identify improvement opportunities (see Chapter 6).

5.3.1 Strategic theories: competitive positioning theory and resource-based view

The two identified theories to gain insight into competitiveness on a strategic level are Porter's competitive positioning theory and Barney's resource-based view. To identify competitive factors, both theories will be explained in this section.

Competitive Positioning Theory (CPT)

According to Porter's positioning theory a firm should, to gain competitive advantages, aim at 'cost leadership', 'cost focus', 'differentiation' or 'differentiation focus'. In other words, the tactics of a tenderer should be aimed at either lowest price, best value for money or to optimize its strategy for certain market segments (focus) (see Figure 8). Differentiation can be achieved by differentiation at attributes that are widely valued by clients, which allows to get awarded by a premium price (Porter, 2004).

Porter suggests that the chance of competitive advantages is most likely when a choice is made among the strategies. Otherwise, the chance exists to get 'stuck in the middle', which implies losing ones competitive advantages. Attractive profits can only be gained, while being stuck in the middle, if the market is highly favorable or if competitors are in the same position (Porter, 2004). Applying two positioning strategies simultaneously is rarely successful for firms according to the theory. Only if a firm is able to separate two largely distinct business units, each can pursue a different positioning strategy (Porter, 2004).

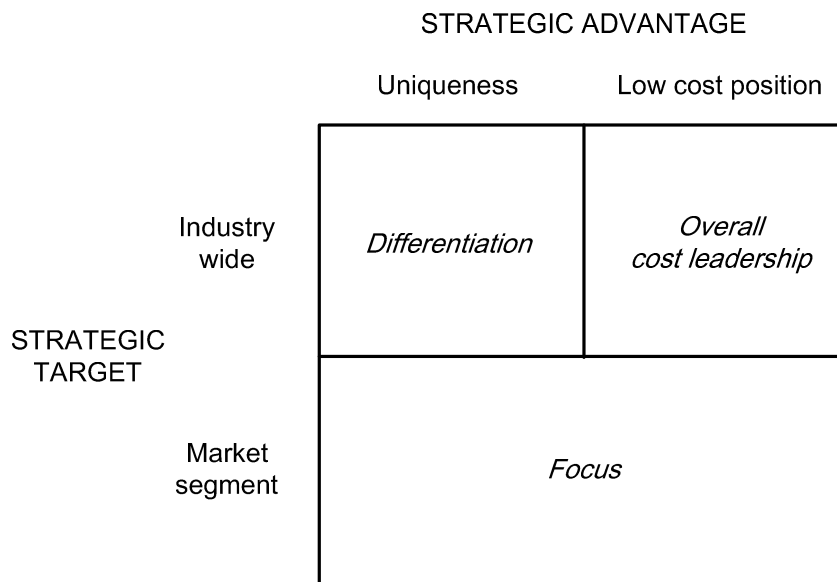


Figure 8: Competitive positioning strategies (based upon Porter, 2004)

Resource-Based View (RBV)

Barney (1991) formulates competitive advantage as a firm's implementation of a value creating strategy that is not simultaneously implemented by any current or potential competitor (Barney, 1991, p. 286). The value creating strategy is dependent on the firm's resources, which are 'strengths that firms can use to conceive of and implement their strategies' (Barney, 1991, p.286). Competitive advantages can only be realized if a firm has unique resources, otherwise competitors would offer similar solutions. To realize sustained competitive advantage, a firm's resource must have the following attributes (Barney, 1991, p. 288):

- be valuable by exploiting opportunities or neutralizes threats in a firm's environment;
- must be rare among competitors;
- be imperfectly imitable;
- no existing equivalent substitutes.

Resources that do not meet these attributes can temporarily contribute to competitive advantages or applied to aim at competitive parity. This is to perform equally as competitors at those areas that do not contribute to differentiation.

5.3.2 Processes: organizational learning

Researches in the construction sector have not let to an univocal understanding of competitiveness. Nevertheless, the key findings to address performance and competitiveness revolve around organizational learning (cf. Barlow, 2000, Dave and Koskela, 2009, Gann and Salter, 2000, Gielingh, 2005, Green et al., 2008a, Green et al., 2008b, Holt et al., 2000, Love et al., 2000, Zhang et al., 2009). Additionally, this has been linked to standardization (Gann and Salter, 2000) and innovation (Barlow, 2000). The processes of organizational learning are examined to select competitive factors from this point of view, in order to supplement the strategic factors.

Organizational learning, standardization and innovation are heavily complicated and affected by the project-based nature of the construction industry. The one-off character of project hinders information flows and standardization. Furthermore, the application of innovations is often project specific and not distributed due to poor

information flows. Barlow (2000) argues that because of these circumstances, the importance of coordination and integration of knowledge across organizations is critical for successful project delivery. Zhang et al. (2009) opt to establish knowledge management systems to avoid re-inventing the wheel and reduce redundant work. Reuse of information can furthermore reduce time spent on problem solving and increase quality (Dave and Koskela, 2009). Organizational learning is thus not just about sharing knowledge, since this remains often unused or ignored. It is about taking ideas through a lifecycle of feedback and refinement (Dave and Koskela, 2009, p. 896). Love et al. (2000, p. 108) defined it as follows: 'If the industry is to improve construction organizations must integrate learning within day-to-day work processes, in such a way that they not only share knowledge and continuously improve, but also, operate efficiently and effectively in response to their changing environment'.

To be successful, despite the sector's circumstances, with innovation, standardization and organizational learning three factors are required according to Barlow (2000). Non-hierarchical internal and external information structures have to be developed. This will address the hindrance to the application of competitive strategies of eroding importance of past experiences, as mentioned by Betts and Ofori (1992) (see section 5.2).

Furthermore, central figures helping to nurture and implement the partnering process, so called 'champions', may be crucial to distribute and implement the organizational 'memory' (Barlow, 2000, p. 979). These champions harness knowledge and can stimulate change.

Additionally, project and business processes must be integrated (see Figure 9). This argument has been extracted from Gann and Salter's (2000) attempt to apply the resource-based theory on the particular project-based nature of the construction sector. Business processes are ongoing and repetitive. It enables routines, which can stimulate innovation and provides opportunities for standardization. On the other hand, project processes have a tendency to be temporarily and unique. The resources of the standing organization have the function to support projects. Vice versa, projects need to provide feedback to the core organization. To be successful, project experiences must be integrated in continuous business processes to ensure the coherence of the organization (Barlow, 2000, Gann and Salter, 2000).

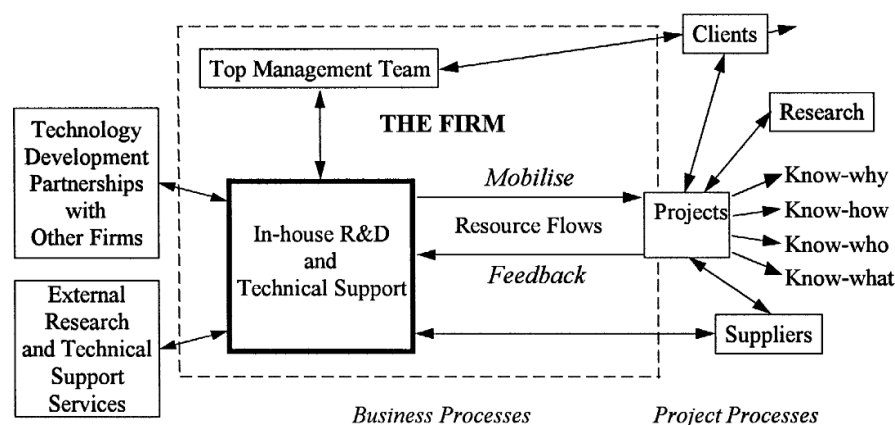


Figure 9: Business and project processes (Gann and Salter, 2000, p.969, figure 4)

Furthermore, Gann and Salter emphasize the importance of tacit knowledge. They distinguish four types of knowledge that stems from projects (see Figure 9). Know-what and know-why tends to be explicit (recorded), whereas know-who and to some extent know-how tends to be implicit (tacit). Especially tacit knowledge is expected to

be extremely important in the particular project-based environment (Gann and Salter, 2000, p. 969). Not enough attention is paid to tacit knowledge according to Dave and Koskela (2009). Gielingh (2005) argues to map knowledge preferably problem oriented. The recommendation stems from the observation of a lack of knowledge used within the construction industry, even though knowledge is the most important and costly ingredient for construction projects. This caused the wheel to be re-invented during design and engineering. Knowledge, stemming past projects' data, need thus to be accessible without significant efforts (Gielingh, 2005).

In project-based networks many interactions between firms and institutions take place (see Figure 10). Processes differ therefore from traditional manufacturing. Operations do not take place within clear boundaries of firms and without clear buy-sell relationships. Technological development results from many interactions among the various actors. Therefore, a firm has to extend its technology strategy behind its boundaries to manage it effectively. Projects are executed in dynamic networks, whereby teams are supported by firm's resources and competencies. These alliances and interdisciplinary projects complicate information sharing. Knowledge must be transferred over the boundaries of firms and disciplines, which is the fundamental ingredient for alliances (Holt et al., 2000). However, in practice this is hampered by firms tending to retain information, crucial to system's integration, in order to manage risks in their own sphere of control (Gann and Salter, 2000). This lack of adequate inter-organizational co-operation is one of the main reasons for problems in the construction sector (Barlow, 2000).

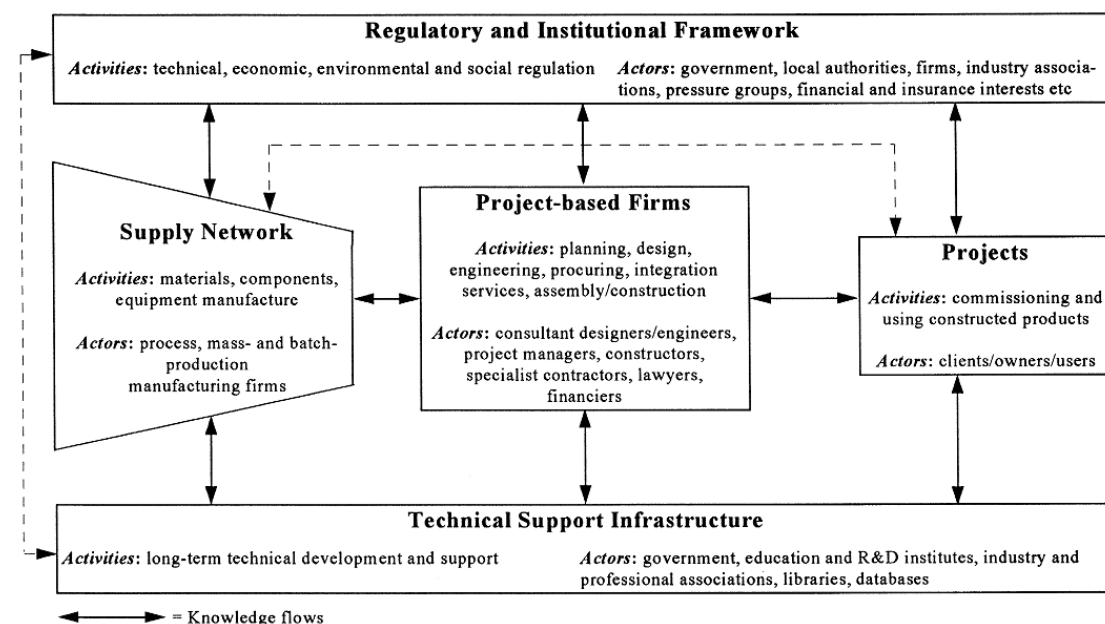


Figure 10: Actors and knowledge flows in project-based networks (Gann and Salter, 2000, p. 960, figure 1)

Besides poor information sharing, the low innovative character of the construction sector was caused by contracting authorities specifying all requirements. This is changing by new contract forms and procedures. More freedom in design and engineering and functional requirements stimulate the market to come up with solutions themselves (Valkenburg, 2008). This is likely to stimulate innovation, since more demanding and experienced clients are seen as the key stimulus for innovation (Barlow, 2000).

5.4 Conclusion: theoretical competitive factors

To increase competitiveness at MEAT tenders insight into competitive factors is gained based upon literature findings. These factors will be used to analyze BAM Infra in order to formulate recommendation about a strategy to increase competitiveness at MEAT tenders. Strategy is defined in this research as: 'an intended course of actions and processes to realize a successful tender bid'.

Strategic and process theories

Literature addressing competitiveness in the construction sector revolves about two main themes: application of generic strategic theories and organizational learning. The former addresses strategic decisions, while the latter revolves around business processes. Both views are taken in account to gain insight into factors that affect competitiveness.

Out of the many schools of thoughts about firms' competitiveness, two theories are frequently applied to the construction sector. These are Porter's competitive positioning theory (CPT) and Barney's resources-based view (RBV), which receive the greatest popularity in many fields. However, views on the applicability to the construction sector varied (cf. Betts and Ofori, 1992, Gann and Salter, 2000, Green et al., 2008b). Nevertheless, the researcher believes that changing market conditions are in favor of the applicability of these theories. Among other things MEAT tenders and the increased role of sustainability enable differentiation and competitive benefits from a wider range of resources. Such opportunities used to be limited, forming one of the main hindrances to apply competitive theories (Betts and Ofori, 1992).

Due to the sector's project-based nature, many researchers have emphasized rather the importance of organizational learning. This is seen as the key factor to improve performance and competitiveness. Since MEAT tenders give greater freedom to contractors to develop solutions themselves, knowledge will remain one of the most valuable assets of construction firms. Therefore, organizational learning is likely to remain a determining factor that contributes to firms' competitiveness.

Strategic competitive factors: competitive positioning theory

The competitive positioning theory opts to position the firm according to a specific strategy. This can be either aimed at cost leadership, differentiation or focus. The latter implies a cost leadership of differentiation strategy for just a market segment. Differentiation can be achieved by differentiation at attributes that are widely valued by clients, which allows to get awarded by a premium price (Porter, 2004). According to this theory, the whole firm should be aimed one single strategy. Otherwise the organization gets 'stuck in the middle', which implies that a firm loses ones competitive advantages.

This insight leads to the following strategic competitive factor: *implementation of a single competitive positioning strategy: cost leadership, differentiation or focus (Porter, 2004).*

Strategic competitive factors: resource-based view

According to the resource-based view competitive advantage can be gained when a firm implements a value creating strategy that is not simultaneously implemented by any current or potential competitor (Barney, 1991, p. 286). This can only happen if a firm has unique resources, otherwise competitors would offer similar solutions. To realize sustained competitive advantage, a firm's resource must have the following attributes (Barney, 1991, p. 288):

- be valuable by exploiting opportunities or neutralizes threats in a firm's environment;
- must be rare among competitors;
- be imperfectly imitable;
- no existing equivalent substitutes.

Resources that do not meet these attributes can temporarily contribute to competitive advantages or applied to perform equally as competitors at those areas that do not contribute to differentiation.

This insight leads to the following strategic competitive factor: *implementation of unique value creating strategy (Barney, 1991).*

Process competitive factors: organizational learning

The project-based nature of the construction sector complicates organizational learning heavily. Projects are often unique and one-off complicating knowledge development and deployment. In addition, knowledge is often implicit which makes it difficult to communicate.

To be successful, despite the sector's circumstances, project experiences must be integrated in continuous business processes to ensure the coherence of the organization (Barlow, 2000, Gann and Salter, 2000). At the core organization ongoing and repetitive business processes take place to support projects. Vice versa, projects, which are often temporarily and unique, need to provide feedback to the core organization.

Furthermore, knowledge management systems are suggested to capture and redistribute codified knowledge (Zhang et al., 2009). Additionally, central figures helping to nurture and implement the partnering process, so called 'champions', may be crucial to distribute and implement the organizational 'memory' (Barlow, 2000, 979). These champions harness implicit knowledge and can stimulate change.

Organizational learning is furthermore hindered by the inter-firm character of projects, which causes barriers for information sharing. Therefore, knowledge must be coordinated and integrated across organizations (Barlow, 2000).

These insights lead to the following process competitive factors:

Intra firm:

- *Integration of project and business processes (Gann and Salter, 2000)*
- *Presence of knowledge management systems (cf. Barlow, 2000, Zhang et al., 2009)*
- *Presence of champions (Barlow, 2000)*

Inter firm:

- *Coordination and integration of knowledge across organizations (Barlow, 2000)*

6 BAM Infra's status on competitive factors

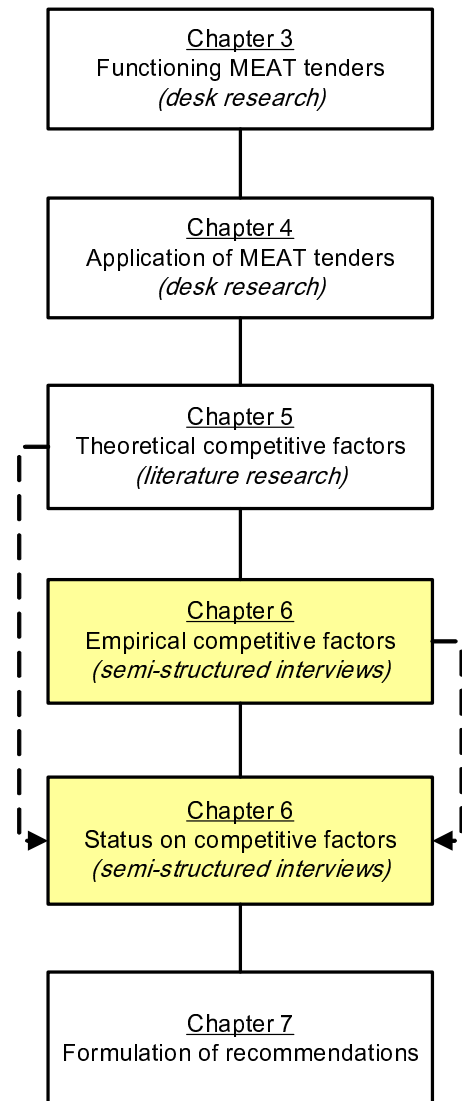
In addition to theoretical competitive factors (see Chapter 5), empirical factors are identified. These factors address specific characteristics of MEAT tender processes. Subsequently, in order to identify opportunities to increase competitiveness, the status on both types of competitive factors has been assessed.

Both steps have taken place by means of semi-structured interviews, which suit well the explorative character of this research (Baarda et al., 1996). Interviews revolved around the organization's performances, project processes, theoretical and empirical competitive factors. See for an overview of interviewees Appendix II and for interview topics Appendix III. The interviewees represented several layers in (project) organizations in order to gain an overall picture of the tender process.

Firstly, the organization structure and strategy is presented (6.1). In addition, BAM Infra's overall performance on MEAT tenders (6.2) and its generic tender process has been assessed (6.3). This served as background information, to support further questioning about factors that affect competitiveness, based upon interviewees' experiences (6.4). Subsequently, the status on theoretical and empirical competitive factors has been assessed (6.5). The final section concludes with an overview of the key findings of this empirical part of the research (6.6).

6.1 Organization structure and corporate strategy

BAM Infra's organization structure and corporate strategy are presented in this section, because it are essential elements to enable performance assessment. BAM Infra consists of four operating companies: BAM Civil Engineering (Civiel), BAM Roads (Wegen), BAM Rail and BAM Civil Engineering Technology (Infratechniek) (see Appendix VIII). Furthermore, BAM Infra is supported by the consultancy and engineering firm BAM Infraconsult. All five companies operate mainly in the Netherlands and are part of Royal BAM Group N.V. (hereafter, BAM). BAM's core businesses are civil engineering, construction and property. The Group is market leader on these markets in the Netherlands, where 47% of its total turnover was realized in 2008 (BAM, 2009a). BAM is subdivided by disciplines in several operating companies. This is fed by the philosophy to have close ties with clients based on geography and market sector. Operating companies are responsible for their own



profit-and-loss accounts. The decentralized structure is further applied within the operating companies, which are again subdivided in several semi-independent companies (see Appendix VIII) (BAM, 2009a).

Due to the scale and complexity of many infrastructural projects, cooperation among operating companies is needed. In essence, alliances are formed with BAM operating companies. External parties are involved if supplementing kinds of expertise are needed.

BAM has defined its philosophy as follows: 'offer real value to our clients and work with them to provide the optimum solution delivering high standards in developing, maintaining, renewing and extending the constructed environment' (BAM, 2009c). The Group has put social responsibility and sustainability high up its agenda. Among other things, it issues an annual sustainability report according to the international 'People, Planet and Profit' concept. Furthermore, it is actively involved with the development of sustainable technologies. Additionally, the Group participates in sector wide discussions and development towards a more sustainable construction industry (BAM, 2009b).

BAM Infra's strategy revolves around three themes: specialization, differentiation and transparency (BAM, 2009b). Specialization is needed to continuously improve kinds of expertise in order to remain ahead of competition. Differentiation is seen essential to continuously develop the kinds of expertise needed and to ensure a durable business. Namely, specializations will disappear and new ones will become important. Finally, transparency should evoke effective mobilization of knowledge and identification of inefficiencies.

6.2 Performance at MEAT tenders

Insight into the organization's overall performance on MEAT tenders enables to see performances on competitive factors in the right perspective. This is therefore analyzed preceding further analyses of the organization's performance on competitive factors.

The degree of winning tender bids is not satisfying (see Appendix IX). This causes the tendency to participate in many tenders, which results in high transaction costs. The low success rate was partly ascribed to an unhealthy market in which the firm operates. Namely, interviewees agreed that some tender bids are lost because of unrealistic bids from competitors. These are consequences of miscalculations or tender bids below cost price. This so called 'diving' takes place when the inevitable losses of such a bid are preferred over the situation of having no work at all. Competitors with a low work load are thus seen as a major threat at tenders. Interviewees were divided about how often miscalculation and diving takes place. Two views could be distinguished that have different views on the competitiveness of BAM Infra's pricing.

One view described the overall performance to be good at value criteria, but prices are not competitive enough. According to some interviewees it is hard to compete against small and mid-sized firms because of BAM Infra's own size. They argued that smaller organizations are able to price sharper. This is because they have a smaller standing organization and are more flexible to temporarily decrease prices when the actual workload is low. Furthermore, some interviewees believe that disadvantages do occur because BAM Infra operating companies are each other's natural partners. External parties might be able to deliver more competitive prices or kinds of expertise that suit the project better. However, often it is not possible to involve those parties.

External parties are often not willing to cooperate with BAM Infra if one of the operating companies is a direct competitor. Furthermore, options to cooperate are limited by cartel regulations.

Interviewees that described another view have a stronger believe in the strength of BAM Infra's pricing. According to them, BAM Infra knows very well projects' cost prices and they profit from procurement benefits. According to this view BAM Infra prices very good and realistic. The frequent lost of tenders is therefore ascribed, for a large extent, to diving and miscalculations of competitors.

An overview of tender outcomes, as collected during this research, gives an indication of that both views are correct in various cases (see Appendix IX). This overview is based upon tenders that came along during this research, it is therefore not comprehensive. Both views on the competitiveness of BAM Infra's prices might thus be right. Sometimes, tender outcomes show indeed large price differences that state suspicions about unrealistic tender bids. On the other hand, various tender outcomes, without wide prices differences among tenderers, show that tender prices have negatively affected competitiveness. At these tenders, BAM Infra's good scores on value criteria were insufficient to make up for the higher tender price. Due to the lack of a comprehensive overview of BAM Infra's performance on MEAT tenders, no further clarification can be given about both views.

Performance on sustainability criteria was rather project specific according to interviewees. The project specific nature of sustainability criteria causes solutions to be developed on an ad hoc basis. BAM Infra's major innovations on this field are not frequently applied, because they are often not valued at tenders.

In general, interviewees argued that improvement of competitiveness can be made by further developing the quality of tender bids. The competitiveness of pricing remains somewhat uncertain, especially due to market conditions. Nevertheless, at some interviews the expectation came up that differences in tender prices are narrowing. The market is gaining more experience with new contract forms and is starting to develop more insight into cost prices and risks. This decreases differences in tender prices, which increases opportunities to differentiate. If the gap between tender prices is too wide, it cannot be compensated for with value criteria. If price differences will indeed narrow, value criteria will create greater opportunities to distinguish at tenders.

6.3 Tender process

To support the questioning about empirical competitive factors, interviewees were questioned about the tender process first. Despite processes differ somewhat per tender, a generic process has been identified.

Decision to bid

Formally, the tender process starts when a tender is officially published by the contracting authority. Often tenders are already expected, e.g. when it is mentioned in policy goals. The decision to participate in the bidding process is taken by directions of BAM Infra's operating companies. They look for tenders that match companies' profiles. Furthermore, companies' need for work is an important factor taken in consideration.

Project team formation

After the decision to bid, a tender team is formed. Formally, directions of operating companies decide about the formation of teams. However, most often it concerns rather standard projects with self-evident team formations and partner selection. At relative large projects the Group's direction gets more involved. In such cases, often a steering committee is set up to form the project team. For this, negotiations take place among the operating companies. An interviewee compared it with the Dutch cabinet formation, whereby important positions are somewhat equally spread amongst participating parties.

Partner selection

BAM's operating companies are each other's natural partners. External parties are only involved if their capabilities are not available within BAM's organization. Selection of external parties is often based on past experiences. Among other things, confidentiality issues are a reason that parties cooperate for multiple projects and a long duration. According to interviewees, this 'clustering' is a common phenomenon in the Dutch construction market.

Project teams' structure

In general project teams have similar organization structures. At the top of a tender project team stands the tender manager, who holds the final responsibility of the tender proposal. He is also the key contact person for the client, with whom the contact is intense. The tender manager is assisted by the project organizer. Furthermore, teams exist of a contract manager, environmental manager (permits, communication, grids, etc.), document control and calculators. Dependent on the size of the tender, sub-project teams are formed (BAM, 2009b).

Strategy formation

The development of a proposal is guided by the tender's content. With brainstorm like sessions, ideas are generated to best fulfill the client's requirements and desires. An important aspect taken into consideration is the weights of criteria. According to interviewees, this can be relatively easily determinable from the tender document. Hereupon 'a strategy to win' is formulated, which is based on the generated ideas and 'feeling with the project'. In general the goal at MEAT tenders is to score well on both price and value criteria.

Interdisciplinary project development

Due to the scale and complexity of projects, interdisciplinary coordination is necessary. Interviews revealed that this process is considered to be essential. However, approaches to guarantee a well fitting integral solution and the attention paid to it seemed to differ. Some interviewees pictured a process of collaborative development of the whole bid. During the whole process the overall goal is taken in account and sub-projects are continuously adjusted to each other. Tradeoffs caused by interdependencies are made from an early stage, while working towards the final integral solution.

Another process that came forward was an approach with the varying disciplines operating more semi-independent. They have more freedom to optimize their part. At a later stage sub-projects are added together. Hereafter the improvement process of the overall design starts. Adding up sub designs will normally not result in an optimal overall design. Efforts and negotiations are thus needed to improve it. Solutions are selected based upon cost estimations or multi criteria analyses. Negotiations between

disciplines are needed, since solutions are interwoven and affect each other (BAM, 2009b). Tradeoffs are thus needed to make the whole solution fit well together.

Final proposal

The tender manager guides the design process and decides together with related directions about the final proposal. For this, the price is determined based on risk estimations, chances and the aimed mark-up. During this stage gut feelings start to play a role. An interviewee defined this as 'exiting', since many decisions are made that affect the bid heavily.

6.4 Perspective of analyses: competitive factors

To supplement the competitive factors derived from literature, interviewees have been questioned about factors that determine competitiveness based upon their experiences at MEAT tenders. Both types of factors formed the input for further questioning about the organization's status on these factors that affect competitiveness (see 6.5). An overview of the competitive factors is given in this section.

6.4.1 Theoretical strategic factors

The identified theoretical competitive factors related to strategy are as follows (see chapter 5):

Competitive positioning theory:

- Implementation of a single competitive positioning strategy: cost leadership, differentiation or focus (Porter, 2004)

Resource-based view:

- Implementation of unique value creating strategy (Barney, 1991)

6.4.2 Theoretical process factors

The identified theoretical competitive factors related to processes are as follows (see chapter 5):

Organizational learning:

- Integration of project and business processes (Gann and Salter, 2000)
- Presence of knowledge management systems (cf. Barlow, 2000, Zhang et al., 2009)
- Presence of champions (Barlow, 2000)
- Coordination and integration of knowledge across organizations (Barlow, 2000)

6.4.3 Empirical factors

Interviewees mentioned three competitive factors that stood out because of their potential to improve competitiveness at MEAT tenders: focus on sustainability, client driven tendering and persuasiveness. These factors have become important only recently with the increased application of MEAT tenders. Interviewees indicated that especially these factors can be further developed and make positive contributions to increase competitiveness. Therefore these factors will be further considered to draw up recommendations (see Chapter 7).

Focus on sustainability

Even though sustainability receives often relatively little weight at tenders, it does offer opportunities to distinguish at tenders according to interviewees. Sustainable solutions can also benefit criteria other than those addressing sustainability. E.g. fewer transport movements can have many benefits, expanding to the criteria of price and nuisance reduction. Therefore, interviews argued that the focus on sustainability within in projects is an import factor that can contribute to increase competitiveness.

Client driven tendering

Matching the proposed solutions with clients' needs and desires is important to win a tender. Interviewees argued that this is not a straightforward process in projects. Tender documents have to be interpreted and communication with the client needs to take place. Especially addressing value criteria in a way that satisfies the client can be a challenge, since often many design alternatives are available. A client focus is therefore important to select the alternatives that are expected to realize the greatest pay-off.

Persuasiveness

In addition to the proposed solution, the success is also dependent on the persuasion of the solution's presentation. Interviewees argued that this is an important aspect at tenders, especially if differences among the bids are relatively small. Interviewees attached great importance to writing skills. The content of proposals should be written clearly with the right amount of detail (depending on what the client wants). Furthermore, documents should be easy understandable and presented in a nice format. Such aspects, which are not considered to be the core business of project teams, play an important role nevertheless.

6.5 Status competitive factors

The main goal of the interviews was to identify opportunities to improve competitiveness at MEAT tenders. For this, the status on theoretical and empirical competitive factors was assessed. Based upon this, recommendations will be formulated to change the actual performances on competitive factors into desired directions (see chapter 7.1).

6.5.1 Theoretical strategic factors

Strategic competitive factors were derived from two schools of thought: competitive positioning strategy and resources-based view. Both factors are assessed separately in this section.

Competitive positioning strategy

In general, tender teams aim to score well on both price and value criteria. Interviewees consider a good price as a precondition to enable differentiation on value criteria. This is the result of award mechanisms that award differentiation only to a limited and pre-defined amount. No deliberate choice to focus on costs or differentiation, as prescribed by Porter's competitive positioning theory (CPT), is made in the organization. According to CPT, the organization is therefore 'stuck in the middle' and will not fully develop its competitive advantages. However, the market seems to be in favor of 'being stuck in the middle', which should enable to win projects with profitable margins. Namely, the client aims at procuring with low prices and high value. Therefore tenders offer often little room to get rewarded for differentiation by premium prices.

Additionally, contractors are faced with both lowest price and MEAT tenders. This makes an organization 'stuck in the middle' if it aims at differentiation at MEAT tenders. Namely, lowest price tenders clearly demand a cost leadership strategy. According to CPT applying two different competitive strategies within in a single organization cannot be successful, unless a distinction is made among business units.

Resource-based view

According to the resource-based view competitive advantages are realized by applying non imitable value creating capabilities. Theoretically, MEAT tenders enable to realize competitive advantages with much more resources in comparison to lowest price tenders. Capabilities no longer need to realize low costs per se. E.g. nowadays capabilities to reduce nuisance or improve sustainability are much more valued. This is confirmed by interviewees. However, barriers remain to fully profit from the firm's resources.

Prerequisite to profit from resources at tenders is that they are valued at tenders. According to interviewees, this is often not the case which causes the organization to not fully profit from its capabilities. They argue that especially the benefits of sustainable innovations are not completely exploited. For this, the following three causes were identified in interviews:

- client does not value the innovation in a tender;
- client gives little weight to criteria valuing the innovation;
- client differentiates little with judgment of the tender bids.

Innovations that do not realize additional benefits at tender bids do not contribute to the organization's competitiveness at MEAT tenders. According to interviewees, three causes can be distinguished why a client does not value certain innovations in a tender. These are as follows:

- client does not want to;
- client is not aware of the possibility;
- client does not want to disturb an equal level playing field.

The final argument takes place when a client assumes to benefit certain firms too much by demanding certain criteria. This could disturb competition, because only a limited number of contractors would be able to tender. As a consequence, the client would risk paying higher prices due to lack of competition.

General agreement existed amongst the interviewees that BAM does not fully profit from its sustainable innovations, because they are insufficiently demanded for at tenders. They also argued that marketing and communication would be one of the key solutions to change this in favor to the organization.

6.5.2 Theoretical process factors

Interviewees indicated that some knowledge in the organization is developed redundantly and not fully exploited. For a large extend they ascribed it to insufficient information sharing, caused by barriers that corresponds with literature about organizational learning (see section 5.3.2).

Projects' one-off nature, uniqueness and different terminology complicate sharing of knowledge. Much is project specific and according to interviewees not applicable at other project on a one-to-one basis. Nonetheless, interviewees argue that much information can be fruitful to other tenders. The main challenge is rather to specify bids to the specific characteristics of a tender. Furthermore, knowledge is often tacit; related to 'know-how' and 'know-who' which is difficult to communicate (see Gann and Salter, 2000). As a consequence, much knowledge is not further applied and

developed. Gann and Salter (2000) relate this to the feedback between project and business processes.

Additionally, a lack of information structures was identified, which presence is considered essential for organizational learning by Barlow (2000). This might explain why, according to some interviewees, a great deal of knowledge sharing takes place based upon requests. The reach of information is therefore limited. References were furthermore made about central figures in the organization known to have certain kinds of expertise. Such employees were contacted often and considered as valuable sources of knowledge. Some interviewees suggested to further increase usage of such 'experts' to support tender teams. That would enable to operate with smaller core teams and to deploy the expertise at more projects. This would simplify decision making in tender teams and make knowledge used more effectively.

Furthermore, inter-firm boundaries among operating companies form barriers for information sharing. It does not as much seem to stem from strategic considerations, as often described in literature. The operating companies do operate semi-independent, but are nonetheless part of the same group with close ties to each other. Interviewees argue that it is rather a practical consequence of the decentralized structure, where formal and informal lines with other operating companies are relatively long. Nevertheless, the in house nature of cooperation offers the organization a great (potential) advantage over some competitors. Inter-firm coordination and integration of knowledge is namely easier to realize in comparison with fully independent market parties. Furthermore, the size of the organization permits it to develop many kinds of expertise and innovations. Therefore, interviewees argue that competitive advantages can be realized by effective development and mobilization of the firms' knowledge. This is in line with literature findings addressing organizational learning.

6.5.3 Empirical factors

Empirical competitive factors, as identified in interviews, revolved around three themes which are assessed accordingly.

Focus of sustainability

Sustainability criteria are considered as 'one of the criteria' and are treated similar to other criteria. Profits are made in tender teams, which is their preliminary focus. Therefore, sustainable alternatives are applied when they are considered as the most rewarding alternative. However, even though sustainability criteria receive relatively little weights at tenders, some interviewees argued that it offers yet unexploited opportunities to distinguish at tenders. They argued that if more attention would be devoted to sustainability, new differentiating opportunities will arise which are nowadays overlooked.

Client driven tendering

According to interviewees, sometimes solutions are developed rather from a technical perspective than a client perspective. This causes solutions to be developed that are excellent from a technical point of view, but which do not match client's demands. E.g. nuisance could be short but fierce or long but moderate. Therefore it is needed to understand the client's interpretation of criteria and act accordingly. Sometimes this might conflict with the engineer's nature to seek after the best technical solutions. Interviewees mentioned that client driven tendering is often difficult because it is hard to know what the client is aiming at. Sometimes they do not know it themselves or there is no unambiguous preference detectable. Since uncertainty exists always regarding the evaluation of subjective criteria, but no major disputes have been

mentioned in interviews. Client driven tendering is thus about specifying the proposal, as good as possible, to the known preferences of the client.

Competitiveness is further affected if solutions go beyond what is asked for. Additional solutions increase prices, but do not result in extra rewards. This is why it is important to deliver just what the client asks for. Again, sometimes this conflicts with the engineer's nature.

Persuasiveness

Besides the proposed solution, the chances of winning the contract are influenced by the way plans are presented. Especially if differences among the tender bids are little, small things can make the difference. Interviewees attached great importance on writing skills. MEAT tenders demand often many plans to be written, e.g. maintenance, quality control and project management. Evaluations of such plans are for a great deal affected by factors like writing style, presentation, level of detail and lay-out. Doing the basics right is considered to be fairly easy and a prerequisite for successful tendering, according to interviewees. Suggestions were made to lay down such basics in a writing guide. Writing of plans was furthermore considered to be a specific skill, that some are good at and some not. General agreement existed that not always sufficient and sometimes too last minute attention is devoted to writing and persuasiveness.

6.6 Conclusion: improvement opportunities

By means of semi structured interviews, which suit well the explorative nature of this research, empirical competitive factors have been identified. These factors supplement the earlier selected theoretical competitive factors. Subsequently, BAM Infra's status on both types of factors has been assessed to identify improvement opportunities.

Prior to the analyses of competitive factors, BAM Infra's performance on MEAT tenders has been analyzed to put findings in the right perspective. This showed that in general performances on value criteria are relatively good. However, different views on the organization's prices existed. Some interviewees argued that the prices are relatively high, others believed that the prices were good and realistic. Both views agreed that tenders are sometimes lost by competitors offering suspicious low prices. This is believed to be the consequence of miscalculations or tender prices below cost price. Nevertheless, interviewees indicated that competitiveness improvements can be made by further improving tender bids.

In addition to theoretical competitive factors, supplementing factors have been identified by means of semi structured interviews. Interviewees indicated that in particular these relatively new processes, needed for MEAT tenders, can contribute to increase competitiveness. The empirical competitive factors are as follows:

- Focus on sustainability at projects: Take sustainability into account as a natural decision criterion.
- Client driven tendering: Match solutions with clients' needs and desires.
- Persuasiveness: Present proposed solutions persuasively to client.

Status on competitive factors:

Strategic – competitive positioning theory

In general, tender teams aim to score well on both price and value criteria. Interviewees consider a good price as a precondition to enable differentiation on value

criteria. This is because most MEAT tenders enable recognition of differentiation by premium prices only to a limited amount. Thus, no deliberate choice to focus on costs or differentiation, as prescribed by Porter's competitive positioning theory, is made in the organization.

Strategic – resource-based view

BAM Infra has sustainable innovations at its disposal that could potentially result in competitive advantages, according to interviewees. These innovations are considered to be rare among competitors and difficult to imitate. However, it is not sufficiently valued at tenders to indeed contribute to competitiveness.

Process – organizational learning

Interviewees indicated that knowledge in the organization is developed redundantly and not fully exploited. Projects' one-off nature, uniqueness and different terminology complicate sharing of knowledge. Much is project specific and according to interviewees not applicable at other projects on a one-to-one basis. Furthermore, knowledge is often tacit, related to 'know-how' and 'know-who', which is difficult to communicate. Because of these circumstances the integration of project and business processes is hindered.

Additionally, a lack of information structures was identified, which presence is essential for organizational learning according to Barlow (2000). This might explain why, according to some interviewees, a great deal of knowledge sharing takes place based upon requests. The reach of information is therefore limited.

References were furthermore made about central figures in the organization known to have certain kinds of expertise. Such employees were contacted often and considered as valuable sources of knowledge.

Furthermore, inter-firm boundaries among operating companies form barriers for information sharing. Interviewees argue that it is a practical consequence of the decentralized structure, where formal and informal lines with other operating companies are relatively long.

Empirical – sustainability

Sustainability criteria are considered as 'one of the criteria' and are treated similar to other criteria. However, even though sustainability criteria receive relatively little weights at tenders, some interviewees argued that it offers yet unexploited opportunities to distinguish at tenders. They argued that if more attention would be devoted to sustainability, new differentiating opportunities will arise which are nowadays overlooked.

Empirical – client driven

Interviewees mentioned that client driven tendering is often difficult because it is hard to know what the client is aiming at. Nevertheless, they believe that improvements can be made on this process. Namely, solutions are sometimes developed too much from a technical point of view. As a consequence, teams risk to develop solutions that go beyond client's needs and desires.

Empirical – Persuasiveness

Presentation and writing of plans is considered by interviewees as an important part of the tender process. It can affect the outcome, which is especially important if differences with competitors are relatively small. However, interviewees agreed that sometimes insufficient attention is devoted to this aspect of the tender process.

7 Opportunities to increase competitiveness

Insights into competitive factors and BAM Infra's related statuses have led to the identification of opportunities for improvement. Based hereupon recommendations are formulated (7.1). In addition, external factors and other clients are discussed since they influence the effectiveness of the recommendations (7.2). Subsequently, the recommendations are further specified to BAM Infra and implementation suggestions are given (7.3). The final section summarizes the essence of the recommendations (7.4).

7.1 Strategic applications to BAM Infra

The analyses on competitive factors have led to insights into opportunities for improvements that affect competitiveness. Based hereupon recommendations are formulated per factor which is presented in this section.

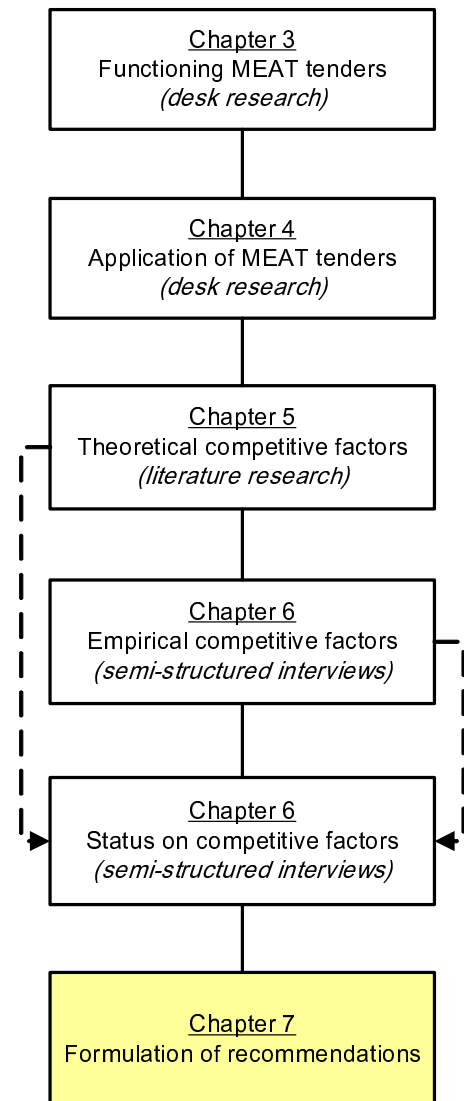
7.1.1 Increase differentiation at tenders

BAM Infra does not fully develop its competitive advantages, according to Porter's competitive positioning theory (CPT), since it operates as stuck in the middle. No deliberate choice between the strategies of cost leadership or differentiation is made.

The organization's characteristics seem to be in favor of a differentiation strategy at MEAT tenders.

However, its application remains hindered by tenders with insufficient opportunities to differentiate. Nonetheless, CPT offers insight into possibilities to increase competitiveness. Namely, some tenders do enable pay-off with differentiation. Therefore, the following opportunities arise based upon CPT's insights into competitiveness.

- Apply differentiation strategies project specific, instead of organization wide.
- Strive for an organization wide differentiation strategy and bid only at those tenders that enable sufficient pay-off from this strategy.
- Distinct business units to tender type and apply the strategies of cost leadership and differentiation simultaneously. Positive impact on tender prices can be realized by the unit with a strong cost focus, aiming at lowest price tenders. The unit focusing at MEAT tenders can further apply options 'a' or 'b' to apply differentiation.



The weight given to value criteria at tenders is leading at options 'a' and 'b'. These options address actual market conditions whereby it is often not possible to get rewarded by a premium price for differentiation. Respecting these market conditions is necessary. However, according to the theory, it will not result in the full realization of the organization's competitive advantages. Nevertheless, these strategies are likely to increase pay-off with the ongoing development in the market whereby value criteria are further gaining importance at MEAT tenders.

In order to distinguish more at tenders the organization has to look for attributes at which it can distinguish itself from competitors and which are highly valued by clients. Especially the valuing by the client is important, since nowadays tenders often do not enable differentiation with the organization's key sustainability capabilities. The organization should thus choose to differentiate at areas which are weighted sufficiently by value criteria at tenders. RWS's application of key themes at MEAT tenders can contribute to select attributes that are widely valued (see section 4.1). Additionally, the organization should aim at parity or proximity of costs and quality relative to competitors at areas that do not affect differentiation (Porter, 2004).

Option 'c' is most closely in line with the competitive positioning theory. However, the business unit aiming at MEAT tenders will still be faced with tenders that have insufficient differentiation opportunities. Therefore, this unit has to follow option 'a' or 'b' nonetheless. A major benefit of option 'c' would be the impact on tender prices of the unit aiming at lowest price tenders. According to the theory, an increased cost focus will make the unit more price competitive.

7.1.2 Increase pay-off sustainable innovations

BAM Infra has sustainable innovations at its disposal that could potentially result in competitive advantages, according to interviewees. These innovations are considered rare among competitors and difficult to imitate. However, they are not sufficiently valued at tenders to indeed contribute to competitiveness. To realize competitive advantages with existing and newly developed innovations, the organization must improve its capability to realize payoff from their innovations. This can be realized by persuading clients to value organization's innovations more and to improve the match between R&D and clients' demands. Extending the technological strategy over the organization's boundaries is in line with Gann and Salter's (2000) recommendations.

Interviewees suggested that clients' demand at tenders can be influenced by adjusting marketing and question clients more actively about sustainability. Adjusting marketing stems from an interviewee's observation that great efforts are made on this field, but that it does not sufficiently pay off. Therefore, the suggestion was made to realize improvements by adopting new marketing approaches. Furthermore, interviewees proposed to question clients actively about sustainable solutions to increase awareness of sustainable possibilities. At open dialogue procedures this could even directly pay off since tender criteria can still be adjusted during the dialogue phase.

Marketing plays also a role with new innovations. R&D's benefits can be further increased by focusing it to areas that are highly valued by clients. However, this is hard to determine on the field of sustainability since no unambiguous sustainability themes have been formulated by RWS. Also sustainability policies of provinces and municipalities are very diverse. In general, RWS's recent valuing of quality themes shows at which fields most gain can be realized (see section 4.1). Another suggestion, which came forward in interviews, was to involve clients more often and earlier during the development phase. This offers the opportunity to adjust innovations to client's desires instead of presenting fully developed solutions in the end.

7.1.3 Stimulate organizational learning

BAM Infra is a large organization in the Dutch construction sector, which is why it has the potential to profit much from organizational learning. In comparison with many competitors, much more experience and kinds of expertise are available within a single organization. However, knowledge is developed redundantly and not exploited to its fullest extent.

In order to improve knowledge development and deployment, further integration of project and business process is recommended. This is needed to ensure the coherence of the organization according to Gann and Salter (2000). Therefore, improvements are proposed to improve projects' feedback of codified and tacit knowledge.

Knowledge management systems enable to capture and distribute codified information. Interviewees indicated that on this aspect improvements can be made in the organization. An information system should enable to capture codified information and make it easy accessible throughout the organization. Literature emphasizes to capture information of both successful and failed designs and bids (cf. Gann and Salter, 2000, Gielingh, 2005).

Not all information and experiences of projects can be captured by information systems. Much knowledge is tacit, especially know-who and know-how, and therefore difficult to transfer (Gann and Salter, 2000). This is why the researcher recommends increasing the deployment and formation of experts, which is also suggested by some interviewees. This increases the role of, what Barlow (2000) calls, champions in the organization which Barlow considers essential for successful project delivery. Widespread project support by experts enables to widely benefit from experts' expertise and tacit knowledge. Important is that experts are employable throughout the whole organization in order to fully benefit from it. Additionally, it contributes to avoid redundant knowledge development. Namely, interview findings revealed that momentarily some experts are tied to their operating company, which causes similar kinds of expertise to be developed simultaneously at various places throughout the organization.

Furthermore, integration and inter-firm coordination of knowledge are determining aspects of organizational learning. To realize this, the usability and reach of information should be improved.

Problem oriented information mapping has been promoted, by Gielingh (2005) and some interviewees, to increase the usability of information. Projects' uniqueness, one-off nature and differing terminology complicate information sharing. Therefore, to overcome these barriers, problem oriented information mapping is advocated. It can involve information like e.g. approaches to solve problems, essence of criteria and indications of solutions' success. Such information is valuable to support project

development. It can be used as a starting point, which enables to focus more on the main challenge of specifying solutions to the specific tender.

The reach of knowledge is largely dependent on the degree of access to the proposed information system and experts' field of action. Inter-firm access to the same information system will make information widely available. This development can also be supported by enlarging the work field of experts to cover a larger range of the organization.

Furthermore, close ties among experts can support the coordination and improvement of knowledge development. Some interviewees suggested to organize more often network events. This should stimulate employees, working on similar topics at various operating companies, to share their experiences and learn from each other. Another option is to group kinds of expertise in more central organizations, which is increasingly applied within the organization.

The creation of an information management system is several times recommended in this section. A combination of these aspects results in the following recommendation: set up an inter-firm and problem oriented information system. This is proposed to address the following barriers of information sharing: uniqueness, one-off character, differing terminology and lack of inter-firm coordination.

Another returning theme is the involvement of experts. The researcher proposes to increase the application of experts and enlarge their field of action. Involvement of experts increases the application of knowledge, whereby projects can especially benefit from their tacit knowledge which cannot be extracted from information systems. Facilitating communication among experts, e.g. by grouping experts in a central organization, stimulates further information sharing and coordination of knowledge development.

7.1.4 Create sustainable project culture

The formation of a sustainable project culture is suggested to grasp more sustainable opportunities at projects which are already in reach of the organization. Sustainability should become one of the natural decision criteria, according to interviewees. Developers should question automatically which design alternatives are most sustainable and how this will pay off. This change of mindset is mostly a cultural aspect and in line with BAM Infra's ambition to be leading on the field of sustainability. However, sustainability does not receive special attention in projects yet. By taking in account sustainability as a natural decision criterion, new opportunities might arise that enable to increase competitiveness. This can also be the result of increased performances on criteria other than sustainability. It is a low risk measure to take, with potentially great pay-off.

7.1.5 Improve client driven tendering and persuasiveness

The final suggestions focus on actual processes that gained increased importance because of MEAT tenders. Client driven tendering and persuasion play a larger role at these tenders since more freedom is given to contractors to develop solutions themselves. Interviewees indicated that it is important to fully acknowledge the importance of these processes and act accordingly. It is therefore necessary to keep in mind what the client wants during the whole development process. A strong client focus should become a natural part of project development.

In addition, the presentation of plans should be done persuasively. Plans should be well readable, contain the right amount of detail and help to convince the client about

the proposed solutions. Writing is considered a professional skill, which is why it should be treated like it. Sufficient time and resources must be made available at projects to perform the writing tasks. In addition, writing guides and training can support the development of employees' skills. Another option is to involve external support.

7.2 Additional factors to take into consideration

The formulated recommendations stem from competitive factors that are in the organization's sphere of control and are aimed at MEAT tenders of RWS. However, tender outcomes are also dependent on external factors which are difficult to influence (7.2.1). Furthermore, strategic decisions related to differentiation are dependent on the targeted clients. Therefore, the applicability of recommendations to other clients than RWS is addressed (7.2.2).

7.2.1 External factors

Besides factors in the organization's own sphere of control, tender outcomes are also affected by external factors. The success of a tender bid is for a great deal dependent on competitive bids, which cannot be influenced. Especially diving of competitors is seen as a major treat, since it results in unrealistic price competition. On the other hand, diving competitors are probably weakening since losses are inevitable.

Tender outcomes are furthermore affected by clients' preferences. These are hard to influence, although marketing is intended to have some effect. Nonetheless, the challenge remains to develop bids that match client's preferences best. In addition, clients' evaluations of bids have great impact on the outcome. Especially subjective criteria can cause uncertainties. Nevertheless, none of the interviewees were aware of any major disputes with the client. The organization should thus aim to minimize uncertainties by getting to know the client well, which enables client driven tendering.

7.2.2 Applicability to other clients

This research has focused on tenders of public parties in the Dutch infrastructural sector, whereby RWS has been identified as the principle client. Other important public parties, tendering out according to MEAT, are provinces and municipalities. In addition, works are also executed for private clients. The suggested improvements are thus not based on the analysis of the full spectrum of clients. Nevertheless, suggestions to shape conditions to realize increased competitiveness and improving actual processes are not client specific. This is in contrast with strategies to distinguish at tenders, whereby clients play a central role in strategy formation. Namely, differentiation can only take place on fields highly valued by clients. Therefore, the whole range of clients should be considered when forming a differentiation strategy.

7.3 Implementation at BAM Infra

The formerly suggested improvements were based upon individual competitive factors. These insights enable to propose specific recommendations to BAM Infra by combining different points of views and addressing implementation suggestions. The level of recommendations differs depending on the impact on the organization and the efforts to realize them. Therefore, four types of recommendations are distinguished.

7.3.1 Improve actual project processes

Recommendations related to a sustainable project culture, client driven tendering and persuasiveness address actual processes. Increasing emphasizes on these processes and devoting sufficient attention to it enables to makes the recommendations happen. However, it is not a straightforward process since it affects routines and mind sets of project teams. Nevertheless, devoting more efforts to these processes is a low risk measure to take and has potentially large benefits.

Develop a sustainable project culture

Developing a sustainability mind set, by taking in account sustainability as a natural decision criterion, enables to grasp opportunities already in reach of the organization. To realize a sustainable project culture, support from project management is essential. Project members should be questioned about their decisions considering sustainability. An 'interviewee' described it as follows: "You should explain why you have *not* chosen the sustainable variant, instead of explaining why you have chosen the sustainable variant". Additionally, specifying tasks, responsibilities and measurement methods is proposed to structure the role of sustainability in projects.

- Project management has the task to question actively about sustainability to make it a natural decision criterion.
- Project management has the task to define tasks and responsibilities relating sustainability to define its role at projects.

Improve client driven tendering and persuasiveness

Continuous focus on client's needs and desires is needed. Just like sustainability, this should become a natural decision criterion in project development. Pressure from project management is thus needed to stimulate client driven tendering.

Furthermore, acknowledgement of the importance of persuasive writing is needed. It should become an integral part of the tender process by devoting sufficient time and the right resources to it. Project management has the task to manage this process. In addition, development of writing skills can be facilitated by training and writing guides. Another option is to consider external support to take part in the writing process.

- Project management has the task to make client driven tendering and persuasive writing part of the tender process by creating awareness and devoting sufficient attention to it.
- Management of operating companies have the task to facilitate improvements on persuasive writing by enabling training, setting up writing guides or involve external support.

7.3.2 Facilitate organizational learning

Improving organizational learning is strongly advocated in this research. Therefore, an information management system and an increased supportive role of experts are recommended.

Inter-firm, problem oriented information system

In order to stimulate organizational learning an inter-firm and problem oriented information system is recommended. Interviews revealed a real need for such a system within the organization. It is, however, a complex task to set up an information management and to make it functioning properly within the organization. It is

therefore not aimed at quick pay-off, but rather to gain long term competitive advantages.

Besides setting up an information management system, crucial for its functioning are incentives for employees to share their knowledge through the system. E.g. this can be realized by devoting time and budget to project teams to realize input for the system or to couple bonuses to it. In addition, the architecture of the system determines the usability. Questioned should be how and which information will be present in the system. Best practices and references are possibilities which can be sorted to topic or tender phase.

- The recommended inter-firm and problem oriented information system contains a great deal of IT work and inter-firm coordination. Therefore, support from BAM Infra's management is needed.
- Roles have to be defined within the organization to structure the input of information from projects and ensure the coherence of the system.

Further develop role of experts

A supportive role of experts on a wider scale is suggested. This is in line with an ongoing development at BAM Infra, whereby experts are increasingly deployed at projects in a supportive role. The researcher recommends to centralize developments of disciplines that fulfill supportive roles at projects. This stimulates the coordination and development of knowledge. In addition, the deployment of tacit knowledge can be increased by enlarging experts' work fields.

To effectively support developments in the organization the network of champions within the various operating companies plays an important role. These champions should be informed and involved at ongoing developments. This enables them to facilitate knowledge and expert deployment within their operating companies.

- The suggested further development of a supportive role of experts suits BAM Infraconsult. They are recommended to develop or centralize disciplines that can function in a supportive role at projects. Commitment of other operating companies and project management is needed to involve experts and to avoid redundant development of similar kinds of expertise.

7.3.3 Redefine differentiation strategy

Following the competitive theories – competitive positioning and resource-based view – it becomes clear that competitiveness can be improved by differentiation. The organization has to choose fields, which are highly valued by clients, on which it can distinguish itself from competitors. This will enable the organization to improve its capability to realize pay-off from differentiation goals. To better suit market conditions, it is recommended to (re)define the recent goal to differentiate on the field of sustainability.

Questioned should be if (new approaches with) marketing can get recent sustainable innovations increasingly valued at tenders. Furthermore, prolonging the actual strategy by focusing on some key sustainability themes is only beneficial if sufficient confidence can be gained about the fields that are highly valued by the client. In addition, earlier client involvement at product development is advocated to increase the match of end products with client's preferences.

Momentarily projects demand for a great deal ad hoc development of sustainable solutions based on project specific criteria. Therefore, to match the strategy with

client's demand, the option arises to focus more on facilitating these developments. Recommendations related to organizational learning can support this.

Thirdly, in spite of increasing importance to sustainability it remains fairly limited valued at tenders (in 2008 just 4% of all value criteria expressed in currency units). Therefore, it can be questioned if this is the most suitable field to opt for differentiation instead of aiming at competitive parity. Nonetheless, for marketing purposes sustainability can remain high upon the agenda. This can support market developments into the desired direction of the organization. However, for now operational excellence at other fields, thus enabling differentiation, might be more rewarding.

- BAM Infra's management is recommended to (re)define the differentiation strategy to improve its match with fields that are highly valued at tenders.
- Heads of operating companies' R&D departments have the task to manage earlier client involvement during product development.
- On all levels of the organization the task exist to take part in (new approaches with) marketing to get recent and future innovations valued more at tenders.

7.3.4 Distinct lowest price and MEAT tenders

Insights derived from the competitive positioning theory opt for organizational changes to realize increased competitiveness. CPT suggests setting up two largely distinct business units, dividing lowest price and MEAT tenders. This suggestion shows similarities with an ongoing movement within the organization to develop large MEAT tenders by a specific unit. According to CPT, a distinction must be fully developed. This is, however, based upon the assumption that a differentiation strategy is possible, which is only partly the case at MEAT tenders. Therefore, this insight should be interpreted by respecting the circumstances in which the organization operates.

Separating business units based on tender type is a severe measure to take. It can, however, take place to a lesser extent, which matches the ongoing movement in the organization. Therefore, it is recommended to start separating complex processes that are uniquely needed for MEAT tenders. This will enable to develop the expertise needed by specific sections, while further distinction can be applied in a later stage. The major benefit of a distinction between business units is the increase of competitiveness at lowest prices tenders. Units preliminary aiming at lowest price tenders are supposed to compete better because of a strong cost focus. This should result in lower prices for execution of predefined works, which would be beneficial for regional offices. In addition, this can also serve MEAT tenders if the MEAT tender unit can profit from reduced costs of works executed by lowest price units.

- Further development of a distinction, based upon tender type, restructures the organization. Regional offices will have to focus more on (small and midsize) lowest price tenders, while central organizations' focus shifts to (midsize and large) MEAT tenders. Commitment of involved operational companies' management is therefore needed.

7.4 Conclusions: recommendations for BAM Infra

Based upon identified improvement opportunities recommendations are formulated to increase BAM Infra's competitiveness.

Develop with a sustainability mindset, client driven and increase persuasiveness

Taking sustainability in account as a natural decision criterion will enable to grasp opportunities at projects which are nowadays overlooked. This applies also to the client focus at projects, which should become a natural decision criterion as well. It should be continuously considered how solutions contribute to meeting client's demand and desires, rather than realizing the technical potential. Pressure from project management is essential to create a sustainability minds set and increase client driven tendering.

In addition to development of bids, the presentation affects the outcome. Therefore, sufficient attention has to be devoted to communicate plans persuasively. This process should be considered as an integral part of the tender process. Sufficient time must be devoted to writing down the plans and it should be done why those who master the skill of writing. Facilitating of these processes can takes place by setting up writing guides, training or external support.

Devoting more efforts and emphasizes to these processes is a low risk measure to take and has potentially large benefits.

Inter-firm, problem oriented information system

In order to stimulate organizational learning an inter-firm, problem oriented information system is recommended. The goal of an information system is to capture learned lessons and knowledge from projects and make them suitable to serve other projects. Furthermore, feedback from projects enables to gear business developments to the need of project teams. Projects are, however, mostly unique, one-off and confronted with differing terminology. Therefore, the system is recommended to be problem oriented.

Improving distribution of knowledge will support ad hoc developments at project. Although criteria differ per tender, past experiences can be of great value at projects according to interviewees. The main challenge is namely to specify solutions to the specific tender, rather than developing solutions from scratch. In order to make the system function well, incentives have to be created for project teams to add their input to the system.

Setting up an information system and making it function effectively is a complex task. It is therefore not aimed at quick pay-off, but rather to gain long term competitive advantages.

Further develop role of experts

A supportive role of experts on a wider scale is suggested, which is in line with an ongoing movement at BAM Infra. The recommendation is based on literature's importance devoted to 'champions', who harness implicit knowledge and can stimulate change. Therefore, it is recommended to further centralize developments of disciplines that fulfill supportive roles at projects. This stimulates the coordination and development of knowledge. In addition, the deployment of tacit knowledge can be increased by enlarging the work fields of experts.

The suggested supportive role of experts is in line with an ongoing movement at BAM Infra. It is therefore recommended to expand this movement and centralize kinds of expertise that fulfills supportive roles at projects and to enlarge experts' work fields.

Improve differentiation

Insights from the competitive positioning theory and the resource-based view revealed that BAM Infra's present differentiation strategy does not pay off sufficiently. The organization's key sustainable themes are insufficiently reflected at tenders, which is why this strategy should be reconsidered. Questioned should be if sufficient confidence exist about the key sustainability themes that will dominate tenders. This would enable to prolong the actual strategy by aiming at differentiation at some themes. Marketing and client involvement play herein an important role to match developments with clients' demand. On the other hand, momentarily sustainability criteria are often diverse and project specific, which creates the option to aim at differentiation by facilitating these demands. Furthermore, due to the fairly limited weight given to sustainability it can be questioned if this is the best field to aim for differentiation rather than parity.

Improving the organization's capability to realize pay-off from their differentiation goals can have a great impact on its competitiveness. Therefore, redefining the differentiation strategy is recommended.

Distinct lowest price and MEAT tenders

The competitive positioning theory opts to set up two distinct business units to enable the application of cost leadership and differentiation strategies simultaneously. This suits the actual situation wherein BAM Infra is faced with lowest price and MEAT tenders. Competition on MEAT tenders takes for a great extent place on design and engineering, while this is already specified at lowest price tenders. Therefore, MEAT tender units can further develop these skills and develop a differentiation strategy. On the other hand, lowest price tender units can operate with a strong cost focus and increase competitiveness at lowest price tenders. In addition, price reductions can serve MEAT tender projects if lowest price units can take over parts of the works.

CPT's suggested distinction of business units is a severe measure to take and is built upon the assumption that differentiation is possible. At MEAT tenders this is only partly the case. Therefore, it is proposed to distinct complex processes that are uniquely needed for MEAT tenders first. This enables to further develop the expertise needed by units devoted to these processes. Further distinction can take place in a later stage, which should be aimed at realizing cost advantages for regions competing at lowest price tenders.

8 Conclusions and recommendations

To conclude this research, the key conclusions (8.1) and recommendations (8.2) are presented in this chapter. In addition, a reflection on the conducted research is provided by the researcher (8.3) and recommendations are made for further research (8.4).

8.1 Conclusions

The conclusions of this research, presented in this section, provided the basis on which recommendations for BAM Infra were formulated to improve its competitiveness at MEAT tenders (see 8.2).

Functioning of MEAT tenders

Clients' aim with MEAT tenders is to procure value-based. For this, value criteria are specified in addition to price criteria. The most common mechanism in the Dutch infrastructural sector to award the contract of MEAT tenders is the 'virtual tender price'. For this, tender prices are deducted by virtual discounts based upon performances on value criteria. The bid with the lowest outcome, the virtual tender price, gets the contract awarded.

Theoretically, this implies that contractors' bid decisions can be narrowed down to:

- add solution if discount > additional costs;
- leave out solution if penalty < cost savings.

However, decision making is complicated by uncertainties related to subjective criteria and systems' interdependencies.

MEAT tenders in the Dutch infrastructural sector

BAM Infra's principle public client related to MEAT tenders is 'Rijkswaterstaat' (RWS). Other important public clients are provinces and municipalities. Their MEAT tender policy is rather diverse and less developed as RWS's policy, which is why this research has focused on RWS.

RWS is increasingly tendering out according to MEAT and value criteria are gaining in importance. In 2008 MEAT tenders represented over 60 percent of the total tender value and within these tenders, expressed in currency units, value criteria accounted for 32% of criteria's weightings (External, 2009).

Role of sustainability

Sustainability, relating to environmental aspects, is in general not given great weight at tenders. Just 4% of all value criteria in 2008, expressed in currency units, addressed sustainability (Otto, 2009). Furthermore, RWS has not defined clear sustainability themes yet (External, 2009). The key challenge is the measurement of sustainability, which hinders implementation. Nonetheless, developments of criteria on this field are ongoing and expected to increase in importance.

Competitiveness in the construction sector

Literature research revealed a discussion about competitiveness in the construction sector, revolving around the application of strategic theories. Hindrances, related to sector's characteristics, to the application of Porter's competitive positioning theory and Barney's resource-based view were identified. However, because of changing market conditions the researcher believes that these theories become better

suitable. Therefore, insights into competitive factors were derived from these strategic theories.

Additionally, a widespread agreement about the importance of organizational learning in construction specific literature was identified. Due to the sector's project-based and inter-firm nature many barriers for organizational learning exists. However, this is considered to be the key process to enable performance improvements and to increase competitiveness. Therefore, literature addressing organizational learning in the construction sector has been assessed to derive factors from that affect competitiveness.

Improvement opportunities

With insights into competitiveness, derived from strategic theories, organizational learning and empirical findings, BAM Infra's status on competitive factors has been assessed. This has led to the identification of improvement opportunities per factor.

Strategic competitive factors: competitive positioning theory

The competitive positioning theory opts to position a firm according to a specific strategy: cost leadership or differentiation, for the whole industry or just a market segment (Porter, 2008, p. 3). This corresponds not with BAM Infra's current strategies at MEAT tenders, whereby the aim is to score well on both price and value criteria.

Following the positioning theory, a differentiation strategy at MEAT tenders would match the organization's characteristics best. For this, the organization should be allowed to get awarded by premium prices. This is, however, often not the case due to limited differentiation opportunities at tenders. Furthermore, the organization is also faced with lowest price tenders, which clearly demands a price leadership strategy. To aim at two positioning theories simultaneously, two largely distinct business units have to be set up according to the theory.

Strategic competitive factors: resource-based view

According to the resource-based view competitive advantages can be gained when a firm implements a value creating strategy that is not simultaneously implemented by any current or potential competitor (Barney, 1991, p. 286). This is in line with BAM Infra's strategy, notably regarding sustainability. The pay-off is, however, limited, mainly because organization's sustainable innovations are little valued at MEAT tenders.

Process competitive factors: organizational learning

The project-based nature of the construction sector complicates organizational learning heavily. Projects are often unique and one-off complicating knowledge development and deployment. In addition, knowledge is often implicit which makes it difficult to communicate. These hindrances were also identified at BAM Infra, causing knowledge to be developed redundantly and not exploited to its fullest extent.

To be successful, despite the sector's circumstances, project experiences must be integrated in continuous business processes to ensure the coherence of the organization (Barlow, 2000, Gann and Salter, 2000). This can be facilitated by knowledge management systems to capture and redistribute codified knowledge (Zhang et al., 2009). Interviews revealed a lack of such systems within the organization. Additionally, central figures helping to nurture and implement the partnering process, so called 'champions', may be crucial to distribute and implement the organizational 'memory' (Barlow, 2000, p. 979). These champions

harness implicit knowledge and can stimulate change. This is in line with the observation that some employees within the organization were frequently contacted and seen as valuable sources of knowledge.

Organizational learning is furthermore hindered by the inter-firm character of projects, which causes barriers for information sharing. Therefore, knowledge must be coordinated and integrated across organizations (Barlow, 2000). Within BAM Infra, many operating companies operate within the same organization. However, as a practical consequence of the decentralized structure, inter-firm barriers for information sharing exist nevertheless.

Empirical factors: project processes

Interviewees mentioned three competitive factors that stood out because of their potential to improve competitiveness at MEAT tenders: focus on sustainability, client driven tendering and persuasiveness. These factors have become important only recently with the increased application of MEAT tenders.

A focus on sustainability and client driven tendering was seen important by interviewees because it enables to grasp opportunities that are already in reach of the organization. Nowadays, opportunities are overlooked because sustainability is not considered as a natural decision criterion. In addition, acting client driven by continuously modifying solutions towards client's needs and preferences can be further developed. Although, this is seen as a difficult task because it is hard to determine what the client really wants.

Furthermore, persuasive presentation of plans can affect tender outcomes. This process should be done right, especially the writing process was considered important by interviewees. Sufficient attention must thus be devoted to it, which turned out not always to be the case.

8.2 Recommendations

Based upon the identified improvement opportunities, related to competitive factors, recommendations are drawn up. For this, also organization's characteristics and external factors were taken in account. The level of recommendations differs on the efforts of realization and the impact to the organization. Therefore, four types of recommendations are distinguished and presented in this section.

Stimulate a sustainable project culture, client driven tendering and persuasiveness

In order to grasp more sustainability opportunities, project management has a clear task to question actively about sustainability as a decision criterion. This will create awareness in project teams and actively support a sustainable mind set.

In addition, a strong focus on client's needs and desires is needed. Continuous consideration on how solutions contribute to meet client's demand and desires is needed, rather than to focus on the realization of the technical potential. Pressure from project management is needed to further deploy the client driven mind set at projects.

In addition, acknowledgement of the importance of persuasive writing is needed. Interviewees considered it as a professional skill, which is why writing should take place by those who master the skill. Project management has the task to manage this process. They should enable 'writers' to do their task properly; enabling sufficient time, resources and avoid last minute work. In addition, development of writing skills can be facilitated by training, writing guides or external support.

Devoting more efforts and emphasizes to these processes is a low risk measure to take and has potentially large benefits.

- Project management has the task to question actively about sustainability to make it a natural decision criterion.
- Project management has the task to define tasks and responsibilities relating to sustainability to define its role at projects.
- Project management has the task to make client driven tendering and persuasive writing part of the tender process by creating awareness and devoting sufficient attention to it.
- Management of operating companies have the task to facilitate improvements on persuasive writing by enabling training, setting up writing guides or involve external support.

Inter-firm, problem oriented information system

In order to stimulate organizational learning an inter-firm and problem oriented information system is recommended. This corresponds to literature and empirical findings. Interviews revealed a real need for such a system within the organization.

The goal of an information system is to capture learned lessons and knowledge from projects and make them suitable to serve other projects. Projects are, however, mostly unique, one-off and confronted with differing terminology. Therefore, the system is recommended to be problem oriented. Improving distribution on knowledge will support and structure ad hoc developments at projects. Although criteria differ per tender, past experiences can be of great value at projects according to interviewees. In order to make the system function well, incentives have to be set up for project teams to add their input to the system.

Setting up an information system and making it function effectively is a complex task. It is therefore not aimed at quick pay-off, but rather to gain long term competitive advantages.

- The recommended inter-firm and problem oriented information system contains a great deal of IT work and inter-firm coordination. Therefore, support from BAM Infra's management is needed.
- Roles have to be defined within the organization to structure the input of information from projects and ensure the coherence of the system.

Further develop role of experts

A supportive role of experts on a wider scale is suggested, based upon literature's importance devoted to 'champions'. They harness implicit knowledge and can stimulate change. This is in line with an ongoing development within BAM Infra, where experts are increasingly deployed at projects in a supportive role.

The researcher recommends to further centralize developments of disciplines that fulfill supportive roles at projects. This stimulates the coordination and development of knowledge. In addition, the deployment of tacit knowledge can be increased by enlarging the work field of experts. Furthermore, cooperation with champions at the decentralized operating companies is important to facilitate knowledge and expert deployment within these operating companies

- The suggested further development of a supportive role of experts suits BAM Infraconsult. They are recommended to develop or centralize disciplines that can function in a supportive role at projects. Commitment of other operating companies and project management is needed to involve experts and to avoid redundant development of similar kinds of expertise.

Improve differentiation

Following the competitive theories – competitive positioning and resource-based view – it becomes clear that competitiveness can be improved by differentiation. The organization has to choose fields, which are highly valued by clients, on which it can distinguish itself from competitors.

The investigated pay-off of the organization's sustainable strategy is still little. This is mainly due to little weight given at tenders to BAM Infra's key sustainability themes. Even though RWS is a leading public authority on the field of sustainability in the Dutch infrastructural sector, it has not defined clear sustainability themes yet. Much sustainability criteria are rather project specific and major innovations get little rewarded. Therefore it is recommended to redefine the actual goal to differentiate on the field of sustainability. For this, insights into decisions to be taken are presented:

- How can (new) marketing approaches contribute to get recent and future sustainable innovations increasingly rewarded at tenders?
 - Does sufficient confidence exist about the key (sustainability) themes that are going to be important at tenders to aim a differentiation strategy at them?
 - How can the actual demand of project specific sustainable solutions be further facilitated?
 - Is sustainability the best field to aim (operational) differentiation at rather than competitive parity?
 - How can client involvement during R&D improve the match of innovations with clients' demands?
-
- BAM Infra's management is recommended to (re)define the differentiation strategy to improve its match with fields that are highly valued at tenders.
 - Heads of operating companies' R&D departments have the task to manage earlier client involvement during product development.
 - On all levels of the organization the task exists to take part in (new approaches with) marketing to get recent and future innovations valued more at tenders.

Distinct lowest price and MEAT tenders

Insights based upon the competitive positioning theory opt for organizational changes to realize increased competitiveness. Lowest price tenders suit a price leadership strategy, while MEAT tenders enable a differentiation strategy. To aim at two strategies simultaneously, the theory suggests to set up two largely distinct business units dividing lowest price and MEAT tenders. However, this is based upon the assumption that a differentiation strategy is possible at MEAT tenders, which is only partly the case. Therefore, insights of this theory are used to come up with recommendations.

The preparation of a MEAT tender bid demands more and different processes compared to lowest price tenders. It is therefore proposed to distinct complex processes that are uniquely needed for MEAT tenders to further develop corresponding knowledge by units devoted to these processes. This is in line with an ongoing movement in the organization. Further distinction can take place in a later stage, which should be aimed at realizing cost advantages for regions competing at lowest price tenders. This can also support the MEAT tender unit if reduced prices for works can be applied at MEAT tenders.

- Further development of a distinction, based upon tender type, restructures the organization. Regional offices will have to focus more on (small and mid size) lowest price tenders, while central organizations' focus shifts to (mid size and large) MEAT tenders. Commitment of involved operational companies' management is therefore needed.

8.3 Reflection

In this section the reflection on the conducted research is presented by addressing the suitability of the research methods. In addition, the researcher reflects to what extent the research approach and the conclusions are applicable to other companies in the construction sector. Furthermore, suggestions are made for the validation of the research findings and recommendations. To conclude, the relevance of this research to the construction sector is addressed.

Research methods

The chosen research methods suited well the research steps that had to be taken. Desk research enabled to get a good understanding of the functioning and application of MEAT tenders. Literature research gave various insights into competitiveness in general and related to the construction sector. However, no research was identified that related directly to MEAT tenders. This is why the application of generic theories to MEAT tenders had an explorative character. As a consequence, also hindrances to apply strategic theories were identified. Therefore, recommendations are derived from insights into competitiveness rather than from straight forward application of theories.

The semi-structured approach of interviews suited well the explorative character of the research. The first interviews were used to get an overall picture of BAM Infra's tender process and performance. Later interviews revolved more around improvement opportunities. In general, interviewees pictured a relatively equal process and agreed upon similar improvement opportunities. However, especially regarding the organization's performance different views have been identified. This was among other things possible because of a lack of statistical data to found statements about organization's performances.

In addition, interviewing has some drawbacks that should be taken in account. Interpretation of what is said and how it is put on paper plays a role. Only a limited amount of people has been interviewed who all had slightly different views. Additionally, interviews have only been held at BAM Roads and BAM Infraconsult. The interviewees had much experience on cooperation with the other operating companies. However, the intention existed to check findings with the all of BAM Infra's operating companies. Though, this has not taken place due to time limitations. Nonetheless, interviewees stated that the findings are representative for whole BAM Infra.

Generalization research path

The conducted research steps are irrespective of BAM Infra and can be applied to other contractors as well. An understanding of the functioning and application of MEAT tenders is needed for any analyses of competitiveness on tenders. Furthermore, insights into competitiveness were derived from literature addressing competitiveness in general and at the construction sector. The selected theories dominated the relevant literature and were selected based upon the changing market conditions because of MEAT. The identified competitive factors can thus

serve any competitor for analyses to improve its competitiveness. The hindrances to strictly apply strategic theories are related to market circumstances and not to BAM Infra. Therefore, also these insights can be applied generically. On the other hand, empirical factors and improvement opportunities are closely related to BAM Infra.

Validation findings and recommendations

Validation of the research findings can further strengthen this research. Because of the research's explorative character, verification by experts would be a suitable method to verify the correctness of the findings. In addition, this would strengthen the basis on which the recommendations are formulated. Two of such sessions have been held during this research. This led, however, to supplementing insights that are incorporated within the research findings. The sessions resulted thus more in additional information instead of fulfilling the verification purpose. New validation sessions by experts would therefore strengthen this research. However, this was not realized because of time constraints.

Relevance for construction industry

During this research a general believe about the potential of MEAT tenders was identified. Agreement existed amongst interviewees and in literature that these tenders suit projects often better than lowest price tenders. Namely, also criteria other than price are considered to be essential for contractor selection. MEAT tenders offer therefore the opportunity to increase quality of works and stimulate innovation. This is why further development of MEAT tenders by clients and contractors can contribute to further improve the quality of construction projects.

Among other things, this research showed that further improvement on MEAT tenders can be made if clients define unambiguous strategies and put up high standards. Clearly defining key themes for tenders and acting accordingly enables contractors to develop improved technologies and processes. However, these are long term processes. This is why key themes must remain highly valued at tenders over long periods in order to enable contractors to profit from innovations on those fields.

8.4 Recommendations for further research

During this research new research topics have come up that can contribute to the development of competitiveness and MEAT tenders. Therefore, suggestions for further research related to BAM Infra's competitiveness are provided in this section. In addition, suggestions are made to further develop MEAT tenders which relate to the whole construction sector.

BAM Infra's competitiveness:

Define insight into performances

No clear picture could be drawn about the organization's performance on MEAT tenders. Different points of view existed, especially related to the competitiveness on tender prices. It is therefore recommended to gain a more profound insight into the organization's performance. This can in particular support the suggested strategic decisions to be taken. Namely, this will affect the emphases of tender bids – price versus differentiation – which must lead to increased competitiveness. Understanding actual performances is therefore needed, in order to move towards a well founded direction.

Incentives and content information management system

The benefits of the recommended information management system are for a large extent dependent on the system's content and incentives to share knowledge. The set up is recommended to be problem oriented. However, further specifying the system's content is needed to address the organization's needs well. Possible options to form the system's content are best practices, references and information from successful and failed designs.

Furthermore, incentives must exist for project teams to indeed add input to the system. Time, resources and budget must be available for projects to share their knowledge in a way that it can serve other projects. In addition, consequences can be attached to not fulfilling this task. Further development of an information system relates thus strongly to the system's content and incentives.

New marketing approaches

BAM has put (sustainable) development high upon its agenda, but it does not contribute enough to competitiveness yet. Innovations are too little valued at tenders. One of the reasons for this is that the client is not aware or does not want to ask for it at tenders. Therefore, methods must be developed to persuade the client to value the firm's innovations nevertheless. This can be realized with marketing and communication, although much effort is already put in place on these fields. This is why further research will be fruitful on how marketing can be made more effective.

Sector wide development of MEAT tenders:

Enable rewards for competitive advantages at tenders

Clients' aim of an equal level playing field at tenders conflicts with the demand for more quality and contractors' goal to reach competitive advantages. This is why a solution must be developed that enables contractors to fully profit from competitive advantages without disturbing competition at tenders. In 2007 a covenant was signed that enables open licensing of innovations, however, this only limited applied (RWS et al., 2007). Further research on this field is recommended to enable putting up higher standards at tenders.

Profit from market's expertise

Bids that have not won the contract can contain valuable solutions to specific parts of the tender nonetheless. However, nowadays these solutions cannot be applied to further improve the proposal of the winning tenderer. This could, however, contribute to increase the quality of the works to be executed. Therefore, it is recommended to study possibilities to enable the winning tenderer to make use of solutions developed by losing tenderers. This will improve the overall quality of works and enables losing tenderers to realize some gain nevertheless by financial compensation for its developed solutions.

Measurement of sustainability

The measurement of sustainability has been identified in this research as the main barrier to the application of sustainability criteria. Measurement of sustainability is often incomplete, affects whole firms rather than just the project and is sensitive for strategic behavior. E.g. measurement of projects' CO₂ emissions contains a great deal of uncertainty and affects activities that are not directly related to the project. Questions do come up like how to calculate CO₂ emission of a design team supporting a project from a company's office with 200 other co-workers. Further research efforts are therefore needed to realize sector wide agreement on measurement methods of sustainability.

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Appendix I Abbreviations

CPT:	Competitive Positioning Theory
GPP:	Green Public Procurement
LP:	Lowest Price
MEAT:	Most Economically Advantageous Tender
RBV:	Resource-Based View
RWS:	Rijkswaterstaat

Appendix II Overview interviewees

BAM*

Person	Title	Organization	Interview
Frank d'Hondt	Director Realization	BAM Wegen	75 min
Hans Ramler	Director	BAM Wegen	60 min
Jan Stigter	Technology & Development	BAM Wegen	60 mins
Kasper van Esch	Project Leader Infra	BAM Infraconsult	2 x 90 min
Maja Elsten	Head of Business Development & Advisor	BAM Infraconsult	90 min
Maurits Dekker	Project Leader Sustainability	BAM Infraconsult	120 min
Michiel Eijnsink	Pre-Qualification	BAM Wegen	105 min
Pieter Kersten	Tender Manager	BAM Wegen	90 min
Robert ten Bras	Project Coordinator	BAM Wegen Oost	90 min
William van Niekerk	Director	BAM Infraconsult	60 min

*In addition, frequent consultation of BAM Infraconsult's Business Development has taken place.

External interviews

Person	Title	Organization	Interview
Gijsbert de Jong	Senior Advisor Procurement Management	RWS	90 min
Marco Dreschler	PhD TU Delft	Civil Engineering – TU Delft	90 min

Appendix III Interview topics

Due to the explorative character of this research, interviews had a semi-structured nature. This implied that interviews revolved around pre-determined topics about competitive factors and project processes. The latter had a two-folded goal: identification of additional competitive factors and the status on all factors. Additionally, external factors have been discussed to put the firm's performance in perspective. The following overview shows the key topics on which the interviewees have been questioned.

BAM:

- Competitive factors (identified in literature)
 - Applicable strategies
 - Differentiation opportunities at MEAT tenders
 - Differentiating capabilities of the organization
 - Organizational learning
 - Information sharing
 - Knowledge management systems
 - Presence of 'champions'
- Project processes
 - Project organization
 - Decision making
 - Cooperation
 - Competitive factors at MEAT tenders
 - Understanding of MEAT mechanisms
 - Importance of sustainability
 - Role of sustainability at projects
 - Standardization
 - Client driven tendering
 - Life cycle thinking
- External factors
 - Clients
 - Competition
 - Judgment tender bids

RWS:

- Application of MEAT
- RWS's ambition and goals
- Key quality themes
- Importance of criteria
- Sustainability
- Past performance criteria
- Results of MEAT tenders
- Evaluation of MEAT tender bids

TU Delft:

- MEAT mechanisms
- Differentiation at MEAT tenders
- Importance of value criteria

Appendix IV EU legislation: tender procedures

Public works exceeding the threshold of 5,150,000 Euros need to comply with agreement 2004/18/EC as laid down in national regulations (EC, 2007). For this, five different tender procedures can be applied:

- Open procedure: No pre-selection takes place; any interested economic operator may submit a tender (EU, 2004, article 1).
- Restricted procedure: Pre-selection takes place based on selection documents. Subsequently, a predetermined number of companies offer their bid (EU, 2004, article 1).
- Negotiated procedure: The contracting authority consults the company of choice themselves and negotiates the contract together (EU, 2004, article 1).
 - With prior publication (article 30, 2004/18/EC):
 - In the event of irregular or unacceptable tender bids with the open or restricted procedure;
 - In exceptional cases where the price cannot be determined on forehand;
 - In the case that the specification cannot be established with sufficient precision;
 - Works with the sole purpose of research, tests or development.
 - *Negotiated procedure without prior publication (article 31, 2004/18/EC):*
 - If the award of the contract cannot take place by means of the open or restricted procedure, due to the nature of the project that doesn't enable specification to be drawn up sufficiently;
 - If the award of the contract can only be granted to one contractor due to technical or artistic reasons;
 - If extreme urgency;
 - If procurement takes place with exceptional attractive conditions (e.g. from a bankrupt);
 - If additional provisions or services (strict conditions apply);
 - Many more conditions.
- *Competitive dialogue*: Pre-selection of at least 3 parties takes place based on selection documents. Subsequently, the authority solves the complex problem in dialogue with the selected parties. Award of the contract needs to take place based upon the MEAT award criterion (EU, 2004, articles 1 & 29). The competitive dialogue is applicable if:
 - Tender is particularly complex;
 - Contracting authority considers allowance of the contract is not possible with the open or restricted procedure.

- *Design contests*: Procedures that allow the contracting authority to acquire a plan or design selected by a jury after being put out to competition. The award can take place with or without prizes (EU, 2004, article 1).

Appendix V Content of RWS's MEAT tenders

RWS has defined four quality themes on which they focus with MEAT tenders, these are as follows:

- *Sustainability* is the quality theme that is applied most diversely. RWS relates sustainability to the planet aspect, but hasn't defined clear sub themes. So far, criteria are mostly project specific and terminology differs. In general, sustainability is not given great weight at tenders. No major projects have been tendered out with sustainability as a determining theme (External, 2009). On the other hand, the sustainable quality criteria that are applied have only been realized on average for 36% by the winning tenderers in 2008 (Otto, 2009).

- *Project control* is the quality theme with the largest relative importance. These criteria are aimed to check if plans can be executed like proposed. Despite the importance given to project control, it remains a challenge to determine the effect of project control plans (External, 2009). This is caused by the fact that plans are written before execution takes place.

- *Public focus* is RWS's key performance theme whereupon signification results have been achieved. Project duration are shortened and the impact on traffic circulation is reduced (External, 2009). Contracts have been awarded by the discount achieved on this criterion leading to the virtual lowest tender price (e.g. A2 North, Holendrecht – Maarssen).

- *Safety* is a value criteria of which its suitability is unclear (External, 2009). Safety is for a large extent regulated by law and regulations. Furthermore, quality determination of safety plans is problematic. Among other things, it involves many preventive measures, the effectiveness of which are ambiguous. Safety is thus a subject hard to measure objectively, which makes it a difficult criterion to apply at tenders. Furthermore, it can be questioned till what extent safety can be defined as a wish rather than a requirement (External, 2009).

Appendix VI Application barriers for sustainability at tenders

The phenomenon of conservative application of sustainable MEAT award criteria in the Dutch construction sector is in line with other observations of European researches. Varnäs et al. (2009) studied 51 Swedish construction projects. None of them contained environmental criteria that influenced the outcome of evaluations. Bouwer et al. (2006) identified a large number of unclear criteria among over 1000 European tenders. These criteria were unlikely to result in the obtained environmental benefits.

General explanations for the conservative application of MEAT award criteria have been identified in the literature:

- Lack of training, knowledge and experience on how to develop and apply award criteria (BECO, 2008, Bouwer et al., 2006, Varnas et al., 2009, Zeeburg, 2008);
- Aim to keep it simple (Varnas et al., 2009);
- Fear of additional costs when guidance on quality / sustainability (Bouwer et al., 2006, Varnas et al., 2009);
- Lack of management support and resources (Bouwer et al., 2006, Zeeburg, 2008).

The increased application of MEAT tenders is likely to overcome the knowledge barrier. RWS is especially gaining much experience with criteria related to reducing nuisance and project duration. On these topics successes have been realized and further refinement is ongoing.

Sustainability criteria, related to environmental aspects, are still in the exploration phase. An obstacle remains the measurement of sustainability. Therefore an ICT tool, DuboCalc, is being developed which enables the calculation of the environmental impact of materials used for a project. The goal was to apply this tool for tenders from 2010 onwards. However, this will only be the case for a limited amount of projects with low weights given to the DuboCalc calculations (Profnews, 2009). This is due to serious shortcomings of the program. Furthermore, contractors were hardly challenged on sustainability during a fictive pilot project where great weight was given to DuboCalc (BAM, 2009b). This is the reason why DuboCalc will be further developed and its application delayed.

The aim to keep tenders simple is advocated in many policy documents. It's argued to focus on a limited number of main topics, to keep the process understandable. This is a common phenomenon at tenders. Frequently great importance is given to some key quality criteria, often in line with RWS's four key themes. However, no key sub-topics regarding sustainability have been identified by RWS yet (External, 2009).

The fear of additional costs is not totally legitimate, since no prove for this has been found. RWS estimated increased project cost because of MEAT at 1.5 – 2 % (External, 2009). Additionally, one of the key elements of the GPP strategy is life-cycle costing (EC, 2004). For this, purchasing, operating and end-of-life costs are taking in account to reveal the total costs of ownership. This method enables to discover win-win situations, whereby environmental advantages go together with cost savings. E.g. measures taken in the construction sector (regarding new buildings and offices) to reduce CO₂ emission can also lead to cost savings by reducing the demand of energy (PwC, 2009).

RWS's goals are quite ambitious. All tenders should be awarded on MEAT and quality is indicated as a key element for procurement. Indicated price/quality ratios between 60-40 % and 40-60 % are very progressive. These goals are supposed to be supported by the management, which reduces the last application barrier as well. Interviews at RWS revealed that the real ambition is more about the purpose of applying MEAT. It should only be used if real benefits can be gained (External, 2009). Thus, it is not so much about value-price ratios. Nevertheless, support for MEAT tenders is clearly present within the organization.

Concluded can be that RWS's goals and the diminishing barriers will contribute to an increased and more signification application of MEAT award criteria.

Appendix VII Green public procurement by Dutch governments

EU's public authorities expenditures account for around 16% of EU's gross domestic product (EC, 2004). Thus, when these authorities procure 'green' a major environmental impact can be made. Additionally, it also sets a good example that influences the market. This why the European Commission adopted the political target of 50 % Green Public Procurement to be reached by all member states in 2010 (EC, 2009).

The Dutch government has the ambition to go behind EC's target by procuring 100% sustainable at the latest in 2010. Municipalities pursue to procure 75% sustainable in 2010 and 100% in 2015. Provinces and regional water authority's have a target of 50% for 2010 (VROM, 2008). Dutch public authorities procure yearly between 50 and 60 billion Euros (EZ, 2009) and 4.5 à 8 billion Euros per year in the sector of 'ground, road and water management' (SenterNovem, 2009a). A major sustainable impact can thus be realized when sustainable criteria are applied (EZ, 2009). The responsible Dutch minister, J. Cramer, stated in a progress report on sustainable procurement to the Dutch House of Representatives⁸ that the realization of these targets has her absolute priority (VROM, 2008).

The sustainable procurement implies that contractors in the construction sector have to comply with standards set by SenterNovem, a Dutch agency of the ministry of Economic Affairs. These standards are formulated in minimum and award criteria. When projects are tendered out, the latter can only be applied if the award of the contract takes place based on MEAT award criteria (SenterNovem, 2009a). Studies indicate that between 40% and 60% of all procurement contracts of ministries include at least minor sustainability requirements (Bouwer et al., 2006, Prenen, 2008, VROM, 2009). With this, the Netherlands is one of the 'green-7'⁹; seven leading countries on GPP within the EU (Bouwer et al., 2006). The statistics are based on past tenders and the construction sector is not specifically addressed. It remains thus unclear what the actual status is of the application of sustainable criteria in construction tenders.

Furthermore, the demanded degree of sustainability in green public procurement is an important aspect to take into consideration. E.g. the criteria for the 'road sector'¹⁰, as defined by SenterNovem, contains just two minimum requirements: 'process and convey rest materials' and 'management and maintenance plans must be delivered after completion of the road' (SenterNovem, 2009a, p. 4-5). These are the only minimum requirements that have to be met in order to label it as 'green procurement' (SenterNovem, 2009c) All other criteria, such as durable usage of materials, are either defined as award criteria or points of special attention. Per project, the contracting authority can determine themselves if they apply these criteria. Thus, even though the Dutch GPP goal indicates a movement towards

⁸ Dutch House of Representatives = Tweede Kamer der Staten-Generaal

⁹ 'Green 7': Austria, Denmark, Finland, Germany, the Netherlands, Sweden and the UK (Bouwer et al., 2006)

¹⁰ Road sector as defined by SenterNovem: all roads, cycling and pedestrian paths

sustainable procurement, it does not guarantee a progressive application of sustainable criteria at tenders.

During this research RWS acknowledged that the GPP criteria do not sufficiently match their ambitions (SenterNovem, 2009b). They initiated brainstorm sessions with partners¹¹ in the ground, road and water sector to specify the meaning of GPP. The main themes of discussion were:

- GPP must be developed more goal orientated;
- The level of ambition must be increased and extra ambitions must be valued;
- The guidance of innovative developments by determining together key topics;
- Further development of instruments to support GPP, such as DuboCalc and a CO₂ monitoring tool.

Construction sector and environmental impact in perspective (UNEP, 2003)

- People spend an estimated amount of 80-90 % of their time in the built environment (incl. vehicles)
- Construction is the largest industrial sector in Europe (10-11% of GDP)
- It accounts for over 50% of national capital investment in most countries
- Worldwide workforce of 111 million people
- High multiplier effect: every dollar spent on construction generates up to three dollars of economic activity in other sectors
- Reducing buildings' GHG emissions in Europe by 20% would create 300.000 permanent jobs over a ten year period
- It consumes half of all resources humans take from nature
- It consumes (incl. production and transport of materials) 25-40% of all energy used
- Cement industry contributes to 5-7% of world's CO₂ emissions
- Built environment is largest source of GHG emissions in Europe

¹¹ Contracting authorities: RWS, District Water Boards, Prorail and Ministry of Defence, market parties: Bouwend Nederland and ONRI, environmental organisation: Stichting Natuur en Milieu.

Appendix VIII Organization structure BAM Infra and BAM Roads

The organization structures of BAM Infra (Figure 11) and BAM Roads (Figure 12) are presented in this appendix (both pictures are in Dutch). The latter shows an example of an organization structure that corresponds with other operating companies.

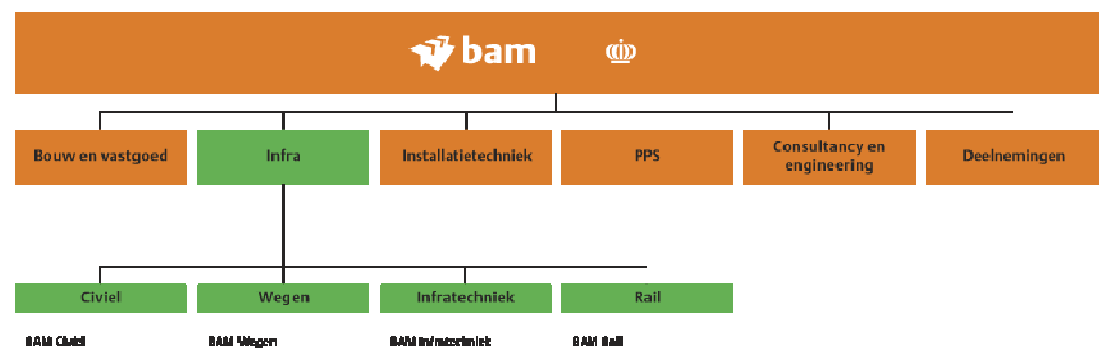


Figure 11: Organization structure BAM Infra (Infra, 2010)

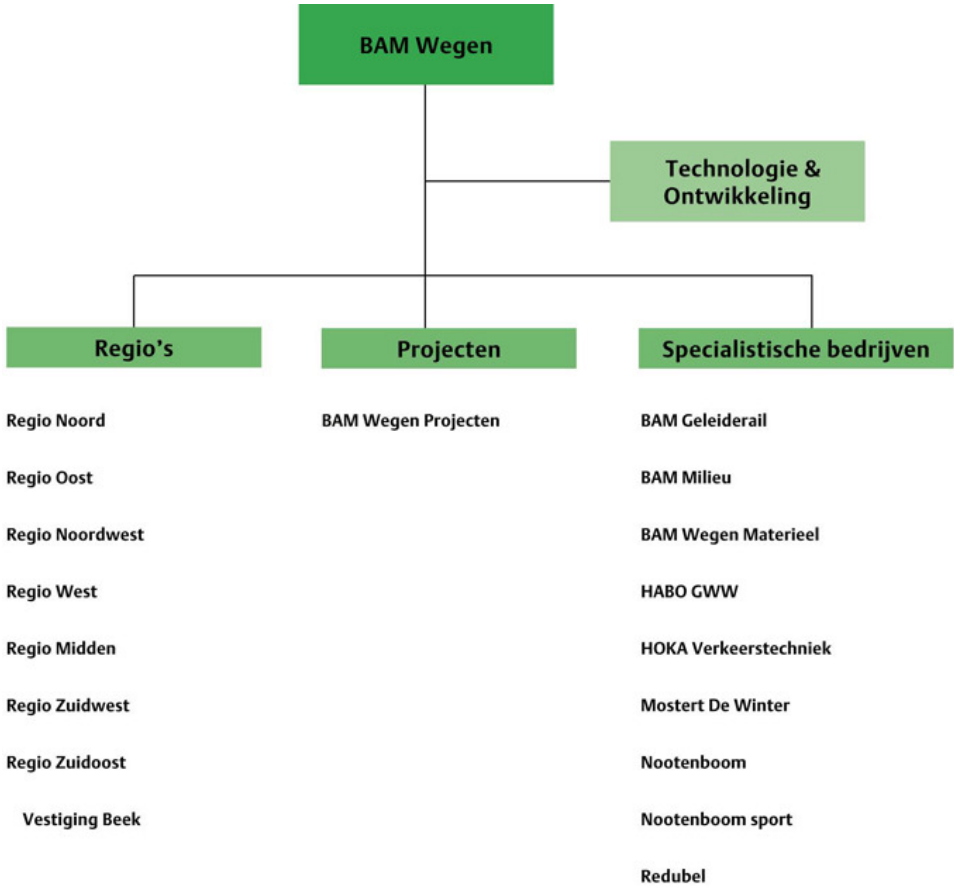


Figure 12: Organization structure BAM Roads (Wegen, 2010)

Appendix IX Overview MEAT tenders BAM Infra

Figure 13 gives an overview of MEAT tenders that have come across this research. Some of the tenders' outcomes and analyses have been assessed. In addition, tenders have been listed to give an indication on which interviewees have based their experiences.

No further comprehensive data about the organization's success rate at MEAT tenders did exist. However, the following figure gives an impression of the overall success rate of LP and MEAT tenders combined: in 2004-2008 just 5% of all tender bids, with involvement of BAM Roads, were won (BAM, 2009b). Performances on pre-selections in 2009 were much better, 85% passed and 15% got rejected (BAM, 2009b).

Project	Datum	Price	Value criter Overall			% difference tender price with overall lowest tender price	% difference with winning tender price
N31 Zurich - Harlingen	2005						
IGO Noord	2006				1		
Ontwerpen en realiseren van onderhoudsmaatregelen voor de kunstwerken in beheergebied van RWS Noord-Hollad	2006				1		
KOSMOS-7 Noordelijk Nederland, Flevoland en Gelderland	2006				1		
Combiplan Nijverdal	2006						
		5	1	5	45,3%	45,3%	
DBFM-overeenkomst InfraProvider Coentunnel Tracé	2006						
N50 Hattermerbroek - Kampen Zuid	2006						
Groot onderhoud op rijksweg 57	2006						
Reconstructie A2 Holendrecht-Maarssen	2006						
Alliantie A2 Hooggelegen Rondweg Wesepe	2006 2007						
		3	1	1	12,5%	0,0%	
Project A4 Omlegging Steenberg	2007						
		3	1	2	7,5%		
Project A2 Maastricht	2007						
		-	-	-	-	-	
D&C N348 Wegvak om Wesepe	2007						
Reconstructie Julianaplein + aanpak Julianabrug, Groningen	2007						
Ontwerp en realiseren aansluiting Kunderberg en Imstenradenweg op A76	2007						
Omleiding Ommen	2007						
		2	1				
A28/A32 Knooppunt Lankhorst	2007						
		3	1	3			
Variabel onderhoudsbestek dienstkring Utrecht	2008						
		5	1	2	25,7%	14,6%	
Integraal Groot Onderhoud A1 Betonbanen	2008						
		3	1	2	5,2%	5,2%	
N34/N36 Omleiding Ommen	2008						
		3	1	2	2,2%	2,1%	
A12 Zoetermeer - Gouda	2008						
Limburgs onderhoudswerk	2008						
IGO A1 Betonbanen	2008						
		4	2	2	8,5%	5,5%	
BRM/WRM Bedrijventerrein Gaasperwaard te Vianen	2009						
		1	1	1	0,0%	0,0%	
Kademuur Eemshaven	2009						
				1			
A12 Woerden - Gouda	2009						
		4	4	4	23,5%	23,5%	
N322	2009						
		-	4	4	0,0%	0,0%	
N325 Reconstructie Prins Mauritssingel	2009						
		5	5	5	27,4%	27,4%	
A12 Utrecht - Veenendaal	2010						
Zht 25178 A12		2	4	3	11,3%	11,3%	

Figure 13: Overview MEAT tenders