Subject headings: MEAT, quality improvement, quality implementation, tender submission, learning in projects
“Knowledge comes by taking things apart: analysis. But wisdom comes by putting things together.”

John A. Morrison
Preface

After almost 7.5 years of study (4 years completing a bachelor’s degree and 3.5 years of (pre)master’s study at TU/e) it is time to conclude this period with this master’s thesis. During the previous 7.5 years, I have learned a lot about myself, others, professional knowledge, academic research and much more. A personal highlight from this period that I will always remember is the semester I spent in Singapore. It was a big step, to study in a foreign environment for a long period. Despite my concerns, I am glad I took that step, since it has had a major contribution in my development. In the last couple of years, I have experienced great personal development through gaining a lot of knowledge, experience and wisdom. For that reason, I am very much looking forward to using all that knowledge, experience and wisdom in practice.

This master’s thesis would not have existed without the help of the below-mentioned people. First of all, I want to thank the company where I conducted the research for my master’s project, Van den Biggelaar Grond- en Waterbouw. I would especially like to thank Niels Kamphuis and Esther Geutjes for their support and for helping me with all my questions. During the last six months, I had some wonderful experiences within the company due to my supervisors. Therefore, I want to particularly thank you both for the trust you showed in me and for giving me the opportunity for personal development.

The second group of people I would like to thank are my supervisors from the TU/e. Each venture has its ups and downs, and it would be a lie if I said that this thesis developed smoothly. In cases like these, it is good to have a skilled supervisor. I would therefore like to thank Isabelle Reymen. Isabelle, I am very thankful that you wanted to be my supervisor. The trust and support which you gave me helped me greatly during the development of this thesis. Every time we had an appointment you encouraged and motivated me in such a way that I knew what I had to do. You never gave me the feeling that I was asking too much, even though I know I was. For that reason, I would like to thank you very much for all the time and advice you gave me regarding my research. Furthermore, I would like to thank Néomie Raassens for the work you did as my second supervisor.

Last but not least, I want to thank the people who form part of my personal life. First of all, I would like to thank my family and friends. I especially want to thank my brother, Kees Vernooij, for helping me with my master’s thesis. He is the only person in my family with recent experience in academic research. I asked him several times to review this thesis and he often gave me good suggestions. I also want to thank my girlfriend for her patience and for being the listening ear when I was complaining about everything – I really needed that from time to time. Furthermore, I would like to
thank my parents. They have encouraged me since childhood to study, and thanks to them it has been possible to study. Finally, I would like to thank my close friends. The previous couple of years I was the one who didn’t go out with you guys because of exams or other school-related reasons. Thank you guys for giving me that space and showing me understanding!

Frank Vernooij
Management summary

This research was conducted at Van den Biggelaar Grond- en Waterbouw. Van den Biggelaar is a leader in projects within the context of the land and water market. In order to obtain a contract, Van den Biggelaar must obtain tenders. They do not currently have appropriate insights into the quality of the tender submission process. In order to be more competitive, the company needs to gain deeper insights into tenders and in the success and failure components of the Most Economically Advantageous Tender (MEAT) criteria.

This topic arose via the company problem as indicated above, the interest of the researcher, and the need in the academic literature. During completion of a Bachelor of Mechanical Engineering, (Avans ‘s Hertogenbosch) the researcher followed a minor in quality improvement, in which he also performed his bachelor’s graduation project. In the academic literature, articles regarding the tender submission are based on doing tenders with the lowest price. The amount of literature concerning the tender submission using the MEAT method is minimal, and there is a need for academic data from practice. Therefore, the aim of this research was to create an innovative way of doing a tender process. In this process, the literature will be used to create a founded design.

The goal of this research was to obtain an insight into how the tender submission process is performed within the company, to discover how the company implements the MEAT criteria, to improve the tender submission process and to expand the literature about tender submissions for tenders that use the MEAT method. In order to accomplish this, the following research question was developed: How can the quality in tender submission of MEAT tenders within Van den Biggelaar be improved? In order to answer this research question, three sub-questions were developed. RQ1: What is the state of the currently available literature regarding quality improvement/implementation and tender submission which uses the MEAT method? RQ2: What is the current tender submission process at van den Biggelaar? And finally RQ3: How can the tender process at van den Biggelaar be improved?

To answer the research question, a review of the literature was first performed. The literature study consisted of several topics; these topics were chosen in a way to create a well-defined and founded answer for the problem faced by the company. The first topic regarded quality; a general definition of quality is provided below. Thereafter, a brief description about how to manage quality was presented. The next topic discussed is quality management systems, in which the three most commonly used quality management systems are discussed (Total Quality Management, LEAN and Six Sigma). The next section of the literature review concerns quality implementation, in which the three most important aspects are discussed (management support, commitment and training). The
final topic discusses learning in projects; this literature was useful to create a learning cycle in the redesign.

To fulfill this academic research, the required input was collected through multiple methods, based on the guidelines provided by Van Aken et al. (2006). These methods included interviews, observations and documentation. The interviews were performed within the company during the entirety of the research. The second method performed during this study was observation, namely observing the tender process within the company. The final method employed was documentation; a case study was done of the previous tenders with the MEAT method. By using these different methods and by gathering data from different sources, a stronger substantiation of research constructs was assured (Yin, 2009). After the extensive literature study, multiple interviews were held with the company’s employees. After data collection, an analysis was performed regarding the old tenders and the current tender submission process was visualized.

The results of the analysis showed several points where improvement could be achieved. The main finding was that currently no standard procedure exists for tender submission. The priority for the company was to create a design for the tender submission process, taking into account the findings of this research. The findings were then discussed with the company managers, after which it was decided to focus on the following improvements:

1. Create a standard tender submission process.
2. Write tender solutions in a SMART way.
3. Make a tender planning.
4. Consider writing a plan which takes subjective judgement into account.
5. Make standard questions to check tender documents.
6. Create better communication/knowledge sharing in tender teams.
7. Early involvement of tender team members.

The above improvements are presented in order of importance. In order to fulfill the improvements, it was of major importance that these solutions fit within the new tender process. In the figure below (Figure 0-1; New tender process) the new tendering process is described. Each box illustrates a step in the tendering process; the blue boxes are new additions to the process.
In order to determine whether or not this new process is successful, selected tests were conducted. These tests were performed in three ways. First, the requirements used prior to the redesign were assessed. Thereafter, the design was discussed with the company director and with the tender managers. Finally, the new tender process was used for a small tender. The
implementation phase commenced after the results were tested. The first step of this process was completed through a delta analysis, in which differences are shown between the new and the previous situations. After performance of the delta analysis, a stakeholder analysis was done. The last step in implementing the new design was the creation of an action plan, the consideration of possible resistance, and the consideration of counter actions for that resistance.

The final part of this thesis is formed by a discussion of the results. The general discussion describes the main goal of this research, which was to improve the quality of tender submission at Van den Biggelaar Grond- en Waterbouw (RQ). By studying all the data gained regarding the sub-questions, a standard process regarding how the company should perform a tender submission was created (shown earlier in Figure 0-1; New tender process).

The contribution that this research offers to the existing literature lies in the tender submission process. As mentioned above, the current information about a tender submission was based on tenders which use the lowest price method. This research focused on tenders which use the MEAT method. By focusing on the MEAT method, this research contributes to fill vacancies in the literature.

The designed process, as mentioned above, becomes the standard when the tests have positive results. The process was designed with the help of company members, and was designed in such a way that all the steps are easy to use. This is a large advantage, because new employees can easily understand the way of doing a tender submission at the company. If it remains unclear, an explanation can be asked of the tender manager.

The current research should be interpreted with some limitations in mind. These limitations resulted in suggestions for future research. The biggest limitation was that the research was conducted at one SME, meaning that the process may not be suitable for large companies. The design of the process is based on tenders which are made with or by the company. There are combinations that are conducted with large companies, but the results of this research have not yet been tested on a large company. Other limitations were that there was no distinction between tenders that were made by the company or in a combination with another company, that no specific client feedback was analyzed, as in this design all feedback was processed generally, and finally that the cost of the MEAT method was not compared with the benefits of the MEAT method.
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List of used terms

The company: The company in this case is Van den Biggelaar Grond- en Waterbouw BV. The company is the organization who applies for tenders.

The client: The client is the organization who is putting the tender on the market. This is often the government.

Tender: A procedure to obtain a particular service or product that is granted or issued on the basis of several factors.

MEAT: Most Economically Advantageous Tender. This is a method of performing a tender; this method examines tenders in an economical way, wherein a large number of different variables can be examined rather than price alone.

Tender document: This is a document the company writes for the client. In the plan, the company shows the client a roadmap with all milestones, technical and financial details. Furthermore, this is a document in which the company explains how they comply with the MEAT criteria.

Tender letter: This is a document from the client to the company. In this document, the client describes the MEAT criteria and what the idea of the tender is.
1. Introduction

1.1 Research problem

This research was conducted at Van den Biggelaar Grond- en Waterbouw. Van den Biggelaar is a leader in projects within the context of the land and water market. Within this market, their focus is on water safety and water management, with the Netherlands and Belgium as their work area. Van den Biggelaar is able to realize large-scale projects within their own disciplines, but also by combining forces, and doing large scale multidisciplinary projects with complementary partners. Within this market sector, Van den Biggelaar performs best as a main contractor and as a partner in strategic alliances. Examples of projects conducted by Van den Biggelaar are the renovation of the boulevard in Scheveningen, and the renovation of “de Dommel” in Eindhoven. These projects can vary from renovation to realization or be a combination of these. Van den Biggelaar distinguishes itself from its competitors by being smart, dynamic, reliable and by showing social responsibility. Due to a reorganization, Van den Biggelaar is currently underemployed in writing tenders; however, they are actively searching for new employees. Henceforth, Van den Biggelaar Grond- en Waterbouw will be referred to as “the company.”

The company’s goal is, in order to be competitive, to improve the quality of tender submissions by using the Most Economically Advantageous Tender (MEAT) criteria. In the previous few years, the company has registered itself for several tenders. The company has won many of these tenders in combination with other companies. However, they do not have appropriate insights into the quality of the tender process. In order to be more competitive, the company must acquire deeper insights into tenders and in the success and failure components of the MEAT criteria.

This topic arose via the company problem as indicated above, the interest of the researcher and the need in the academic literature. During study of a Bachelor in Mechanical engineering (Avans ‘s Hertogenbosch), the researcher followed a minor in quality improvement, also completing his bachelor graduation project in this area. A review of the academic literature reveals a large amount of information regarding quality and quality implementation (e.g., Abdallah, 2014; Wicks & Roethlein, 2009). Articles concerning the tender submission are available; however, those articles are based on tenders with the lowest price method (e.g., Coskun & Katirci, 2012; Liu, Xu, Li, Zhang, & Wang, 2011). The amount of articles which involve the MEAT method are minimal, and these articles provide only an explanation of the meaning of MEAT (e.g., Lenferink, Arts, Tillema, Valkenburg, & Nijsten, 2012; Parikka-Alhola & Nissinen, 2012). As described, there is a high practical relevance for the use of the MEAT method, but currently a low theoretical guidance exists. As a paucity of
literature exists concerning tender submission using the MEAT method, this study aimed to create an innovative way of performing the tender process for tenders which use the MEAT method. This process involved the available literature being used to create a founded design. This study therefore worked to correct the existing paucity of literature in this area.

1.2 Research goal

The goal of this research was to obtain an insight into how the tender submission process is carried out within the company, to identify how the company deals with the MEAT criteria, to improve the tender submission process and to expand the literature about tender submission for tenders which use the MEAT method.

The first step to reach the goal was to achieve insights and create a clear overview of the tender submission process. In order to create this overview, a description of the tendering process was developed. Another step in this process was to create a database wherein all the tenders were collected and interpreted. This database formed the basis wherein possible relationships/causalities could be found. An additional advantage of the database was that the company could easily identify relationships with old tenders when commencing a new tender. Furthermore, the employee insights were an important source of information in order to achieve the research goal. The employees had the highest degree of insight, information and experience about possible improvements. By combining the currently available literature with the data collected from the company, a new tender submission process for MEAT tenders was created.

1.3 Report structure

This thesis is divided into multiple chapters. In the following chapter, the literature study is outlined. On the basis of this literature study, initial insights are discussed, which allow an understanding of the current amount of available information about this topic to be gained. In the third chapter, the problem is defined in further detail. For this report, the conceptual project design by Van Aken et al. (2006) was used. In chapter four, the research methodology is presented. Chapter five concerns the analysis of the project. After the analysis, a redesign is discussed in chapter six. In this chapter, all possible improvements are discussed and a selection is made. In the final chapter, the results are discussed and a conclusion is given.
2. Literature study

The theoretical background consists of several topics that were chosen to create a well-defined and founded answer to the problem of the company. With the aid of this literature, the redesign was founded and new ideas were generated.

In the first part of this chapter, the concept of “quality” will be discussed, and a general definition of quality will be provided. Thereafter, a brief description about how to manage quality will be presented. The final part of this section provides an extensive analysis of the different quality management systems. The next section of the literature review concerned quality implementation. In this part, three criteria were important and will be explained. The final section discusses learning in projects. In this way, methods of learning from old tenders were identified.

2.1 Quality

2.1.1 Definition of quality

In this section, the definition of quality is given. Much information exists regarding quality. The article by Wicks and Roethlein (2009) showed that it is difficult to define the term quality. In the article, the variable of quality was studied, and many varying definitions were found. In the table below (Table 2-1; Definition of quality), selected definitions of quality are presented.

Table 2-1; Definition of quality

<table>
<thead>
<tr>
<th>Definition of quality</th>
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<tr>
<td>Value and degree of excellence in relation to price.</td>
<td>(Feigenbaum, 1991) in (Wicks &amp; Roethlein, 2009)</td>
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<tr>
<td>Conformance to specifications.</td>
<td>(Crosby, 1984) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
<tr>
<td>Conformance to requirements.</td>
<td>(Garvin, 1987) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
<tr>
<td>Prevention and defect avoidance.</td>
<td>(Crosby, 1984) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
<tr>
<td>Fitness for use (which introduces a customer focus into manufacturing quality).</td>
<td>(Juran &amp; Gryna, 1988) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
<tr>
<td>Meeting and/or exceeding customer expectations and perceptions and creating customer satisfaction in the goods and services produced.</td>
<td>(Sahney, Banwet, &amp; Karunes, 2004) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
<tr>
<td>The degree to which a set of inherent characteristics fulfills requirements.</td>
<td>International Organization for standardization (2004) in (Wicks &amp; Roethlein, 2009)</td>
</tr>
</tbody>
</table>
The consumer’s judgement about a product’s overall superiority or excellence. (Wicks & Roethlein, 2009)

Excellence in terms of the underlying dictionary definition. (Peters & Waterman, 1982) in (Wicks & Roethlein, 2009)

Introduce customer expectations and perceptions into the definition of service quality. (Parasuraman, Zeithaml, & Berry, 1985)

According to the Japanese philosophy: zero defects – meaning doing it right the first time. (Parasuraman, Zeithaml, & Berry, 1985)

The degree to which customer requirements are met. (Weele, 2010)

These definitions support the assumption that a concrete and universally accepted definition of quality does not exist. Of all the definitions of quality, the most widely accepted is the ISO definition, which reads as follows: “The degree to which a set of inherent characteristics fulfills requirements” (Wicks & Roethlein, 2009). All of the above mentioned definitions (Table 2-1; Definition of quality and the ISO definition) provide an overview of the ways to define quality. In this investigation, the ISO definition was used as the definition of quality.

2.1.2 Quality management systems

Several quality management systems are used to manage quality. In this chapter, the three most common management systems are briefly explained. The three most familiar management approaches are: Total Quality Management (TQM), Six Sigma and Lean (Salah, Rahim, & Carretero, 2010; Talha, 2004). These methodologies are widely used by various industries.

**Total Quality Management**

TQM is a broad set of management and control processes designed to focus on the entire organization and all of its employees (Talha, 2004). This involves the continuous improvement of organizational processes, resulting in high quality products and services.

Inherent to TQM are the concepts of product quality, process control, quality assurance and quality improvement (Talha, 2004). In addition, TQM provides a unique approach to improve organizational effectiveness, with a solid conceptual foundation and one that offers a strategy for improving performance that takes into account how people and organizations actually operate (Hackman & Wageman, 1995).

Talha (2004) described TQM as customer driven; that customer satisfaction is the driving force behind quality improvement. In contrast, Wruck and Jensen (1994) declared that quality management is achieved by productivity or cost reduction programs. Finally, Rahman and Bullock
considered TQM to be a way of creating commitment from and with all employees and, in this way, creating the best quality.

**Six Sigma**

The quality management system Six Sigma is growing; it ranges from the reduction of defects in an organization process, products and services, to becoming a business strategy that focuses on improving the understanding of customer requirements, business productivity and financial performance (Salah, Rahim, & Carretero, 2010). Six Sigma can also be viewed as an extension of TQM. After the great successes of Motorola, the method became increasingly popular, and has now expanded to many other sectors. This growth has become more popular since the Six Sigma principles have also been used in service industries in the context of supply chains, hospitals, local government and in public sectors.

Knowledge regarding Six Sigma has expanded, and since the popularity of this method increases it has become an active area of research. Tjahjono, Ball and Vitanoc (2010) mentioned that there are four interpretations of Six Sigma: a set of tactical tools, an operational philosophy of management, a business culture and an analysis methodology that uses the scientific method. Despite the different interpretations, the main goal of Six Sigma remains the same (i.e., improving efficiency, profitability and capability in the process).

**Lean manufacturing**

The objective of lean manufacturing systems (LMS) is to eliminate everything that does not add value to the process (Salah, Rahim, & Carretero, 2010). LMS continuously identifies and eliminates waste from the system. According to Toyota’s Fujio Cho, the definition of waste is: “Anything other than the minimum amount of equipment, materials, parts and workers which are absolutely essential to production.” Another definition of waste is unnecessarily long cycle times or waiting times between value-added activities (Salah, Rahim, & Carretero, 2010). However, waste can also refer to rework or scrap, which is often the result of an unnecessary number of variables (Salah, Rahim, & Carretero, 2010). Eliminating waste in manufacturing cannot be achieved by looking to the manufacturing department alone. It also requires changes in other functions, such as product design, materials section and marketing. In order to achieve optimal waste reduction and process improvement, a company-wide integrated effort is needed (Upadhye, Deshmukh, & Garg, 2010).

LMS provide a competitive strategy to achieve well defined development. In contrast to Six Sigma and TQM, LMS are unique because they focus on teaching people how to use LMS, and to see
the product or service and the entire value stream from the perspective of the customer (Salah, Rahim, & Carretero, 2010).

Upon examination of the three management systems, it becomes clear that they have the following aspects in common: a focus on continuous quality improvement, the control or improvement of processes and the elimination of waste. This research focused on these aspects in the redesign creation.

2.2 Quality implementation

This chapter will cover quality improvement. In doing so, the most important determinants of successful quality implementation are specified and further explained. In specifying these determinants, a table is presented to compare determinants according to different authors. The theoretical framework of the different methods is fairly simple. However, when an organization faces quality issues (and, as a result, requires quality improvement) the implementation of a quality improvement system is complex. To successfully implement a quality improvement method, it is important to set a goal that a company is desirous to achieve, and define how they can achieve that goal (Taylor, 2001). The first step in implementing a quality program is to create a strategic vision.

The three main reasons for a successful implementation or for a failure are gaining commitment, training and management support (Dumond, 1995; Abdallah, 2014; Berrouiguet, 2013; Keating & Harrington, 2003). These three are closely interrelated.

2.2.1 Gaining commitment

Commitment is an important factor for the success of quality improvement, and involves both of the other determinants (management support and training), which will be explained in the following sections. Commitment is a very broad area; it is a determinant that must start at the highest level of the organization, and training must be given in order for all to understand the implementation and to become involved in the process. This will be further explained in later sections (Cutler & Kleiner, 1997).

When the stakeholders approve of and are committed to quality improvement, the next phase is to determine the type of commitment required to launch quality improvement. The first priority is the training of key management and staff personnel, who will become the facilitators. A facilitator is required to help other employees working with the improvements during a project. The facilitator must monitor the skill levels of these employees and, when necessary, organize further training. This aspect is important in order to avoid the frustration of employees when dealing with unfamiliar
situations, which will inevitably lead to a decrease in enthusiasm for the improvement project (Laszlo, 1999).

### 2.2.2 Training

The following determinant is an essential element in implementing quality improvements; this determinant is training. Training is often taken too lightly and underestimated. Training must create an understanding in appropriate areas at an appropriate level for the trainees, which leads to “buy-in” and eventually to commitment (Cutler & Kleiner, 1997).

At the beginning of a training program, the upper and mid-level managers are the most important participants of the training. They should therefore be the first to receive the training. This approach creates commitment at the upper and mid-levels of the organization (Cutler & Kleiner, 1997). The upper and mid-levels should then act as contact points when other participants have questions.

### 2.2.3 Management support

Gaining approval from management and obtaining commitment are the first steps towards a successful implementation of quality management in an organization (Laszlo, 1999). Furthermore, support must be given from the highest levels of the organization. The CEO or senior manager influences the success of a quality program more than any other organization member. The quality that the company is desirous to display to their customers is best represented via the CEO or senior manager. It is therefore important to use every opportunity to demonstrate their quality commitment (Cutler & Kleiner, 1997). The organization can show that the implementations or changes are important with the help of a high level person in the organization (Jackson, 2001). The commitments from the higher managers need to be visible, otherwise the people in the organization will not respond in the desired way. The people need to receive regular reinforcement that the leaders are applying the same improvement concepts.

A manager who is capable of executing the earlier mentioned determinants is a good leader. Managing people consists of more than controlling their activities; managers must provide the appropriate leadership in demonstrating commitment (Laszlo, 1999). Leadership is also important in the implementation of a quality management system. The necessary competencies of a leader are knowledge, skills, abilities and attributes that leaders need to perform their job. Leaders play three roles: setting a direction, aligning people, and motivating and inspiring people (Das, Kumar, & Kumar, 2011).
2.3  Project learning

This section concerns project learning. This concept is important, because despite the realization that learning from prior project experience helps to achieve the economic goals of learning, it can also enhance a company’s competitive advantage, as knowledge-based practices can be unique, difficult to copy and can be organizationally embedded over time (Jugdev, 2012). Studying the learning processes in organizations is as old as organizations themselves. In this way, the field of studies and different terms concerning learning within workplaces and organizations are extended.

2.3.1 Learning processes

The first step in the process of learning from a project is to define a clear overview of the studies about project reviews. In order to improve and learn from previous projects, the previous projects must be reviewed. The literature describes project reviews as quality improvement practices that involve an assessment of the elements of specific project phases. Commonly used synonyms for project reviews include project assessments, lessons learned, project completion audits, post implementation reviews, appraisals, after-action reviews, debriefings and post-implementation evaluations (Disterer, 2002). If the project review phase is conducted correctly throughout the project lifecycle, it can result in maximum value, so that corrections can be made in a timely manner (Schindler & Eppler, 2003). In practice, most project reviews are conducted at the closeout phase. When project reviews are performed ineffectively, crucial project knowledge is neither documented nor communicated for subsequent use. These factors can contribute into increased project costs, extended schedules, lack of communication, considerable rework and costly mistakes (Jugdev & Mathur, 2013). Furthermore, project reviews help improve customer satisfaction (Kotnour, 1999) and process efficiencies and effectiveness (Kotnour, 1999; Kamara, Augenbroe, Anumba, & Carrillo, 2002; Koners & Goffin, 2007). Through project reviews, people learn about successful and unsuccessful practices (Busby, 1999), and can reflect on outcomes in order to better understand project results (Kotnour, 1999). Project reviews help organizations deliver more successful projects and can have a positive impact on decision quality (Kotnour & Kurstedt, 2000). In addition, project reviews also involve a dissemination function: actions can be documented for further follow up and to be shared with others (Busby, 1999).

Since the unit of analysis is tender projects that have been carried out by teams within their workplaces, a description about workplace learning is given. Bratton, Helms-Mills, Pyrch and Sawcheck (2004) described that workplace learning encompasses all forms of learning that happen in and around the workplace. This includes formal, non-formal, self-directed, collective and informal
activities (Bratton, Helms-Mills, Pyrch, & Sawchuck, 2004). Learning within the workplace occurs in roughly two approaches. The first approach involves learning by doing; learning occurring with regard to how to handle random problems. The second approach describes that learning also occurs regarding how these problems can (and should) be handled in general (Hällgren & Wilson, 2007). These approaches also apply, to a certain extent, in the following theories. One of the most commonly used theories is described as Organizational Learning (OL). According to Liu and Low (2009), OL is a process in which an organization can meet its existing needs to find knowledge assets, increase decision-making potential and create new opportunities. It requires an organization which is supportive, and it involves people, content, process, culture, infrastructure and technology (Egbu, Sturges, & Gorse, 2000). A further theory regarding learning in organizations is Communities of Practice (CoP). CoP concerns creating and sharing knowledge; the field of project management has embraced this concept. It is a less formal way for participants to share and transfer knowledge (Egbu, 2004; Sense, 2008). Project management officers often organize voluntary lunch sessions or topic-specific discussions as a means to help develop CoPs. In the project management context, a CoP allows participants to share both tacit and explicit knowledge and to create an ongoing culture of informal project knowledge sharing (Jugdev & Mathur, 2013). Fenwick (2008) described that learning is practice based and participative and may involve formal or informal teaching. It is also “embedded in action, not centered in an individual’s head but distributed among activities and continuous interactions and relationships of people within a system” (Gibb & Fenwick, 2008). Workplace learning is therefore “emergent, embodied and embedded in joint activity” (Gibb & Fenwick, 2008), and CoP practices reflect situated learning principles. Furthermore, the “learning lessons” are frequently used. In project based organizations, learning lessons concern past projects and the successful implementation of this learning to future projects; this is commonly acknowledged as difficult to achieve. Lessons learned are an efficient and effective way of transferring valuable project knowledge. The Project Management Institute’s body of knowledge (PMBOK) defines lessons learned as “the learning gained from the process of performing the project. Lessons learned may be identified at any point. Also considered a project record, to be included in the lessons learned knowledge base” (Jugdev & Mathur, 2013). It involves sharing knowledge about the elements of specific project phases that went according to plan, the parts that could be improved on and plans to address these issues before moving on to the next phase. Lessons learned can be defined as involving a variety of activities and processes. Nevertheless, crucial knowledge gained from a project is not always documented or communicated for subsequent use (Jugdev, 2012). In order to conduct effective lessons learned, there must be management support, the correct stakeholders must be involved and knowledge should be shared in both codified and uncodified
ways. Lessons learned are processes that involve formal and informal learning. Effective lessons learned can be embedded into company practices, especially through informal learning and sharing practices, such as through Communities of Practice and by applying principles from workplace learning, such as situated learning theory (Jugdev, 2012). As described in this section, mutual variables can be identified in the different terms. Both OL, CoP and LL emphasize that sharing knowledge on an informal basis is crucial. Although the statement about knowledge sharing is commonly supported by multiple project managers, it remains difficult to implement in practice. In an investigation into project-based learning practices in a number of European companies, Keegan and Turner (2001) found that three of the key barriers to learning in project-based firms are time pressures, centralization and deferral. (Fuller, Dainty, & Thorpe, 2011). In order to counteract these key barriers, the team must transform into a structural knowledge sharing team.

2.3.2 Informal knowledge sharing

In order to generate informal knowledge sharing within teams (and organizations), some changes are recommended. In the study by Fuller, Dainty and Thorp (2011), four recommendations were presented with respect to Project Management Office (PMO) leaders. This research field fits well with the tender team at Van den Biggelaar. The first recommendation for PMO leaders was to act as knowledge brokers across multiple communities through a “network of relationships built on trust, professional development and mutual understanding.” The second called for an equal emphasis on good projects and poor projects. The third addressed the need for reflection on lessons over the lifecycle of the entire project, not only at completion. The final recommendation recognized the need for an independent facilitator to create the correct conditions for reflective activity by the actors (Fuller, Dainty, & Thorpe, 2011). In addition, workplace learning provides rich theoretical perspectives to contribute insights into how this shared learning can become more effective (Jugdev & Mathur, 2013). By implementing these four recommendations, the organization creates intangible knowledge-based resources (as described in the resource based view of the firm), which can serve as a source of competitive advantage as they tend to be unique for the company, difficult to copy and are also culturally embedded.

2.3.3 Team learning

It is therefore important to examine how project participants share what they learn, and whereby the resources inside the firm become stronger. By sharing knowledge, the team participants and the team itself is learning. Learning in teams can be described as an ongoing cycle that includes the recognition of the need to learn, readiness to learn, learning processes and
applications (Arrow & Cook, 2008; Sessa & London, 2006). The team learning contained herein is a relatively permanent change in the team’s knowledge, skill or behavior. It has been defined as a process in which a team takes action, obtains and reflects upon feedback, and makes changes to adapt or improve (Drach-Zahavy & Somech, 2001; Edmonson, Bohmer, & Pisano, 2001). Team learning occurs when members ask questions, seek feedback, experiment, reflect on the team process, and discuss options and errors (Sessa V. I., London, Pingor, Gullu, & Pater, 2011). As a process, team learning involves the activities through which individuals acquire, share and combine knowledge through experiences with one another. Evidence that team learning has occurred includes changes in knowledge, either implicit or explicit, that occur as a result of such collaboration (Argote, Gruenfeld, & Naquin, 2001). In general, three types of behavior processes of learning exist.

- **Adaptive**: adaptive learning involves reacting almost automatically to stimuli to make changes in processes and outcomes as a coping mechanism. This learning process is similar to the “single loop learning,” “team learning” and “exploitive learning” (Sessa V. I., London, Pingor, Gullu, & Pater, 2011).

- **Generative**: generative learning is learning pro-actively and intentionally and applying new skills, knowledge, behaviors and interaction patterns to improve the team’s performance. This learning process is similar to “double-loop learning.”

- **Transformative**: transformative learning involves reshaping or altering the team’s purpose, goals, structure or processes. Unlike adaptive learning, which tends to be incremental, and generative learning, which builds on prior perspectives, transformative learning requires experiencing disorientation and then reorientation, which creates an entirely new direction of growth. This reorientation produces a new team structure, strategy, goals and identity (Sessa V. I., London, Pingor, Gullu, & Pater, 2011).

## 2.4 MEAT

### 2.4.1 The philosophy of MEAT

There are currently two ways of awarding a tender. The previous award system uses the criterion of the lowest price, which is focused on the minimum requirements in accordance with the tender specification, as competition can arise only on price. For tenderers, it does not therefore make sense to offer more than the minimum requirements, because there is no appreciation in return on the part of contracting authority. In fact, doing more can be a disadvantage, because it will only bring further expense. For that reason, the MEAT method was introduced. “The content of the Most Economically Advantageous Tender in the EU purchasing directives applies to the subject
matter of the contract and, more specifically, to the award stage of the procurement process. It is a weighted sum of different aspects of the product or service that provides value to the purchaser in terms of economical, quality, ecological and social aspects” (Parikka-Alhola & Nissinen, 2012). The use of the MEAT method will deliver a better perspective. By assigning value to what the client considers as the major criteria, the company can anticipate those specific criteria. A further advantage is that the client stimulate the company in generating added value, because the company can achieve a better competitive position. Therefore, a project is no longer put on the market for bidding, and there is not an exclusive focus on the price. Instead, open and functional questions are formulated, which must be elaborated by the construction firms in their proposal (Lenferink, Arts, Tillema, Valkenburg, & Nijsten, 2012). In this way, projects are awarded on the basis of quality.

The prescription in the “Aanbestedingswet 2012” (public procurement law 2012) is to spend as much as possible on tenders based on the MEAT method. In the application of the MEAT method, an optimum price-quality ratio for the requested product or service will be obtained. Subsequently, the contracting authority can directly control the process by determining how much value is used for every MEAT criterion.

In order to ensure that an excess of criteria are not simultaneously used, it is not compulsory to use all policy criteria. It should be a logical choice, given the nature of the project. The policy of Rijkswaterstaat is to use no more than three main criteria. These main criteria can be composed of several sub-criteria if they form a coherent whole.

2.4.2 MEAT at Rijkswaterstaat

Tendering on the basis of the MEAT method also contains other aspects, besides the tender submission price, namely the evaluation and provision of a value. The value of the price and the value of the other facets are merged in order to determine the most economically advantageous tender. This is based on a document made by Rijkswaterstaat (Rijkswaterstaat, 2014), in which an explanation is given regarding how they view and work with MEAT.

Two main principles are involved in the calculation of the MEAT method: the method of price correction and the method of the ratio. The calculation method of price adjustment means that the subscripted price gets a fictive discount for the achieved quality values. The amount of fictive discount is determined in an earlier phase. The methodology of the ratio means the ratio value/price is determined. This ratio indicates how much value for each euro is offered. At Rijkswaterstaat, the price correction only is used.
Different criteria exist within the MEAT method. The MEAT criteria are divided into three types: performance criteria, quality criteria and price criteria. Examples of performance criteria are “project finished earlier,” “longer lifetime” and “less amount of road closure.” Examples of quality criteria are “risk management,” “durability” and “design.” Examples of price criteria are “tender submission price” and “an explicit and direct effect on a necessary side investment.”

A complex part of the MEAT method is subjectivity. According to the Van Dale dictionary, subjective means a situation may be viewed with the involvement of personal feeling. In contrast, objective means that no person feeling is involved in the situation. This assertion would mean that only criteria that can be measured in an objective way can be used, leaving performance criteria and price criteria alone. Restrictions are not in the structure of the criteria themselves. If a subjective criterion complies with an objectified evaluation process, it is justified according to Rijkswaterstaat.

Determining the price at which every MEAT criterion can be granted is difficult. It should challenge the contractor; contractors must be able to differentiate themselves. That argues for a substantial amount available for quality. Too little is insufficient, but too much is also not ideal. If it is too low, it is not deployed on quality. If it is too high, contractors describe the tender in a strategic way and in this way decrease the price/quality ratio for the offered solution.

Once the project team believes that the selected quality values are correct, a simulation will be tested to gauge whether this is correct. The project team will choose six bids, in which bidders have different strategies: two tenders are oriented to the lowest possible price (not much added value), two tenders trying to combine significant value with an average price, and two tenders which put lot of emphasis on quality, and in doing so will score higher on quality, but at the cost of a higher price.

The evaluation of the MEAT criteria is a relatively laborious and time consuming task. This requires careful preparation and a planned course. In this context, there is a need for an assessment protocol. This protocol has the following points for attention:

1. The role of the assessment team and the relationship with the tender committee
2. The composition of the assessment team and assessment scope of each member
3. Setting up the assessment with appropriate planning and availability of the assessment team
4. The determination of the evaluation result
5. Discussing the evaluation results with bidders
It may be that it is undesirable for particular MEAT criteria to have a subscriber who has an inadequate score. Therefore, the contracting authority should have the option to designate such registration as unacceptable using marks on and off the point (knock-out). It is desirable to reject a contractor when the degree of risk in the tender is too high.

A summary of the literature is presented in the table below (Table 2-2; Main findings of literature study). In this table, the main points of the main topics are listed. References are listed in the right-most column.

Table 2-2; Main findings of literature study

<table>
<thead>
<tr>
<th>Topic</th>
<th>Main points</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>The degree to which a set of inherent characteristics fulfills requirements</td>
<td>Wicks &amp; Roethlein, 2009</td>
</tr>
<tr>
<td>Quality management systems</td>
<td>Focus on continuous quality improvement</td>
<td>Salah, Rahim, &amp; Carretero, 2010;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Talha, 2004</td>
</tr>
<tr>
<td></td>
<td>Creating process control/improvement</td>
<td>Salah, Rahim, &amp; Carretero, 2010;</td>
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<td></td>
<td></td>
<td>Talha, 2004</td>
</tr>
<tr>
<td></td>
<td>Eliminate waste</td>
<td>Salah, Rahim, &amp; Carretero, 2010;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Talha, 2004</td>
</tr>
<tr>
<td>Quality implementation</td>
<td>Gaining commitment</td>
<td>Culter &amp; Kleiner, 1997; Laszlo, 1999</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td>Culter &amp; Kleiner, 1997</td>
</tr>
<tr>
<td>Management support</td>
<td></td>
<td>Culter &amp; Kleiner, 1997; Jackson, 2001;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laszlo, 1999</td>
</tr>
<tr>
<td>Project learning</td>
<td>Project reviews</td>
<td>Busby, 1999; Disterer, 2002</td>
</tr>
<tr>
<td></td>
<td>Project reviews help improve customer satisfaction</td>
<td>Kotnour, 1999</td>
</tr>
<tr>
<td></td>
<td>Learning by doing</td>
<td>Hällgren &amp; Wilson, 2007</td>
</tr>
<tr>
<td></td>
<td>Organizational learning</td>
<td>Lui &amp; Low, 2009</td>
</tr>
<tr>
<td></td>
<td>Communities of practice create sharing knowledge</td>
<td>Egbu, Sturges, &amp; Gorse, 2000</td>
</tr>
<tr>
<td>Team learning</td>
<td>Projects are awarded on the basis of quality</td>
<td>Arrow &amp; Cook, 2008; Sessa &amp; London, 2006</td>
</tr>
</tbody>
</table>

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3. Problem definition

3.1 Problem context

As mentioned in the introduction, Van den Biggelaar Grond en Waterbouw is a construction firm active in the land and water market. This project focused on the first business step, which is receiving an offer of work. The company wants to be competitive in the current market. There are many rules in this market, include safety and environmental rules, and these are becoming stricter. The rules are designed to keep all parties satisfied during the execution of the project. The client desires to have the minimal amount of responsibility, laying the responsibility on the company. Recent years have seen another way of contracting being more commonly used. These contracts are called Uniforme administratieve voorwaarden – geintegreerde contracten (uniform administrative requirements – integrated contracts; UAV-GC contracts). UAV-GC means that a tender is design and construct instead of the old situations in which they provided a company with all the information and the company then submitted a price. In the new way of working, the client describes the problem and the contractors devise and describe a solution. Since it is not reasonable to use the lowest price, the MEAT method is frequently used. The MEAT method is explained above in the theoretical background; briefly, it focuses on the quality of the work rather than the lowest price.

The MEAT method is relatively new to the Netherlands, only coming into use in the previous few years. At the company, the MEAT method has been used for approximately four years. When examining the academic information, articles concerning tender submissions exist, but these articles are based on tenders with the lowest price method (e.g., Coskun & Katirci, 2012; Liu, Xu, Li, Zhang, & Wang, 2011). The number of articles that involve the MEAT method is minimal, and the articles only provide an explanation of the meaning of MEAT (e.g., Lenferink, Arts, Tillema, Valkenburg, and Nijsten, 2012; Parikka-Alhola & Nissinen, 2012). As described, there is a high practical relevance for the use of the MEAT method, but there is currently a low theoretical guidance. As there is a paucity of literature about tender submissions made with the MEAT method, this study aimed to create an innovative way of carrying out the tender process using the MEAT method.
3.2 Problem definition

After the performance of a number of interviews (Appendix A) with the tender manager, head of the calculation department and the director of the company in order to become more familiar with the problem, a cause and effect diagram was designed (Figure 3-1; Cause and effect diagram), in which a summary of the interviews and meetings performed is presented.

Upon examination of the cause and effect diagram (Figure 3-1; Cause and effect diagram), it can be observed that the focus is on the improvement of tender submissions. Although a broad designation, by the creation of clusters, some factors can be combined. After the interviews, many improvements were heard, and these improvements were translated into the diagram. In this way, a clear overview of improvements that can be made is available. Many complaints, particularly concerning communication, were raised in the interviews. The employees of the company described that a kickoff off at the beginning of a new tender with all stakeholders does not occur. Furthermore, another problem related to the kickoff, that of a lack of early involvement, was raised. A further complaint raised several times was the capacity of the calculating department. Although only one relatively young member of the calculation department is employed at the company, an external expert with lengthy experience has been hired. The final observations were the MEAT scores. These scores are important in acquiring a tender, and were shown to be quite low. An analysis of the MEAT scores revealed that the risk analysis did not score highly on average. This means that in many
tenders there is no fictive discount granted with the risk analysis. In the database, the risk analysis scores were not high in most cases.

The cause and effect tree should be interpreted carefully. As it is based on a limited number of interviews, the problem and causes mentioned may not be valid and reliable, as may be true of all other important causes have already been examined (Van Aken et al., 2006).

### 3.3 Research question

In the previous chapters, the problem of the company was described in detail. An examination of quality improvement in tender submission reveals that there is not much information or research available concerning the topic of tender submission. This research in part works to address this deficiency. Therefore, together with the company, the following general research question (RQ) was created.

**RQ: How can the quality in tender submission of MEAT tenders within Van den Biggelaar be improved?**

The RQ is clear and broad. By addressing this question, an examination of the MEAT scores will be made. These scores are important, because a high score results in a more fictive discount. For that reason, the MEAT scores are important for this research, as the aim of this research was to improve the MEAT scores in future tender submissions. When insufficient information or room for improvement was observed, this research was expanded to include an examination of tender submission in general. In order to answer the RQ, three sub-questions were created:

**RQ 1: What does the currently available literature reveal about quality improvement, quality improvement implementation, MEAT, learning in projects and tender submission? (Chapter 2)**

RQ 1 has been answered in the theoretical background. The aim of RQ 1 was to identify the most current information about the topics which are addressed in this research.

**RQ 2: How does the tender submission process occur at Van den Biggelaar? (Chapter 5)**

This question was important in order to learn the process and to gain an insight into the activities involved in a tender submission process. To aid in answering the second question, a flowchart was created. The flowchart was based on the interviews and the observation method. The interviews were performed with people within the company who were involved in the tender submission
process. In combination with the flowchart, a brief explanation will be presented of each step of the tender submission. This question was designed to find a possible gap between theory and practice.

RQ 3: How can the tender process be improved at Van den Biggelaar? (Chapter 6)

RQ 3 is an important question that will require a great deal of time to answer. To answer this question, a database containing all MEAT scores was created. A further way of gaining information for this question was through the performance of several interviews within the company with employees involved in the tender submission process. The final source of information was the observation of all daily activities in the company in order to determine points of attention. With the results of this question, a meeting was arranged within the company to allow them to choose the best manner for which to improve their organization.
4. Research methodology

In this chapter, the research methodology is discussed. In order to complete this study, the guideline published by Van Aken et al. (2006) was used. In the first part of this chapter, this guideline is described (Van Aken et al., 2006). In the second section, a description of the data collection method is given. The data were collected via interviews with the companies' employees, through an analysis of available documentation in the company, and through observation. After the data collection, the data analysis will be discussed. In the analysis, the current tender submission process is described. A database was created to allow an analysis of all MEAT scores in the previous two years. The final part of this chapter provides a short description about the redesign of the topic.

4.1 Research design

This project was a typical business problem-solving (BPS) project. For that reason, a book by Van Aken et al. (2006) was used for the composition of this master thesis. A typical BPS project consists of an analysis and a design part, an organizational change part and a learning part. BPS projects are usually commenced in order to improve the performance of a business system, a department or a company regarding one or more criteria. Ultimately, these projects should impact positively on a company's profits, but the usual targets of a BPS project are more operational in nature, related to the efficiency of operational activities. For that reason, a classic problem solving cycle as elaborated in the regulative cycle by van Strien (1997) is used. The regulative cycle consists of five basic process steps, as shown in the lower cycle in Figure 4-1; Regulative and reflective cycle. In this figure, a cycle is added, namely the reflective cycle, which consists of three basic steps, and is shown in the upper part of Figure 4-1; Regulativ.
The regulative cycle is used for business problem solving, and the reflective cycle involves the steps that act as a reflection on the project’s results. This project consisted of two layers, each layer reflecting one cycle. The first layer is the regulative cycle, in which problem solving for a specific case occurs. The second layer concerns the reflection, in which the results are reflected upon and compared to other cases and to the literature in order to generate knowledge and add to the literature.

A full BPS project consists of the analysis of the problem and its context, the design of a sound solution for that problem, the actual change of the organizational structures and/or work processes, and the subsequent management of the new situation, in order to achieve performance improvement (Van Aken et al., 2006).
4.2 Data collection

Data collection in this investigation involved a combination of data collection methods. These methods included interviews, observations and documentation. By using these different methods and by gathering data from different sources, a stronger substantiation of research constructs was assured (Yin, 2009). As this was novel research, and as there is a paucity of data currently regarding this subject, the data collection was of a qualitative nature. According to Creswell (2003), a qualitative research method is appropriate for instances where the important variables are unknown (Creswell, 2003).

As shown in the regulative cycle, a problem existed in the definition and diagnosis phases. It was therefore necessary to collect data for each of these phases. For the problem definition, this involved mostly general data, and was collected in a passive way. For the data collection for the diagnosis phase in the regulative cycle, the data collection was collected in a more active way.

The first method of data collection employed was via interviews. In this research, in-depth, semi-structured interviews (Appendix A) were performed. The questions were designed to obtain an insight into the tender submission process and the MEAT method, and to learn the opinion of the employees regarding MEAT and their current method of working. The interviews were not recorded, as this met with participant resistance, and it was thought that the participants would not speak as freely as they would without the use of a recording device. The interviews were done with employees of the company. Regarding the information collected via the interviews, the researcher made use of the 24-hour rule by Yin (2009). This rule states that the interviews must be transcribed within a day (Yin, 2009). The employees who were interviewed were from different professional areas, different levels of responsibility and seniority. This was done in order to collect and integrate a variety of perspectives. All of the interview respondents were selected in consultation with the supervisor. To be precise, the following respondents participated in the interviews: the CEO of Van den Biggelaar Group, the director of the company, the tender manager, the business desk manager, and members of the calculating department, and finally an interview was done with a MEAT expert. In total, nine interviews were conducted; all eight employees involved with the tender submission process were interviewed. The ninth interview was with a MEAT expert. In addition to the interviews, specific questions which pertained to their profession were also asked of employees. The interviews were conducted during the entirety of the master’s research project; this period ran from the beginning of October until the end of January 2016. During the research, specific questions were asked of the employees of the company, this information was also used in the analysis.
Furthermore, data were collected from an examination of all relevant documentation available from the company. By examining all the previous tenders, a connection was sought between the data collected from the interviews and the that from the documentation present on the company’s servers. In regards to the data collection method, 11 previous tender cases were analyzed (old tender documents). All of these 11 cases were tenders that used the MEAT method and which occurred within the previous two years. The reason for choosing this time period was because of a big reorganization that had occurred in the company; tenders before that period were not applicable to the current problem. The 11 representable tenders had documentation with feedback regarding the quality of the tender document. A database was created using these 11 cases; this database is presented in the following chapter.

The final data collection method used was that of observation. This method was not applicable during the initial weeks of this study, as a certain process was not observed. However, the observation method was an excellent method of data collection. By being situated within the company, the author was able to receive an education of the different employee roles. Processes within the company were directly observed. The information provided via interview and through an analysis of the documentation was therefore able to be combined with that gained through observation.

The aim of the data collection was to identify further information regarding the tender submission process and all the activities that are involved in this process. In order to gain an understanding of the entire process, careful attention was paid to the MEAT process.

### 4.3 Data analysis and diagnosis

The data analysis is an important part of any scientific study. Eisenhardt (1989) described it as the heart of extending theoretical insight from case studies. However, it is also a difficult part of the process (Eisenhardt, 1989). Data analysis is the process of selecting, focusing, simplifying, abstracting and transforming all the data that are collected through all inputs (Miles, Huberman, & Saldaña, 2014). The case studied in this instance concerned how to improve the quality of tender submission for tenders using the MEAT method. The analysis commenced with the preparation of the interview questions. The purpose of the interviews was to obtain an idea of the company and their activities. During this period, the main subjects of this research were defined. The data analysis in this study was performed using the guideline found in the book by Van Aken et al. (2006). Van Aken et al. (2006) used three approaches to produce a diagnosis. By combining these three approaches, an accurate diagnosis can be found. These three approaches are: first, focusing on the empirical
analysis (interviews, case study); second, focusing on the theoretical analysis (literature); and third, focusing on the process-oriented analysis (visualizing the tender submission process at the company) (Van Aken et al., 2006).

An empirical analysis is needed in order to validate a problem, explore the causes, validate the causes and determine the importance, and map the problem. In validating the problem, the first step is to check whether the problem is a real problem, a perception problem or a target problem. When the problem is valid, its causes will be investigated. A qualitative method for the exploration of a cause and effect tree is by doing interviews. The final step in empirical analysis is the validation of the causes. This is done by performing further interviews and by examining the documentation of the company.

In the process-oriented analysis, the business process and the cause and effect tree are combined to validate the causes. In cases where an excessive focus lies on the cause and effect tree, the possibility exists that it will lose the actual business process and will thereby produce a superficial analysis. The process-oriented approach commences with the development of a general description of the business process, including both the operational process and the control system (Van Aken et al., 2006).

When the important causes have been collected and selected, the diagnosis can then be made. The diagnostic story is a short summary of the main points of the analysis.

### 4.4 Redesign

The next step in the regulative cycle is the solution design. This is the central idea of the BPS project. The realization of the designed solution should result in the solution of the defined business problem. The key activities in actual designing involve synthesis evaluation iterations (Figure 4-2; Key activities in designing).

![Figure 4-2; Key activities in designing (Van Aken et al., 2006)](image-url)
Synthesis is the creative leap towards a possible solution. The input of the synthesis step involves three types of input:

- Problem related inputs. The problem definition, the problem analysis and diagnosis, and the specifications.
- A model of the present business system as a starting point for the redesign.
- Ideas for possible solutions.

An important source of ideas is the diagnosis of the causes of the business problem. This diagnosis can provide clues for the design solution. However, this solution cannot be logically deduced from the diagnosis. The diagnosis concerns what is, the solution about what can be. A further source of ideas is the client organization. As they are most familiar with the problem, there is a possibility that they may have ideas for the solution. One advantage of this is that by involving the client organization in a redesign, resistance to the realization of the redesign may be substantially reduced. The final source of ideas is literature. The scholarly and the management literature provide a wealth of solution concepts, and general ideas on how to plan and organize business activities of all kinds.

Design follows synthesis-evaluation iterations: possible solutions are evaluated against specifications. These specifications may include the following:

- Functional requirements,
- User requirements,
- Boundary conditions and
- Design restrictions.

These four types of specifications may also serve as a checklist for students to elicit specifications from their client system. The final version of the designed solution should be presented together with an accompanying change plan.
5. Analysis and diagnosis

This chapter concerns the second step of the regulative cycle: the analysis and diagnosis step. According to Van Aken et al. (2006), three approaches should be used, which can be combined to produce a diagnosis. The first approach is to focus on an empirical analysis. In this case, this is performed by examining the tenders that are done at the company. The case study allows an improved view of how tender documents are written. The second approach is to focus on the theoretical analysis. This is difficult, as there is a current paucity of information regarding MEAT, as mentioned earlier. Although one large organization has provided a description of how they handle MEAT, this is not enough to use as a theoretical analysis. The third approach described by Van Aken et al. (2006) is to focus upon the process-oriented analysis. In this case, the tender submission process is described to provide an insight into how the company works in a tender process.

5.1 The importance of the MEAT method

At the commencement of the analysis, a database was constructed (Table 5-1; Database of tenders) containing the 11 important tenders completed during the past two years. This allowed a better view of all the tenders and the MEAT criteria. In the database (Table 5-1; Database of tenders), a column shows whether the tender was granted. The importance of the MEAT method is clearly seen in the accompanying graph (Figure 5-1; MEAT score). In this figure, there is no distinction between the MEAT criteria, rather the emphasis is on the high scores which are often granted.

![Figure 5-1; MEAT score](image)

In the graph (Figure 5-1; MEAT score), the 11 tenders are shown with the MEAT scores. The scores are provided in percentages, and the percentage indicates the amount of the fictive discount which is provided for a criteria. The MEAT score was negative in one tender; in that case, there will
be a fictive increase of the price instead of a fictive discount. A negative score indicates that the client did not approve the tender and viewed it as below average. In this graph, the different types of criteria are not examined; rather, it shows why MEAT is important. When examining the graph, it can be observed that the tenders 4, 5, 6, 7, 9 and 11 had a high average score. The tenders that were granted to the company were 4, 6, 7, 9 and 11. The reason that tender 5 was not granted was because another company also had high MEAT scores in combination with a lower cost price. Tender 7 did not have a high average MEAT score, because in this case two criteria had much higher discount rates. In a tender, the MEAT criteria have different discount rates. The company uses this to give priority to some criteria. Through an examination of the results presented in this graph, it can be concluded that MEAT is important in the performance of tenders.

5.2 In-depth analyses of previous tender projects

5.2.1 Database

A database was created (Table 5-1; Database of tenders) of all the tenders with MEAT criteria that were performed at the company during the previous two years. Subgroups corresponding to the MEAT criteria were included. Four criteria frequently recurred; however, some criteria were judged too specific. These latter criteria were grouped into the category of “others.” The four criteria that frequently recurred were risk management, environment management, planning management and technology management. Each MEAT criterion was audited by an audit team, which was created by the client. This audit team awarded a mark to each criterion. This mark was related to a percentage or a price; with this price or percentage, a fictive discount was calculated.

Two situations are present in the database. The first (most common) situation is the case of a tender that is done in a combination. This means that the tender is done in combination with other companies. The second is the situation in which the company is applying for the tender on its own without other companies. After completing a number of interviews, it was discovered that many of the tender documents are not written by the company itself. Most of the time, the company/the combination uses an outside company to write the tender documents. Therefore, there is no distinction between the tenders done by the company itself or by a combination.
<table>
<thead>
<tr>
<th>Tender</th>
<th>Granted</th>
<th>MEAT-criteria</th>
<th>Sub group MEAT-criteria</th>
<th>Rating</th>
<th>Fictive discount in percentage</th>
<th>Fictive discount in euro</th>
<th>Maximum fictive discount in euro</th>
<th>Scope:</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender 1</td>
<td>No</td>
<td>Project planning</td>
<td>Planning management</td>
<td>5</td>
<td>-25%</td>
<td>-135.000</td>
<td>540.000</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design quality</td>
<td>Technology management</td>
<td>5</td>
<td>-25%</td>
<td>-135.000</td>
<td>540.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environment management</td>
<td>Environment management</td>
<td>8</td>
<td>50%</td>
<td>270.000</td>
<td>540.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 2</td>
<td>No</td>
<td>Design and integration</td>
<td>Technology management</td>
<td>4</td>
<td>Not applicable</td>
<td>900.000</td>
<td>900.000</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk management plan</td>
<td>Risk management</td>
<td>0</td>
<td>Not applicable</td>
<td>-</td>
<td>300.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 3</td>
<td>No</td>
<td>Traffic disruption</td>
<td>Environment management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>1.500.000</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environment nuisance</td>
<td>Environment management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>1.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Process and inventory risks</td>
<td>Risk management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control of the top 5 risks</td>
<td>Risk management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 ambition level</td>
<td>Others</td>
<td>not</td>
<td>5%</td>
<td>272.500</td>
<td>540.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 4</td>
<td>Yes</td>
<td>Process management</td>
<td>Technology management</td>
<td>8</td>
<td>50%</td>
<td>6.250.000</td>
<td>12.500.000</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complaint management</td>
<td>Environment management</td>
<td>8</td>
<td>50%</td>
<td>6.250.000</td>
<td>12.500.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SME involvement</td>
<td>Others</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>5.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interview + business case</td>
<td>Others</td>
<td>8</td>
<td>50%</td>
<td>10.000.000</td>
<td>20.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 5</td>
<td>No</td>
<td>Project management plan</td>
<td>Technology/planning management</td>
<td>3</td>
<td>75%</td>
<td>375.000</td>
<td>500.000</td>
<td>0 tot 4 waarin 4 best</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limit nuisance</td>
<td>Environment management</td>
<td>3</td>
<td>75%</td>
<td>375.000</td>
<td>500.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of execution method</td>
<td>Technology management</td>
<td>4</td>
<td>100%</td>
<td>1.000.000</td>
<td>1.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexibility planning</td>
<td>Planning management</td>
<td>3</td>
<td>75%</td>
<td>1.125.000</td>
<td>1.500.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 6</td>
<td>Yes</td>
<td>Plan of action</td>
<td>Technology management</td>
<td>3</td>
<td>Not applicable</td>
<td>3.000.000</td>
<td>4.000.000</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Realized target in 2015</td>
<td>Planning management</td>
<td>10</td>
<td>Not applicable</td>
<td>2.000.000</td>
<td>2.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 7</td>
<td>Yes</td>
<td>Performance support</td>
<td>Others</td>
<td>8</td>
<td>50%</td>
<td>9.600.000</td>
<td>19.200.000</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk file</td>
<td>Risk management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>19.200.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opportunite file</td>
<td>Others</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>9.600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interview - keyofficial 1</td>
<td>Others</td>
<td>10</td>
<td>100%</td>
<td>19.200.000</td>
<td>19.200.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interview - keyofficial 2</td>
<td>Others</td>
<td>10</td>
<td>100%</td>
<td>9.600.000</td>
<td>9.600.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 ambition level</td>
<td>Others</td>
<td>Level 5</td>
<td>50%</td>
<td>500.000</td>
<td>500.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 8</td>
<td>No</td>
<td>Approach risk NGE (not exploded explos)</td>
<td>Risk management</td>
<td>2</td>
<td>20%</td>
<td>35.000</td>
<td>175.000</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach risk authorizations jetties</td>
<td>Others</td>
<td>3</td>
<td>60%</td>
<td>42.000</td>
<td>70.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plan of action</td>
<td>Technology management</td>
<td>2</td>
<td>20%</td>
<td>35.000</td>
<td>175.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interview</td>
<td>Others</td>
<td>3</td>
<td>60%</td>
<td>150.000</td>
<td>250.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 9</td>
<td>Yes</td>
<td>Quality of concept project management plan</td>
<td>Technology/planning management</td>
<td>2</td>
<td>50%</td>
<td>2.000.000</td>
<td>4.000.000</td>
<td>0 tot 4 waarin 4 best</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limit nuisance</td>
<td>Environment management</td>
<td>3</td>
<td>75%</td>
<td>6.000.000</td>
<td>8.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of execution method</td>
<td>Technology management</td>
<td>3</td>
<td>75%</td>
<td>4.500.000</td>
<td>6.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexibility planning</td>
<td>Planning management</td>
<td>2</td>
<td>50%</td>
<td>3.000.000</td>
<td>6.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 10</td>
<td>No</td>
<td>Quality assurance, implementation, results and second line inspections</td>
<td>Technology/planning management</td>
<td>6</td>
<td>0%</td>
<td>-</td>
<td>500.000</td>
<td>2 tot 10 waarin 10 best en 6 voor 0% staat</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technology design and implementation</td>
<td>Technology management</td>
<td>7</td>
<td>25%</td>
<td>250.000</td>
<td>1.000.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 ambition level</td>
<td>Others</td>
<td>Level 5</td>
<td>5% of tender value</td>
<td>256.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender 11</td>
<td>No</td>
<td>Integration into environment</td>
<td>Environment management</td>
<td>6</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performance support</td>
<td>Others</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As mentioned above, four subgroups were created to organize the MEAT criteria. The first criterion was technology management; everything related to how the company is going to make the project was placed in this subgroup. A client often wants to know how the company is going to achieve the project; this criterion is often used. The next subgroup is environment management; everything related to the environment was placed in this subgroup. This can vary from nuisance to communication regarding the environment. This group recurred in many tenders. Within the environment subgroup, environmental risks are included; this was placed in the environment management subgroup. The third subgroup is risk management. In this subgroup, the risks of the project with its counteractions are described. Risk management is difficult to analyze, because a specific risk criterion does not exist in some tenders. However, in those cases, the risks are described within the other criteria. For example, the environmental risks can be described in the environment management subgroup. Nevertheless, when there are risk management criteria, these often concern risks to the environment or the risk of not achieving a deadline. In the risks subgroup, the company often has to show the client how all possible risks will be faced. The final subgroup is planning management. This subgroup concerns everything related to planning. The client may want to know if the company has anticipated possible delays and that nothing has been forgotten.

After the creation of the database, the earlier-mentioned subgroups are based on the criteria were placed into a graph (Figure 5-2; Scores for MEAT criteria, grouped in frequently occurring categories). The graph below presents the discount rate in percentages for the frequently occurring categories.

![Figure 5-2; Scores for MEAT criteria, grouped in frequently occurring categories](image-url)
When examining the graph, it can be observed that technology management and environment management are the most common subgroups. These were followed by risk management and planning management. The score for each criterion can be seen in the graph, showing that technology, environment and planning management scored well. When examining the risk management criteria, no high scores are seen. As described above, it is difficult to draw conclusions based on these criteria, because the risks are sometimes divided into the other groups, and those have higher scores. For that reason, these will be analyzed in more detail during the case study. Nevertheless, when the client uses the criterion of risk management, the company does not score highly, as shown in the figure (Figure 5-2; Scores for MEAT criteria, grouped in frequently occurring categories).

5.2.2 Case studies

After the creation of the database, a more specific table was designed. The main reason for this was to gain an insight into all tenders. This table can be seen on the following page (Table 5-2; Case studies of tenders). For the creation of tender case studies, fourteen cases were selected. This gives more tenders than those listed in the database (Table 5-1; Database of tenders); the reason for this is because some of the tenders used for the case studies were selected from tenders existing prior to the reorganization. These were not incorporated earlier because they were not representative in determining the current problem in the company. In this case, they can be used as input for possible improvements; for that reason, they were added to the table. In the table (Table 5-2; Case studies of tenders), the important aspects for a tender are listed. After reading all the tender documents, the tender letters, and by completing all the interviews, the knowledge obtained was used to compile the important tender aspects. All these aspects were discussed and verified with the management team and with members of the business office to ensure the criteria table was well defined.

As can be seen in the table, there are three extra subgroups: design, quality of writing and contract management. These aspects are not concrete MEAT criteria, but nevertheless these aspects are important in making a tender document. Design indicates how the document looks and how the information is transferred to the client. Quality of writing concerns how the company writes the document, for instance, does the company use many methods or does it focus on previously completed tenders? Another aspect concerns the writing of the tender document in a professional way. The final new subgroup is contract management; this regards how the company answers the questions of the client and whether the company writes the answer in a SMART way. The other subgroups are MEAT criteria, and have been explained above. Next are the tenders on the left side of the table, along with the aspects all the tenders are listed that have on average a high MEAT
score; on the right the tenders are shown which had on average a low MEAT score. In the tenders, four signs are used: ✓, X, ±, and n.a. The ✓ means that the aspect was appropriate for that tender. The X means that the aspect was not answered in a proper or complete way. The ± indicates that the aspect is answered but not using the SMART criteria, or that it is insufficienly complete. N.a. means not applicable; therefore, the aspect is not representable for that tender.

**Table 5-2: Case studies of tenders**

<table>
<thead>
<tr>
<th>Tender</th>
<th>MEAT Score</th>
<th>X</th>
<th>±</th>
<th>n.a.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 3</td>
<td>✓</td>
<td>✓</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 4</td>
<td>✓</td>
<td>✓</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 5</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 6</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 7</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 8</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 9</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 10</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
<tr>
<td>Tender 11</td>
<td>✓</td>
<td>X</td>
<td>±</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

When examining the tenders in the table, it can be seen that the lower part shows the total score of each tender. The tenders with the higher MEAT scores have more ✓ than X, indicating that the table is representable. However, there are some exceptions, namely tenders 3 and 7. Tender 3 has a high MEAT score because a MEAT criteria used in that tender was that the company must complete a presentation about their tender document. This presentation had a high discount rate, and for that reason it had a high score. The reason that a presentation is not used in the case study
table is because there is no documentation about the presentation and therefore it is difficult to draw appropriate conclusions. Tender 7 also does not have a high score. This can be explained because this is a tender that is older than 3 years. The design and the quality of writing in this tender document was not as good as that seen in recent documents. Nevertheless, it was decided to use this variable because it had good points in the subgroups of environment management and risk management. Tenders 11 and 14 had some specific criteria that did not fit the subgroups; for that reason, they were not often applicable in the case study table.

From all of the aspects, the most important subgroup is contract management. This subgroup is a good indicator for success; if the scores are high, it can be assumed that the tender is successful. It is however very difficult to answer all the questions in a SMART way. Since this subgroup is important, it is necessary to improve it. The SMART criteria are important in this subgroup (and therefore also for tenders in general), as for every tender the client asks the company to write the answers using the SMART criteria. In the subgroup “Quality of writing,” the aspects “methods and models are used” and “project team is explained/introduced” do on average have good scores on the left side of the table and do not on average have good scores on the right side of the table. Methods and models are important and can be improved for future tenders. The aspect of “project team is explained/introduced” is in many tenders not asked and sometimes not allowed. When it is not asked, it can be of added value, but otherwise it is not a useful aspect. In the subgroup “design,” the aspect “important expectations are made more specific” does on average have a high score on the left side of the table and does not on average have a high score on the right side of the table.

The four MEAT criteria did not show unexpected results. The first criterion analyzed was risk management. The subgroup of risk management did not score as poorly as the database showed. This may be explained that risks form small parts of other MEAT criteria. For example, there is a tender where the risks are discussed for the planning; the MEAT criteria is “planning.” Therefore, risk does not return to the database but rather to the “case study of tenders” table. In general, the feedback from an audit team for risk management concerns formulation or not enough detailed design. After a tender submission, there is often a feedback which says that it is too general, not complete or too brief; this is based on the feedback from the audit team. This can be interpreted in two different ways. The first is that it is not described in a SMART way or that the design is not complete. The feedback in one of the projects was that the control measures were not SMART formulated. Another interpretation is that there are some risk control measures that do not add to or that are not relevant for the project.
The second criterion analyzed was the environment nuisance. In general, this was relatively positive, as from the five tenders, four had high scores. A remarkable insight concerns that, although two of the five successful tenders did not have feedback, those two tenders achieved a high score on these criteria. The positive feedback was mostly described as “good and clear.” In contrast, negative feedback was received that the solutions are not SMART formulated and were incomplete. In summary, in this case some points were good and well defined, and others were not.

The third criterion is “planning management.” Concerning the feedback, there were variances in results. For some tenders, there is a high score, while one tender scored very low. Positive feedback included that the planning had some good actions and the actions were described as complete and clear. The negative feedback described this point as unclear and that the control measures added value. For one particular tender, the client thought that van den Biggelaar did not understand the situation.

The fourth criterion is “technology management.” The score was below average for three tenders, and was on or above average for the other four tenders. Positive feedback included that the company made clear how they were going to develop during the project. The negative feedback included that the client missed an adequate verification and validation of the project. The design was of an insufficient level, and the plan described was very general.

The main findings of the case study are summarized in Table 5-3; Findings of case study.

Table 5-3; Findings of case study

<table>
<thead>
<tr>
<th>Findings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write important aspects more specifically/notably</td>
<td>The cases study showed that tender documents that contain specific important aspects score more highly.</td>
</tr>
<tr>
<td>Use methods and models in tender document</td>
<td>Tender documents which use methods and models score more highly.</td>
</tr>
<tr>
<td>Introduction of tender team</td>
<td>Often not allowed, but when allowed it adds value to the tender document.</td>
</tr>
<tr>
<td>Formulate solution SMART</td>
<td>Feedback document of the tender document often writes that the solutions are not written in a SMART way.</td>
</tr>
<tr>
<td>Risk control measurements do not add anything or are not relevant</td>
<td>The feedback for risk management is often that the control measurements do not add anything or are not relevant.</td>
</tr>
</tbody>
</table>

## 5.3 Tender submission process

To gain an insight into the process of tender submission, the data collection methods of observation and interviews were used. The observations were carried out by being physically located in the company, actively observing and conversing within different departments. The data collection method of performing interviews was that most useful in gaining an insight into the tender submission process. Several interviews were performed with each of the different departments involved in the process. At the end of these departmental interviews, interviews with the management team and with the director of the company were performed, in order to determine whether further observations could be gained. A further reason was to encourage commitment from the management (Cutler & Kleiner, 1997). In Figure 5-3; Current tender submission the process is shown and a detailed explanation is provided. The description is divided into five parts to allow a better overview of the process.
5.3.1 Finding and selecting the tender

Finding a tender is not difficult. There are many tenders on the market; however, there are also many contractors. Within the company, some people have many connections, which from time to time may provide work, or contact the company for a job without performing tender selection via the tender platforms. However, in general, most tenders can be found on the platforms explained in the following paragraph.
In the Netherlands, all tenders are located on one platform. The platform is a website (www.tenderned.nl). There is another platform for tenders in Europe (www.ted.europe.eu). The use of TenderNed has been compulsory since the first of April 2013, according to the tender law 2012. There is a threshold value; when a tender is equal to or above that value, the tender provider is required to submit the tender to the European tender platform. This threshold value is approximately €5.0 million, unless certain exceptions apply. All tenders located in the Netherlands and listed on ted.europe.eu are automatically linked to TenderNed. In this way, all the works located in the Netherlands can be found on TenderNed. Within the company, TenderNed is checked on a daily basis by all members of the commercial meeting, namely the directors, the tender manager and the head of the business desk secretariat. These members are not always present at this meeting. When interest is shown by a member in a tender for consideration by the company, the tender is shared between the members for analysis. Subsequently, it is discussed in the weekly commercial meeting.

All tenders of interest are discussed in the commercial meeting. All criteria are checked and an estimation is made to check whether the work is of interest to the company. During this meeting, the following steps are discussed. This may lead to further investigation, producing information that will allow a well informed choice to be made. However, it can happen that a decision is made to proceed with the calculation; with this decision, an investigation into the project can be commenced. Another situation may be that the project is too large or that it is applicable to a different market. In these cases, the directors will usually attempt to combine with other companies in order to commence the project. In that situation a new meeting will be arranged with the other companies involved to form a plan regarding how to approach the project and how to divide the different roles involved in the tender.

When one of the above situations occur, the project will be documented in an internal document called the “Calculatie planner” (calculating planner). In this document, all of the year’s tenders of interest are documented. Another activity that commences during the above situations is that the business desk secretariat creates a folder containing all the important information. By considering this folder, the business desk knows what remains to be performed, what is currently happening and completion or submission deadlines.

5.3.2 Business desk secretariat

When the project is submitted in the calculating planner, the business desk secretariat starts collecting all the required documents. The secretariat makes two folders; one for the secretariat
with all the necessary documents and one for the calculating department with all the necessary documents. These documents are different for each task. Via TenderNed, all the required documents and certifications are noted. Some documents are always required. An example of such a document is the “eigen verklaring” (own statement). This document often differs as not every tender has the same requirements. Another document is the chamber of commerce extract.

During the preparations of the tender submission, the business desks secretariat closely follows TenderNed in case the client adds documents. Questions are asked by the secretariat at designated times, and when “nota van inlichting” (the note of intelligence) is given the secretariat will disseminate it to the relevant employees of the firm.

5.3.3 Pre-qualification

In some cases, a pre-qualification is required. A pre-qualification is called a “not public tender.” This is often used for large tenders to limit the amount of tender submissions. This because it is a waste of time and financial resources to allow all companies to enter into extensive tender preparation. By performing a pre-qualification, a selection of usually three to five contractors is made. These selected contractors then do the tender submission as that described in the previous paragraph.

In doing a pre-qualification, the business desk collaborates with the tender managers to show and prove that the company is able to execute the tender. Showing and proving this is done by presenting previous works and references. For the pre-qualification, an own statement is necessary to show that the contractor has not participated in past illegal activities. Another document that must also be added is the model-k, declaring that the contractor did not have any foreknowledge of the tender.

Usually, too many contractors submit all the necessary documents and references for the tender. Therefore, three to five contractors must be selected. There are several ways to select a group of contractors. Most companies select using a lottery system or by ranking the contractors by reference quality and choosing the top three to five.

5.3.4 Calculation

When the calculating department receives notice that the tender has received a “go,” they start reading all the material provided in the folder made by the secretariat of the business desk. The calculation notes all the important aspects. Thereafter the calculation department creates an execution methodology. This execution methodology will be discussed during a meeting with the
tender manager. The directors are also involved during this process. For small tenders, this meeting occurs at the desk; for large tenders, a scheduled meeting is organized and more people are involved in the process. A meeting is held once per fortnight. The small tenders are usually RAW (Rationalisatie en Automatisering Grond-, Water- en Wegenbouw), meaning that the calculation must designate a price for which the company will execute the tender. The larger tenders are usually UAV-GC contracts, indicating construct and design. For the larger tenders, an external design company is often used due to the understaffing of the calculation department. A meaning is also held each fortnight with this kind of cooperation, to observe the work of the external company. The company’s experts will then judge whether the provided solution is suitable.

During the entire process, there is a focus on the MEAT criteria. The criteria are discussed from the first meeting, and attention is paid to the execution methodology. These criteria are discussed at all subsequent meetings. A specialist may sometimes be consulted regarding a specific MEAT criterion. During this process, the costs of obtaining a high MEAT score will be controlled to avoid the costs rising unacceptably.

At the end of the process, the calculation department calculates the cost of the developed solution. The final price is provided to the directors. This is the final step in the calculation; it is then handed over to the secretariat of the business desk.

5.3.5 Finishing and submission

When the secretariat of the business desk receives the definitive price, the project plan and the MEAT plan (when the client requests it) from the calculating department, the final step is to submit the tender. This can be done in different ways, although a particular way may sometimes be required. However, the client usually asks for it to be done in various ways; for example, the company must submit it in hardcopy along with an online submission. The tender must usually be uploaded to TenderNed; however, sometimes it is required to be submitted as a hardcopy.

Depending on the project, the result will be given in different amounts of time. This is usually within two weeks for a RAW contract; a UAV-GC contract may require a longer period of time.

5.3.6 Tender submission process conclusion

After a selection of interviews had been performed with several members of the organization, the tender submission process was described. The purpose of the interviews was to gain an insight into the tender process, to learn how they deal with MEAT, and to ask about potential improvements during the tender process. In the above description of the tender process, the main
finding was that there is no currently followed standard process. All of the steps described were
developed by listening to all members of the organization; with that information, the process was
created.

The answers regarding improvements made during the tender process were in most cases the
same. Employees often replied that the tender procedure was insufficient. They would like to be
involved earlier in the process, as this would improve the quality of a tender. They also
recommended an analysis of the “GO/NO GO” process regarding the decision to commence the
tender process, in order to better analyze the tenders that will be chosen. Another frequently heard
answer concerned improvements regarding communication. Communication is very important for
such a company as van den Biggelaar, because it works with people who have a high degree of
experience and knowledge. It is important to share this knowledge and experience with younger
employees to reduce or avoid errors. A final frequently noted pronouncement was about the
amount of calculating employees; the calculating department is currently very underemployed. The
director later stated that this is currently an area of focus within the company.

A point of improvement was also identified during the observation. After observing the company
for several months, it was seen that there is often not much time remaining at the end of the tender
process. This means that a tender team must rush to complete the tender. By improving the
planning of the tender process, more time will be available at the end of a tender. In this time, the
tender document can be improved and optimized, reducing included errors.

5.4 Employee perspective of MEAT

The data collection methods of documentation and interviews will now be discussed. Most of
the content was gained via interviews. When examining the documentation, it can be seen that one
organization exists (Rijkswaterstaat) that has described their vision of MEAT (see literature 2.4.2
MEAT at Rijkswaterstaat). Rijkswaterstaat is a large organization located in the Netherlands.
Rijkswaterstaat is the executive agency of the Ministry of Infrastructure and the Environment in the
Netherlands. As it is such a large and has performed work for the Ministry, the documentation is
representable and can be used. The documents they made can be useful because they are written
from their perspective. The company can therefore use this information and determine the items
identified as important by the Rijkswaterstaat in the context of a tender document. The final part of
this chapter discusses the employee perspective of MEAT, and how they work with it.

Despite being in possession of the documentation from Rijkswaterstaat, questions regarding the
MEAT method also formed part of the interviews (Appendix A). A goal of the interviews was to gain
an insight into how the company works with the MEAT criteria. A selection of questions in the interview concerned the MEAT criteria. The answers were often similar. The MEAT criteria are important in preparing the tender; however, as the company does not write many tender documents, the MEAT tenders are usually completed by an external design/tender company. When the company writes a tender plan, they use external companies that have an expertise in the MEAT criterion. Regarding the question of their view of the use of the MEAT criteria, the same answer recurred. Some members did not like the MEAT criteria, as they believed they are subjective. Other members thought that these criteria are not used correctly, again as they are subjective. All of the members realized that these criteria are important, because high MEAT scores lead to higher chances of receiving a tender.

In conclusion, it is difficult to draw a conclusion about the employees perspective of MEAT because several companies are involved in most of the tender documents. As mentioned above, the specific criteria were used by an outside company specialized in that area.
5.5 Diagnosis

The analysis of the study is presented in this chapter. In this section, the results of the analysis are summarized. First, the findings of the case study are explained; thereafter, the findings of the tender process and the interviews are described. The results of the case study are presented in two tables: a database containing the scores (Table 5-1; Database of tenders) and a table used to review the tender documents (Table 5-2; Case studies of tenders). The results of this latter table (Table 5-2) revealed that there are some points of improvement. The first findings from the database were that risk management has not scored well in many of the tenders (Figure 5-2; Scores for MEAT criteria, grouped in frequently occurring categories). No clear explanation for this was found, since the risk analysis is often performed by external companies. The main findings of the case study were that the solutions provided by the company were not formulated SMART. Using the feedback document, the audit team reported that answers were not formulated using the SMART structure. Another finding in the case study regarded the tender documents, wherein the methods and models scored better compared to other documents, and that documents where the important text is written in bold scored better. Tender documents which introduced the project team often had higher scores; however, this is not often allowed. The final finding concerned the lack of information regarding the presentation criteria. As no information was available, it was impossible to form conclusions. In order to improve this point, it is recommended to collect information regarding presentations.

Interesting results were observed in the analysis of the data concerning the current tender process, which had been collected through the use of interviews and observation. One of the most surprising findings concerned the lack of a standard process of doing tender submissions within the company. This may be explained as due to a current lack of employees, the result of the earlier mentioned reorganization. A number of other improvements were also identified during the analysis of the tender process. One of these improvements is to involve members of the tender team at an earlier stage. Furthermore, communication within the company can be improved, particularly regarding the careful consideration that should be given to the GO/NO GO decision. The results showed that there is, for some of the tender projects, no time remaining at the end of a tender project. This is a large disadvantage, because the tender document cannot therefore be sufficiently checked, resulting in critical errors or missed opportunities. A further possible improvement was to create a standard structure and/or rules for tender documents. The information regarding presentations should also be documented, a checklist should be designed to check a tender document and more knowledge/information should be shared.
6. Redesign

The next step in the regulative cycle is to design a solution for the problems found during the analysis. This part of the research is the basic idea of the BPS project. The realization of the designed solution should result in the solution of the defined business problem. The findings described in the previous chapters were discussed with the managers of the company. This discussion led to the redesign of the tender process. This involved a narrow focus on the following topics (enumerated according to importance):

1. Create a standard tender submission process.
2. SMART formulation.
3. Improved tender planning.
4. Dealing with subjectivity.
5. Standard questions to check tender document.
6. Communication/knowledge sharing.
7. Early involvement.

The findings in the previous chapter show that there is a high demand to ensure that the improvements will be implemented in the company. In order to fulfill the possible improvements, the company decided that the solutions should fit within the new tender process. The majority of the seven topics above were based on these findings, and were partly decided in collaboration with the company. Creating a standard tender submission process is the basis of becoming more professional in the performance of tenders, which leads to a higher chance of success. All members of the organization needed to be informed of the creation of such a standard. The second priority was the SMART criteria; this is important, since writing a tender document in a SMART way will generate higher scores. Nevertheless, this is challenging, since the company often uses an external company to write the application. The next topic concerned the tender planning. It is important to properly check a tender document at the end of a tender process. Through this check, the document can be optimized and mistakes can be avoided. Subjectivity is hard to avoid in a tender. It is therefore important that there is a special focus on preventing the occurrence of subjectivity. In consultation with the company, it was decided to create a number of standard questions in order to check a tender document and to identify an informal way of sharing knowledge. Some of the improvements are logical and can be combined, which simplifies the performance of the tender process including the improvements. For that reason, early involvement is crucial, as these changes are easier to implement at the commencement of a new process.
The redesign was created with the help of the employees in order to create public support and add extensive experience/knowledge. Requesting input from the employees was useful because the employees know the problem and are likely to have some ideas regarding possible solutions. A further advantage was that by involving the employees of the company in a redesign, future resistance to the realization of the redesign may be substantially reduced (Van Aken et al., 2006). The final source used in developing the redesign was the literature. The scholarly and management literature provided a wealth of solution concepts and general ideas on how to plan and organize business activities of all kinds. Therefore, the literature was used in combination with the ideas of the employees and the findings of the study.

In the table (Table 6-1; Redesign requirements) below, the requirements for the redesign are shown. These requirements were based on the four types of requirements described by Van Aken et al. (2006). By checking the new process with these requirements, discussing it with the management, and by testing the design in practice, possible improvements were identified. When further possible improvements are identified, the design can again be altered.

**Table 6-1; Redesign requirements**

<table>
<thead>
<tr>
<th>Functional requirements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The realization of the new tender process should solve the chosen business problems.</td>
<td></td>
</tr>
<tr>
<td>The benefits should exceed the costs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User requirements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The people working with the tenders should have the competences required to work within the new tender process.</td>
<td></td>
</tr>
<tr>
<td>The new tender process should be user-friendly.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boundary conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The new tender process should comply with the present business policies of the company.</td>
<td></td>
</tr>
<tr>
<td>The new tender process should fit within the present company culture.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design restrictions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The project changes should take no more than six months (depending on the number of tenders; five tenders is the maximum).</td>
<td></td>
</tr>
<tr>
<td>The realization of the new tender process should change as little as possible within the present business system.</td>
<td></td>
</tr>
</tbody>
</table>

In the next section of this chapter, the new tender submission process will be explained in detail. In Figure 6-1; New tender submission process, the new tender submission process is shown. In the figure, all of the new/changed steps are shown in a contrasting colored. The altered steps are explained in detail. After the design was created, it was tested. This testing was performed by
discussing the design with the management, by checking the requirements, and finally by testing it in practice. The final part of this chapter will discuss the implementation.

6.1 New tender submission process

The new tender process is shown in Figure 6-1; New tender submission process. The new actions within the process are presented in blue. Furthermore, the process divided into five groups, namely identifying and selecting tender, pre-qualification, tender document, calculation, and business desk and reflection. These groups formed the steps that should be undertaken in the tender process. Each group is explained in detail below Figure 6-1; New tender submission process; some groups did not require changes when compared to the previous tender process, and for that reason they do not require extensive explanation. The groups containing new steps (as shown in blue), are explained in further detail below.
Figure 6-1; New tender submission process

6.1.1 Identifying and selecting the tender

The first steps in the process did not change, as no improvements could be identified; the current method of selecting tenders was excellent. The first changes are described in the third step.
This particular step is now divided into three steps; two steps are identical to the previous process and one is new. This new step is concerned with selecting a tender manager. Selecting a tender manager is important, as the manager immediately begins to cogitate over the selection of members for the tender team. The tender manager can also share his/her view about the tender during the selection phase. This is a new step; in the previous process, the work of the tender manager was done by the directors. As there is now many new members in the firm and many new employees working on tender projects, it is advantageous to involve tender managers early in the process.

6.1.2 Pre-qualification

No changes were made in the pre-qualification phase. However, the references database was added to the new process. Although the references database is not new, the author was unaware of it for an extended period. For that reason, it was added to the process in order to improve the awareness of new organization members regarding the references database during their examination of the new tender submission process.

6.1.3 Tender document

When a pre-qualification is granted, the tender manager should immediately begin approaching tender team members. The tender manager does not undertake this step during an earlier phase as members may focus on or spend inordinate time on ideas that may not be important if the tender is not granted. When there is no pre-qualification, the tender manager can immediately begin approaching tender team members. After selecting and discussing the tender team, a kick-off and a strategic session must be organized. During the kick-off, members introduce themselves, including their specific roles in the tender process and their specialties. After the kick-off, the strategic session can commence. The tender manager decides who will attempt the strategic session. It is important that all the important members are present during this meeting, as it is advantageous to bring a large amount of experience to bear. Furthermore, all the important team members must know the strategy and have the opportunity to share their view of the strategy. The strategic session agenda is provided in Appendix B. Through this agenda, the tender manager can structure the meeting, decide on clear actions and confirm an appropriate and well-defined strategy for the tender. During this meeting, the client and the competitors are discussed. By discussing the client, the tender manager examines the database to identify previous tender projects performed for the same client, and to identify particular points of attention. The information concerning previous tenders helps to improve customer satisfaction, process efficiencies and effectiveness (Kotnour, 1999). Another important aspect of examining previous tenders concerns handling subjectivity. By using information about a previous tender document for the same client, the company can use it to
its advantage, as this information describes the aspects which are important to a specific client. By responding to this information, subjectivity can be used to the company’s advantage. Input will also be requested from members outside the company, and if specific answers about a certain client are received the tender manager will add these to the database. In this way, the database is maintained as up-to-date, useful, and which can make a difference to the performance of future tenders. Another purpose of the strategy meeting is to consider the competitors. During this step, the team can discuss possible competitor actions. Based on this information, the company can create a roadmap to distinguish itself from its competitors. At the end of the meeting, all findings will be reviewed and agreements about the tender project will be made. These agreements may concern the number of meetings, which will depend on the size of the tender and the size of the tender team. After the session, the tender manager and the directors will discuss the findings and determine a strategy. A clear strategy will allow the tender team to realize the manner in which they should consider the tender ideas. After the strategic session, all the members will begin to consider ideas for the tender, bearing in mind what had been discussed during the strategic meeting.

The next session is a brainstorming session. The developed agenda for the brainstorming session can be found in Appendix C. The chosen strategy will be explained during the brainstorming session. Thereafter, the MEAT criteria will be discussed. For each particular criterion, ideas will be discussed, taking into account the chosen strategy. At the end of the meeting, a decision will be made to start working on selected ideas. The final discussion point is to make clear appointments for the planning of the tender project. The next step in the tender submission process is the elaboration of the possible ideas. Through elaborating these ideas, a well-defined decision can be made during the decision meeting. This decision can be made with the help of a trade-off matrix (TOM). The choice to use a TOM is based on the experience some members of the company have with this system. This will create support amongst the team members, as they are familiar with TOM and it was their idea to use TOM. A TOM lay-out can be found in Appendix D. The TOM found in the appendix is an example only; the values must be determined anew for each project. On the basis of TOM, all the possible ideas are measured and the best solution chosen. This TOM can be completed by the tender team. During a meeting, the TOM can be shown on a large screen and the TOM can be completed by the entire team. After the decision meeting, the chosen ideas can be developed in detail.

After these decisions are made, the tender document can be written. Writing a tender document is often done by an external company. When the document is finished, all the team members will read the document and the tender manager will arrange a tender document evaluation meeting. In this meeting, the document is discussed and the comments and additions are
discussed with the team. Through the posing of basic questions, the tender document can be tested as regards completeness and quality (Appendix E). With these questions, the tender document is automatically tested to determine if it is written with the SMART criteria. Five of the questions focus on the five steps of the SMART principle. These five steps are Specific, Measurable, Acceptable, Realistic and Time-bound. After checking the document, the writer of the tender document can change/improve it. After improvements are made, the tender manager and a few members of the team will perform a final check of the document. When the document is finished, an employee outside the team, who has not been involved with the project, should read the document. It is important that this final check be performed by someone who does not have a direct relationship with the process, as this will allow him/her to judge the tender objectively and identify possible errors that went unnoticed by the team members. Thereafter, the tender document can be delivered to the business desk.

6.1.4 Calculation and business desk

The calculation of the tender did not change to a large extent. This step commences after the decision-making phase. After the decision-making phase, the calculating department knows the development aims of the company regarding the document, and thus what must be calculated. This price will be discussed with the director and will then be given to the business desk.

After the tender document and the price of the tender are completed, the business desk secretariat will upload the files. Little here differentiates the new process with the previous process. When the tender is granted and the work is correctly completed, the business desk secretariat will upload the references to the references database, to allow their use in future pre-qualifications.

6.1.5 Reflection

After the tender is submitted, the company must await the result and the feedback document. The receiving of this document triggers the final step, that of reflection. This step is new to the process. In this step, the tender team comes together for the final time to discuss the results and discuss the feedback document provided by the client’s audit team. A feedback session may be organized by the client in place of a feedback document. A member of the company should attend this feedback meeting and make notes to share this information during the internal meeting at the company. The importance of an evaluation meeting is widely supported in the literature concerning TQM, CoP and knowledge sharing (Section 2.3 Project learning). During the company internal feedback meetings, only the members with specific added value (in the context of the tender) are required to participate. The purpose of the meeting is to learn from the successes and failures. By
discussing this in a meeting, knowledge is able to be shared. After this meeting, all members have been made aware of this information. By doing this for all the projects, all employees are able to learn from each other. When there are important findings, these should be shared with all members of the organization. An agenda is developed for this meeting (Appendix F); in this way, a standard structure is created for the meetings. The database must be updated during the meeting. A requirement for this meeting is the necessary of the important factors/findings about the client to be documented in the database. With these important aspects, the company can then gain extensive knowledge of the client, which can then be used by the company employees. In this study, the collection of important data has already been stated in regards to previous old tender projects. However, as this was not the primary goal of this study, this is general information which is gained via the feedback of the tender document. For new tender projects, the database must only be updated with each specific tender. It is important to execute this final step carefully, because this will allow an improvement in the number of tenders granted in the long term.

6.1.6 Planning

Another important aspect in the tender process is tender planning. The tender manager should keep track of the planning at all times. The tender manager should create a plan at the beginning of a tender project. The plan is important since the analysis revealed that several tender documents have previously been submitted without a proper check. Since keeping track of the planning is so important, it should be a point of discussion at every meeting. In this way, all members will be reminded of the plan and can inform the tender manager of their status. If the tender manager becomes aware of a possible delay, the manager should immediately anticipate this situation. At the conclusion of the project, a period of at least one week should be included to enable final change to be made.

6.2 Testing

The new tender submission process needed to be tested; this was performed in three ways. The first way of testing involved the use of the requirements (Table 6-1; Redesign requirements). Thereafter, the design was discussed with the director and with the tender managers. The final test involved using the system in the completion of a small tender.

It was difficult to determine whether the functional requirements were met, because it remained unclear whether the business problem was solved. This will require long-term testing. At the current time, few costs have been incurred; therefore, to measure the benefits of the new process, it must be used for a longer period. In this way, the exact benefits can be established. The
following requirements are those of the user. The new process was designed along with the employees of the company, and all new activities were discussed with the people who use them. The design was made as simple as possible, and a template was provided for the important activities. The next requirements are the boundary conditions. The new process will fulfill these requirements, because the process is based on the previous way of doing tenders. The new design was made with the members of the company, which will prevent the arising of cultural differences. The final requirements are those of the design restrictions. Currently, no standard structure exists for performing a tender; therefore, when the new process is implemented, it will not require large alterations.

The design was also tested by some members of the organization. These members were the tender manager and the director, as they will work with the design and will implement it throughout the company. As the design was created with their involvement, it is unsurprising that few further changes were required in discussion with them.

The final test will be conducted in practice. First it should be tested on a small tender project, as a small project has the advantages of few people being involved with less pressure to the tender team. Another reason to use a small tender team is that high expenses do not have to be bourn if the project fails. The design has partly been used for a tender; however, the results are not yet known, as this can require several months. Therefore, in order to fully test the design, several months will be required.

### 6.3 Implementation of the improvements

The first step in the implementation of the improvements was the delta analysis. In the delta analysis, differences are revealed, contrasting the new situation with the old system. This is further explained in Table 6-2; Delta analysis.

#### Table 6-2; Delta analysis

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Difference with present situation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard tender submission process</strong></td>
<td>Currently, there is no standard way of performing tenders. By implementing a standard way of completing tenders, new employees will more easily learn the new steps of a tender.</td>
</tr>
<tr>
<td><strong>SMART/standard questions</strong></td>
<td>Currently, there is no method/system used to check a tender document or to check whether the solution is written SMART. By creating a standard list of questions, the tender document can be</td>
</tr>
</tbody>
</table>
checked, and using the standard questions, the solutions are automatically checked to be written SMART.

<table>
<thead>
<tr>
<th>Tender planning</th>
<th>Currently, no tender planning occurs. In the new tender process, the tender manager must create a plan at the beginning of the tender project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjectivity</td>
<td>Currently, there are not much counter actions to prevent subjective judgement. By creating a database and documenting client information, these can be handled with subjectivity. The change introduced is that there is a strategic session and an evaluation session to use/collect client information.</td>
</tr>
<tr>
<td>Knowledge sharing</td>
<td>Currently, no specific method is used to share knowledge. In the new method, knowledge sharing is attempted informally. By having a strategic session, a brainstorming session and an evaluation session, members of the organization will be able to discuss projects and ideas; by doing this, they can learn from each other and from previous projects.</td>
</tr>
<tr>
<td>Early involvement</td>
<td>A new step in the process is tender preparation. In this step, the tender manager choses members of the tender team at the immediate outset of the tender process. The differences are that all members are chosen prior to the commencement of the project; in the previous situation, members were approached when needed.</td>
</tr>
</tbody>
</table>

The next action required for the implementation is the conduction of a stakeholder analysis. This is important to gain an insight into all the people who are important in the tender submission process. Five stakeholders were identified through the performance of a stakeholder analysis. These five were the director of the company, the tender team members, the client, in some cases a subcontractor, and finally the project team. The project team is the team that will execute the work when the tender is granted.

The first step of this study was the analysis of all the people involved with the tender submission process. This group of people increased during the study period, because a number of new employees commenced with the company. It was important to involve the new employees from the beginning. Van Aken et al. (2006) described that it is important to have a solid communication plan.
Often the information gap, namely the gap between themselves and the organization, is underestimated. This gap can be a potential source of resistance, producing uncertainty and mistrust. By examining the possible resistance of the stakeholder, Van Aken et al. (2006) provided some points that should be taken into account by the researcher. These points are:

- Lack of understanding,
- Differences in opinion,
- Lack of trust,
- Low willingness to change, and
- Conflict of interest.

Using these points, a table (Table 6-3; Stakeholder resistance) was created in order to identify the resistance (if any) that can be expected from each stakeholder.

**Table 6-3; Stakeholder resistance**

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Lack of understanding</th>
<th>Differences in opinion</th>
<th>Lack of trust</th>
<th>Low willingness to change</th>
<th>Conflict of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of the company</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>Tender team</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Subcontractor</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The client</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Project team</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In the table, only the management and the tender team are involved with the implementation of the new tender submission process. The other stakeholders are involved to a greater degree with the use or the results of the tender submission. The use of the tender submission process means that when the process is implemented, a subcontractor must work with the method used by the company. Since a subcontractor works for the company, they must work with the tender submission process which the company uses. Therefore, the subcontractor is a stakeholder, but the subcontractors are not involved with the implementation of the new tender submission process. The result indicates whether a tender is granted or not. When a stakeholder is involved to a higher degree with the result, it means that they do not have an influence on the implementation of the new tender submission process. For that reason, no resistance is expected from the client and the project team during the implementation of the tender process. The client and the project team are
not required to contribute to the tender submission, but do receive benefits when a solid tender document is made. When a tender document is complete and solid, the execution of the work will run smoothly, which is good for the project team and the client.

In order to combat these forms of resistance, a plan to prevent this resistance from occurring was developed. In doing so, involvement from the beginning of the project is very important. The first three points are covered by involving the stakeholders in the creation of the new tender submission process. During the process, the findings were checked with the stakeholders in order to see whether they agreed with the findings and the counteractions. By involving all the stakeholders during the process, different opinions in the final solution can be prevented/minimized and a cultural intervention is created. A lack of understanding will not form a large problem, because the findings are constantly discussed with the stakeholders. As a matter of fact, most of the information has originated from the stakeholders. The final version of the improvements will be personally explained to each stakeholder, in order to let the employees get more familiar with the process. This minimizes the amount of resistance and creates technical interventions.

Another way of approaching the implementation is by examining the important determinants of quality implementation. There are three key factors: management support, training and gaining commitment (Dumond, 1995; Abdallah, 2014; Berrouiguet, 2013; Keating & Harrington, 2003). The redesign was developed while maintaining an awareness of these factors. The research was performed in collaboration with the management; therefore, management support for the implementation was observed by the employees. The second factor is training; this factor is difficult to explain, because the tender manager is involved with the process and knows how it works. The other members of the tender team are familiar with most of the steps in the new process. However, as the new steps in the process were created in collaboration with the members of the tender team, further training should be unnecessary. Informal training using the standard for a small tender is anticipated to be sufficient. The final key factor is gaining commitment, which is done by involving the employees in the design. As this research was performed with the help of the employees, commitment to the design is already present.

The final step of the “implementation of the improvements” is to make an action plan. The main action is to actually use the new tender process. This should be done for a small tender in which the MEAT method has an important role. The director of the company can best judge which tender and which tender manager should perform the first tender with the new process; it is difficult to set a time for this as it is unknown when a tender will come onto the market. However, as the tender managers are familiar with the new tender submission process, problems should not arise. When a tender manager plans to use the new process, the tender manager has only to follow the process
steps as shown in Figure 6-1; New tender submission process. While using the new process, the director should ensure that the process is performed correctly and together with the tender team improvements of the process should be documented. When the tender process is improved, it can then be used for all tenders. When the new process is used as the standard, the director should perform a periodic check to determine whether the process has been done correctly. He/She should also ensure that the database has been completed correctly. When this is not the case, a meeting should be organized to show the importance of using this method.
7. Discussion

The conclusion to this research project is presented in this chapter. The first section of this chapter discusses the answer to the research question. The second section provides the project results and the theoretical contribution. Thereafter, the practical implications are outlined in the third section. The final section presents the limitations of the research and also provides suggestions for future research.

7.1 General discussion

The main goal of this research was to improve the quality of tender submissions at Van den Biggelaar Grond- en Waterbouw (RQ). In order to answer the research question, three sub-questions were developed. These sub-questions were: RQ1: What is the state of the currently available literature regarding quality improvement/implementation and tender submission which uses the MEAT method? RQ2: What is the current tender submission process at van den Biggelaar? And finally RQ3: How can the tender process at van den Biggelaar be improved? By studying the information and findings gained from research into the sub-questions, a new standard tender submission process was developed for the company.

The result of this process was a tender submission process that will improve further in the long term. This will be achieved through the included learning cycle. In creating the new process, three steps were followed:

The first process conducted was the gaining of an understanding of the current literature regarding quality improvement in tenders. The first action was the undertaking of a study of the literature concerning quality and quality implementation. The next step was to search for literature regarding tender submission processes. A number of articles were identified concerning tender submission; however, all used the method of lowest price tenders. This research focused on the MEAT method. The final search of the literature concerned the MEAT method; the articles located provided general explanations of the MEAT method.

The next sub-question required an analysis of the current situation and thus the current tender submission process. By understanding the current process, problems and shortcomings were identified and understood earlier and to a greater extent. A further point is that studying all of the tender documents allowed an understanding to be gained regarding what clients like to see. During this research, a figure detailing the current process was developed (Figure 5-3; Current tender submission process); this allowed further insight. Subsequently, a case study was done to identify
advantages and disadvantages from the perspective of the client. All information collected during the case study was entered into a database.

The aim of the final sub-question was to improve the tender process. To answer this question, a new tender submission process was developed. This process was developed in such a way that it deals with the findings of this research. In the new process, three steps were improved or developed as new. These three steps were: “finding and selecting the tender,” “writing the tender document” and “evaluation”. The first step involves identifying and selecting the tender; this did not change to a large degree compared with the current situation. A new step, that of choosing a tender manager, was added; in this step, the tender manager will choose the tender team members. The second improvement in the process involved the step of creating/writing the tender document. In the new tender submission process, a step-by-step process was devised for the creation of a tender document. In doing so, several steps have been developed; these steps are outlined in an agenda that should be followed by the tender team. The final improvement was also a new addition to the process, and also new for the company. This was the evaluation of the tender project. In order to become a learning/knowledge sharing process, at the end of a project an evaluation must be completed. This involves a meeting with the stakeholders of the company. In this way, the company can learn from the projects and can share that knowledge with the rest of the company. The findings of this evaluation will be documented in the earlier-mentioned database. This database is the driving force to learn from past tender submissions. Through using this system, the company will further learn about its clients, leading to an eventual improvement in quality.

7.2 Theoretical implications

The contribution that this research makes to the existing literature is about the tender submission process. As mentioned above, the current literature regarding tender submission is based on tenders that use the lowest price method. This research focused on tenders that use the MEAT method. More generally, this research provides a method of approaching a project where it is necessary to be competitive. Therefore a tender submission process is developed.

By studying the tender submission process in the company (construction company), this research contributes to the existing literature about tender submission processes. Currently, there is a paucity of literature concerning tender submission processes. The current literature about tender submission use the method of performing tenders with a bidding process (Coskun & Katirci, 2012; Mehmedali & Abdulrezak, 2008) (which is obsolete), and there is an academic gap about tender submissions for tenders in which the MEAT method (Parikka-Alhola & Nissinen, 2012; Lenferink, Arts, Tillema, Valkenburg, & Nijsten, 2012) is used. This investigation involved the creation of a
tender submission process that uses the MEAT method. The new process was developed by means of a case study and by conducting interviews with members of the construction company. All the added/improved steps were supported by the findings of the research and in the literature (e.g. Cutler & Kleiner, 1997; Disterer, 2002; Salah, Rahim, & Carretero, 2010); the process was also tested by the company. This tender submission process therefore contributes to the existing literature.

In addition, the new tender submission process has several new aspects, two of the new aspects are the learning cycle and dealing with subjectivity. Those two new aspects were processed in the evaluation session at the end of the tender process. In an evaluation session, the lessons learned and the client are discussed. This knowledge will then be documented in the earlier-mentioned database (Table 5-1; Database of tenders). This database can be used for future projects. When several tenders have been performed for the same client, the company gains important information about the client and can use this information in the future writing of tender documents. By using this knowledge, subjectivity is used to the company’s advantage; when there is no subjectivity, it will still be of advantage to the company. The theoretical implication is contained in the evaluation process; this step can be added to any tender submission process, not only for MEAT tenders but also for tenders that use the lowest price method. With the evaluation session a database will be created which can be used to share knowledge about different execution methods or to share possible risks. This evaluation session will contribute to filling the current gap in the literature regarding tender submissions that use the lowest price (e.g. Coskun & Katirci, 2012; Liu, Xu, Li, Zhang, & Wang, 2011).

7.3 Practical implications
The results of this study have allowed the development of a number of practical recommendations for Van den Biggelaar Grond- en Waterbouw. After undergoing a large reorganization two years ago, the company is growing again. Therefore it is important to create standard processes. At the current time, no standard way of doing a tender submission exists. One of the steps in becoming a competitive company is by designing a well-defined tender submission process. This process has been designed in this study, and as mentioned earlier this process will become the standard. This process was designed with the help of company members, and was designed in such a way that all the steps are easy to use and understand. An advantage of this new process is that new company members will be able to easily understand the way of doing a tender submission process, as it was designed in an intuitive and simple way.

The writing of a tender document is also covered in the process, including a description of the basic steps followed. Each meeting in this process will have an agenda; this must be followed by the
tender manager. A tradeoff matrix is created during the decision-making process meeting. With this matrix, all ideas can be measured, ranked, and the idea with the highest score can be identified.

The final step of the new design is the evaluation session. This step is to learn more about the customer and to share the findings of the project. By learning about the customer, a possible subjective judgement can be used to the company’s advantage. By having detailed information about the client, the company can write a plan that appeals to the customer. By making a database, which would require time, all information concerning clients can be documented. In the beginning, the tender team will need to examine previous tender projects relating to other clients; however, the database will soon be large enough to contain specific information for each client.

This process was developed for the performance of a tender submission in a construction company, but can also be used for tender projects in other companies. In the new tender submission process, the strategic session and the brainstorming session agenda must only be adjusted to adapt to other situations, allowing the process to be used. More generally, this process was developed in such a way that it can be used for all kind of projects in which companies must compete and deliver the best plan.

7.4 Limitations and future research

The current research should be interpreted with some limitations in mind. These limitations resulted in suggestions for future research. Firstly, the research was conducted at one SME, meaning that this process may not work for large companies. The design of the process was based on tenders that are made with or by the company. There are combinations that are conducted with large companies, but the results of this research have not yet been tested by a large company. A further limitation of this research is that the tender documents were from one company and from a number of other companies who wrote the tender in combination with the first company. Future research could involve the reading of tender documents that are written by larger companies and tender documents of SMEs. The comparison of results may reveal different outcomes. Another improvement would be to read tender documents from other construction companies. This will be difficult to achieve, because all the companies are doing their best to improve their way of writing tenders. For that reason, they do not want to share information with their competitors. Nevertheless, companies do exist that are specialized in writing tenders for construction companies. Through the conduction of research in such a company, it would be possible to collect data regarding the companies for which they are working.
Secondly, no distinction was made in this research between tender projects that are performed by the company alone or tenders that are completed in combination with other companies. During this study, the decision was made not to take it into account, because of a limited amount of information. Nevertheless, it would be interesting to perform research to determine the differences between tenders that are done in combination and those that are done on their own.

The third limitation was that client specific feedback was not analyzed. It is therefore not possible to ascertain, for example, whether a relationship exists between feedback and a client, or whether identical feedback would be provided. This was not performed as there was an insufficient number of tenders to allow a connection between clients to be observed. The new tender process will document client feedback. In this way, when the database is expanded, future research could involve an in-depth research into client specific feedback, allowing the creation of a client specific process when approaching a tender.

The final limitation in the research were that the cost of the including MEAT method compared to the benefits (the fictive discount) from using the MEAT method was not able to be determined. The process now focuses on using the MEAT method; however, future choices may not focus on MEAT at all, instead purely focusing on having the lowest price. Future research should compare the cost price of fulfilling all of the MEAT criteria with the benefits gained through use of the MEAT criteria.
8. References


9. Appendix

Appendix A – Interview questions

Interview vragen:

1. Wat is je functie/activiteiten binnen van den Biggelaar?
2. Hoelang werk je al bij vd Biggelaar?
3. Hoelang al in de Infra sector?
4. Hoe verloopt het tender proces?
5. Voor welk stukje van een inschrijving bent jij verantwoordelijk?
6. Heb je hier veel te maken met EMVI?
7. Zo ja, in hoeverre heeft EMVI prioriteit tijdens de voorbereidingen? Wordt er dan ook echt gekozen naar EMVI of wordt er rekening mee gehouden?
8. Wat vind je van EMVI?
9. Op het gebied van inschrijven, wat kan er volgens jouw beter binnen van den Biggelaar?
10. Waarom kan dit beter, wat gaat er nu niet goed?
11. Wie maakt er belangrijke beslissingen?
   a. Waar zijn die beslissingen op gebaseerd?
   b. Altijd deze persoon/groep mensen?
   c. Wanneer in het proces worden welke beslissingen gemaakt?
Appendix B – Strategy session

Agenda Strategiesessie

Project: Afsluiteren
Datum / tijd: 12-12-2015 / 10.00 uur

Aanwezig v/d Biggelaar: Klaas Klaasen & Harry van Hie
Aanwezig andere bedrijven: Willem van de Andere
Afwezig: Pietko Nie

Strategiesessie project

Doel van strategiesessie
Wat is het project?
Wat is de vraag?
- EIW/criteria?
- Bekende klant?
- Voor wie is het project belangrijk, wat wordt er belangrijk gevonden?
Wat is het doel van het Biggelaar?

Strategiesessie concurrent

Wie zijn de concurrenten?
Wat zijn de sterke/zwakke punten van de concurrent?
Wat zijn de sterke/zwakke punten van v/d Biggelaar?
Waar maakt v/d Biggelaar het verschil?

Afsluiting

Tenderplanning, inplannen overigessessie
Contact gegevens + aanwezigheidslijst
Wat is het gevoel bij de tender?
## Appendix C - Brainstorming session

### Brainstorm sessie

<table>
<thead>
<tr>
<th>Project:</th>
<th>Afsluiten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datum / tijd:</td>
<td>12-12-2015 / 10.00 uur</td>
</tr>
<tr>
<td>Aanwezig v/d Biggelaar:</td>
<td>Klaas Klaassen &amp; Harrie van Hier</td>
</tr>
<tr>
<td>Aanwezig andere bedrijven:</td>
<td>Willem van de Andere</td>
</tr>
<tr>
<td>Afwezig:</td>
<td>Pieter Nier</td>
</tr>
</tbody>
</table>

### Introducire

**Doel van de sessie**

Eisen klant/legale/soapkingon

### Trade Off Matrix

**Wat is een Trade Off Matrix**

Algemene selectie criteria

### Kaders en Randvoorwaarden

De gekozen strategie nog één keer

Toelichting randvoorwaarden criteria

Programma van Eisen

### Ideeën genereren voor de verschillende criteria

Top driee ideeën per criteria

Brainstorm per criteria

Insulier, Trade Off Matrix

### Afsluiting

Notulen brainstrom sessie |

Later tijdens nieuwe inzichten/ideeën mailen door!

Vervolg acties
**Appendix D - Trade off matrix v/d Biggelaar**

This trade off matrix (TOM) is an example, and the values it contains are fictional. Therefore, the entire TOM must be adjusted for each new tender. For example, when a tender has four criteria, one criterion must be added, and the number of ideas can also vary.

<table>
<thead>
<tr>
<th>Trade off matrix</th>
<th>Idee 1 criteria 1</th>
<th>Idee 2 criteria 1</th>
<th>Idee 3 criteria 1</th>
<th>Idee 1 criteria 2</th>
<th>Idee 2 criteria 2</th>
<th>Idee 3 criteria 2</th>
<th>Idee 1 criteria 3</th>
<th>Idee 2 criteria 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosten</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Uitvoerings kosten</td>
<td>4 1 5 3</td>
<td>5 1 2 3</td>
<td>3 4 5 1</td>
<td>2 3 4 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design kosten</td>
<td>2 2 2 3</td>
<td>4 5 3 4</td>
<td>4 1 2 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uitvoering</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uitvoering eigen beheer</td>
<td>5 1 2 5</td>
<td>3 4 3 2</td>
<td>2 5 3 1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Uitvoerings methodiek</td>
<td>3 3 3 1</td>
<td>2 5 3 5</td>
<td>5 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Uitvoerings tijdsduur</td>
<td>5 1 5 3</td>
<td>4 1 5 2</td>
<td>2 1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ervaring</td>
<td>2 2 5 3</td>
<td>2 1 1 4</td>
<td>4 3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Overige aspecten</td>
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<td></td>
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<td></td>
<td></td>
</tr>
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<td>31 78 67</td>
<td>73 56 65</td>
<td>63 57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Master’s thesis  
F.J.M. Vernooij | 0824617
Appendix E - 10 basic questions when checking a tender document

10 vragen om een tenderdocument te testen

Project: Afsteden
Datum: 12-12-2015

1. Wordt er concreet antwoord gegeven op de vragen van de klant?
2. Komt er uit het antwoord duidelijk naar voren hoe van den Biggelaar dit gaat doen?
3. Wordt er aangetoond gemaakt dat van den Biggelaar in staat is om dit te doen?
4. Is het plan van van den Biggelaar realistisch?
5. Is het plan van van den Biggelaar realistisch bij het totaal van de tijd?
6. Komt uit het tender document duidelijk naar voren wat de visie van van den Biggelaar is?
7. Zitten er methodes/afbeeldingen/graafjes in ter verduidelijking van het plan?
8. Worden de belangrijke aspecten van het plan verduidelijk in het plan (cursief/verdrukt)?
9. Is er met het schrijven van het plan naar onderlandse gekozen die voor dezelfde opdracht geveerd zijn geschreven?
Appendix F - Agenda for evaluating a session

Agenda Evaluatie sessie

Project: Metuderen
Datum / tijd: 12-12-2015 / 10.00 uur
Aanwezig vid Biggelaar: Klaas Klaassen & Marije van Her
Afwezig: Platto, Niel

Introductie
Uitgang bespreken
Wat vonden we zelf van het plan?
Wat vonden we van het tnder project?
Wat kon beter
Wat vonden we goed gaan

Feedback document
Wat is er gescroend?
Wat is de onderbouwing van de score?
Wat is er per criterion gescroend?
Wat is er goed/gestreefd gedaan volgens de opdrachtgever?
Zijn we het hier mee eens?
Wat zijn de leerpunten van deze feedback?
Wat vindt de klant belangrijk?

Afsluiting
Herhaal bevindingen
Verwerk de belangrijke punten van de klant in database